2022 RESIDENT RESEARCH DAY

DEPARTMENT OF SURGERY

University of Saskatchewan

Saskatchewan Health Authority

"Any institution that relies on its clinical services alone without coincident medical research rarely gains distinction."

- Sir William Osler, 1895

Dr. Ivar Mendez

Fred H. Wigmore Professor and Provincial Head

Department of Surgery

University of Saskatchewan and Saskatchewan Health Authority

Welcome to the 2022 Department of Surgery Residents Research Day. This is the 9th consecutive year that we celebrate research by our residents and faculty. As I reflect over the past decade, I am gratified to see that research has thrived in the Department. We have more faculty engaged in basic, clinical, and quality improvement research than ever in the history of the Department. Our research productivity measured by the number of peer-reviewed publications and funding has increased four-fold in the past 9 years and the Department is in a secure academic footing.

We are convinced that research is crucial not only for the generation of new knowledge and innovation but is essential for the delivery of the best surgical care to the people of Saskatchewan and the training of the surgeons of the future. We are leading the way in our institutions on this path.

The research Committee has been instrumental in promoting research at all levels, from our undergraduate students to faculty members across the province. They have focused on our new recruits and provided seed funding and mentoring. The engine of research in the Department is on the efforts of our faculty and our surgeons-scientists. They will continue to strengthen the quality and breath of the research in the future.

It is my hope that the Department continues to thrive in research and innovation and becomes a recognized national and international player in academic surgery.

The Research Committee and I are delighted to welcome you to the first in-person Resident Research Day in three years. It is always so exciting to watch and listen to our residents and medical students in the earliest stages of their academic careers. Let's face it – it's hard to do quality research. There are no shortcuts. Pursuing a concept from the formulation of objectives, methods, and data collection/analysis all the way through to its publication in a peer-reviewed journal with a decent impact factor is ... an odyssey. And the culmination of all those quests, in all the research we undertake in our careers, adds the layers of experience that ultimately begets a surgeon-scientist. Today we get to witness the sparks that ignite the surgeon scientists of the future.

And surgery really needs more people like that.

Our Research Committee has been working hard to create more infrastructure to support surgical research in Saskatchewan. As highlighted at Grand Rounds last year, there are many roadblocks to surgical research in Canada, but our department continues to see growth in research publications and grants. This is a testament to our dedicated faculty and trainees who continue to integrate high quality research within practices that are increasingly strained as part of a health care system in crisis.

I wish to thank all the presenters, session chairs and judges. I would also like to thank the Department of Surgery Research Committee, who helped plan today's program and awards. I particularly want to thank our invited guest, Dr. Biron. And finally, I would like to thank the support staff in the department for facilitating such an excellent program.

Dr. Daryl Fourney

Director of Research

Department of Surgery and Division of Neurosurgery

Professor

College of Medicine, University of Saskatchewan

2021 Award Recipients

Surgery
Virtual Resident Research Day

Platform Presentations:

Podium Presentation Award 1st Place
Bryan Renne

Podium Presentation Award 2nd Place
Amit Persad

Podium Presentation Award 3rd Place
Kyle Irvine

Resident Research Publication Award:

Emily Chan

Undergraduate Medical Student Awards:

Dash-Reed Research Award — Michael Thatcher

2020 Award Recipients

Surgery
Virtual Resident Research Day

Platform Presentations:

Podium Presentation Award 1st Place
Kristen Marciniuk

Podium Presentation Award 2nd Place
Kristi Billard

Podium Presentation Award 3rd Place
Amit Persad

Resident Research Publication Award:

Amit Persad

Undergraduate Medical Student Awards:

Dash-Reed Research Award — Emmitt Hayes

2022
DEPARTMENT OF SURGERY
RESIDENT RESEARCH DAY

November 17, 2022

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Introduction

Department of Surgery
Resident Research Day

08:00 - 08:20

OPENING REMARKS

Dr. Daryl Fourney
Director of Research and Professor
Department of Surgery and Division of Neurosurgery

WELCOME

Dr. Ivar Mendez
Provincial Head and Fred H. Wigmore Professor
Department of Surgery

Session I

Moderator: Dr. Trustin Domes
08:20 - 09:30

BREAK 09:30 - 09:45

KEYNOTE SPEAKER

Department of Surgery
Resident Research Day

09:45 - 10:45

WORKING TOWARD PRECISION MEDICINE IN HEAD AND NECK SURGERY

Dr. Vincent Biron

Associate Professor and Surgeon-Scientist
Division of Otolaryngology - Head and Neck Surgery
Head and Neck Oncologic Surgery
University of Alberta and Alberta Health Services

Director, Otolaryngology - Head and Neck Surgery Research
Laboratory of Alberta (OHRLA),
Chair Northern Alberta Head and Neck Tumor Board and
Associate Editor for the Journal of Otolaryngology - Head and Neck Surgery

BREAK 10:45 - 11:00

Dr. Vincent Biron is an Associate Professor and Surgeon-Scientist in the Department of Surgery, Faculty of Medicine at the University of Alberta. He is presently the Director of the Otolaryngology-Head and Neck Surgery Research Laboratory of Alberta (OHRLA), Chair of the Northern Alberta Head and Neck Tumor Board and Associate Editor for the Journal of Otolaryngology-Head and Neck Surgery.

Dr. Biron began his post-secondary education at the University of Alberta where he received a Bachelor of Science with Honors in Molecular Genetics, followed by a PhD in Medical Genetics in the area of epigenetics. He then obtained a medical degree from the University of Calgary and returned to the University of Alberta to complete his residency in Otolaryngology-Head and Neck Surgery. This was followed by fellowship training in Head and Neck Oncologic, Microvascular and Skull Base Surgery from the University of California Davis. Dr. Biron returned to the University of Alberta as a Faculty member in the Division of Otolaryngology-Head and Neck Surgery in 2014.

His clinical practice is focused on head and neck cancer, transoral robotic (TORS) and thyroid surgery. He is actively involved in international outreach aimed at improving head and neck cancer care in developing countries.

He has published over 70 papers in peer-reviewed journals. His research interests include molecular biomarkers, epigenetics of head and neck cancer, human papillomavirus, transoral robotic surgery outcomes and molecular diagnostics. He has received numerous awards and grants for his research.

Dr. Vincent Biron

Associate Professor
Division of Otolaryngology - Head and Neck Surgery

Head and Neck Oncologic Surgery

University of Alberta & Alberta Health Services

Session II

Moderator: Dr. Evan Barber
11:00 - 12:10

CLOSING REMARKS 12:10 - 12:30

Acknowledgments

The Department of Surgery would like to thank the following individuals for serving as judges and session moderators for the 2022 Resident Research Day.

Judges

Dr. Amanda Hall
Assistant Professor, Department of Surgery
Division of General Surgery (Pediatric)
College of Medicine, University of Saskatchewan

Dr. Abbas Khani-Hanjani
Clinical Associate Professor, Department of Surgery
Division of Cardiac Surgery
College of Medicine, University of Saskatchewan

Dr. Yigang Luo
Clinical Professor, Department of Surgery
Division of General Surgery
College of Medicine, University of Saskatchewan

Dr. Julia Radic
Assistant Professor, Department of Surgery
Division of Neurosurgery
College of Medicine, University of Saskatchewan

Dr. Vince Biron
Associate Professor, Department of Surgery
Division of Otolaryngology - Head and Neck Surgery
Faculty of Medicine & Dentistry, University of Alberta

Moderators

Dr. Trustin Domes
Assistant Professor, Department of Surgery
Division of Urology
College of Medicine, University of Saskatchewan

Dr. Russell Murphy
Assistant Professor, Department of Surgery
Division of Otolaryngology - Head and Neck Surgery
College of Medicine, University of Saskatchewan

Dr. Evan Barber
Assistant Professor, Department of Surgery
Division of Thoracic Surgery
College of Medicine, University of Saskatchewan

2022
Department of Surgery
RESIDENT RESEARCH DAY ABSTRACTS

Favorable Kidney Transplant Outcomes Following Longer Machine Cold Perfusion Pump Times: A Retrospective Analysis of Donor-Matched Kidney Transplants

Platform Presenter: Carlos Verdiales

Division of General Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Luke Baxter (Division of Orthopedic Surgery, Northern Ontario School of Medicine), Dr. Mike Moser (Department of Surgery, University of Saskatchewan), Dr. Gavin Beck (Department of Surgery, University of Saskatchewan), Dr. June Lim (Department of Community Health and Epidemiology, University of Saskatchewan).

Rationale:
The machine cold perfusion apparatus ('the pump') has benefits in terms of early kidney transplant function compared to non-pump preservation. While longer time outside the body has been shown to have detrimental effects, a prior paired study suggested that longer pump times, i.e. the second kidney in a pair, trended towards improved results. Our goal was to confirm or refute these results by reviewing our program's experience.

Methods:
We analyzed 61 pairs of transplant recipients who received kidneys from the same donor (2012-2019). Patients were divided into two groups depending on whether they were transplanted first (K1) or second (K2). Therefore, the patients in each pair had identical donor characteristics, except for time on the pump. McNemar's (paired) test or Kaplan-Meyer analysis were used as appropriate.

Results:
The two groups had similar demographics (age, BMI, diabetes, and highly sensitized recipients and retransplants). Pump times for K1 and K2 were 5.2±2.4h (mean±SD) and 10.8±3.4h ($p<0.0001$), respectively. Overall, 46/61 (75%) of K1 and 52/61 (85%) of K2 had freedom from biopsy-proven acute rejection at 1 year ($p=0.029$). Delayed graft function was documented in 20/61 (33%) of K1 and 12/61 (20%) of K2. ($p=0.046$). There was a trend toward higher graft survival ($p=0.061$) and patient survival ($p=0.054$), favouring K2.

Conclusion:
Our results agree with a previous study suggesting there may be benefits to longer pump times. The results of both studies should motivate further studies looking at a possible anti-inflammatory 'second kidney effect' from longer cold perfusion.

Funding Sources:
None

Ankle Fractures with Syndesmotic Disruption: A Novel Surgical Technique Using Suture Tape to Address Syndesmotic Instability without Rigid Fixation

Platform Presenter: Lauren Ready

Division of Orthopedic Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Tousief Hussein (Department of Surgery, University of Saskatchewan).

Rationale:
Ankle fractures and sprains are one of the most common orthopaedic injuries. When repairing these bony injuries, it is essential to also address the soft tissue to regain joint stability. Here, we evaluate a novel syndesmosis repair technique in comparison to the established procedure options.

Methods:
Between 2019 and 2022, seventeen patients underwent an open reduction internal fixation of their ankle with one surgeon at one of two facilities (RUH, SCH). Inclusion criteria were patients who underwent a syndesmotic repair by this surgeon after experiencing an ankle fracture with syndesmotic instability. All clinic, admission and operative notes were examined for each patient to determine operative and hospital course.

Results:
It is essential to achieve anatomic reduction, especially addressing rotational deformity. Initially the anterior talo-fibular ligament (ATFL) was identified, then drilled through, exiting along the anterior aspect of the medial malleolus. The drill was used to create another path through to the medial malleolus, exiting posterior to the first hole. A Heuson suture passer was then used for the passing of Alter tape in double loop fashion to reestablish the fibular alignment.

Conclusion:
This is the first manuscript identified describing this novel technique for syndesmosis repair. Furthermore, our results demonstrate that stability can be established in formats other than the most common procedures that have been accepted as the repair of choice. This technique offers a quality option that produces good outcomes with less hardware. We propose the suture loop as a successful alternative to the current syndesmotic repair techniques performed.

Funding Sources:
None.

A Pre-Operative Nerve Root Sedimentation Sign is Associated with Improved Post-Operative Outcomes in Back-dominant Pain

Platform Presenter: Braeden D. Newton

Division of Neurosurgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Zach Huschi (Department of Medicine, University of Saskatchewan), Amit Persad (Department of Surgery, University of Saskatchewan), Laura Neuburger (Diagnostic Imaging, University of Calgary), Uzair Ahmed (Department of Surgery, University of Saskatchewan), Yanzhao Cheng (Department of Surgery, University of Saskatchewan), Daryl Fourney (Department of Surgery, University of Saskatchewan).

Rationale:
Recent evidence has shown the nerve root sedimentation sign may have diagnostic and prognostic value regarding lumbar spine stenosis. We examined the relationship between a pre-operative positive SedSign and post-operative outcomes for all decompressive lumbar spine surgeries using a validated classification scale for lower back and leg pain.

Methods:
Prospective data on 243 patients that underwent elective lumber spine decompression for back and/or leg pain between January 1, 2012 and May 30, 2019 was retrospectively reviewed. Patients undergoing surgery for trauma, tumor, cauda equina syndrome, and infectious etiology were excluded. Baseline characteristics included SSPc, diameter of the dural sac, and diameter at the level of maximal stenosis. Post-operative outcomes were based on changes in Oswestry disabiity index, Visual analogue pain scores for back and leg pain, and EuroQoL group 5-dimension self-report (EQ5D).

Results:
A positive pre-operative SedSign in back-dominant pain patients was associated with a reduction in post-operative leg pain ($p=0.024$), pain intensity ($p=0.023$), and less disability with self-care ($p=0.007$) as measured by the VAS, ODI, and EQ5D. Multivariate analysis revealed reduced post-operative VAS leg pain in those with pre-operative SedSign. Additionally, we found that a positive SedSign was associated with older age ($p<0.0001$) and worsened stenosis ($p < 0.0001$).

Conclusion:
The data represent the largest analysis of post-operative outcomes with respect to a positive pre-operative SedSign to date. Our data support post-operative improvement in pain and quality of life, though only improvement in leg pain remained statistically significant following multivariate analysis.

Funding Sources:
None.

Expanding Stroke Imaging into the Third Dimension

Platform Presenter: Claire N. DuVal

Undergraduate Medical Education
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
M. Jake Pushie (Department of Surgery, University of Saskatchewan), Nicole J. Sylvain (Department of Surgery, University of Saskatchewan), Huishu Hou (Department of Surgery, University of Saskatchewan), Michael E. Kelly (Department of Surgery, University of Saskatchewan).

Rationale:
Stroke is a leading cause of death and disability in Canada, and better treatments are needed for this condition. Stroke research in animal models requires the quantification of stroke lesion volume in order to assess severity of the stroke and evaluate efficacy of interventions, but traditional methods of calculating volume using many slices through the lesion are time-consuming and render the tissue unusable for additional imaging. The ABC/2 model is a clinically used method for estimating stroke lesion volume using a single slice based on the assumption of a hemiellipsoid shape, and we propose that this may be useful for estimating stroke volume in our models of stroke.

Methods:
A protocol of serial cryosectioning of brain tissue, and subsequent light microscopy, synchrotron-based imaging, and three-dimensional volume reconstruction was used to compare the traditional method of volume estimation with the ABC/2 model in three different surgical models of stroke.

Results:
Analysis revealed that the ABC/2 method of volume estimation performed best in the photothrombotic model, and performed poorly in the middle cerebral artery occlusion and intracranial hemorrhage models.

Conclusion:
Three-dimensional lesion volume depends on the method by which stroke is induced. Proximity to anatomic structures such as the midline alters the three-dimensional lesion shape and utility of the ABC/2 model. The lesion shape produced by the photothrombotic model is most suitable for use with ABC/2, while other models show marked disagreement. These findings have the potential to be applied to future stroke studies, particularly for the photothrombotic model.

Funding Sources:
This project was funded by the Heart and Stroke Foundation, Saskatchewan Health Research Foundation and the University of Saskatchewan College of Medicine.

A Novel Trigeminofacial Reflex: Insight from Radiofrequency Rhizotomy under General Anesthetic

Platform Presenter: Amit Persad

Division of Neurosurgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Aleksander M Vitali (Department of Surgery, University of Saskatchewan), Jonathan A Norton (Department of Surgery, University of Saskatchewan).

Rationale:
Trigeminal neuralgia is a debilitating facial pain condition. Radiofrequency rhizotomy is a commonly used percutaneous technique for treatment of trigeminal neuralgia especially in cases not eligible for microvascular decompression. This technique is usually performed with the patient under conscious sedation. We devised a method for performance of this technique under general anesthetic with neurophysiology monitoring.

Methods:
We describe a technique for intraoperative EMG-based guidance of radiofrequency rhizotomy for trigeminal neuralgia. The patient is put under general anaesthetic and EMG monitoring is set up. Needles are placed in temporalis muscle, masseter and mylohyoid or anterior belly of digastric. Resting activity is monitored. Rhizotomy is then performed under fluoroscopic guidance, with monitoring of EMG potentials pre- and post-lesioning, with specific attention paid to presence of an abnormal electrophysiologic reflex.

Results:
A total of 38 procedures were performed in 23 patients. Of these, 15 were revision procedures. Patients had improvement from BNI pain scale 3.8 to 1.3, and had a reduction in number of medications from 1.9 to 0.8. Survey results indicate greater practitioner satisfaction with this technique.

Conclusion:
Radiofrequency rhizotomy can be performed under GA with IONM guidance with good results. We present a novel method for EMG-based monitoring. Implicit to this study is a novel electrophysiologic reflex that serves as a marker of trigeminal nerve pain.

Funding Sources:
Resident Research Award, Department of Surgery.

Equitable Care with Unequal Outcomes: Ethnic Disparities in Surgical Oncology in Canada. A Scoping Review

Platform Presenter: Rubia Ahmed

Undergraduate Medical Education
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Zarrukh Baig (Department of Surgery, University of Saskatchewan), Ameer Farooq (Department of Surgery, University of British Columbia), Dilip Gill (Department of Surgery, University of Saskatchewan), Nathan Ginther (Department of Surgery, University of Saskatchewan) Ahmer Karimuddin (Department of Surgery, University of British Columbia).

Background:
There is a general awareness that cancer incidence and morality are higher in First Nation Canadians. Furthermore, previous studies have shown an increase in cancer incidence in other ethnic minorities in Canada as well. Despite this, the oncological disparities for ethnic groups, post-surgery are unknown. We present a summary of the evidence on racial and ethnic disparities in Canada after oncological surgery.

Methods:
This is a scoping review of relevant studies. With the help of a librarian, studies were identified through MEDLINE, PubMed, Embase and Cochrane Library databases. Two independent reviewers screened for inclusion and exclusion. Sixteen studies were reviewed for data extraction and critical appraisal using a CASP checklist.

Results:
Sixteen studies were identified, of which 3 assessed disparities in head and neck cancers, 5 assessed cancer mortality in general, and 8 assessed colorectal, breast, prostate, liver, lung and renal cancers. For all cancer types, mortality was higher in First Nations and lowest in recent immigrants and those of Asian and South Asian descent. Specifically, Asian ethnicity had higher head and neck cancer survival than non-Asians. Cancer specific mortality was also higher in First Nations and Inuit People. No studies reported outcomes on oncological outcomes apart from mortality.

Discussion:
This review identified sixteen good quality studies that addressed ethnic disparities in outcomes for oncological surgeries in Canada. However, the only reported outcomes were on mortality. The current studies report a higher overall mortality in First Nation Canadians, and lower mortality in Asians, South Asians and recently arrived immigrants from Asia. No study specifically addressed disparities in oncological outcomes. This is likely due to scarcity of data on ethnic identifiers in provincial databases. Further research is required to identify the scope of ethnic disparity in oncological post-operative outcome.

Funding Sources:
None.

Assessment of the Reverse Fragility Index in Vascular Surgery Randomized Controlled Trials with Statistically Non-Significant Primary Outcomes

Platform Presenter: Eva Liu

Division of Neurosurgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Allen Li (Faculty of Medicine, University of Ottawa), Arshia Javidan (Department of Surgery, University of Toronto), Aryan Ahmadvand (Faculty of Medicine, University of Ottawa), Derrick Tam (Department of Surgery, McMaster University), Faysal Naji (Department of Surgery, McMaster University), Thomas Forbes (Department of Surgery, University of Toronto).

Rationale:
Many randomized controlled trials (RCT) in vascular surgery comparing endovascular techniques to open surgery have found statistically non-significant primary outcomes. The objective of this study is to assess the reverse fragility index (RFI) of RCTs comparing endovascular vs. open surgery in abdominal aortic aneurysms (AAA), carotid artery stenosis (CAS), and peripheral artery disease (PAD).

Methods:
MEDLINE and Embase was searched for RCTs investigating AAA, CAS, or PAD with statistically non-significant binary primary outcomes. The primary outcome was the median RFI. The RFI was calculated by creating a two-by-two contingency tables from study data and subtracting events from the group with fewer events while adding non-events to the same group until a two-tailed Fisher exact test produced a statistically significant result ($P<0.05$).

Results:
4187 articles were captured in our initial search with 49 studies reporting 101 different primary endpoints being included (Table I). The median RFI was 7 (interquartile range, 5 - 11). 39 (39%) endpoints had a loss to follow-up greater than its RFI. Mann–Whitney U test showed follow-up analyses and composite endpoints were significantly associated with higher RFIs [median 9.5 vs 6 ($P<0.01$) and 9.5 vs 7 ($P<0.05$) respectively] but not funding source ($P=0.46$). Sample size was positively correlated to RFI (Pearson $r = 0.28$, 95% CI: 0.09 to 0.4512, $P<0.01$).

Conclusion:
A small number of event conversions (median 7) are required to change the outcome of negative results. Conclusions from large sample studies appear less fragile compared to their less sampled counterparts.

Funding Sources:
None.

Does Addition of Longer-acting Local Anesthetic Improve the Post-Operative Pain After Carpal Tunnel Release? A Randomized Controlled Study

Platform Presenter: Emily Chan

Division of Orthopedic Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Laura Sims (Department of Surgery, University of Saskatchewan), Churao Yang (Department of Anesthesiology), University of Saskatchewan), Kristi Billard (Department of Surgery, University of Saskatchewan), David Sauder (Department of Surgery, University of Saskatchewan).

Rationale:
Carpal tunnel release (CTR) is a simple and effective treatment for carpal tunnel syndrome in patients who have failed conservative management. In Canada, this surgery is often performed in the ambulatory clinic under local anesthesia, with lidocaine (a short-acting agent) as the drug of choice. Post-operative pain is a concern for many patients, and a previous study at our institution found that maximal pain was experienced 8 hours after surgery. Although use of a longer-acting anesthetic, such as bupivacaine, should theoretically prolong the post-operative pain blockade, few studies have investigated its use for CTR. Therefore, the aim of our study was to compare the post-operative pain experience after CTR with the use of either our standard lidocaine solution (L) or a longer-acting mixture consisting of lidocaine and bupivacaine in equal amounts (LB).

Methods:
Patients undergoing CTR were randomized into L or LB groups. Post-operative pain severity was recorded at several timepoints within the first 72 hours, using the Visual Analog Scale (VAS). The timing and quantity of post-operative analgesic use (Tylenol and/or Advil) were also documented. Both patients and assessor were blinded to allocation.

Results:
A total of 145 patients were recruited. After exclusions, 139 remained: 67 (48.2%) in the L group and 72 (51.8%) in the LB group. Mean age of patients in the L group (56.9 years) was was significantly lower than that of the LB group (63.0 years) ($p=0.02$). Baseline carpal tunnel severity scores were similar between groups. Compared to the L group, post-operative VAS scores were significantly lower in the LB group at 6 hours (2.3 vs 3.2, $p=0.02$) and 8 hours (2.9 vs 3.9, $p=0.02$). Additionally, patients in the LB group reported longer time to first analgesic use than those in the L group (5.2 hours vs. 3.7 hours, $p=0.02$).

Conclusion:
Our results suggest that patients anesthetized with a mixture of lidocaine and bupivacaine for CTR experienced less postoperative pain at 6 and 8 hours, compared with those who received lidocaine alone. In our experience, this mixture is a feasible alternative to lidocaine for CTR performed under local anesthesia.

Funding Sources:
Saskatoon City Hospital Orthopedic Advancement Fund

Does the Calgary Postoperative Pain After Spine Surgery (CAPPS) Score Predict Better Long Term Outcomes After Lumbar Spine Surgery?

Platform Presenter: Barzany Ridhu

Undergraduate Medical Education
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Amit Persad (Department of Surgery, University of Saskatchewan), Zachary Huschi (Department of Internal Medicine, University of Saskatchewan), Daryl Fourney (Department of Surgery, University of Saskatchewan).

Rationale:
Poor pain control after spine surgery results in longer hospital stay, increased narcotic use, and may affect long term outcome. The Calgary Postoperative Pain After Spine Surgery (CAPPS) score predicts poorly controlled pain after spine surgery, but whether it correlates with long term outcomes is unknown. The objective of this study was to evaluate if CAPPS correlates with longer term patient self-reported pain, functional outcomes or quality of life scores after lumbar spine fusion.

Methods:
A retrospective database review was performed on 261 adults (>18 years of age) who underwent elective lumbar fusion surgery between 2011-2019. A modified eight-tier risk-based CAPPS score and a simplified three-tier score was determined for each patient. Validated patient self-reported baseline and outcomes measures at 6-8 weeks and 12-18 months postoperative included the Oswestry Disability Index (ODI), EuroQol Group 5-Dimension Self-Report (EQ5D), and visual analogue pain scores (VAS) for back and leg.

Results:
At first follow-up, regression analysis revealed statistical significance between the CAPPS score, the ODI score and EQ5D anxiety/depression score. On linear regression analysis at final follow-up, the 8-tier CAPPS Score was correlated with VASback and VASleg pain scores, and all but one ODI and EQ5D variable respectively. At final follow-up, the 3-tier CAPPS score was associated with VASback and VASleg scores, and multiple ODI And EQ5D variables.

Conclusion:
The preoperative CAPPS score correlates with long term outcome measure of pain, function and quality of life after lumbar fusion surgery. Modifiable components of CAPPS could help guide medical preoperative optimization for surgery.

Funding Sources:
Dean's Project Grant, College of Medicine.

Non-Awake vs Awake Placement of Spinal Cord Stimulators in Canada: A Multi-Centre Qualitative Study

Platform Presenter: Kristen Marciniuk

Division of Neurosurgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Jonathan Norton (Department of Surgery, University of Saskatchewan).

Rationale:
Spinal cord stimulation (SCS) is a common therapeutic approach for treating intractable chronic pain. A key factor determining SCS efficacy is lead positioning to generate paresthesias in areas of perceived pain. There are two distinct approaches to confirming appropriate coverage.
1) Sedative anesthesia with local anesthetic and intraoperative patient reporting of pain coverage.
2) General anesthesia and intraoperative neurophysiological mapping using compound muscle action potentials (CMAP) or somatosensory evoked potential (SSEP) collisions. Placement guided by neuromonitoring has been shown to decrease OR times, produce more accurate placement with better pain coverage and less excess paresthesias and adverse events. The aim of this study is to determine the prevalence of non-awake SCS placement with neuromonitoring in Canada, given the demonstrated benefits, and to identify possible barriers to implementation.

Methods:
We designed a structured questionnaire to assess the procedures for SCS implantation in centres across Canada. The survey was distributed via email to members of the Canadian Neuromodulation Society.

Results:
Preliminary results indicate 50% of functional neurosurgeons perform SCS implantation asleep with neuromonitoring. Barriers to utilizing neurophysiologist assisted lead placement include familiarity with the awake procedure, lack of access, and lack of awareness.

Conclusions:
The results of this survey will provide a comprehensive summary of the practice of neuromodulation in Canada. These results are preliminary and based on low number of responders. We anticipate that as responses continue to be collected the frequency of asleep SCS implantation with neuromonitoring will be much lower.

Funding Sources:
None.

Medial Congruent vs Cruciate Retaining Total Knee Replacement: A Randomized Controlled Research Trial

Platform Presenter: Bianca Sarkis

Division of Orthopedic Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
William Dust (Department of Surgery, University of Saskatchewan), Anthony King (Department of Surgery, University of Saskatchewan), Trevor Loback (Department of Surgery, University of Saskatchewan), Ian Lutz (Department of Surgery, University of Saskatchewan), Jeffrey McKerrell (Department of Surgery, University of Saskatchewan), Jans van der Merwe (Department of Surgery, University of Saskatchewan).

Rationale:
Total knee arthroplasty is a successful treatment for knee osteoarthritis; however, 10-15% of are dissatisfied with the outcome and have persistent pain. One approach has been to modify the components used. Presently, the Persona Cruciate Retaining and Medially Congruent designs are commonly used in Canada. The purpose of the study is to compare the results of the two surfaces in order to improve surgical outcomes and assist in indicating future implant designs.

Methods:
Participants will be recruited from the Saskatoon arthroplasty group. The mainstay of evaluation will be by Patient Reported Outcome Measures (PROMS). Pre-operatively, patients will complete the Oxford 12 Knee score and the VR-12 Quality of Life score. Intra-operatively, they will be randomized to one of two implants. Follow-up will occur at 12 and 24 months post-op. At these visits, patients will once again complete the Oxford and VR-12 questionnaires, as well as the Forgotten Joint Score and New Knee Society Satisfaction Score. The 24 month follow-up range of motion assessment occurs with a different surgeon to preserve blinding. Routine pre and post-operative x-rays will be used to assess the degree of arthritis and final positioning of implants.

A bilateral total knee replacement sub-study will be conducted within the same study group. The initial knee will be included in the randomization, and the second knee will receive the other implant, in order to analyze both in the same patient.

Results/Conclusions:
We are hoping to recruit 360-400 participants in 12-18 months. The duration of the study is likely to be 3-4 years.

Funding Sources:
None.

Neurophysiology and Acute Stroke: Prediction of Outcomes Post-Operatively

Platform Presenter: Nicole Pendleton

Division of Neurosurgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Jonathan Norton (Department of Surgery, University of Saskatchewan), Lissa Peeling (Department of Surgery, University of Saskatchewan), Michael Kelly (Department of Surgery, University of Saskatchewan), Arthur Sowa (Department of Mathematics, University of Saskatchewan), Francis Bui (Department of Electrical Engineering, University of Saskatchewan).

Rationale:
Advances in acute stroke treatment, such as thrombolysis or endovascular therapy have decreased the burden of disability. For every minute that the brain is deprived of blood flow due to an ischemic stroke approximately 1.9 million nerve cells are lost along with a staggering 12km of axonal fibres and 13.8 billion connections between cells. In stroke the mantra truly is; Time is Brain. Much work is done on metrics such as 'Door to needle time' are used and seen as indicators of stroke quality care overall. Spontaneous activity (EEG) and triggered somatosensory evoked potentials are commonly used in surgical cases to warn of an impending stroke. This year the concept of being "last electrically well" was introduced. This project is to investigate the possibility of using neurophysiology to identify successful revascularization, the concept of "next seen electrically well".

Methods:
Patients with suspected large vessel occlusion, a NIHSS ≥10 and be deemed suitable for endovascular therapy are eligible. Stimulation for the SSEPs will be applied to the median nerve, the posterior tibial nerve bilaterally and from the scalp overlying the sensory cortices. EEG activity will be recorded using 6 electrodes. Recordings will occur during the preparation of the patient, removal of blood clot and after removal of the clot. At each time point, the ASPECTS and tici score will be documented.

Conclusion:
At the conclusion of the project, we will have significant insights into both how neurophysiology can be a biomarker of ischemic stroke and how it may be used to guide revascularization. We currently have results for two participants and are actively enrolling and conducting the study on more patients.

Funding Sources:
RUH Foundation.

Preliminary Analysis: Dexamethasone-Supplemented TAP Blocks May Reduce Opioid Requirements after Colorectal Surgery: A Multi-Center Randomized-Controlled Trial

Platform Presenter: Samantha Bird

Division of General Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
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Rationale:
The use of dexamethasone in conjunction with peripheral nerve blocks has been shown to increase the duration of the block. In this multicenter randomized trial, we sought to assess pain control and nausea in the first 48 hours post-operatively after minimally invasive colorectal surgery in patients who received TAP blocks with and without dexamethasone.

Methods:
This study is powered to include 60 patients from two academic hospitals that perform colorectal surgery in Saskatoon and Vancouver. Twenty-four patients undergoing laparoscopic colorectal surgery were included in this analysis. Patients were allocated into 2 groups. Group 1 (TAP) received bilateral TAP blocks using 0.25% bupivacaine with epinephrine and Group 2 (TAP-D) received bilateral TAP blocks in combination with dexamethasone. Opioid use in the post anesthetic care unit, at 24h, 48h were recorded from patient charts.

Results:
There were 14 patients in the TAP group and 10 patients in the TAP-D group. Adjusting for 9 confounders, TAP blocks with dexamethasone did not significantly change opioid requirements in PACU, at 24H or 48H post-op. There was a trend towards lower opioid use in the TAP-D group at 24H (-9.3mg; p=0.36), at 24-48H (-4.36mg; p=0.72), and in 48H total (-16.0mg; p=0.46). There was no difference in the number of patients reporting nausea (-0.2; p=0.36) or length of stay (-1.1; p=0.33).

Conclusion:
The preliminary analysis did not show significant improvement in opioid use in the first 48 hours post laparoscopic colorectal surgery with TAP-D blocks. A trend towards lower opioid use was evident in all our measured outcomes.

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None.

Notes

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