2021 DEPARTMENT OF SURGERY
VIRTUAL FACULTY RESEARCH DAY

University of Saskatchewan

Saskatchewan Health Authority

"One special advantage of the skeptical attitude of mind is that a man is never vexed to find that after all he has been in the wrong."

- Sir William Osler

Welcome to the 2021 Department of Surgery Virtual Faculty Research Day. The COVID-19 pandemic has had a significant impact on not only clinical work, teaching and research but our own lives as well. This last year has been a time for innovation, change and the learning of new ways to provide the best surgical care to the Province of Saskatchewan and its people. Today's virtual faculty research day speaks to the resilience of the members of the Department of Surgery and their commitment to excellence in research and academia during this health care crisis.

I would like to thank the Director of Research Dr. Daryl Fourney, research coordinator Karen Mosier and the research committee for their generous contributions of time and effort in preparing this event. We are honored to have Dr. Andrew Seely from the University of Ottawa as our keynote speaker. It will be an exciting day and I look forward to all the presentations.

Dr. Brian Ulmer

Clinical Professor and
Interim Provincial Head

Department of Surgery

University of
Saskatchewan
and
Saskatchewan Health
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The COVID-19 pandemic has continued to challenge our health systems and highlighted some systemic weakness. At no time in recent memory has the appetite for trustworthy clinical evidence to guide health decisions been greater. Despite millions of dollars of investment in COVID-19 research in Canada, contributions from other counties have exceeded ours in guiding much health policy. COVID-19 has shown the need for better research infrastructure in Canada, as well as strategic planning to coordinate objectives. A culture change is required, so that research is not viewed as a separate activity driven by a small number of dedicated investigators, but rather, an intricate part of the health system, for which all of us (i.e., physicians, nurses, allied health workers, support staff, administration) needs to be more engaged.

During this difficult time, I have been privileged to work with colleagues across Canada as part of The Canadian Association of Chairs of Surgical Research - a national voice for surgical research. I was pleased to share with them our Department's Research Handbook for Faculty and Residents, released in late 2020. It is just one example of a tool to help surgeon researchers find solutions for daily challenges.

Despite the pandemic, research output in our Department has continued to grow: peer-reviewed publications, abstracts at national and international (virtual) meetings, and competitive peer-reviewed grants have increased. These efforts are highlighted in the Department of Surgery's Annual Report.

Today we celebrate our Faculty's research: we have a diverse group of researchers across multiple Divisions, spanning basic science and clinical work. Please take this opportunity to learn more about research in the Department of Surgery and, if interests align, reach out to your colleagues. I wish to thank all of the presenters, moderators and judges. I would also like to thank the Research Committee, who helped plan the program and awards. I particularly want to thank our invited guest, Dr. Andrew Seely, from the University of Ottawa. Finally, I thank the support staff in the Department for facilitating this excellent program.

Dr. Daryl Fourney

Professor and
Director of Research

Department of Surgery
and
Division of Neurosurgery

University of
Saskatchewan
and
Saskatchewan Health
Authority

FACULTY RESEARCH
AWARDS

2019 Award Recipients

Surgery
Faculty Research Day

Platform Presentations:

1st Prize	Dr. Paul Mick
2nd Prize	Dr. Jeremy Reed
3rd Prize	Michael Zaki
Honourable Mention Presentation	Dr. Jake Pushie

2018 Award Recipients

Surgery
Faculty Research Day

Platform Presentations:

1st Prize	Hye Ji (Jay) Kim (Dr. Francisco Cayabyab)
2nd Prize	Dr. Mike Moser
3rd Prize	Dr. Daryl Fourney

2017 Award Recipients

Surgery
Faculty Research Day

Clinical Presentations:

1st Prize	Dr. Daryl Fourney
2nd Prize	Dr. Nael Shoman

Basic Science Presentations:

1st Prize	Dr. Jake Pushie (Dr. Michael Kelly)
2nd Prize	Elisabet Jakova (Dr. Francisco Cayabyab)

2021
DEPARTMENT OF SURGERY
VIRTUAL FACULTY RESEARCH DAY

May 25, 2021

Contents

Introduction

Department of Surgery
Virtual Faculty Research Day

08:00 AM - 08:15 AM

WELCOME

Dr. Brian Ulmer
Clinical Professor & Interim Provincial Head
Department of Surgery

OPENING REMARKS

Dr. Daryl Fourney
Professor & Director of Research
Department of Surgery

Session I

Department of Surgery
Virtual Faculty Research Day

MODERATOR: Dr. David Kopriva

08:15 AM - 09:30 AM

10 Minute Break 9:30 AM - 9:40 AM

Keynote Speaker

Department of Surgery
Virtual Faculty Research Day

MODERATOR: Dr. Stephen Gowing

09:40 AM - 10:40 AM

Developing Surgeon Scientists and Surgical Research

Dr. Andrew Seely

Scientist, Clinical Epidemiology Program
Ottawa Hospital Research Institute

Tier I Clinical Research Chair, Faculty of Medicine
University of Ottawa

Professor of Surgery, Division of Thoracic Surgery
University of Ottawa

Professor of Surgery, Division of Critical Care Medicine
University of Ottawa

Vice-Chair Research, Department of Surgery
University of Ottawa

Director of Research, Department of Thoracic Surgery
The Ottawa Hospital

President
Canadian Association of Thoracic Surgeons

Founder and Chief Executive Officer
Therapeutic Monitoring Systems (TMS) Inc

10 Minute Break 10:40 AM - 10:50 AM

Andrew JE Seely is a Professor at the University of Ottawa within the Departments of Surgery (Thoracic Surgery) and Critical Care Medicine, a Scientist at the Ottawa Hospital Research Institute, a Tier I Clinical Research Chair (2020-2025) in the Faculty of Medicine at the University of Ottawa, Vice-Chair of Research in the Department of Surgery at the University of Ottawa, Director of Research for the Ottawa Division of Thoracic Surgery, President of the Canadian Association of Thoracic Surgeons, and Founder and Chief Executive Officer of Therapeutic Monitoring Systems Inc.

Dr. Seely's education includes an undergraduate honors physics (B.Sc.) at Carleton University, followed by medical school (MDCM), general surgery training (FRCSC), and a doctoral degree in basic science from McGill University (PhD), and thoracic surgery and critical care medicine training (FRCSC) at the University of Ottawa.

Dr. Seely's scholarly interests include: 1) theoretical research exploring the clinical insights of complex systems science (e.g. emergence, uncertainty and dissipation); 2) physiologic understanding of complex biologic variability; 3) applied research monitoring multiorgan variability during exercise, onset and resolution of infection, prediction of likelihood of donation success following Donation after Circulatory Death (DCD), critical illness and weaning; and 4) development and implementation of a systematic means to continuously monitor all adverse events after all surgery, and feedback that information to improve surgical care.

Dr. Seely has supervised several graduate students and built research teams, has published over 145 peer-reviewed papers, presents annually at international meetings and has been awarded over $8.7 in competitive grant funding. He shares his family life with Kathy Patterson and their daughters Phoebe and Ruby in Ottawa.

Dr. Andrew Seely

Professor of
Thoracic Surgery &
Critical Care Medicine,

Tier 1 Clinical Research
Chair, Faculty of Medicine

College of Medicine,
University of Ottawa

Scientist, Clinical
Epidemiology Program,
Ottawa Hospital Research
Institute

Session II

Department of Surgery
Virtual Faculty Research Day

MODERATOR: Dr. Lalenthra Naidoo

10:50 AM - 12:20 PM

Presentation of Awards & Closing Remarks

Department of Surgery
Virtual Faculty Research Day

12:20 PM - 12:30 PM

PRESENTATION OF AWARDS

Dr. Brian Ulmer
Clinical Professor & Interim Provincial Head
Department of Surgery

Dr. Daryl Fourney
Professor & Director of Research
Department of Surgery

CLOSING REMARKS

Dr. Daryl Fourney
Professor & Director of Research
Department of Surgery

1st, 2nd and 3rd Podium Presentations Award Winners will be announced via email later in the day

Acknowledgments

The Departments of Surgery would like to thank the following individuals for serving as judges and moderators for the 2021 Virtual Faculty Research Day.

Judges

Dr. Francis Christian
Clinical Professor, Department of Surgery
Division of General Surgery
College of Medicine, University of Saskatchewan

Dr. Renee Kennedy
Associate Professor, Department of Surgery
Division of Thoracic Surgery
College of Medicine, University of Saskatchewan

Dr. Jeremy Reed
Assistant Professor, Department of Surgery
Division of Orthopedic Surgery
College of Medicine, University of Saskatchewan

Dr. Adam Wu
Assistant Professor, Department of Surgery
Division of Neurosurgery
College of Medicine, University of Saskatchewan

Session Chairs

Dr. Stephen Gowing
Assistant Professor, Department of Surgery
Division of Thoracic Surgery
College of Medicine, University of Saskatchewan

Dr. David Kopriva
Clinical Associate Professor, Department of Surgery
Division of Vascular Surgery
College of Medicine, University of Saskatchewan

Dr. Lalenthra Naidoo
Assistant Professor, Department of Surgery
Division of Otolaryngology
College of Medicine, University of Saskatchewan

2021

Department of Surgery

VIRTUAL FACULTY RESEARCH DAY ABSTRACTS

Patient Tendencies Regarding Resiliency and Catastrophizing as it Relates to Carpal Tunnel Surgical Outcomes

Platform Presenter: Dr. David Sauder

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

Team Members/Affiliations:
Sarah McLaren (Department of Surgery, University of Saskatchewan), Laura Sims (Department of Surgery, University of Saskatchewan), Yanzhao (Alex) Cheng (Department of Surgery, University of Saskatchewan), Raymond Khan MD (Department of Surgery, University of Saskatchewan).

Rationale:
Carpal tunnel release (CTR) is performed in a similar fashion on all patients in a single surgical practice. Despite this, results continue to be variable. We believed that patient characteristics led to a clinical difference in outcomes for CTR patients and endeavored to demonstrate this.

Methods:
This was a prospective case series performed at a single center. Patients were enrolled on the morning of their surgery. They filled out three self-reported questionnaires to determine their Brief Resilience Score (BRS), their Pain Catastrophizing Scale (PCS) and their Boston Carpal Tunnel Questionnaire (BCTQ) score. The patients then underwent a CTR done in a standardized fashion. They then were followed up at 3 and 6 months to fill out a BCTQ to determine if the change in score correlated to their BRS and the PCS.

Results:
Patients had significant improvement in their BCTQ at 3 months and this did not significantly change at 6 months. The BRS and PCS scores did not correlate with the BCTQ in any way. We divided groups in catastrophizers and non-catastrophizers. We also divided patients in high, normal, and low resilience. We did not show any significant correlation to outcome in any of these categorizations.

Conclusion:
CTR is a reliable operation that significantly benefits patients. Results are good at 3 months and do not change significantly between 3 and 6 months. Outcomes appear to be unaffected by patient characteristics of pain catastrophizing and resiliency. CTR can be offered to patients regardless of their psychological or personality traits.

Funding Sources:
Saskatoon Orthopedic Advancement Fund.

Istradefylline, an FDA-approved Anti-Parkinsonian Drug, is Neuroprotective in a Preclinical Animal Ischemic Stroke Study

Platform Presenter: Michael Zaki

Neuroscience Research Cluster, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Elisabet Jakova (College of Medicine, University of Saskatchewan), Dr. Francisco S. Cayabyab (Department of Surgery, University of Saskatchewan).

Rationale:
Ischemic stroke is followed by a rapid increase in extracellular concentrations of adenosine in both ischemic core and penumbra. This elevated adenosine has a short-term neuroprotective effect caused by A1 receptor (A1R)-mediated decrease in presynaptic glutamate release and reduced excitability in the postsynaptic membranes. This short-lived neuroprotective effect is caused by rapid desensitization of the inhibitory A1R and the subsequent upregulation of the excitatory A2A receptor (A2AR). Therefore, we hypothesize that blocking A2ARs with the clinically approved A2AR antagonist Istradefylline ameliorates neuronal damage and behavioral deficits in an animal stroke model.

Methods:
We have developed the pial vessel disruption (PVD) as a unique model of small vessel stroke in male Sprague-Dawley rats. Istradefylline (3mg/kg, i.p.) was administered 1 hr after surgery and for the next 2 days. On day 3, we performed behavioural analysis to assess post-stroke anxiety and memory deficits. On day 4, the rat brains were analyzed electrophysiologically for changes in long term potentiation (LTP) and with confocal imaging for propidium iodide (PI)/FluoroJade C (FJC) staining for cell damage/ neurodegeneration. In addition, we assessed the contribution of proinflammatory and anti-inflammatory markers of microglia in neuronal damage.

Results:
We found that Istradefylline significantly attenuated PVD-induced cognitive impairment and LTP deficits. Istradefylline reduced anxiety and depressive symptoms. Moreover, Istradefylline significantly lowered neuronal death and neurodegeneration in hippocampal tissue. Finally, Istradefylline suppressed the expression of the pro-inflammatory markers nNOS and TNF-alpha 72 hr following PVD.

Conclusion:
The clinically approved Istradefylline showed neuroprotective translational potential in our pre-clinical animal model of cerebral ischemia.

Funding Sources:
SHRF, Heart and Stroke Foundation and UGS (University of Saskatchewan Graduate Scholarship).

A Randomized Controlled Trial of Negative Pressure Wound Therapy (NPWT) to Reduce Colorectal Surgical Site Infection (SSI)

Platform Presenter: Dr. Gary Groot

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

Team Members/Affiliations:
Sheev Dattani (Saint Alphonsus, Boise, Idaho), Prosanta Mondal (Community Health and Epidemiology, University of Saskatchewan), Rhonda Darbyshire (Saskatchewan Health Region), Carolyn Morin (Saskatchewan Health Region), David Ginther (Department of Surgery, University of Saskatchewan), Hong Pham (Department of Surgery, University of Saskatchewan), Jivanjot Gill (College of Medicine, University of Saskatchewan).

Rationale:
The surgical site infection (SSI) rate in clean-contaminated wounds from elective colorectal procedures ranges from 15-30%. Within our health region, SSI rate is 20% despite implementation of preventative measures.

Methods:
This was an unblinded randomized controlled trial designed to determine the effectiveness of prophylactic negative pressure wound therapy (NPWT) in reducing superficial SSI in clean-contaminated elective colorectal surgery. Participants were randomized to either standard surgical dressing (SSD) or negative pressure wound therapy (NPWT) over a closed incision. The outcome measured was the incidence of superficial surgical site infections (SSI) at post-operative day 30.

Results:
126 of a planned 398 patients were randomly assigned to SSD (n= 61) or NPWT (n= 61). 55 patients from the SSD group and 47 from the NPWT group were included in the analysis. Results showed a clinically important but statistically non-significant difference between the two groups. The overall rate of SSI of the as-treated analysis was 14.7% and was slightly lower at 13.5% in the intent-to-treat (ITT) analysis. Across both analyses, there was a trend toward higher rates of SSI in the SSD, with the ITT analysis showing somewhat larger differences; however, in both logistic regression models, the trends were non-significant.

Conclusion:
We present the only known randomized controlled trial of prophylactic NWPT after elective colorectal resection, which yielded a non-statistically significant reduction in superficial SSI rate compared with standard surgical dressing. An adequately powered prospective randomized study is needed to clarify the effectiveness of NPWT to reduce wound infections in this patient population.

Funding Sources:
Kinetic Concepts Incorporated (KCI).

A Placebo-Controlled, Double-Blind, Multicentre, Randomised Phase 3 Trial of Riluzole in Patients Undergoing Decompressive Surgery for Degenerative Cervical Myelopathy

Platform Presenter: Dr. Daryl Fourney

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

Team Members/Affiliations:
MG Fehlings (University of Toronto), JH Badhiwala (University of Toronto), EM Massicotte (University of Toronto), H Ahn (University of Toronto), HF Farhadi (Ohio State University), CI Shaffrey (University of Virginia), A Nassr (Mayo Clinic), P Mummaneni (University of California), PM Arnold (Kansas University Medical Center), WB Jacobs (University of Calgary), KD Riew (Columbia University), M Kelly (Washington University), DS Brodke (University of Utah), AR Vaccaro (Thomas Jefferson University), AS Hilibrand (Thomas Jefferson University), J Wilson (Louisiana State University), JS Harrop (Thomas Jefferson University), ST Yoon (Emory University), KD Kim (University of California Davis), C Santaguida (McGill University), B Kopjar (University of Washington).

Rationale:
Degenerative cervical myelopathy (DCM) due to cervical stenosis is the leading cause of spinal cord dysfunction in adults. Based on animal studies, we hypothesized that the sodium/glutamate blocking drug, riluzole, may improve function, reduce pain, and decrease neurological complications after surgery for DCM.

Methods:
In this multi-center, double-blinded, placebo-controlled randomized trial, 290 adults (mean age 58 years) with moderately-severe DCM (modified Japanese Orthopaedic Association [mJOA] scale score 8-14) were assigned to surgical decompression plus riluzole (50 mg PO BID for 14 days before surgery and 28 days after surgery) or surgical decompression plus placebo (N=141 riluzole; N=149 placebo).

Results:
There were no serious drug-related adverse events. Subjects in both trial arms improved in all endpoints for functional status, disability, quality of life, neurological function, and pain. There was no statistically significant difference between riluzole and placebo groups in the primary outcome of change in mJOA score at 6 months (2.45 vs. 2.83 points, respectively; treatment effect: -0.38 points, 95% CI -0.90 to 0.13 points, P=0.14). Patients in the riluzole group had a greater reduction in Neck Pain numeric rating scale (NRS) score than those in the placebo group that was sustained longitudinally over a 1-year period after surgery (treatment effect: -0.76 points, 95% CI -1.49 to -0.04 points). A similar trend was observed for Arm/Shoulder Pain NRS (treatment effect: -0.62 points, 95% CI -1.37 to 0.13 points).

Conclusion:
Although riluzole did does not enhance neurological recovery in DCM, potential effects in reducing neuropathic pain after surgery merit further study.

Funding Sources:
AO Spine North America.

Targeting Androgen Signaling and HERG-STAT1 Complex in Hormone-Sensitive Prostate Cancers

Platform Presenter: Dr. Francisco Cayabyab

Neuroscience Research Cluster, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Siyi He (College of Medicine, University of Saskatchewan).

Rationale:
Prostate cancer is the third leading cause of cancer death in Canadian men. Currently, androgen deprivation therapy is a common prostate cancer therapy, but the unwanted disruption of normal androgen signaling warrants further studies to find novel targeted therapy for prostate cancers. The potassium channel HERG (human ether-a-go-go-related gene) is over-expressed in solid tumors and hematopoietic cancers. We recently demonstrated the hormone-induced upregulation of HERG and transcription factor STAT1 in human breast cancer cells, and HERG-STAT1 assembly at the cell surface could be reduced by an inhibitory peptide. Here, we determined whether a similar hormone-sensitive regulation of HERG-STAT1 complex underlies the oncogenic potential of HERG in androgen-sensitive prostate cancer cells.

Methods:
To determine whether HERG and STAT1 levels are altered by androgen receptor (AR) stimulation, we used the AR-selective agonist R1881, AR antagonist Bicalutamide, and AR-sensitive LNCap and AR-insensitive C4-2 prostate cancer cells. We also studied whether a cell-permeable STAT1 peptide fragment (called FR-peptide) could prevent AR-induced cell proliferation and HERG-STAT1 interactions assessed by confocal imaging and co-immunoprecipitation (co-IP).

Results:
The AR agonist R1881 increased cell proliferation by promoting interaction between HERG and STAT1. Disrupting the HERG-STAT1 complex with FR-peptide or inhibiting AR with Bicalutamide decreased HERG and STAT1 expression, HERG-STAT1 colocalization/co-IP, and R1881-induced LNCap proliferation. In contrast, these effects were absent in C4-2 cells.

Conclusion:
These results indicate that AR signaling in LNCap increases HERG-STAT1 complex which promotes cancer cell proliferation, and that HERG-STAT1 complex represents a novel anti-cancer therapeutic target for androgen-sensitive prostate cancers.

Funding Sources:
This research was funded by NSERC Discovery Grant, SHRF, Canadian Breast Cancer Foundation and Canadian Foundation for Innovation to FSC.

Cardiovascular Risk Factors for Age-Related Hearing Loss

Platform Presenter: Dr. Paul Mick

Division of Otolaryngology - Head & Neck Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Rasel Kabir (Department of Surgery, University of Saskatchewan), M. Kathleen Pichora-Fuller (Department of Psychology, University of Toronto), Natalie Phillips (Department of Psychology, Concordia University), Charlotte Jones (Department of Medicine, University of British Columbia), Walter Wittich (École d'Optometrie, Université de Montréal), Emily Urry (Sonova International).

Rationale:
Sensory impairment is the leading cause of disability worldwide among adults aged 65 years and older and prevention is key to reducing the burden. Risk factors for cardiovascular disease (e.g., smoking, diabetes, hypertension, hyperlipidemia and obesity) may affect vascular health in the cochlea and thus hearing ability, but observational studies are lacking. Our goal was to determine if the five conditions listed above were associated with hearing decline among a community-based sample of Canadians aged 45-85 years, and whether the associations were modified by sex and age.

Methods:
Data from the first two waves of the Canadian Longitudinal Study on Aging (CLSA) (baseline and 3-year follow up) were used in the analyses. Hearing levels were determined using pure-tone audiometry. Multivariable regression was used to analyze associations between change in hearing and the presence or absence of cardiovascular disease risk factors at baseline, adjusting for relevant confounders. All analyses were stratified by sex. Effect modification according to age was tested using interaction terms.

Results:
There were 30,097 participants. Obesity and smoking predicted faster rates of hearing loss among females and males, respectively. Combinations of smoking and hypertension, and smoking and obesity, increased the risk relative to smoking alone among males. Many associations were stronger among adults in the 55-64 years old age group.

Conclusion:
The results justify trials to investigate whether treating cardiovascular disease risk factors reduces hearing loss. Preventive efforts may be most successful if aimed at adults in the 55-64 year-old age group.

Funding Sources:
College of Medicine Research Grant (CoMRAD); Sonova International.

SaskStim: A Novel Approach to Spinal Cord Stimulation Provides Both Modulation of Sensory Inputs to the Nervous System and Generates Locomotor-Like Patterns

Platform Presenter: Dr. Jonathan Norton

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

Team Members/Affiliations:
Gabrielle Couysen (College of Medicine, University of Saskatchewan).

Rationale:
Spinal Cord Stimulation (SCS) has a long tradition as a therapy option for chronic neuropathic pain. Tonic (50Hz) electrical stimulation through electrodes placed epidural on the dorsal surface of the spinal cord is effective in reducing pain by an average of 50% in around 80% of patients. Newer stimulation paradigms use burst stimulation patterns or very high frequency stimulation and have slightly better results, but very few patients have complete pain resolution and there remain some patients for whom SCS does not provide adequate pain relief. The aim of this study was to develop a novel SCS paradigm that may offer pain relief in a physiological manner different from existing patterns of stimulation.

Methods:
This is the first part of that study, an acute in vivo model. We used intact, anesthetized pigs and placed an epidural stimulating electrode on the dorsal surface of the spinal cord at the thoraco-lumbar junction. Somatosensory evoked potentials (SSEPs) were used to assess transmission of sensory percepts in the nervous system with recording electrodes on the scalp overlying the sensory cortex and stimulation applied at the 'ankle'. Epidural stimulation was randomized to either tonic, burst, high-frequency or SaskStim and a wash-out period was allowed between each modality. EMG electrodes were also placed in the legs.

Results:
All four types of epidural stimulation were able to modulate, and obliterate in some cases, the SSEP. Tonic and SaskStim produced the most locomotor like stepping patterns.

Conclusion:
SaskStim has potential to both modulate chronic pain and as an aid in rehabilitation.

Funding Sources:
Department of Surgery, College of Medicine (CoMGRAD) and Start-up Funds.

New Parkinson's Disease (PD) Models and Emerging Roles of Adenosine A1 Receptors in PD-Related Alpha-Synucleinopathy and Dopaminergic Neuron Loss

Platform Presenter: Elisabet Jakova

Neuroscience Research Cluster, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Damaso Sadi (Department of Surgery, University of Saskatchewan), Aniket Kumar (Department of Surgery, University of Saskatchewan), Ivar Mendez (Department of Surgery, University of Saskatchewan), Francisco S. Cayabyab (Department of Surgery, University of Saskatchewan).

Rationale:
Most animal models of Parkinson's disease (PD) focus on understanding the late-stage pathogenic processes of dopaminergic neuron depletion and Alpha-Synuclein (α-Syn) aggregation. Our team recently discovered that prolonged adenosine A1 receptor (A1R) stimulation leads to increased α-Syn expression in rat substantia nigra and in dopaminergic neuronal cell line. We hypothesized that chronic A1R stimulation leads to α-Syn misfolding/aggregation and subsequent neurodegeneration of dopaminergic neurons.

Methods:
Initially our in vivo PD model involved a 7-day i.p. injection of male Sprague-Dawley rats with N6-Cyclopentyladenosine (CPA, A1R-selective agonist) with or without 1,3-dipropyl-8-cyclopentylxanthine (DPCPX, A1R antagonist). Another in vivo PD model using female Wistar rats and intracerebral infusion of CPA in the nigro-striatal pathway, with or without prior i.p. injection of DPCPX, was also used. After respective treatments, animals were subjected to a battery of behavioural tests and the rat brains were analyzed immunohistochemically for neurodegeneration and loss of dopaminergic neurons.

Results:
With i.p. injections, CPA-treated rats showed increased depressive-like behaviour and motor deficits compared to vehicle-treated groups. Co-administration with DPCPX attenuated these behavioural abnormalities. Confocal imaging analyses confirmed significant substantia nigra neurodegeneration and α-Syn aggregation after CPA treatments. With a unilateral intracerebral infusion of CPA, we observed increased ipsilateral neurodegeneration of dopaminergic neurons (reduced tyrosine hydroxylase) and progressively worsening motor function (via methamphetamine challenge) assessed at 3, 6, and 12 weeks post-CPA infusion.

Conclusion:
Our novel in vivo PD models strongly indicate the A1R involvement in the loss of substantia nigral neurons, suggesting that A1Rs and downstream A1R-activated signaling could be targeted for novel PD therapy.

Funding Sources:
This research was funded by the NSERC, SHRF, HSFC and CFI to FSC.

The Establishment of Third Space Submucosal Endoscopy at the University of Saskatchewan

Platform Presenter: Stephen Gowing

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

Team Members/Affiliations:
Samson Haimanot (Division of Gastroenterology, Department of Medicine, University of Saskatchewan).

Rationale:
Traditional therapeutic endoscopy involves endoluminal based therapies for the resection of premalignant and early malignant mucosal lesions as well as endoscopic ultrasound and fluoroscopy-based therapies. Recent advances in endoscopy, initially pioneered in Japan, have enabled endoscopes to incise the mucosa and travel outside the bowel lumen into the submucosal plane. Access to this new third space allows for the en bloc resection of mucosal lesions to the depth of the muscularis propria utilizing a standard gastroscope or colonoscope, without the need for bulky rigid platforms. Previously endoscopic mucosal resection (EMR) was available for small superficial lesions confined at or above the muscularis mucosa. Larger mucosal lesions would require piecemeal EMR, resulting in difficult to interpret margins with high rates of positivity, or need for major surgery. Additionally, submucosal tunnelling enables endoscopic myotomy as well as the resection of small submucosal lesions.

Methods:
Commencing in February 2020, endoscopic submucosal dissection (ESD) was introduced for the en bloc resection of early esophageal, gastric and colorectal cancers.

Results:
In addition to preventing the need for surgical resection, ESD enables a curative intent alternative for patients with major comorbidities who would not be candidates for curative intent surgery or chemoradiation. Per-Oral Endoscopic Myotomy (POEM) was subsequently introduced for the treatment of achalasia, followed by Zenker's diverticulum endoscopic cricopharyngeal myotomy (Z-POEM), allowing for therapeutic myotomy without surgery.

Conclusion:
Third space submucosal endoscopy is available and offers an important therapeutic alternative for Saskatchewan patients with benign and malignant gastrointestinal disease.

Funding Sources:
None to declare.

Cannabis Use Patterns in Canadian Surgical Patients at the Time of Legalization: A Collaborative Multicenter Study

Platform Presenter: Dr. Laura Sims

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

Team Members/Affiliations:
Dr. Ruby Grewal (Wrist Evaluation Society of Canada, Western University), Roth Mcfarlane (Hand and Upper Limb Centre).

Rationale:
Cannabis was recently legalized for recreational use in Canada and has been used medically for several years. Cannabis use patterns as well as patient's attitudes toward cannabis use at the time of legalization are not well understood and it is unclear what effect these legal changes might have. These patterns are important for surgeons to understand in their patient population.

Methods:
A multicenter cross-sectional survey study of over 1500 patients collected anonymously from upper extremity orthopedic patients at seven sites in 2018 was performed. Participants were asked whether they currently use cannabis. If affirmative, they were asked a series of questions regarding usage patterns. Participants were also asked about their perceptions surrounding cannabis use, including likelihood of use, safety, and comfort discussing it with their physician.

Results:
In the six months following legalization, 50% of participants felt that cannabis was safer than prescription narcotics, with 29% currently using cannabis. Reasons included pain (56%), stress (51%), and recreation (42%). Of those not using cannabis, 24% were more likely to consider it following legalization. Forty-six percent stated they were comfortable discussing cannabis with their physician. Forty-three percent were using cannabis more than four times per week.

Conclusion:
Many patients are currently using cannabis on a regular basis. Patients are more comfortable discussing cannabis with their physician than before legalization. Treating surgeons should be aware of these trends and expect to receive questions regarding use. Surgeons should be educated on the potential risks and benefits of Cannabis use in the perioperative period.

Funding Sources:
None.

A Research Day Project
About Research Day Projects

Platform Presenter: Dr. Mike Moser

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

Team Members/Affiliations:
Zarrukh Baig (Department of Surgery, University of Saskatchewan), Carlos Verdiales (College of Medicine, University of Saskatchewan), Zaini Sarwar (Department of Medicine, University of Saskatchewan).

Rationale:
Peer-reviewed publication is an important validation of the hard work and expense that went into a project. Yet, many resident projects worthy of publication are never published. The purpose of our study is to determine what factors predict publication or presentation at a national conference.

Methods:
Department of Surgery Resident Research Day programs and abstracts were obtained from 2008-2020. Publication or presentation status was obtained using Google Scholar and PubMed. Univariate analysis was performed using Student's t-test or chi-squared test, followed by logistic regression analysis.

Results:
A total of 201 projects were identified. The presenter/first author was a surgery resident for 117 of the abstracts. Because the median time from research day to publication was 12 months, abstracts from 2019 and 2020 were not considered in the final analysis, leaving 99 abstracts. Fifty-one of the 99 projects were published in peer-reviewed journals (52 %), and 36 (36%) were presented at national conferences. Only 26 of 43 Research Day award-winning abstracts (60%) appear to have gone on to publication. Multivariate analysis revealed multidisciplinary research (OR 4.46, 95%CI 1.8-11.4, p= 0.002), greater than one trainee working on the project (OR 2.56, 95% CI 1.02-6.43, p=0.045), and faculty supervisor having > 25 publications (OR 2.46, 95% CI 1.03-5.88, p=0.042) as significant predictors of publication. No factors were identified that predicted presentation at a national conference.

Conclusion:
Our study identifies factors that can serve as starting points in discussions of ways of reducing the rate of unpublished resident projects.

Funding Sources:
No funding was required. Many thanks to Karen Mosier and Angela White for their help in obtaining archival information.

UNIVERSITY OF SASKATCHEWAN
Department of Surgery

Saskatchewan
Health Authority