05.05.2024

36th Resident Research Day

2024

Abstract Booklet

Provincial Department of Anesthesiology

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" Research is formalized curiosity. It is poking and prying with a purpose."

Zora Neal Hurston, American Anthropologist 1891-1960

Dr. Jon Gamble

Dear Colleagues and Friends,

It gives me great pleasure to once again welcome you to the Provincial Department of Anesthesiology's Annual Resident Research Competition. Despite the Residents' busy schedules and numerous demands of their time, our Department has a long tradition of excellence in Post Graduate Medical Education research. This year is no exception.

In addition to the excellent resident presenters and engaged anesthesiology faculty, we are honored to have judges from a variety of backgrounds promising to bring rich and rewarding discussions.

We are excited to offer a catered in-person option this year. We look forward to celebrating the successes of our residents and learn as we do so.

I look forward to spending a morning with each of you.

Jon Gamble

MD, FRCPC (Anes, Crit Care)
Executive Director of Research
Provincial Department of Anesthesiology
University of Saskatchewan

May 5th, 2024

7:00 - 8:00
BREAKFAST

08:00 – 08:15
OPENING REMARKS

8:15 - 10:00
ORAL PRESENTATIONS-
In Progress Projects

10:00-10:15
COFFEE BREAK

10:15 - 11:05
POSTER PRESENTATIONS-
R1s

11:05 - 11:15
POSTER PRESENTATIONS-
Summer Students

11:15 – 11:45
ORAL PRESENTATIONS-
Completed Projects

11:45 - 12:00
LUNCH

12:00 - 12:25
FPA PRESENTATIONS

12:25-12:45
Extra Q&A time

12:45
AWARD PRESENTATIONS &
CLOSING REMARKS

Residents

R4


Brittany Benson


Angie Hodgson


Alison Knapp


Robin Manaloor
(RAW-bihn maa-naa-loor)


Alixe Pellerin

R3


Aaron Delorme


Anne-Marie Friesen


Trevor Krysak


Shane Leyen


Sarah Larmour


Justin Lishchynsky


Kim Mayville


Gemma Percival

R1


Sara Abolhassani
(ab-OAL-hass-an-ee)


Annie Dinh


Devin Edwards


Kiyana Ghavami


Talha Gondal


Annie Jafri


Chad Lorenz

FPAs


Rudi Siegling


Sarah Tsoi
(Choy)


Cody Weiler

Summer Students & Medical Students


John Perverseff


Roya Emadi


Mah Rukh


Noaah Reaume

Thank you to our judges

Dr. Susan Jelinski
Director, Human Research Ethics, University of Saskatchewan

Dr. Susan Jelinski is the Director, Human Research Ethics for the University of Saskatchewan. Susan is a USask alumni with a BSc in Anatomy and Cell Biology and an MSc in Neuroscience. She then went on to receive her PhD in Clinical Epidemiology from Memorial University of Newfoundland and a DVM from Oregon State University. Susan is an Adjunct Professor in the Department of Medicine at the University of Calgary and the Department of Emergency Medicine at the University of Alberta.

Susan concomitantly served as the Assistant Scientific Director for Alberta Health Services and was a member of the University of Calgary Conjoint Health Research Ethics Board (CHREB) for the past 12 years. In the most recent 2 years, Susan has been the CHREB Vice-Chair.

Dr. Dennis Ong MD, FRCPC
Assistant Professor, Provincial Department of Anesthesiology, College of Medicine, University of Saskatchewan

Dr. Ong completed his Anesthesiology training at the University of Toronto in 1995 and was a Clinical Fellow at Sunnybrook Health Science Centre in 1996 and completed a Thoracic Anesthesia Fellowship at Toronto General Hospital in 1997. After doing a locum in Saskatoon, he decided to leave Ontario and start his practice in Saskatoon in 1998. He has assumed several roles with the department, ranging from Clinical Site Head of St. Paul's Hospital, Director of Thoracic Anesthesia and Royal College Examiner for Anesthesiology. He considers it a great privilege to be involved in the teaching and training of Anesthesia residents and to see them become capable and astute clinicians and colleagues.

Una Goncin
PhD Student, Health Sciences (Medical Imaging) & Clinical Research Assistant, Anesthesiology, College of Medicine, University of Saskatchewan

Una Goncin is a senior PhD student in the Department of Health Sciences at the University of Saskatchewan, focusing on developing imaging techniques for diagnosing and monitoring intestinal inflammation and fibrosis. Throughout her graduate studies, Una has been awarded several scholarships, including the prestigious CIHR Frederick Banting & Charles Best CGS-D. With 9+ years of diverse research experience, Una has contributed to 13 publications in peer-reviewed journals covering wildlife ecology and genetics, virology, medical education, and molecular imaging. She possesses over 4 years of experience in clinical research management within an academic setting, working within the Provincial Department of Anesthesiology under the supervision of Dr. Peter Hedlin & Dr. Jon Gamble."

Abstracts Page

36th Annual Resident Research Day

Abstracts

Enabling Competency 4.5: Summarize and communicate to professional and lay audiences, including patients and their families, the findings of relevant research and scholarly inquiry

ORAL PRESENTATIONS

In Progress Projects

Steeping Success: A Quality Improvement Study Evaluating the Implementation of Tea Trolley Training in Anesthesiology

Authors: Dr. Aaron Delorme, Dr. Lei Xia, Jae Newton

Introduction: In healthcare, effective training methodologies are crucial for ensuring the proficiency and confidence of medical personnel. Anesthesiologists, being critical in patient care, requires continuous training to maintain competence and adapt to evolving practices. The management of a difficult airway is a critical component of anesthesia practice. However, in many cases, the equipment and drugs required to manage a difficult airway are not readily available or not used optimally. Ongoing training and standardization of a difficult airway cart is a crucial component of difficult airway management. This proposal aims to investigate the implementation and reception of Tea Trolley Training (TTT) within the University of Saskatchewan Department of Anesthesiology. TTT, a novel approach characterized by interactive sessions conducted through a mobile tea trolley setup, offers a unique platform for immersive and hands-on learning experiences.

The primary objective of this study is to assess the perception and acceptance of TTT among participants.

Methods: A qualitative approach will be employed, utilizing semi-structured interviews to gather data for thematic analysis. The research will be conducted in a single phase of TTT sessions with the topic for training being our difficult airway carts. Participants will engage in TTT sessions focusing on the utilization and management of difficult airway carts. Feedback will be collected through semi-structured interviews followed by thematic analysis to gauge participant satisfaction, perceived effectiveness, and suggestions for improvement.

Anticipated Outcomes: The anticipated outcomes include insights into the efficacy of TTT as a training tool in anesthesiology, identification of its strengths and limitations, and recommendations for its integration into the department's quality improvement curriculum and the operating room environment.

Cardiac Enhanced Recovery After Surgery (ERAS) in Saskatchewan: an implementation-effectiveness study

Friesen, A-M., Mayville, K., Percival, G., Campbell, K., Cruz, M., Buchko, M. Valiani, S., O'Brien, J., Clunie, M.

Introduction: Annually, over 800 Saskatchewan patients require heart surgery1. Pressures on health systems for personnel and resources has significantly altered and delayed surgical management of cardiac patients. The need for targeted efforts to address extended wait times catapulted the implementation Enhanced Recovery After Surgery (ERAS) for cardiac surgery recommendations in Saskatchewan[2-3]. ERAS is a multimodal patient-centered approach to providing care before, during, and after surgery, benefiting patients, healthcare providers, and system resources.

Using an effectiveness-implementation study design, our research team has undertaken the implementation of six (6) health care provider identified ERAS strategies: 1) multimodal opioid sparing analgesia, 2) prehabilitation, 3) mobilization, 4) extubation within six hours, 5) goal directed fluid therapy, and 6) patient & family engagement.

The objective of this study is to evaluate clinical and patient-oriented outcomes of the 6 cardiac ERAS strategies implemented in Saskatoon.

Methods: We used an implantation-effectiveness study design to test an implementation strategy while concurrently assessing the intervention's impact on clinical outcomes among patients undergoing cardiac surgery in Saskatoon.

Clinical outcomes were systematically collected, including total intravenous milligram of morphine equivalent, pain scores, total dosing of acetaminophen, time to extubating, completion of prehabilitation program, performance of post-operative physical therapy, length of stay, and blood work as a surrogate marker for goal-directed therapy. We set an implementation start date of April 1, 2023 and distributed the following intervention materials: the surgeons letter to patients (May 15th, 2023), the patient pamphlet (April 14th, 2023), laminated order set posted in ICU, and laminated order set posted in the pre-assessment unit.

Additionally, patient-reported outcome measures (PROMs) and patient-reported experience measures (PREMs) related to cardiac surgery were evaluated through two distinct questionnaires: the Cardiac Surgery Patient Experience Survey (CSPES) for PREMs, and the EQ 5D 5L for PROMs. These patient reported outcomes are completed by patients 2 months after surgery, and were collected between July 1 2023 to current.

Results: Between April 1,2023 and January 23, 2024, 67 patients agreed to participate, with 52 deemed eligible (2 months post surgery) and 38 completed surveys. The breakdown of procedures included 76% (n/N) undergoing coronary artery bypass graft and 29% (15/52) receiving valve replacements. Age distribution was as follows: 42% aged 60-69, 39% aged 70-79, and 5% aged 40-49. Predominantly, 76% of participants were male. Regarding patient education, 92% reviewed materials on Enhanced Recovery After Surgery (ERAS) before surgery (Table 1). Two months after surgery, Cardiac ERAS patients self-reported very few health problems and good overall health (Table 2).

Discussion: We expect that implementation of cardiac ERAS will improve clinical outcomes of patients. Future studies should explore barriers to achieving improved clinical outcomes and implementing cardiac ERAS in Saskatchewan.

Table 1. Cardiac ERAS – Preparing for Surgery (n=39)

Before your surgery, did your surgeon discuss how the following factors could impact your recovery?	n (%)
Avoiding alcohol for at least 4 weeks before surgery	24 (62%)
Maintaining physical activity/exercise to prepare for surgery	26 (67%)
The importance of diet and nutrition in making healthier food choices	27 (69%)
How drinking water and clear liquids 2-4 hours before surgery can speed your recovery	30 (77%)
What to expect with surgical pain and pain relief treatments	28 (72%)
Planning for an after-surgery support system (friends or family to provide assistance)	32 (82%)
Early movement and frequent walking starting the first day after surgery	33 (85%)
Stopping smoking for at least 4 weeks before surgery	30 (77%)
Before your surgery, did you read any information (patient education materials) about ERAS (enhanced recovery after surgery)?	36 (92%)

Table 2. Patient Reported Outcome Measures (PROMs – 5D-5Q-5L)

Domain	Median (IQR)
Mobility*	1 (1-1.25)
Self-Care*	1 (1-1)
Usual Activities *	2 (1-2)
Pain/Discomfort*	2 (1-2)
Anxiety/Depression*	1 (1-2)
Health Today	80 (70-90)

*5-point scale from 1=no problems; 2=slight problems; 3=moderate problems; 4=severe problems; 5= unable to do/extreme problems.

REFERENCES

1. 1Al-Omary MS, Williams T, Brienesse SC, et al. Impact of Delay in Surgery on Outcome in Patients Undergoing Cardiac Revascularisation Surgery. Hear Lung Circ. 2021;30(6):888-895. doi:10.1016/j.hlc.2020.09.935

2. Gregory AJ, Grant MC, Boyle E, et al. Cardiac Surgery-Enhanced Recovery Programs Modified for COVID-19: Key Steps to Preserve Resources, Manage Caseload Backlog, and Improve
Patient Outcomes. J Cardiothorac Vasc Anesth. 2020;34(12):3218-3224. doi:10.1053/j.jvca.2020.08.007

3. Grant MC, Isada T, Ruzankin P, et al. Results from an enhanced recovery program for cardiac surgery. J Thorac Cardiovasc Surg. 2020;159(4):1393-1402.e7. doi:10.1016/j.jtcvs.2019.05.035

Evaluating the utility of online simulation in undergraduate anesthesiology education

Authors: Shane Leyen, Matthew Johnson

Introduction: Online simulation utilizes computers to place learners in dynamic, interactive scenarios, and its' use has been associated with positive effects on learner outcomes and experiences.(1) Developed during the COVID-19 pandemic, the 'Virtual Resus Room' (VRR) is a free, open-access, online platform for hosting virtual simulation that has shown encouraging results as an educational tool.(2)

At the University of Saskatchewan, anesthesiology clerkship teaching sessions have traditionally been composed of lectures, student presentations and Problem Based Learning (PBL) worksheets. Anesthesiology relevant scenarios are to be developed and piloted within this curriculum. The aim of this project is to evaluate the general utility of online simulation for use in anesthesiology education, and to assess its impact on learner engagement and competence.

Methods: Study Design is a cohort-comparison, program evaluation study. Taking place at the University of Saskatchewan, with both in-person and virtual learners from across the province during undergraduate anesthesiology academic half days. Study participants will be third year medical students completing their core anesthesiology rotation, with an estimated sample size of 50. Weeks of learners will be randomly assigned to either the control or intervention, being traditional PBLs or Online Simulation, respectively. Post-session surveys will be distributed, including questions on perceived accessibility, engagement, benefits, limitations, self assessment of competence and space for comments. Responses will be summarised, with no statistical analysis planned.

Expected Results: Data collection is scheduled to begin in August 2024. We anticipate learner feedback to be generally positive regarding usefulness, ease of use, engagement, and self-assessment of competence. Anticipated critiques include technological issues and the requirement for high-speed internet.

Discussion: This study's results will help guide decision-making around any further development and inclusion of online simulation within the undergraduate anesthesiology curriculum at the University of Saskatchewan. Future directions include the potential for multidisciplinary collaboration with other healthcare trainees, case review of critical events, CME or skills training for rural providers, low-cost access to sim for centers lacking high-fidelity facilities, and multicenter learning and collaboration.

1. Cook DA, Erwin PJ, Triola MM. Computerized virtual patients in health professions education: a systematic review and meta-analysis. Acad Med. 2010 Oct;85(10):1589–602
2. Foohey S, Nagji A, Yilmaz Y, Sibbald M, Monteiro S, Chan TM. Developing the virtual resus room: fidelity, usability, acceptability, and applicability of a virtual simulation for teaching and learning. Academic Medicine. 2022 May 1;97(5):679-83.

The RUMBLE Trial: A randomized clinical controlled trial evaluating the effect of opioid-free anesthesia on return of gastrointestinal function in laparoscopic colorectal surgery

Dr. Deck, Megan; Dr. Larmour, Sarah; Dr. Lim, Ben; Dr. Gill, Dilip; Dr. Ginther, Nathan; Dr. Barbour-Tuck, Erin; Ms. Goncin, Una; Ms. Carley, Samantha; Dr. Gamble, Jonathan.

Provincial Department of Anesthesiology, University of Saskatchewan

Introduction: Postoperative Ileus (POI) is a major barrier to patient recovery and discharge from hospital following laparoscopic colorectal surgery. Opioid use is an independent risk factor for POI, prompting Enhanced Recovery After Surgery (ERAS) societies to recommend minimizing their perioperative use. While the effect of postoperative opioids on bowel recovery following colorectal surgery is well established, the contribution of intraoperative opioids has not been studied. The RUMBLE trial asks if intraoperative opioid-free general anesthesia (OFA) reduces the time to return of gastrointestinal function in patients undergoing elective, laparoscopic colorectal surgery, compared to traditional opioid-based general anesthesia (TOA). We hypothesized that OFA participants will have expedited bowel recovery and decreased postoperative opioid use.

Methods: This study is designed as a double-blinded, placebo-controlled, randomized clinical trial comparing intraoperative OFA (intervention group) versus TOA (control group) in patients undergoing elective laparoscopic colorectal surgery. Group allocation is 1:1 with a total sample size of 60. Participants include patients age ≥18, ASA class I-III, undergoing elective laparoscopic colorectal surgery.

Preoperatively, all patients receive Acetaminophen and Gabapentin. In both groups, general anesthesia is maintained with Sevoflurane. The OFA group receives Dexmedetomidine, Lidocaine, Ketamine, and magnesium analgesia, while the TOA group receives intermittent boluses of Sufentanil. Both groups receive bilateral Transversus Abdominus Plane (TAP) blocks prior to emergence, and postoperatively both groups receive PRN Hydromorphone and Fentanyl in PACU and a Hydromorphone Patient Controlled Analgesia (PCA) pump for 48 hours thereafter.

Results: Currently 44/60 participants have completed the study protocol, and we hope to present an analysis of preliminary results at our University of Saskatchewan Department of Anesthesiology 2024 Resident Research Day. Our primary outcome; return of bowel function is evaluated by time to tolerance of solid food and defecation. Our secondary outcomes include 48-hour morphine consumption, Verbal Rating Scale (VRS) pain scores, and patient satisfaction.

Discussion: Given the prevalence of POI in colorectal surgery, and its pathophysiologic link with opioids, an improved understanding of OFA is warranted. Our results are expected to add to the growing body of OFA literature and inform future ERAS recommendations.

Cardiac Enhanced Recovery After Surgery (ERAS) in Saskatchewan: albumin utilization

Percival G1, O'Brien J1, Clunie M1, Prokopchuk-Gauk O2

1 Department of Anesthesiology, Perioperative Medicine, and Pain Management, University of Saskatchewan, Saskatoon Saskatchewan, Canada
2 Department of Pathology and Lab Medicine, University of Saskatchewan, Saskatoon Saskatchewan, Canada

Introduction: During cardiac surgery with cardiopulmonary bypass, both crystalloids and albumin are utilized to maintain and restore circulating volume as well as to prime the cardiopulmonary bypass pump. However, the largest trial to date examining albumin administration in cardiac surgery failed to demonstrate any significant benefit of albumin compared to crystalloid solutions.[1] Additionally, cardiac surgery patients who received albumin had higher rates of bleeding, re-sternotomy, and infection.[1] Notably, the International Collaboration for Transfusion Medicine Guidelines now advise against the administration of albumin for volume replacement or priming the cardiovascular bypass circuit among adult patients undergoing cardiovascular surgery.[2]

Albumin is derived from fractionated human plasma and imported into Canada from international suppliers. The cost of albumin in Canada is $5.15/50 mL for Albumin 5% and $25.73/50 mL for Albumin 25%.[3] During the 2019/2020 fiscal year, the national expenditure on albumin totaled $10,978,363.[3] Saskatchewan currently has the highest annual demand for albumin among Canadian provinces, underscoring the need to optimize albumin utilization in alignment with best practice guidelines.

Methods: This study forms part of the broader Saskatchewan Cardiac ERAS implementation-effectiveness study, which aims to enhance the experience and outcomes of cardiac surgical patients by implementing and evaluating best practice guidelines for Cardiac ERAS. Targeted initiatives for knowledge translation have been initiated and evidence-based order sets for cardiac care were implemented in 2023.

Our objective is to enroll cardiac surgery patients undergoing procedures with cardiopulmonary bypass. A retrospective electronic audit of cardiac surgery patients will then be conducted to analyze the primary outcome of pre- and post-intervention albumin administration for cardiopulmonary circuit priming, intraoperative use, and postoperative care. Additionally, we will gather secondary outcomes encompassing major adverse events (i.e., mortality, myocardial injury, reoperation, surgical site infection, acute kidney injury), quantities of blood products transfused (i.e., red blood cells, platelets, fresh frozen plasma), and postoperative bleeding (i.e., chest tube output).

Results: Following the implementation of best practice guidelines for cardiac ERAS, we anticipate a reduction in intraoperative and postoperative albumin administration (primary outcome) and improved clinical outcomes (secondary outcome).

Discussion: This study presents an opportunity to assess the impact of implementing Cardiac ERAS on albumin utilization and the intervention's influence on clinical outcomes.

References:

1. Pesonen E, Vlasov H, Suojaranta R, et al. Effect of 4% albumin solution vs ringer acetate on major adverse events in patients undergoing cardiac surgery with cardiopulmonary bypass: a randomized clinical trial. JAMA. 2022;328(3):251-258.
2. Callum J, Skubas NJ, Bathla A, et al. Use of intravenous albumin: a guideline from the International Collaboration for Transfusion Medicine Guidelines. Chest. Published online March 4, 2024.
3. Jug R, Callum J, Ruijs T, Liu Y, Barty R, Thompson T. Intravenous albumin utilization audit at a large community hospital. Transfusion. 2024;64(1):39-46.

Cardiac Enhanced Recovery After Surgery: Pre-operative Anemia

Mayville, K., Campbell, K., Cruz, M., Pikaluk, R., Valiani, S., Buchko, M., O'Brien, J., Clunie, M.
Provincial Department of Anesthesiology, University of Saskatchewan, Saskatoon, SK, Canada

Introduction: Cardiac Enhanced Recovery After Surgery (ERAS) is an evidence-based patient-centered program that improves patient outcomes while promoting efficiency and addressing challenges in the current health system. ERAS emphasizes prehabilitation, including hemoglobin optimization and patient blood management strategies, to minimize blood transfusion. Hemoglobin optimization has demonstrated considerable benefits in patients undergoing cardiac surgery.

At a time when resources are scarce and surgical wait times are increased in Saskatchewan,[2] there is a justified need and opportunity for prehabilitation and hemoglobin optimization. An interdisciplinary team of stakeholders (cardiac surgeons, cardiac anesthesiologists, nursing, and medical office administrators) developed hemoglobin optimization protocol including, an anemia algorithm, inpatient order set, and care plan. The purpose of this study is to implement and evaluate a protocol for identifying and managing pre-operative anemia.

Research Questions:
1. Does the implementation of a Cardiac ERAS Anemia Optimization protocol increase identification of patients with pre-operative anemia?
2. Does the implementation of a Cardiac ERAS Hemoglobin Optimization protocol lead to increased prehabilitation for anemia in cardiac patients?

Methods: This study was developed using a hybrid effectiveness-implementation study design to assess a newly developed Cardiac ERAS/hemoglobin optimization protocol for identifying, diagnosing, and treating anemia prior to cardiac surgery at the Royal University Hospital in Saskatoon.
We will measure adherence to the hemoglobin optimization protocol using a chart review to compare hemoglobin optimization pre-implementation from November 2021 to January 2024, and post implementation From February 2024 to present. Further, we will conduct structured interviews to identify the facilitators and barriers to hemoglobin optimization using a guide from Salenger et al.'s blueprint for successful implementation of Cardiac ERAS Ethics approval has been granted by the University of Saskatchewan Behavioural Research Ethics Board.

Anticipated Results We anticipate the cardiac ERAS hemoglobin optimization protocol will lead to greater identification, diagnosis, and prehabilitation of patients with anemia. Identifying context-specific barriers and facilitators will inform future efforts to improve prehabilitation of cardiac patients in Saskatoon.

Recommendations: Not applicable currently.

Keywords: Enhanced Recovery After Surgery; ERAS; Cardiac Surgery; Anemia; Blood Transfusion; Patient Blood Management

References:

1. Surgical Information System. Surgical Patient Information Management Saskatchewan Health Authority. Accessed February 27, 2022. http://www.sasksurgery.ca/provider/sis.html
2. Salenger R, Morton-Bailey V, Grant M, Gregory A, Williams JB, Engelman DT. Cardiac Enhanced Recovery After Surgery: A Guide to Team Building and Successful Implementation. *Semin Thorac Cardiovasc Surg*. 2020;32(2):187-196. doi:10.1053/j.semtcvs.2020.02.029
3. Bolliger D, Mauermann E, Buser A. Preoperative anaemia in cardiac surgery: preoperative assessment, treatment and outcome. British Journal of Anaesthesia. 2022 Apr;128(4):599–602. doi: 10.1016/j.bja.2021.12.040.

R1 Poster Presentations

Augmenting high school students' health sciences curriculum using high-fidelity simulation and module-based learning

Sara Abolhassani MD, Henry Bi MD, Justina Koshinsky MD

Provincial Department of Anesthesiology, University of Saskatchewan, Saskatoon, SK, Canada

Background: With the shortage of healthcare workers in Canada, there is the need to increase healthcare workers, more representative of the patient population, for better patient outcomes. Studies have shown positive outcomes for student engagement when using high-fidelity simulation at the high school student level to teach medical sciences and promote healthcare careers. SK high school teachers have expressed a need to improve their Health Studies 20 course. Relevant curriculum topics include “diagnostics and treatment,” “human body,” and “career exploration.”

Research Questions: (1) Will high-fidelity simulation and module-based learning increase high school student engagement in their health studies 20 course? (2) Will the augmented health studies 20 course increase high school students’ motivation to consider pursuing a career in healthcare?

Methods: We will work with high school teachers to integrate high-fidelity simulation with a module-based approach in the Health Studies 20 course. We will use mixed qualitative and quantitative methods using pre- and post-intervention surveys. The sample source will be Health Studies 20 students in Saskatoon, who are typically Grade 11 high school students. The time frame of the study will be over one high school semester. We will need to obtain ethics approval from the University of Saskatchewan and the Saskatoon Public School Division.

Expected Findings: We anticipate that high-fidelity simulation and module-based learning will increase high school student engagement in their Health Studies 20 course. We also anticipate that the augmented Health Studies 20 course will increase high school students’ motivation to consider pursuing a career in healthcare.

Expected Conclusions: We anticipate the results of this research project will inform us on how to improve high school student engagement in health sciences, so that the augmented curriculum can be expanded to rural high schools in SK.

Augmenting high school students' health sciences curriculum using high-fidelity simulation and module-based learning.

Sara Abolhassani MD, Henry Bi MD, Justina Koshinsky MD

Department of Anesthesiology, College of Medicine, University of Saskatchewan

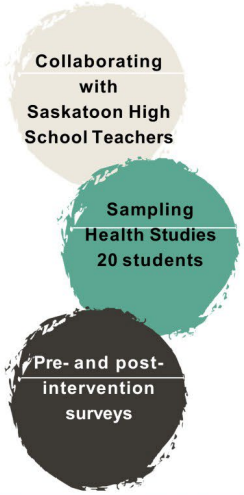
Background

- With the shortage of healthcare workers in Canada, there is the need to promote diversity among healthcare workers, more representative of the patient population, for better patient outcomes. [1-5]
- Studies have shown positive outcomes for student engagement when using high-fidelity simulation at the high school student level to teach medical sciences and promote healthcare careers. [6-11]
- SK high school teachers have expressed a need to improve their Health Studies 20 course. Relevant curriculum topics include “diagnostics and treatment,” “human body,” and “career exploration.”

Research Questions

1. Will high-fidelity simulation and module-based learning increase high school student engagement in their health studies 20 course?
2. Will the augmented health studies 20 course increase high school students’ motivation to pursue a career in healthcare?

Methodology



Expected Findings

We anticipate that high-fidelity simulation and module-based learning will:

1. Increase high school student engagement in their Health Studies 20 course.
2. Increase high school students’ motivation to pursue a career in healthcare.

Next Steps

- Creating course content with high school teacher collaboration
- Designing a questionnaire to survey
- students Ethics approval

References

Microaggressions in The Clinical Learning Environment

Tien Dinh, Annie Jafri, Jessica Bruce, Provincial Department of Anesthesiology, University of Saskatchewan

Background: Microaggressions are common and can have negative consequences for a medical learner's well-being and ability to provide care.

Research questions/hypotheses: Are discussion groups an effective way to teach medical learners/resident physicians about how to better handle microaggressions in the clinical setting.

Methodology: Recruitment of anesthesiology and surgical specialty residents to participate in discussion groups about microaggressions and different tools to navigate them within the clinical context. Participants will complete pre-discussion and post-discussion surveys to collect data about knowledge of microaggressions and confidence/readiness in navigating these microaggressions.

Results/findings: We anticipate there may be a difference in effectiveness between clinical simulation vs. case based learning with regard to teaching medical learners about microaggressions. We also anticipate certain demographics of learners will report more of these types of encounters in the clinical environment. We suspect that the source of these encounters is variable but includes patients, allied health, other residents and/or supervisory staff.

Discussion: N/A

Conclusions: We anticipate that simulation based learning is a more effective method of exposing learners to microaggressions and stimulating discussion regarding strategies to navigate these encounters.

Recommendations: N/A

MICROAGGRESSIONS IN THE CLINICAL LEARNING ENVIRONMENT

INVESTIGATORS: TIEN DINH (R1) ,SYEDA JAFRI (R1)
SUPERVISED BY DR. JESSICA BRUCE

INTRODUCTION

- **Microaggressions:** subtle putdowns of any group, including both verbal and nonverbal exchanges, commonly marginalised populations are more at risk. Are ubiquitous in the clinical learning environment.
- Research shows there are factors that put certain individuals at risk
- Contributes to feelings of **burnout, depression, anxiety**, poor clinical outcomes and attrition
- Simulation based learning may provide learners with the ability to identify and navigate these encounters

OBJECTIVES

Develop and integrate **simulation and non simulation** based learning within the academic schedule with the intent of providing education and a forum for discussion regarding the experience of microaggressions and methods to address them in the clinical workplace

RESEARCH QUESTIONS

1. What is the **optimal method of delivery** for information and education regarding microaggressions in the clinical learning environment
2. Have residents experienced micro-aggressions in their clinical encounters
3. What are common **sources** for these encounters
4. What are learners feelings about this type of education?

METHODOLOGY

Setting: University of Saskatchewan

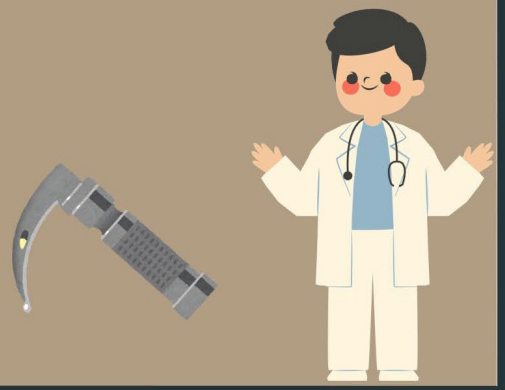
Participants: Residents in Anesthesiology PGY1-PGY5

Data Collection: Survey

Analysis: Qualitative/Thematic Analysis and Quantitative

Ethical Considerations:

- Informed consent will be obtained prior to administration of scenarios.
- There is potential for psychological/mental harm when participating in scenarios or during the debrief period.



RESULTS/FINDINGS

1. Learners identify that they have faced a micro-aggression at some point in their training, and the sources will be variable
2. Learners felt unsupported and unsure of how to navigate these situations when faced with them and provide ways in which they would like to be supported
3. Learners reported increased confidence in their ability to navigate these encounters after the session
4. Certain learners experienced micro-aggressions more than others.
5. There is a difference in effectiveness re: method of delivery

EXPECTED CONCLUSIONS

There is an optimal way to educate learners re: micro-aggressions in the clinical learning environment

Learners found this type of learning valuable for naviagting clinical encounters.

RECOMMENDATIONS

1. It is important for residency programs to acknowledge and support learners in more ways than academic
2. Expansion to other specialties; **surgical** in particular

Protocolization of Autologous Blood Transfusions During Cardiac Surgeries in Saskatoon

Dr Devin Edwards, Dr Michelle Clunie, Dr Oksana Prokopchuk-Gauk

Background: Allogeneic blood transfusions are a life saving intervention, however blood transfusions carry many risks to the recipient patients. One possibly underutilized transfusion sparing technique is autologous blood transfusion, which has been shown in studies to reduce rates of transfusion and in turn reduce the risks that blood transfusions bring to patients. There is currently no protocol for autologous blood transfusions in Saskatoon.

Research Questions: 1. Would a protocolized perioperative autologous blood collection and transfusion technique be acceptable to current cardiac surgery teams? 2. Does a protocolized autologous blood transfusion strategy reduce the amount of allogenic blood products transfused while preserving or improving postoperative outcomes?

Methods: A survey is being developed to assess current practices and opinions on autologous transfusion. Based on survey results and other established practices a protocol for autologous transfusions will be developed.

Expected Outcomes: We expect that large volume autologous transfusions will help reduce allogeneic transfusion rates.

Discussion: N/A

Expected Conclusions: We expect that reducing allogeneic transfusion rates will help reduce post-operative complications associated with transfusions.

Recommendations: N/A.

Protocolization of Autologous Blood Transfusions During Cardiac Surgeries in Saskatoon.

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College of Medicine, University of Saskatchewan

Background

- Anemia and transfusions have been shown to confer short and long term health risks.
- Patients receive more transfusions in cardiac surgeries.
- We currently use cell saver, retrograde priming of bypass circuits, and meticulous surgical technique to help conserve blood.
- One transfusion sparing technique that is less frequently utilized is autologous blood donation.
- There is currently no protocolization of autologous blood donations in Saskatoon.

Research Questions

- Would a protocolized perioperative autologous blood collection and transfusion technique be acceptable to current cardiac surgery teams?
- Does a protocolized autologous blood transfusion strategy reduce the amount of allogenic blood products transfused while preserving or improving post-operative outcomes?

Methodology

- The research will be split into two stages:
  1. A survey for data collection of current practices involving blood management in cardiac surgeries.
     →Distributed to stakeholders locally (or nationally?)
     →What is currently being done?
     →What should we do?

  2. Followed by the development of a protocol for perioperative autologous blood transfusion.
     →Based on literature review and survey results.
     →Will likely require a clinical study.
     →Consent will be obtained from any patients participating.
     →Intraoperative and postoperative outcomes will be measured.
     →Long term implementation based on outcomes.

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Expected Results

- Anecdotally we feel that autologous blood transfusions are a blood management strategy that can be utilized more frequently than it currently is.
- Based on a review of the literature we expect large volume perioperative autologous transfusions to decrease the rate of use of allogenic blood products.

Expected Conclusions

- We expect that our local findings will be comparable to the findings in literature.
- Early adoption of the autologous donation strategies may be healthcare provider dependent, with barriers ideally being identified during survey and data collection stage.

Thanks!

- Thank you Darcie Earle for your help with all things research!
- Thank you Drs Clunie and Prokopchuk-Gauk for your guidance and foresight initiating this project!
- Thank you to my fellow residents for your ongoing support!

The Misunderstood Anesthesiologist: A Prospective Cohort Study Comparing the Effectiveness of Educational Media in Preoperative Assessment Clinics

Kiyana Ghavami (MD, BSc); Allan Meldrum (MD, BSc); Henry Bi (MD, FRCPC, BSc; supervisor)

Background: It has been shown that over 50% of the Canadian population are unable to identify that the most responsible anesthesia provider during their surgical procedure was a physician. Majority of teaching around the perioperative process is conducted at pre assessment clinics (PAC). Efforts have been made to provide patient education at this time, but knowledge retention is poor, especially in regard to the role of the anesthesiologist. There is also a gap in literature exploring the efficacy of different educational medias in patient teaching.

Hypothesis: We hypothesize that educational media will increase knowledge retention, and that computer based media such as videos or websites will have a stronger long-term impact on knowledge retention compared to written or didactic teaching.

Methods: Adult patients undergoing elective surgeries will be selected from Saskatoon City Hospital PAC. There will be 4 study cohorts including one control group receiving verbal education only, and three intervention groups receiving verbal education plus either written, audiovisual, or website-based education. Data collection involves a questionnaire testing knowledge of an anesthesiologist's role collected at three different time points. Repeated measures ANOVA will compare scores between time points and cohorts.

Expected Results: Pre-PAC patients will score low on the questionnaire. Educational interventions should improve this knowledge gap, improving their post-operative questionnaire scores. Specifically, modern formats such as video and website-based education should increase scores by a larger margin than pamphlet-only education.

Expected Conclusion: If the hypothesis is held true, this will add to the body of knowledge demonstrating poor patient understanding of anesthesiologists' scope of practice, and indicate future research should optimize educational modalities offered to patients.

THE MISUNDERSTOOD ANESTHESIOLOGIST: A PROSPECTIVE COHORT STUDY COMPARING THE EFFECTIVENESS OF EDUCATIONAL MEDIA IN PREOPERATIVE ASSESSMENT CLINICS

KIYANA GHAVAMI (MD, BSC); ALLAN MELDRUM (MD, BSC); MARY ELLEN WALKER (RN, PHD; STATISTICIAN); HENRY BI (MD, FRCPC, BSC; SUPERVISOR)

Background

It has been shown that over 50% of the Canadian population are unable to identify that the most responsible anesthesia provider during their surgical procedure was a physician. Majority of teaching around the perioperative process is conducted at pre assessment clinics (PAC). Efforts have been made to provide patient education at this time, but knowledge retention is poor, especially in regard to the role of the anesthesiologist. There is a gap in current literature about which educational media is best for knowledge retention around the perioperative process. Research in other fields of medicine suggest that more modern media materials may be more effective for patient education.

Objectives

-Educate our patient population on what an Anesthesiologist does.
-Investigate which form of modern educational resources has the best effect on knowledge retention in a Canadian PAC patient population.

Research Question

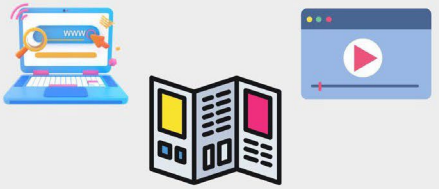
The purpose of this study is to investigate the effects of educational media on PAC patients. We hypothesize that educational media will increase knowledge retention, and that modern media such as videos or websites will have a stronger long-term impact on knowledge retention when compared to didactic teaching which is the current standard of care.

Methodology

Adult patients undergoing elective surgeries will be selected from Saskatoon City Hospital PAC. There will be 4 study cohorts including one control group receiving verbal education only, and three intervention groups receiving verbal education plus either written, audiovisual, or website-based education. Data collection involves a questionnaire testing knowledge of anesthesiologists' roles in the hospital. Results will be collected at three time points: pre-PAC visit, post-PAC visit, and up to 2 weeks post-surgery. Repeated measures ANOVA will compare scores between time points and cohorts.

Expected Conclusion

We expect to find that pre-PAC patients will score low on the questionnaire given the well documented poor level of knowledge around Anesthesiologist by the general public. If our hypothesis is true, educational interventions should improve this knowledge gap, improving their post-operative questionnaire scores. Specifically, modern formats such as video and website-based education should increase scores by a larger margin than pamphlet or didactic education.



Expected Results

This research project will likely reinforce the idea that there is poor patient understanding of anesthesiologists' scope of practice. However, it will also provide guidance for how we can better educate patients on this topic and others around anesthesia in the future when making further educational materials.

Evaluation of Cultural Safety and Trauma-Informed Care Training in the Intensive Care Unit

Talha Gondal MD, Mikalya Hagel BA, Cari McIlduff PhD, Carol Brons, Donna Goodridge RN PhD, Jennifer O'Brien PhD, Sabira Valiani MD FRCPC

Background: Intensive Care Units (ICUs) are pivotal in managing patients with acute and complex medical conditions, often requiring comprehensive and sensitive care. Acknowledging the importance of cultural safety and trauma-informed care in healthcare settings, including ICUs, has gained significant recognition. Ensuring that healthcare professionals in ICUs are equipped with the necessary skills to provide culturally safe and trauma-informed care is essential for promoting positive patient outcomes and reducing healthcare disparities.

Research AIM: This study aims to evaluate the impact of ICU-specific cultural safety and trauma-informed practice training on ICU staff attitudes, knowledge, and practice behaviours in the Saskatchewan Health Authority.

Methods: Evaluation of the intervention will utilize post-training self-assessments, retrospective pre-intervention self-assessments, and 3-month follow up questionnaires to evaluate ICU staff's knowledge, attitudes, and application of learning to their practice. Participants will include up to 90 healthcare providers from all Saskatchewan ICUs. Participants will be offered $25 honoraria for completion of cultural safety and trauma-informed care training. Statistical analysis will be used to compare self-assessments of knowledge and attitudes**.** Descriptive statistics will be used to report frequencies of trauma-informed care practices after training. Feedback from participants will be collected to inform potential enhancements to the training program.

Expected Outcomes: We anticipate improved knowledge, attitudes, and practice behaviours of ICU healthcare providers in Saskatchewan.

Discussion: The findings of this research are expected to shed light on the effectiveness of cultural safety and trauma-informed care training in ICUs, highlighting successful concept transmission, identifying areas for improvement, and emphasizing the necessity of continuous education to maintain and enhance cultural competence among ICU staff.

Expected Conclusions: The study is expected to conclude that effective delivery of cultural safety and trauma-informed care training can enhance staff knowledge, attitudes, and practice behaviours in ICUs.

Recommendations: Based on the findings, recommendations may include refining training modules to better meet the needs of ICU staff, integrating cultural competence into medical training curricula, and developing policies to support continuous education in cultural safety and trauma-informed care across healthcare institutions.

Evaluation of Cultural Safety and Trauma-Informed Care Training in the Intensive Care Unit

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Talha Gondal MD, Sabira Valiani MD, Jennifer O'Brian PhD, Cari Mcllduff PhD, Mikayla Hagel M.Sc.

Introduction

Intensive Care Units (ICUs) play a critical role in patient care, often managing individuals facing acute and complex medical illnesses. In recent years, there has been a growing recognition of the importance of cultural safety and trauma- informed care in healthcare settings, including ICUs (Abdi et al., 2013). Ensuring that healthcare professionals are equipped with the necessary skills to provide culturally safe and trauma- informed care is essential for promoting positive patient outcomes and reducing healthcare disparities .The literature shows various approaches used to evaluate the effectiveness of cultural safety and trauma- informed care training programs in various settings in order to inform the development of an evaluation framework of our own.

Objectives

- To explore the effectiveness of cultural safety and trauma-informed care training in ICUs.
- To evaluate the strengths and limitations of quantitative evaluation methods such as a post-training survey
- To use evaluation of knowledge gain and attitudes towards cultural safety and trauma informed care to inform further development of training in the ICU
- To identify gaps of knowledge in ICU staff regarding cultural safety and trauma informed care To prose

Research Question

What are the baseline knowledge and attitudes of ICU staff members in the Royal University Hospital regarding cultural safety and trauma informed care?

What components of the cultural safety and trauma informed care training inform ICU staff's clinical practice?

Methodology

Study Design:
•A post-training evaluation design assessing ICU staff's knowledge and attitudes towards cultural safety and trauma-informed care.
Participants:
•Staff members from the Intensive Care Unit at Royal University Hospital in Saskatoon, SK, who have completed cultural safety and trauma-informed care training.
Inclusion Criteria:
•Employment as a staff member in the ICU during the period of the study.
Survey Instrument:
•A validated post-training survey based on peer-reviewed tools from existing literature on cultural safety and trauma-informed care.
Data Analysis:
•Statistical analysis to measure central tendencies and dispersion of responses.
•Comparative analysis of individual items to identify patterns in knowledge and attitude shifts.
Outcomes:
•Level of knowledge and attitude changes post-training.
•Feedback on training effectiveness and suggestions for improvement.
Implications:
•Findings will contribute to the refinement of cultural safety and trauma-informed care training modules and the development of an evaluation framework for ICU bereavement programs.

Expected Results

Assessment of Knowledge and Attitudes:

- **Post-Training Survey Results**: The research might show the levels of knowledge and attitudes of ICU staff towards cultural safety and trauma-informed care immediately after completing the training.
- **Quantitative Analysis**: Statistical analysis of the survey results could provide a measure of how well the staff understood and absorbed the training material.

Identification of Training Impact on Clinical Practice:

- **Direct Application**: Surveys might indicate the potential short-term changes in behavior and practices in the ICU.

Evaluation of Training Effectiveness:

- **Effectiveness Ratings**: ICU staff might rate the overall effectiveness of the training.
- **Areas Lacking Clarity**: The survey could identify specific content areas that were not well understood or were inadequately covered.

Long-term Evaluation Considerations:

While this set of expected results focuses on immediate post-training assessments, it might also suggest the need for subsequent evaluations to assess the lasting impact of the training on ICU practices and patient care outcomes.

Expected Conclusions

Effective Concept Transmission: Training successfully conveyed key cultural safety and trauma-informed care concepts, validated by positive survey responses.

Identified Improvement Areas: Specific training aspects need refinement to better meet ICU staff needs and enhance learning outcomes.

Necessity of Continuous Training: Continuous education is crucial for maintaining and enhancing cultural competence and trauma-informed care practices.

Importance of Cultural Competence: Cultural competence is essential for effective ICU operation, suggesting the integration of these practices into all medical training and policies

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Low Intra-operative End tidal Carbon Dioxide- Is there an association with post-operative delirium?

Chad Lorenz MD, Peter Hedlin MD

Background: Much is known about non-modifiable risk factors for post-operative delirium (POD). These factors include advanced age, presence of cognitive dysfunction, history of post-operative delirium, and frailty. Major intra-operative risk factors for POD include hypotension, non-elective surgery, length of surgery, and oxygen saturation. These are not easily modified intra-operatively because of factors often outside of the anesthesiologist's control, including poor health status of the patient. However, two possible intra-operative factors that are modifiable include (i) depth of anesthesia and (ii) end tidal carbon dioxide (etCO2). Recent large retrospective studies have shown that low etCO2 is associated with statistically significant higher rates of 30-day mortality in various surgical procedures. In addition, there is evidence in non-cardiac surgeries that low etCO2 is more strongly predictive of higher rates of POD than depth of anesthesia.

Research Question*:* Is low intra-operative etCO2 in major cardiac surgery associated with higher rates of post-operative delirium?

Methods: This will be a retrospective cohort study involving cardiac surgeries. Data collection includes major hemodynamic values, anesthetic-related values including respirometry, end tidal gas tensions (including etCO2), anesthetic concentrations, and medications administered. Primary outcome will be post-operative delirium as determined by CAM-S, which provides a measure of the severity of delirium, measured on post-operative days 1 through 7. Statistical analysis will utilize general linear mixed measures.

Anticipated Findings: We expect that either low intra-operative end tidal CO2, or large fluctuations in end tidal CO2, will be associated with higher rates of post-operative delirium.

Discussion: N/A (Not Appropriate - Not Available at this Time.)

Expected Conclusions: We anticipate that, in major cardiac surgeries, that the average intra-operative end tidal CO2 in some patients will be below 35 mm Hg. If our results are as expected, the target intra-operative end tidal CO2 should be 40 mm Hg to account for periods of hypocapnia (i.e. during induction and other critical intra-operative events) and to maintain an average end tidal CO2 that is above 35 mm Hg. This will be especially important in patients who are at high risk of POD. This practice change is unlikely to have detrimental effects on patients, is cost-free to implement, and is easily implemented by adjusting ventilator settings intra-operatively.

Low intra-operative end tidal carbon dioxide: Is there an association with post operative delirium?

Chad Lorenz MD, Peter Hedlin MD
College of Medicine, University of Saskatchewan

Background

- Post-operative delirium (POD) is characterized by acute cognitive dysfunction following surgery – manifesting as confusion, altered consciousness, & impaired attention.
- POD significantly impairs patients' recoveries. On average, the cost of developing POD is $55,000 CAD per patient per year.[1]
- The rates of POD typically vary between 5 and 60% depending on the presence of modifiable and non-modifiable risk factors:
  - ➢These include frailty, multimorbidity, history of stroke, pre-existing cognitive impairment, length of surgery, and type of surgery – with cardiac surgeries having higher rates of POD. [1–3]
- Two recent, large retrospective studies have shown that an average intra-operative $etCO_2$ below 35 mm Hg across various surgeries is associated with a higher 30-day mortality rate
  - ➢There may be other deleterious outcomes associated with low $etCO_2$ [4,5]
- There has been conflicting evidence from randomized control trials (RCTs) seeking to understand if deeper levels of anesthesia contribute to a higher risk for developing POD. [6–12]
  - ➢Underlying intra-operative confounders such as $etCO_2$ could be part of the cause for conflicting evidence. [13,14]

Objectives

We aim to replicate findings from previous research which involved non-cardiac surgeries

Research Questions

1. Is low intra-operative $etCO_2$ a predictor of POD?
2. Do RCTs that seek to understand the relationship between depth of anesthesia and POD need to consider $etCO_2$ as a confounder?

Methodology

- Participants – patients over 18 years or older undergoing any major cardiac surgery with an expected length of surgery time over 60 minutes.
- Primary outcome – POD determined by the confusion assessment method-S (CAM-S) measured on post-op days 1 to 7. [15]
- Retrospective cohort study with exposure to $etCO_2$ levels categorized as follows:
  - ➢high (over 45 mm Hg), normal (35 to 45 mm Hg) , low (below 35 mm Hg) [4,5, 16-18]
- Statistical analyses will utilize generalized linear mixed models – potential confounding variables include concentration or dose of anesthetic delivered, cardiopulmonary bypass time, length of surgery, blood pressure, etc.
- To detect a difference at the alpha significance level of 0.05, with a power of 0.8, and estimated POD incidence of 41% in the hypocapnia group vs. 29% in the rest of patients (representing a 30% reduction in POD incidence when hypocapnia is avoided):
  - ➢ Required sample size is ~ 460 patients

Anticipated Results

The primary outcome (POD) incidence rate will be expected to be 30-40% [1–3]

We anticipate:

- ➢Patients with low $etCO_2$ will be associated with increased rates of POD
- ➢Low blood pressure will exacerbate the effects of hypocapnia, as found by Mutch *et al.* (2018) in their study involving non-cardiac surgeries. [14]

Conclusions

A previous study in non-cardiac patients has found low intra-operative $etCO_2$ to be predictive of an increased risk of POD [14] – we anticipate similar findings in cardiac surgery patients.

If results are as expected:

- ➢Low $etCO_2$ in cardiac surgeries should be avoided in patients at high-risk of POD (i.e. patients with frailty, cognitive dysfunction, or cerebrovascular disease)
- ➢$EtCO_2$ is a confounding variable in RCTs analyzing depth of anesthesia and POD

References

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Summer Student Poster Presentations

Is an abdominal compression test useful to predict fluid responsiveness in children undergoing general anesthesia?

Authors: John Perverseff, Mary Ellen Walker PhD; Scott Pharis MD, Jonathan Gamble MD

Introduction: Intraoperative hypovolemia is a leading cause of cardiac arrest during pediatric surgery.[1] Rapid and accurate diagnosis is critical.

Patients with improved cardiac output (CO) after volume resuscitation are termed fluid responsive (defined by an increase in CO greater than 15% with a fluid bolus).[2] The abdominal compression test (ACT) is used in PICU to determine if a patient is fluid responsive, assessing for an increase in preload with pressure applied over the liver.[3,4]

Despite its common use in PICU, there are no previous intraoperative studies.[3] This study aimed to determine whether the ACT can identify fluid responsive patients undergoing GA.

Methods: A prospective, self-controlled, observational, diagnostic study was conducted following Research Ethics Board approval. Eligible participants were aged 3 months to 17 years, ASA status 1-3, undergoing elective procedures under GA for at least 30 minutes. Participants with hepatosplenomegaly, portal hypertension or abdominal wall abscess were excluded.

The ACT included applying 20-25 mmHg pressure (using a sphygmomanometer) over the patient's RUQ for 10 seconds. Two ACTs were performed on each patient after induction: first prior to the surgical procedure and before fluids (T1); second after procedure completion, fluid loading, and prior to emergence (T2). CO was assessed by velocity time integrals (VTI) via the LVOT before and after each ACT. All echocardiograms were reviewed by a pediatric cardiologist to ensure quality.

The primary outcome was % VTI change before and after each ACT; secondary outcomes included ACT diagnostic accuracy.

Results: Thirty-eight patients were enrolled including 23 males and 15 females, median age 52 months, median weight 17.2 kg, median preprocedural fast 235 min, median fluid administered between first and second ACT 14.5 ml/kg.

At T1 the median VTI increase was 19.1% (IQR 8.2 – 23.8); at T2 the median VTI increase was 5.7% (IQR 3.3 – 9.7), The accuracy of the ACT to assess fluid responsiveness as per the area under the ROC curve was 0.91 (0.81 – 1.00).

Discussion: The ACT increased CO to a greater extent in relatively hypovolemic children versus volume replete children. The area under the ROC curve assessment of ACT to diagnose fluid responsiveness was 0.91, indicating excellent diagnostic accuracy.[5] Our findings suggest the ACT is a simple, useful clinical tool to identify fluid responsive patients.

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Is an Abdominal Compression Test Useful to Predict Fluid Responsiveness in Children Undergoing General Anesthesia?

University of Saskatchewan

John Perverseff, Mary Ellen Walker PhD, Scott Pharis MD, Jonathan Gamble MD

INTRODUCTION

- Intraoperative hypovolemia is an important cause of cardiac arrest during pediatric surgery.[1] Patients with improved cardiac output after volume resuscitation are termed fluid responsive, which is defined by an increase in cardiac output of more than 15% in response to a fluid bolus.[2]
- The abdominal compression test (ACT) is used in PICU to determine if a patient is fluid responsive. The test is based upon the reversible increase in cardiac preload with external pressure applied over the liver.[3]
- Despite its common use in PICU, the abdominal compression test is poorly studied in children, with no previous studies published documenting the test during the intraoperative period.[4]

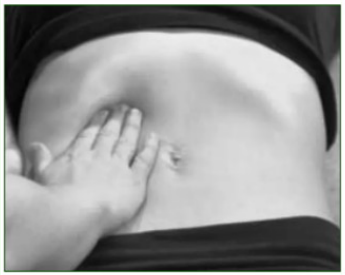

Figure 1. Demonstration of the abdominal compression test.[5]

OBJECTIVE

To determine whether the abdominal compression test can accurately identify fluid responsive patients undergoing general anesthesia.

MATERIALS AND METHODS

- We conducted a prospective, self-controlled, crossover, observational, diagnostic study following local Research Ethics Board approval. Inclusion criteria were consenting participants: ages between 3 months to 17 years; ASA physical status 1-3; elective procedures under general anesthesia scheduled for at least 30 minutes.
- The ACT included applying 20-25 mmHg pressure (using a sphygmomanometer) over the patient's RUQ for 10 seconds. Two ACTs were performed on each patient after induction: first prior to the surgical procedure and before fluids (T1); second after procedure completion, fluid loading, and prior to emergence (T2).
- Ultrasound assessment LVOT-VTI was used to measure cardiac output before and after each abdominal compression test.

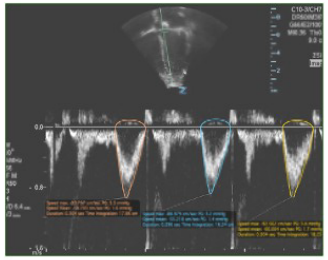

Figure 2. Ultrasound Assessment LVOT-VTI Tracing

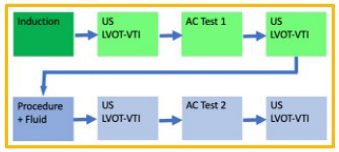

Figure 3. Flowchart of study protocol

RESULTS

38 patients were enrolled in this study.

Primary outcome: % VTI change before and after each ACT, stratified by study assessment (T1 and T2).

- At T1 (before intravascular fluid administration) the median VTI increase with ACT was 19.1% (IQR 8.2 – 23.8); at T2 (after fluid administration) the median VTI increase with ACT was 5.7% (IQR 3.3 – 9.7) (Figure 4).

Secondary outcome: assessment of ACT diagnostic accuracy to diagnose fluid responsiveness.

- The diagnostic accuracy of the ACT to assess fluid responsiveness as evaluated by the area under the receiver operating characteristic curve is 0.91 (0.81 to 1.00).

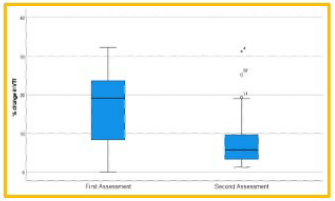

Figure 4. Box Plots of Percent Change in Velocity Time Integral from Pre- to Post- Abdominal Compression Tests at T1 and T2

CONCLUSIONS

The ACT increased cardiac output to a greater extent in relatively hypovolemic children compared to children who are generally volume replete.

The area under the ROC curve assessment of ACT to diagnose fluid responsiveness was 0.91, indicating excellent diagnostic accuracy .[6]

The ACT is a simple, useful clinical bedside tool to identify fluid responsive patients.

FUTURE DIRECTION

- Additional data collection has been conducted to increase sample size.

ACKNOWLEDGEMENTS

Office of Vice-Dean Research, College of Medicine

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Interventions to Support Families through Bereavement in the ICU: A scoping review

Authors: Mah Rukh BA (Psych), Sarah Foran MD, Jennifer M. O'Brien PhD, Carol Brons, Janelle Glessman, Joann Kawchuk, Donna Goodridge RN PhD, Sabira Valiani MD FRCPC

Introduction: While the loss of a loved one is a common phenomenon, the loss of a loved one in the ICU is uncommon and carries a high risk of complicated grief symptoms. For family members who have lost a loved one in the ICU, there is no organized, routine bereavement support offered in Saskatchewan. The primary objective of this scoping review is to identify the interventions for supporting ICU bereaved families that have been reported in the literature and the outcomes that are relevant to bereaved family members. Secondary objectives are to map findings to a Core Outcome Set developed by Harrop and colleagues (2020) and recognize existing gaps in knowledge, including EDI considerations.

Methods: We conducted the literature search using five electronic databases: Web of Science, CINAHL, EMBASE, APAPsycInfo, and MEDLINE. Primary research articles were included which described bereavement program(s) and/or support(s) for bereaved loved ones in the setting of an adult ICU and/or CCU. We extracted data on study aims, methods, setting, patient and bereaved loved one demographics, design, analysis and results. Four reviewers independently screened references and performed data extraction. Descriptive statistics will be used to synthesize data.

Results: We have identified the proportion of articles that address each of the Core Outcomes: Ability to Cope with Grief and Quality of Life and Wellbeing, and their nine thematic dimensions. As research is ongoing, we will perform a narrative description of the results, identify gaps in the literature as they pertain to the Core Outcome Set, and examine our findings through a lens of equity, diversity, and inclusion.

Discussion: In Saskatchewan, ICU bereavement supports are sporadic, and do not include long-term follow-up. The findings of our scoping review will be used to inform stakeholders and knowledge users (healthcare providers, bereavement support providers, and patient partners) as they envision an evidence-based, longitudinal, and sustainable bereavement program in Saskatchewan.

Interventions to Support Families through Bereavement in the ICU: A Scoping Review

UNIVERSITY OF SASKATCHEWAN

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[1]College of Medicine, University of Saskatchewan, [2]Provincial Department of Anesthesiology, College of Medicine, University of Saskatchewan, [3]Patient Family Partner, Saskatchewan Health Authority, [4]Department of Medicine, College of Medicine, University of Saskatchewan

INTRODUCTION

Support for bereaved ICU families is a recognized responsibility of the ICU team, as well as a gap in the ICU literature [1-4]. For family members who have lost a loved one in the ICU, there is no organized, routine bereavement support offered in Saskatchewan.

While the loss of a loved one is a common phenomenon, the loss of a loved one in the ICU is uncommon and carries a high risk of complicated grief symptoms. Approximately 20-50% of bereaved ICU relatives will develop complicated grief [5,6].

A Core Outcome Set (COS) has been developed by Harrop et al. (2020) to guide evaluation of bereavement support for adults in adult palliative care settings [7]. The two core outcomes established are: 1) Ability to Cope with Grief and 2) Quality of Life and Mental Wellbeing, which have various dimensions.

Although several studies have examined bereavement support offered to ICU loved ones, we do not yet understand the full impact of ICU bereavement on the range of these core outcomes and how to best support families throughout this time.

OBJECTIVES

1. Identify the interventions for supporting ICU bereaved families that have been reported in the literature and the outcomes that are relevant to bereaved family members.
2. Map the findings to a Core Outcome Set developed by Harrop et al. (2020).
3. Recognize existing gaps in knowledge.

Research question: *What interventions for supporting ICU bereaved families have been reported in the literature, and what are the outcomes relevant to bereaved family members?*

This process will serve as a first step in the development of an ICU bereavement program in Saskatchewan that is evidence-based, longitudinal and sustainable.

MATERIALS & METHODS

This scoping review utilized the following databases: Web of Science, CINAHL, EMBASE, APAPsychInfo and MEDLINE.

Search strategy: included three key concepts modelled after the works by Efstathiou et al.[8] and Moss et al.[9].

Eligibility criteria:

- Included original investigations that described an ICU bereavement intervention and its outcomes on bereaved family members/loved ones (qualitative or quantitative).
- Excluded pediatric or neonatal ICU.

Data extraction: Articles imported into Covidence software with duplicates removed. Title, abstract screening and full text review independently performed by four reviewers in sequential order. Four reviewers independently extracted data using a data extraction tool in Microsoft Excel.

Following data extraction, results were categorized into Harrop et al. (2020) Core Outcome Set in collaboration with two Patient Family Partners and the ICU team to identify gaps in knowledge.

RESULTS

Types of research designs included:

- 18 qualitative descriptive, 5 prospective descriptive, 4 cross-sectional, 4 randomized controlled trials, 2 case series, 1 cohort study

We have identified the proportion of articles that address each of the Core Outcomes: Ability to Cope with Grief and Quality of Life and Wellbeing, and their nine thematic dimensions. As research is ongoing, we will perform a narrative description of the results, identify gaps in the literature as they pertain to the Core Outcome Set, and examine our findings through a lens of equity, diversity, and inclusion.

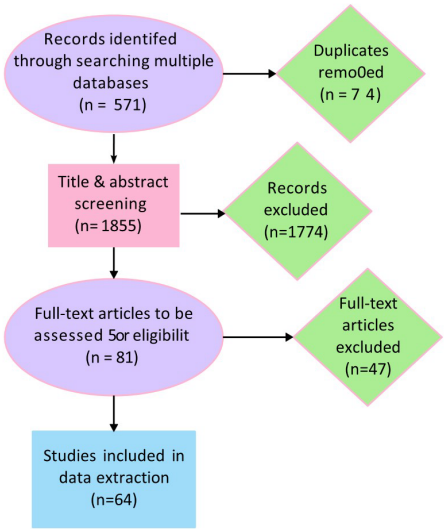

Figure 1: Selection of sources of evidence

CONCLUSIONS

As research is ongoing, results have yet to be analyzed.

In Saskatchewan, ICU bereavement supports are sporadic, and do not include long-term follow-up. The findings of our scoping review will be used to inform stakeholders and knowledge users (healthcare providers, bereavement support providers, and patient partners) as they envision an evidence-based, longitudinal, and sustainable bereavement program in Saskatchewan.

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The incidence of spinal anesthesia failures during elective Caesarean sections; a comparison of two different suppliers

Authors: Noaah Reaume BSc; Alixe Pellerin, MD, RN; Una Goncin BSc; Jonathan Gamble, MD; Mary Ellen Walker, RN, PhD; Peter Hedlin, MD, PhD

Introduction: A subarachnoid block (SAB) with bupivacaine is a commonly used technique for Caesarean sections. An inadequate SAB can be defined as surgical pain or discomfort requiring supplemental intravenous agents, a repeat SAB, or conversion to general anesthesia[1]. The literature identifies multiple patient, provider, and/or product factors associated with SAB failures. A previous chart review found the failure rate at Jim Pattison Children's Hospital (JPCH) in 2020 was 2.5%, following a change in bupivacaine supplier in 2018. This is comparable to the 0.5-6.4%[2,3] failure rate cited in previous literature. We therefore sought to determine the rate of Caesarean section SAB failures at JPCH in 2017, in comparison to 2020, along with associated factors.

Methods: Anesthetic and obstetric records were obtained for all Caesarean sections performed at JPCH from June 2017 to June 2018 (N=1519). A complete chart review was performed for all SAB cases (n=922), which were categorized as either a successful or failed block. Patient factors (BMI, number of fetuses, GA, GHTN, GDM) and spinal anesthesia factors (bupivacaine baricity and volume, fentanyl and epimorph doses, insertion level, number of attempts, complications, time from SAB to PACU) were collected.

Results: The SAB failure rate at JPCH from June 2017 to June 2018 was 4.3%, in comparison to the failure rate in 2020 of 2.5% ($p = 0.018$). The risk of SAB failure with a 95% confidence interval was 1.73 (1.1-2.9) times greater in 2017-18 vs. 2020. No significant differences were observed with respect to patient factors between successes and failures in 2017-18 or 2020. However, we found that 2017-18 failure cases required significantly more insertion attempts ($p<0.001$) and were longer cases overall ($p<0.001$), as compared to successful blocks. There was no statistical difference in factors between the 2017-18 and 2020 failure groups. In 2020, failures were observed to occur in batches. This grouping effect was not observed in 2017-18 with bupivacaine from a different supplier.

Discussion: The SAB failure rate in 2017-18 was almost double the rate observed in 2020. This was inconsistent with our hypothesis that the failure rate would increase after 2018, following the transition to generic bupivacaine. In 2017-18, failures were more likely with longer cases, a possible indicator of increased surgical complexity. We did not find an association between failure rates and patient factors or anesthetic complications. The observed grouping of failures in 2020 may be related to the integrity of certain bupivacaine lot numbers. These findings will inform an ongoing prospective study on SAB failures at JPCH.

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The incidence of spinal anesthesia failures during elective Caesarean sections; a comparison of two different suppliers.

Noaah Reaume BSc; Alixe Pellerin, MD, RN; Una Goncin BSc; Jonathan Gamble, MD; Mary Ellen Walker, RN, PhD; Peter Hedlin, MD, PhD

BACKGROUND

Spinal anesthesia is used in Caesarean sections due to speed of induction, predictability, and postoperative pain control[1]. This procedure uses bupivacaine to achieve a subarachnoid block (SAB). **The Jim Pattison Children's Hospital (JPCH) changed bupivacaine suppliers June 2018.**

- **Successful SAB:** sensory blockage sufficient to allow surgery to proceed without significant pain[2].
- **Failed SAB:** surgical pain/discomfort requiring further intravenous or inhalational agents, or complete conversion to general anesthesia (GA)[2].

A previous chart review found that the Caesarian section **SAB failure rate at JPCH in 2020 was 2.5%.** This is in line with previous literature (0.5-6.4%)[3,4].

Many induction medications cross the placenta and may have negative effects on the neonate. Physiologic changes in pregnancy also increase the risk of aspiration, pulmonary edema, PE, etc.

OBJECTIVES

The literature identifies multiple factors related to the rate of SAB failures, such as:

- Bupivacaine dosing/baricity, stability;
- Patient factors (BMI, GHTN, GDM)
- Provider technique and training level[2].

We seek to determine:

1. The rate of Caesarean section SAB failures at JPCH in 2017-18 vs. 2020.
2. Patient, provider, and product factors related to SAB failures during this period.

These findings will be used to **inform an ongoing prospective study** on the current JPCH failure rate, as well as inform policy within the Department of Anesthesia.

CHART REVIEW METHODS

Anesthetic and obstetric patient records were obtained for all Caesarean sections performed at Jim Pattison Children's Hospital in from **June 2017 to June 2018 (N=1519) and Jan 2020 to Dec 2020 (N=1488).** SAB failures were categorized based on management (e.g., SAB re-attempted, intraoperative supplementation, or conversion to GA) (Figure 1).

Patient factors (BMI, number of fetuses, GA, GHTN, GDM) and spinal anesthesia factors (bupivacaine baricity and volume, fentanyl and epimorph doses, insertion level, number of attempts, complications, time from SAB to PACU) were recorded.

Mann-Whitney U, Chi-Square, and Fisher's Exact tests were used to evaluate differences in metrics between successful and failed blocks and failure groups in 2017-18 and 2020. Alpha was adjusted for multiple comparisons (α=0.025).

RESULTS

SAB failure rate: June 2017-June 2018 = 4.3% vs. Jan 2020-Dec 2020 = 2.5% (p = 0.018).

- Risk of SAB failure was 1.73x (1.1-2.9) greater in 2017-18 vs. 2020 (p<0.05).
- No significant differences observed in patient factors (eg. BMI, GDM, GHTN) between successes and failures in 2017-18 or 2020.
- No significant differences in patient factors between failure groups (2017-18 vs. 2020).
- 2017-18 failures were longer cases vs. successful blocks (105.0 mins [90.0-125.0], 90.0 [73.0-110.0]; p<0.001).
- Failures were observed to occur in batches in 2020 (generic bupivacaine). This was not observed in 2017-18 with non-generic bupivacaine.

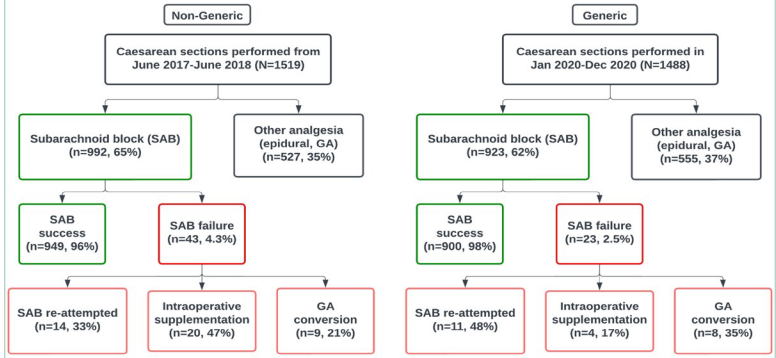

Figure 1. Flow charts describing the distributions of successful vs. failed Caesarean section subarachnoid blocks at Jim Pattison Children's Hospital, Saskatoon SK, in 2017-18 vs. 2020 with non-generic vs. generic bupivacaine.

DISCUSSION

The SAB failure rate at JPCH in 2017-18 with non-generic bupivacaine was 4.3%. Although within the range reported in previous literature, this was inconsistent with our hypothesis that the failure rate would be lower in 2017-18, prior to the transition to generic bupivacaine.

In 2017-18, failures were more likely with longer cases, a possible indicator of **increased surgical complexity**. We did not find an association between failure rates and patient factors or anesthetic complications.

The observed grouping of failures in 2020 may be related to the **integrity of certain bupivacaine lot numbers.** However, this information is not routinely recorded in anesthetic records. This grouping effect was not observed in 2017-18 with bupivacaine from a non-generic supplier.

These findings will inform an ongoing prospective study examining the current failure rate at JPCH and associated factors.

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Subarachnoid Block: Reasons for Insufficiency

Authors: Roya Emadi BSc, Alixe Pellerin MD, Una Goncin MSc, Peter Hedlin MD PhD

Introduction: Subarachnoid block (SAB) using bupivacaine is the most common anesthetic choice for elective cesarean sections due to its reliability, rapid onset, and good postoperative pain control. Current literature suggests SAB failure rates of 0.5-6.4% in cesarean sections. Failed SABs are associated with poor sensory blockade and can result in a conversion to general anesthesia, which can have detrimental effects to the parturient and the neonate. SAB failure can be caused by provider factors (injection technique and dosing of bupivacaine), patient factors (physiological resistance to bupivacaine) and product factors (use of chemically altered bupivacaine).

The purpose of this study was to identify the most prevalent mechanism of failed SABs during elective cesarean sections at Jim Pattison's Children's Hospital (JPCH).

Methods: Following local Research Ethics Board approval, a prospective observational study was conducted over 5 years. Consenting eligible participants included patients undergoing elective cesarean sections (with spinal blocks) at JPCH. Patient demographics and procedural data was collected. Buccal swabs, CSF samples, and leftover bupivacaine vials were collected for each participant.

Results: A total of 5 failed SABs were captured among 205 enrolled patients. Analysis of the collected CSF, buccal swabs, and bupivacaine samples has not yet been conducted.

Discussion: Effective spinal analgesia leads to better clinical outcomes and maternal-neonatal bonding. We can better avoid future failed SABs by identifying the most prevalent mechanism for failed SABs.

Subarachnoid Block: Reasons for Insufficiency

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Department of Anesthesiology, College of Medicine, University of Saskatchewan

BACKGROUND

Subarachnoid block (SAB) using bupivacaine is the most common anesthetic choice for elective cesarean sections due to its reliability, rapid onset, and good postoperative pain control [1,4]. Current literature suggests SAB failure rates of 0.5-6.4% in cesarean sections [4,5]. Failed SABs are associated with poor sensory blockade and can result in a conversion to general anesthesia, which can have detrimental effects to the parturient and the neonate [2,3].

SAB failure can be caused by:
- **Provider factors**: Injection technique and dosing of bupivacaine.
- **Patient factors**: Physiological resistance to bupivacaine.
- **Product factors**: Use of chemically altered bupivacaine [2].

OBJECTIVES AND HYPOTHESIS

- Identify the most prevalent mechanism of failed SABs during elective cesarean sections at Jim Pattison's Children's Hospital (JPCH).
- We hypothesize technical challenges/procedural complications to be responsible for subtherapeutic cerebrospinal fluid (CSF) concentrations in most cases of SAB failure.

STUDY DESIGN AND METHODS

Following local Research Ethics Board approval, a prospective observational study was conducted over 5 years. Consenting eligible participants included patients undergoing elective cesarean sections (with spinal blocks) at JPCH. Patient demographics and procedural data was collected (Table 1). Buccal swabs, CSF samples, and leftover bupivacaine vials were collected for each participant.

STUDY DESIGN AND METHODS

1. Provider factors: Injection technique, patient positioning, bupivacaine dose, and bupivacaine baricity are contributing factors to the likelihood of a successful block. Provider error can lead to failed SABs via low bupivacaine concentrations in the CSF, or unpredictable bupivacaine distribution throughout the subarachnoid space [2]. A CSF sample was collected from each participant to confirm that the spinal needle was in the intrathecal space prior to the administration of bupivacaine.

2. Patient factors: Common patient factors leading to failed SABs include: spinal abnormalities, obese body habitus, and patient anxiety. In addition, there are case reports of patients with a sodium-channel mutation, which makes them resistant to the effects of bupivacaine. A buccal swab was obtained from each participant to determine if they have genetic resistance to local anesthetics.

3. Product factors: Bupivacaine can be stored for extended periods of time without loss of efficacy. It has been hypothesized, however, that bupivacaine may be subject to instability or degradation with exposure to cold/hot temperatures during transport. Leftover bupivacaine samples have been collected for all participants and will be analyzed for anesthetic potency.

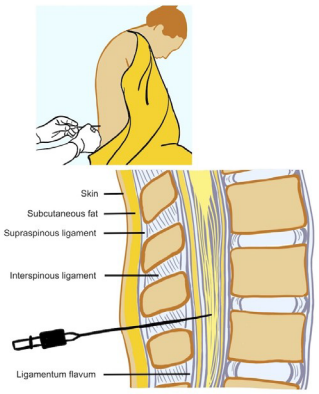

Figure 1. Visual representation of a subarachnoid block: Best practice includes use of hyperbaric (0.75%) bupivacaine in a seated patient with verified CSF flashback. Patient positioning includes flexing of the spine, including the neck.

PRELIMINARY RESULTS

	SAB Success (n=200)	SAB failure (n=5)
Age (yrs)	32 ± 5.0	37 ± 10.0
BMI (kg/m²)	33.8 ± 7.9	38 ± 11.0
Gestational age (wk)	38.8 ± 1.15	38.7 ± 0.63
Gestational diabetes mellitus [n (%)]	42 (21%)	3 (60%)
Gestational hypertension [n (%)]	13 (6.5%)	1 (20%)
Race [n (%)]		
White	122 (61%)	3 (60%)
Asian	32 (16%)	2 (40%)
Black or African American	12 (6%)	0 (0%)
First Nations	26 (13%)	0 (0%)
Other	8 (4%)	0 (0%)
Bupivacaine volume (cc)	1.4 ± 0.07	1.5 ± 0.08
Bupivacaine baricity (%)	0.75	0.75
Fentanyl dose (mcg)	13.9 ± 2.7	12.0 ± 2.7
Epimorph dose (mcg)	99 ± 0.9	100 ± 0
Insertion attempts	1.33 ± 0.85	3.6 ± 1.8
Paresthesia [n (%)]	13 (6.5%)	3 (60%)

Table 1. Patient demographics and procedural data (N=205)

DISCUSSION

A total of 5 failed SABs were captured among 205 enrolled patients. Analysis of the collected CSF, buccal swabs, and bupivacaine samples has not yet been conducted. This preliminary data is not representative of final results and should not be viewed with statistical significance.

Effective spinal analgesia leads to better clinical outcomes and maternal-neonatal bonding [1]. We can better avoid future failed SABs by identifying the most prevalent mechanism for failed SABs at JPCH.

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Oral Presentations- Completed Projects

Safety of a Catheter-Over-Needle (CON) System for Epidural Placement in a Porcine *in vivo* Model

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[Introduction] Continuous epidural analgesia remains an effective modality in the perioperative period and the gold standard for labour analgesia [1]. Epidural catheters are traditionally placed using a catheter-through-needle (CTN) technique. Recent studies have demonstrated that catheter-over-needle (CON) systems have decreased complication rates (accidental catheter dislodgement and medication leakage at the catheter insertion site) and improved analgesia outcomes in peripheral nerve blocks compared to CTN techniques [2,3]. Further study has demonstrated the feasibility of placing epidural catheters using a novel CON system in fresh human cadavers [4]. This proof of concept investigation aims to study the efficacy of epidural catheter placement and potential damage of the spinal cord and surrounding structures caused by using a novel CON system in a live animal model.

[Methods] After local Animal Ethics Board approval, a CON epidural system (E-Cath Acc. Tsui; Tuohy 83mm, Pajunk, Geisingen, Germany) was utilized to evaluate the efficacy and safety of placing epidural catheters in live anesthetized pigs. Pigs were chosen as they share vertebral and spinal cord anatomy similar to humans and other non-human primates. [5] The animals were anesthetized, endotracheally intubated, and positioned laterally. Three CON epidural catheter placements were attempted per animal using loss-of-resistance technique alone (Animal 1) before adding fluoroscopic guidance (Animals 2-6), given the procedural and safety concerns experienced in Animal 1. The animals were then euthanized via a pharmacologic overdose and necropsy was performed to assess final catheter location (epidural placement success) in addition to both gross anatomical and histopathological evidence of damage to the spinal cord and surrounding structures.

[Results] Six pigs (10-12 weeks old, about 30 kg) were used. A Gross necropsy examination demonstrated 17 of 18 catheters were successfully placed in the epidural space. In Animal 1 (epidural placed without fluoroscopic guidance) significant difficulty was experienced identifying the loss-of-resistance in addition to involuntary muscle contraction during placement. Number of attempts per epidural catheter placement in Animal 1 was 3, 10, and 1 respectively, with 2 of 3 catheters ultimately placed in the epidural space. Additionally, significant gross and histopathological injury was found including epidural and subdural hemorrhage, as well as hemorrhagic cavitation in the spinal cord with associated neuronal degeneration and necrosis.

In all subsequent animals (procedure completed with fluoroscopic assistance) epidural placement was clinically unremarkable. There was a maximum of 2 attempts, all were successfully placed within the epidural space, and there was no evidence of gross or histopathologic spinal cord damage. See Figure 1.

[Discussion] This study demonstrated this novel CON system for placing epidural catheters can be successful in a live animal model. The experience with Animal 1 (procedural failure, multiple attempts, and spinal cord damage) is likely related to a dermal plug in the non-stylet epidural needle in the CON kit. Although we did not use a stylet for subsequent procedures, the use of fluoroscopy minimized attempts and distance of tissue the needle passed through, reducing the risk of plugging and subsequent damage. Our results demonstrate a CON-based epidural placement technique is possible; but further investigation is required, including using a stylet epidural needle.

Intensive End of Life Care: Implementation of a guideline-based order set for the withdrawal of life-sustaining therapy in the Intensive Care Unit in Saskatoon Health Region

Knapp, Alison, O'Brien, Jennifer, Cruz, Maria, Walker, Mary Ellen, Kawchuk, Joann, Valiani, Sabira

Introduction/Background: Withdrawal of life-sustaining therapy (WLST) in the Intensive Care Unit (ICU) represents a unique challenge to quality end-of-life care, as the withdrawal of mechanical ventilation can cause symptoms that are distressing to both the patients and their family members and patients often cannot communicate their needs effectively. In 2016. Downar et al. published consensus guidelines that establish standard practices for the withdrawal of life-sustaining therapy. The feasibility and efficacy of implementing these guidelines into practice has not yet been explored. The Consolidated Framework for Implementation Research (CFIR) is a tool described by Keith et al. (2017) which outlines ongoing assessment of an intervention allowing for continuous improvement during implementation, a suitable strategy to evaluate the employment of the WLST consensus guidelines in our ICU.

Methods: This project followed a hybrid effectiveness-implementation design to assess a newly developed WLST order set and supporting documentation, including a nursing flowsheet and care plan. An interdisciplinary Steering Committee was assembled with patient family representatives and ICU healthcare providers to oversee and review the development and implementation of this project. The order set was constructed following the WLST consensus guidelines as a template and integrating feedback from the Steering Committee, guided by local practices, needs, and expertise. The assessment of the intervention included individual and group discussion, feasibility and Quality of Death and Dying (QoDD) surveys from bedside teams, and a chart review. CFIR constructs were utilized to develop the interview questions and feasibility questionnaire. The modified QoDD survey was completed at the time of WLST by the bedside nurse, both pre- and post-intervention. The chart reviews were used to compare average doses of opioids and sedative medication, as well as to evaluate the charting of symptom-based medication administration.

Results: The quality of death and dying surveys were analyzed pre and post-implementation. On a scale of 1 (terrible experience) to 10 (almost perfect experience), the average score pre-implementation was 7.18 vs. 8.6 post-implementation. The results of the feasibility survey showed that the majority of respondents (53%) agreed or strongly agreed that the WLST order set helped them meet the needs of their patients at the end of life and 56% felt it helped them provide good patient care. Of the 68 respondents, 33% felt that there were significant barriers to the implementation of the WLST order set, care plan, and flowsheet and that it did not fit well with their workflow. However, 80% reported that they would use the care plan and flow sheet as is or with revisions. Preliminary analysis of the semi-structured interviews identified several areas of strength as well as some potential challenges with the new WLST order set.

FPA Presentations

Family Practice Anesthesiologist Retention in SK

Authors: David Boyle, Johann-Rudolf Siegling

Introduction: Retention of family practice anesthetists (FPAs) in rural communities is critical to the continuation of surgical and obstetrical services. The average FPA practices for only 10 years. A national survey in 2018 found 10% of responding FPAs were no longer practicing, with relocation the most frequent reason.

Our study proposes further exploration of FPA retention focussing on Saskatchewan and narrowing down on reasons to ceased FPA practice in SK.

Methods: We plan a cross-sectional survey using local databases combined with snowball sampling to reach physicians who are currently or within the past 10 years were eligible to practice as FPA in SK. C.R.C.P Anesthesiologists are excluded, unless they practiced within the scope of FPA within the past 10 years. Recruitment is planned using snow-ball sampling via personal connections, FPA directors and FPA colleagues, using residency, health region, hospital, Saskatchewan College of Physicians and Surgeons, and ACUDA databases. Potential participants will be provided with an invitation letter directing them to the online survey. The survey will be hosted on a secure account and responses will be anonymous. Completion of the survey implied consent.

Pending approval by the Behavioural Research Ethics Board at the University of Saskatchewan (BEH 18-36).

Results: Based on previous results, we expect our results to expand on the number one reason for giving up FPA practice, namely relocation, perhaps due to the demands of their working environments or family needs not met in their communities. We expect results may also indicate personal reasons which may be unique to each participant and may be difficult to generalize.

Discussion: We hope our results will provide insights into ongoing efforts to retain FPAs, and to ensure the continuation of rural surgical and obstetrical services. We anticipate that information gained from this project may inspire initiatives to retain FPAs in rural centers, and that the results of this study may guide other Family Practice Anesthetists in their careers.

Family Practice Anesthesiologist Retention in Saskatchewan

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Introduction

- Continuation of rural surgical and obstetrical service depends on recruitment and retention of Family Practice Anesthesiologists.[1]
- The average FPA practices for only 10 years.
- 10% of responding FPAs were no longer practicing in a 2018 national survey.
- Relocation was the most frequent reason to cease FPA practice.

Objectives

Primary – Exploring factors affecting FPA retention in Saskatchewan

Methods

- Cross-sectional survey using to reach .
- Physicians who are currently or within the past 10 years were eligible to practice as FPA in SK.
- C.R.C.P Anesthesiologists are excluded, unless they practiced within the scope of FPA within the past 10 years.
- Participants identified using local databases combined with snowball sampling.
- Potential participants will be provided with an invitation letter directing them to the online survey
- Completion of the survey implied consent.
- Pending approval by the Behavioural Research Ethics Board at the University of Saskatchewan (BEH 18-36).

Results

Pending.

Based on previous results, we expect our results to expand on reasons why FPA's relocate, perhaps:

- Demands of their working environment?
- Family needs not met in their communities?
- Personal reasons unique to each participant and difficult to generalize?

Discussion

Gain insights into factors challenging FPA practice.

Information gained from this project may inspire initiatives to retain FPAs in rural centers.

The results of this study may guide other Family Practice Anesthetists in their careers.

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References
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Remote Interactive Anesthesia Simulation: An Opportunity for Family Practice Anesthetists (FPA) to enhance skills at their local facility

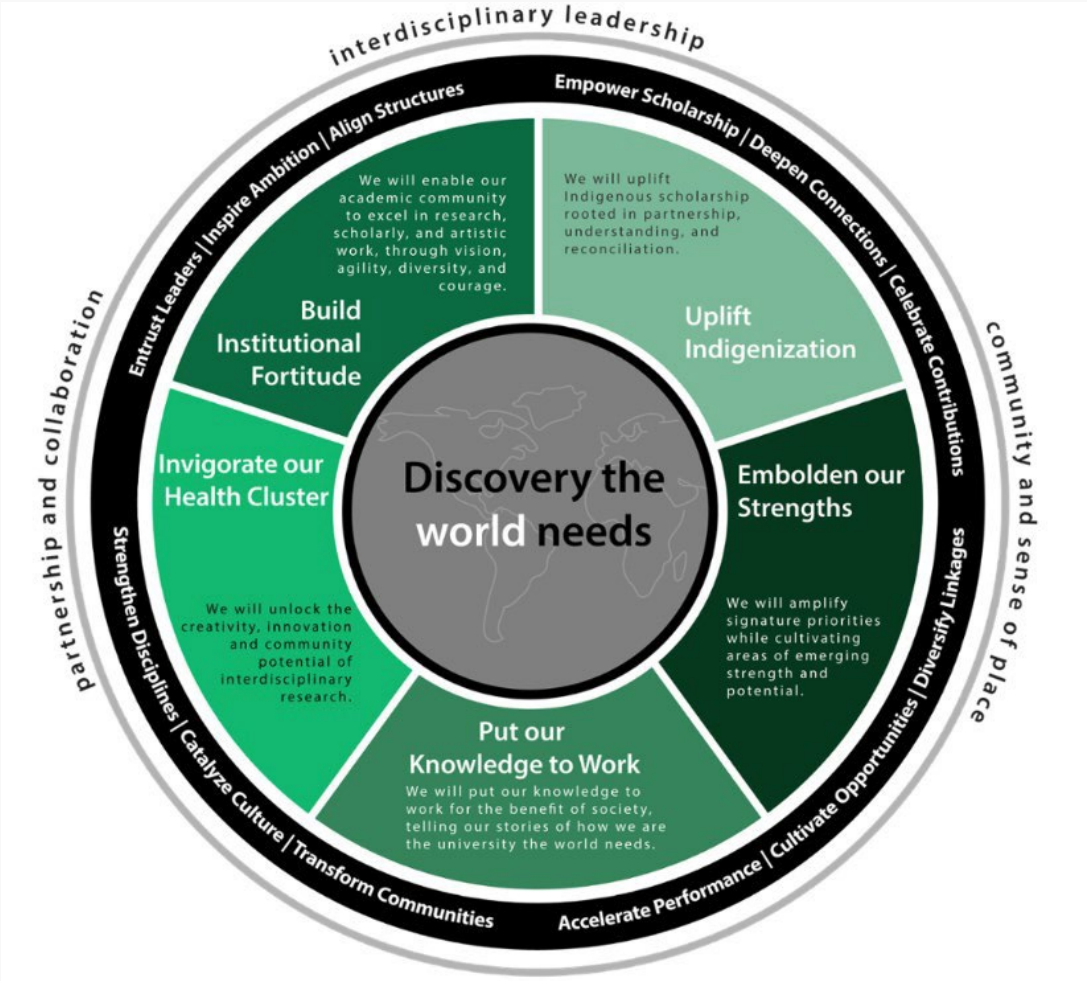
Authors: Tsoi, S., Weiler, C., Hedlin, P., Korchinski, J., Earle, D., Goncin, U.

Introduction: In Canada, there are traditionally two set of physicians that provide anesthesia services. Five-year trained FRCPC anesthesiologists and 3 year trained Family Practice Anesthetists (FPA). Due to the nature of FPA work, they are often situated in Rural/Remote settings. This can make ongoing CME and professional development an additional challenge. Simulation can be helpful for practicing rare scenarios associated with significant morbidity/mortality (Malignant Hyperthermia, Local Anesthetic Toxicity, Codes, etc.). As such, a teaching simulation done virtually can provide a learning opportunity while promoting ease of access.

Methods: This project was approved as qualitative improvement. We designed a survey that looked at key factors around the deployment of a virtual simulation. Photos from around the province were gathered looking at the differences in Anesthesia Carts. Official CME status is also pending approval that will allow for participants to be able to collect credits. The virtual simulation environment is being designed by Anikio, a tech company that specializes in this field. The scenario being developed is Local Anesthetic Systemic Toxicity.

Results: Data collection on the preliminary survey is still ongoing. Preliminary results indicate 100% of FPAs have a call requirement. 100% would be interested in participating in a simulation if CME credits were able to be secured. 33% indicated they find it difficult to meet CME quota. When asked for reasons they found it difficult to obtain CME, respondents indicated time commitment, distance needed to travel, and lack of coverage of services for their own community.

Conclusion: Initial survey responses indicate that a virtual simulation with CME credits attached would be well received by our FPA colleagues in Saskatchewan.



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We acknowledge we are on Treaty6 Territory and the Homeland of the Métis. We pay our respect to the First Nations and Métis ancestors of this place and reaffirm our relationship with one another.