



# 2017 RESIDENT RESEARCH DAY SURGERY & PATHOLOGY





*“Search and study out the secrets of nature  
by way of experiment.”*

- William Harvey (1578-1657)

English physician who discovered the systemic circulation



## Dr. Ivar Mendez

Fred H. Wigmore  
Professor and  
Unified Head

Department of Surgery  
University of  
Saskatchewan  
and  
Saskatoon Health  
Region

Welcome to the 2017 Departments of Surgery and Pathology Resident Research Day!

The research committee have put a lot of effort in organizing this event. The submissions were of high quality and 26 abstracts were chosen for oral presentations. This year the Department of Pathology will join us for this event.

I am very pleased to report that research in the Department of Surgery is thriving. In 2016, the Department attracted over 1.5 million dollars in new research funding and 42 papers were published by our faculty. We have focused our efforts in enhancing resident research and have established a Resident Research Incentive Program Award as well as resident research workshops, research topics seminars and published a research manual that provides a roadmap for navigating research processes at the University of Saskatchewan and the Saskatoon Health Region.

Dr. Morad Hameed, President, Canadian Association of General Surgeons and Associate Professor and Chief, Section of Trauma and Acute Care Surgery Department of Surgery, University of British Columbia is our invited guest and will give the keynote address. Dr. Hameed will also be one of the four Judges along with Dr. Marek Radomski, Dr. Michael Levin and Dr. Elliot Pally. I would like to thank our judges for taking time to assist with this important academic endeavor.

I look forward to seeing all Department members, residents and graduate students at the City Hospital Rependa Theater, Saskatoon City Hospital for an exciting array of research presentations.

Welcome also from Pathology & Laboratory Medicine!

On behalf of the Department of Pathology & Laboratory Medicine I would like to thank Dr. Mendez and the Department of Surgery for extending an invitation to join them for the Joint Resident Research Day. I am pleased that seven of the oral presentations have come from Pathology & Laboratory Medicine. I would like to commend all Faculty in both Departments for their assistance in providing leadership and mentoring to facilitate the residents in this initiative. I would also like to commend the Pathology research Committee for their hard work in contributing to the organization of this event. In addition, I wish to commend all who are presenting for their spirit of inquiry, hard work and high quality topics.

Successful health care and careers in health care are built around the concept of 'team' and a joint initiative such as this provides all involved with an opportunity to build teams and to learn from each other. I hope this event will prove to be a stimulus to future collaborations between our Departments and lead to the development of successful research groups of the future.

I look forward to an exciting and educational day for us all.



**Dr. Fergall Magee**

Associate Professor and  
Unified Head

Department of  
Pathology & Laboratory  
Medicine

University of  
Saskatchewan  
and  
Saskatoon Health  
Region



**Dr. Nael Shoman**  
Director of Research  
Department of Surgery  
College of Medicine  
University of  
Saskatchewan

I would like to take this opportunity to thank all the residents and medical students that have taken time out of their busy schedules to do great research, submit an abstract, and present their work today. As a Department, we are proud to celebrate your work today and showcase your research accomplishments. Thank you and keep up the good work!

I would also like to take the opportunity to thank our faculty members that have shown dedicated commitment to research through their ongoing mentorship and guidance to residents and medical students. The large number of abstracts this year, even more than last year, is a testimony to that commitment, and a demonstration of the changing research culture in our Department.

As a Department, we were very excited to have the Department of Pathology join us on this exciting day. It is a tremendous opportunity to collaborate, learn, and enhance our research profile.

I am honoured to be a part of this year's Resident Research Day, and I look forward to a tremendous day of accomplishments!

## 2016 Award Recipients

### Platform Presentations:

Excellence in Research Award	Suzie Harriman
First Place Award	Amanda Hall
Special Judges Award	Jeffrey Gu

### Poster Presentations:

First Prize	Laura Sims
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### Undergraduate Medical Student Awards:

Dash-Reed Research Award	Kayleen Wingert Reed Gillanders
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## 2015 Award Recipients

### Platform Presentations:

First Prize (Kloppenburger Award)	Jason Shin
Second Prize	Farrukh Munshey
Third Prize	Laura Sims

### Poster Presentations:

First Prize	Amanda Hall
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### Undergraduate Medical Student Awards:

Platform Award Recipient: (Dash Reed Research Award)	Haven Roy
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Poster Award Recipient:	Jimmy Lam
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# 2017 RESIDENT RESEARCH DAY

Surgery

May 24, 2017

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# SESSION I

Saskatoon City Hospital  
Rependa Centre, Asher Auditorium

CHAIR: Dr. Jeff McKerrell

08:45 - 09:45

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## SESSION II

Saskatoon City Hospital  
Rependa Centre, Asher Auditorium

CHAIR: Dr. Bruce DuVal

09:45 - 10:45

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Break 10:45 - 11:00

# SESSION III

Saskatoon City Hospital  
Rependa Centre, Asher Auditorium

CHAIR: Dr. John Shaw

11:00 - 12:00

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## KEYNOTE SPEAKER

Saskatoon City Hospital  
Rependa Centre, Asher Auditorium

12:00 - 12:30

# BIG DATA, STATISTICAL PROCESS CONTROL, AND THE FUTURE OF SURGICAL QUALITY

**Dr. Morad Hameed**

Associate Professor and Chief  
Section of Trauma and Acute Care Surgery  
Department of Surgery, University of British Columbia  
President, Canadian Association of General Surgeons

Lunch  
Foyer outside of Auditorium  
Main Floor, Saskatoon City Hospital

12:30 - 13:30

Morad Hameed is a trauma surgeon and intensivist at the Vancouver General Hospital (VGH) and an Associate Professor of Surgery at the University of British Columbia (UBC). He completed medical school and surgical residency at the University of Alberta, graduate studies in public health at Harvard University, and fellowships in Trauma Surgery and Surgical Critical Care at the University of Miami. He was an Assistant Professor of Surgery at the University of Calgary before moving to Vancouver.

He currently serves as the Chief of the Section of Trauma, Acute Care Surgery, and Surgical Critical Care in the UBC Division of General Surgery, and is the Director of the Trauma and Acute Care Surgery Fellowship Program. He is a past Research Committee Chair for the Trauma Association of Canada (TAC), TAC Treasurer, CAGS Committee on Acute Care Surgery Chair and Program Committee Chair for the Canadian Surgery Forum.

His clinical and research interests are in trauma and acute care surgery, with a focus on trauma systems and the social determinants of health.



## Dr. Morad Hameed

Associate Professor and  
Chief, Section of Trauma  
and Acute Care Surgery

University of British  
Columbia

President, Canadian  
Association of General  
Surgeons

# SESSION IV

Saskatoon City Hospital  
Rependa Centre, Asher Auditorium

CHAIR: Dr. Kotoo Meguro

13:30 - 14:45

A Retrospective Review of the Diagnosis of Papillary Lesions of the Breast – The Saskatoon Experience NICK BANIAK (YANPING GONG)	35
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Break 14:45 - 15:00

## SESSION V

Saskatoon City Hospital  
Rependa Centre, Asher Auditorium

CHAIR: Dr. Gavin Beck

15:00 - 16:00

Follicular lymphoma with Plasmacytic Differentiation – A Rare Entity	JANA KUNASINGAM	41
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# **2017** RESIDENT RESEARCH DAY BANQUET

Delta Bessborough

RECEPTION

18:00

DINNER

19:00

Presentation of prizes:

Dr. Ivar Mendez, Dr. Fergall Magee and

Dr. Nael Shoman



# ACKNOWLEDGEMENTS

The Department of Surgery would like to thank the following individuals for serving as judges and moderators for the 2017 Resident Research Day.

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## JUDGES

### Dr. Morad Hameed

Associate Professor and Chief  
Section of Trauma and Acute Care Surgery,  
University of British Columbia

### Dr. Marek Radomski

Vice Dean, Research  
College of Medicine  
University of Saskatchewan

### Dr. Michael Levin

MS Chair  
College of Medicine  
University of Saskatchewan

### Dr. Elliot Pally

Clinical Assistant Professor, Orthopedics  
Department of Surgery, College of Medicine  
University of Saskatchewan

## SESSION CHAIRS

### Dr. Jeff McKerrell

Clinical Professor  
Head, Division of Orthopedic Surgery  
Department of Surgery, College of Medicine  
University of Saskatchewan

### Dr. Bruce DuVal

Clinical Assistant Professor  
Interim Head, Division of Vascular Surgery  
Department of Surgery, College of Medicine  
University of Saskatchewan

### Dr. John Shaw

Clinical Professor  
Head, Division of General Surgery  
Department of Surgery, College of Medicine  
University of Saskatchewan

### Dr. Kotoo Meguro

Clinical Assistant Professor  
Head, Division of Neurosurgery  
Department of Surgery, College of Medicine  
University of Saskatchewan

### Dr. Gavin Beck

Clinical Assistant Professor  
Department of Surgery, College of Medicine  
University of Saskatchewan



**2017**

**RESIDENT RESEARCH DAY  
ABSTRACTS**

**SURGERY**

# **Heads or Tails: Is Fetal Scalp Lactate Better Than a Coin Toss for Predicting Neonatal Outcomes?**

Platform Presenter: Alicia Andrews

Department of Pathology and Laboratory Medicine  
College of Medicine, University of Saskatchewan

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## **Team Members:**

Dr. Martha E. Lyon, Department of Pathology and Laboratory Medicine, Saskatoon Health Region;  
Dr. Andrew W. Lyon, Department of Pathology and Laboratory Medicine, Saskatoon Health Region

**Area of Research:** Clinical

## **Rationale:**

Fetal scalp lactate has been used in many centres for decades as an adjunct to electronic fetal monitoring (EFM), with the goal of more accurately identifying fetal distress due to intrapartum hypoxia. Tenable correlations have been observed between scalp lactate and other markers of acidosis, but its relationship to neonatal outcomes is less clear. In a January 2017 paper, Wiberg and Källénin collected scalp lactate values for different EFM patterns and Apgar scores in an effort to define a normal range for fetal scalp lactate.

## **Methods:**

Data from Wiberg and Källénin was used to generate a receiver operating characteristic (ROC) curve, using Stata Version 10, for the Lactate Pro meter when discriminating between fetuses with normal EFM and five minute Apgar scores  $\geq 9$  to those with abnormal EFM or Apgar scores  $> 9$ .

## **Results:**

The area under the ROC curve was 0.73. The maximal sensitivity and specificity was at 3.1mmol/L with both sensitivity and specificity equal to 65.9%. At the most widely used clinical decision limit, 4.8mmol/L, sensitivity and specificity were 23.3% and 94.3% respectively.

## **Conclusion:**

At 4.8mmol/L, fetal scalp lactate has reasonable specificity, but very poor sensitivity to discriminate between fetuses with normal EFM and Apgar scores from those with abnormal patterns and/or scores  $< 9$ . The ability to identify normal fetuses may reduce the rate of caesarean section. However, to determine if fetal scalp lactate can identify fetuses that will go on to have poor outcomes, additional subgroups including neonates with lower Apgar scores need to be studied.

# Post-procedural ERCP Image Interpretation by Radiologists

Platform Presenter: Sita Ollek

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

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## Team Members:

Haven Roy, General Surgery; Dr. John Shaw, General Surgery

**Area of Research:** Clinical

## Rationale:

Endoscopic retrograde cholangiopancreatography (ERCP) plays an essential role in the diagnosis and treatment of biliary and pancreatic diseases. Endoscopists are required to interpret images and make therapeutic decisions during the procedure. The images are subsequently reviewed and reported on by a radiologist, after therapeutic interventions have been performed. Previous studies have demonstrated high rates of discrepancy between endoscopy and radiology reports. We aim to determine the rate of discrepancy at our center.

## Methods:

A retrospective review was performed of patients who underwent ERCPs between September 1, 2015 and August 31, 2016. Findings reported by endoscopists were compared to the final radiology report. Discrepancies are reported as proportions, with 95% confidence intervals (CI).

## Results:

A total of 133 eligible patients were included in our study. Discrepancies occurred between endoscopy and radiology reports in 53% of cases (95% CI 44% to 61%). Radiologists did not report on 82% (95% CI 71% to 92%) of cases with choledocholithiasis, 67% of bile leaks (95% CI 13% to 100%) and 55% of strictures (95% CI 33% to 77%).

## Conclusion:

ERCP has essential diagnostic and therapeutic roles. Currently most endoscopists perform therapeutic interventions based on their own intra-procedural image interpretation. Despite this, it remains common practice for radiologists to interpret and report after the fact. Our study shows that discrepancy rates between endoscopy and radiology reports are high. Selective interpretation may be more appropriate and cost effective.

# Mobile Application for Resident Evaluation in a Competency-Based Surgical Foundations Curriculum

Platform Presenter: Kelly Simo

Department of Surgery  
College of Medicine, University of Saskatchewan

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## **Team Members:**

Dr. Trustin Domes, Urology; Dr. Kylie Kvinlaug, Vascular Surgery

**Area of Research:** Clinical

## **Rationale:**

In Saskatchewan, the Surgical Foundations Training Program has been selected as a pilot to field test two entrustable professional activities (EPAs): Wound Closure and Initial Trauma Assessment, for the new Competency By Design (CBD) curriculum. A mobile application was created to assess residents on their performance of two EPAs.

## **Methods:**

Participants: Sixteen residents from the University of Saskatchewan Surgical Foundations program were enrolled. Surgical faculty that observed the trainees performing the EPA were also invited into the study. The mobile-based application was downloaded for free onto personal mobile devices by participants. Residents were introduced to the new assessment method and tool on the first day of their Surgical Foundations Program. Faculty were informed of the pilot project through email. Participants were invited to complete a survey.

## **Results:**

Only 11% of residents felt opposition by faculty to obtaining assessment with the app. The vast majority felt they had difficulty obtaining an assessment using the app. Difficulties included finding time to complete assessment and app access by staff. 85% of users felt the app was easy to use and all faculty were able to complete assessments in less than two minutes.

## **Conclusion:**

Comprehensive roll out is key for successful implementation of any process change. Adequate training on app use for both residents and faculty may improve implementation. Technology will not drive learning or assessment. The residents will be the change agents during the transition to CBD and must be involved in the process for it to succeed.

# Single-Centre Follow-up of TYRX Antibiotic Envelope for Neuromodulation Unit Implantation

Platform Presenter: Uzair Ahmed

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

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## **Team Members:**

Karen Waterhouse, University of Saskatchewan; Dr. Aleksander Vitali, University of Saskatchewan

**Area of Research:** Clinical

## **Rationale:**

Infections are a significant source of morbidity and additional costs for all neuromodulation programs. Studies have placed the rate of infection associated with neuromodulation units to be up to 20%. Local methods of infection control are attractive because they minimize systemic interference, and are therefore easier to administer. We present our experience with the TYRX absorbable antibiotic envelope. Our length of follow-up is longer than what has previously been reported in the literature.

## **Methods:**

We conducted a retrospective chart review of patients referred to one surgeon for either new implantation or revision of neuromodulation units between July 2014 and September 2016. Consecutive cases of deep brain stimulator, spinal cord stimulator, peripheral nerve stimulator, and baclofen or opioid pump implantation were included for analysis. We included a control group of consecutive patients with neuromodulation units placed immediately prior to our experience with the TYRX envelopes, for comparison.

## **Results:**

During the study period, 76 patients had 81 different instances of neuromodulation unit insertion. All patients received the TYRX antibiotic envelope during their surgery. The implants were followed for a total of 880 months, with an average follow-up of 11 months-per-implant. There were no incidences of infection involving antibiotic envelope-containing implants. In 77 consecutive cases of neuromodulation unit implantation prior to usage of the antibiotic pouch, there were 4 instances of infection (5.2%).

## **Conclusions:**

Our single center experience demonstrates a significant drop in the rate of hardware related infections with the use of an antibiotic envelope for neuromodulation unit implantation. We consider the routine use of the envelope to be a highly cost-effective method of infection avoidance in the setting of neuromodulation.

# Parenteral Nutrition Associated Liver Disease: The Effects of Lipid Composition and Aluminum Contamination on Bile Acid Transporters

Platform Presenter: Amanda Hall

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

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## Team Members:

Karen Waterhouse, University of Saskatchewan; Dr. Aleksander Vitali, University of Saskatchewan  
C. Arnold, College of Pharmacy and Nutrition; Dr. G. Zello, College of Pharmacy and Nutrition; Dr. J. Alcorn: College of Pharmacy and Nutrition; Dr. R. Bertolo, Department of Biochemistry, Memorial University of Newfoundland; Dr. J. Brunton, Department of Biochemistry, Memorial University of Newfoundland; Dr. G. Miller: Department of Surgery

**Area of Research:** Basic Science

## Rationale:

Infants on parenteral nutrition (PN) risk developing parenteral nutrition associated liver disease. The pathophysiology is not understood, but factors likely include pro-inflammatory (omega-6) lipids and aluminum (Al) contamination.

## Methods:

We conducted three randomized-control trials; two with a piglet PN model and one with a rat hepatocyte model. In the piglet work we compared high Al vs low Al in either an omega-6 or mixed (omega-3 and 6) lipid PN. We then exposed rat hepatocytes to Al, omega-6, or mixed lipids in isolation, and together. For all studies, we examined the bile acid transporters Mrp2, Mrp3, Bsep, Ntcp, and Oatp8/2, using qPCR, Western blot, immunohistochemistry, transmission electron microscopy, and functional assays.

## Results:

In the piglet trial using omega-6 lipids, qPCR demonstrated a fold difference in favour of low Al for Mrp2, Bsep, Mrp3, and Ntcp. In the piglet study with mixed lipids, C-reactive protein was higher in the high Al ( $p=0.03$ ) and qPCR revealed a downregulation for only Oatp8, Ntcp, and Mrp3 in favour of the low Al group. The canalicular microvilli were also longer in the low Al group ( $p=0.01$ ). For the hepatocyte study, Western blot showed more Oatp2 in the isolated Al group as compared to the Al plus omega-6 group ( $p=0.04$ ). The Mrp2 functional assay demonstrated lack of excretion in groups containing mixed lipids.

## Conclusions:

Aluminum has a negative effect on bile acid transporters and may be exacerbated with omega-6 lipids. Mixed lipids do partially mitigate the Al-induced changes but they may also have unexpected negative effects.



# Peripheral Nerve Stimulation as Treatment For Trigeminal Neuralgia: Implications For Therapy and Pathophysiology

Platform Presenter: Hao Li

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

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## **Team Members:**

Dr. Aleksander Vitali; Division of Neurosurgery

**Area of Research:** Clinical

## **Rationale:**

Trigeminal neuralgia is a debilitating chronic pain disorder affecting the face. Various treatment modalities exist for it, the most invasive of which is an operation around the brainstem known as microvascular decompression (MVD), based on the prevailing theory that trigeminal neuralgia is caused by vascular compression of the trigeminal nerve root. Recently, electrical stimulation of the trigeminal nerve branches of the face has been used to treat several chronic neuropathic pain disorders. However, little has been reported on the use of peripheral nerve stimulation (PNS) to treat trigeminal neuralgia. We present a case series of patients with trigeminal neuralgia who benefitted from PNS after having failed conventional management, including MVD.

## **Methods:**

This is a chart review of all the patients in our institution who received PNS as treatment for trigeminal neuralgia.

## **Results:**

Three patients were reviewed, one male and two females. Ages ranged from 34 to 62. All patients had lived with trigeminal neuralgia for at least 5 years. One experienced pain in the V1 and V2 distribution, while the other two V3. Two patients underwent ablative procedures of trigeminal branches, and all three eventually underwent MVD. As their pain was refractory, PNS was performed with satisfactory results. A major caveat was needing to re-adjust the stimulation program to provide ample coverage.

## **Conclusion:**

Our review shows that PNS may be an alternative surgical treatment for trigeminal neuralgia that is not as invasive as conventional procedures. As well, the success of PNS in patients who failed MVD brings into question the accuracy of the vascular compression theory in the etiology of trigeminal neuralgia, a theory that is already controversial. Our results support the idea that trigeminal neuralgia may involve pathology in the more peripheral branches of the trigeminal nerve.

# Evaluation of a Novel, Serum-based Biomarker Screening Test for Colorectal Cancer

Platform Presenter: Hoda Elshoni

Department of Pathology and Laboratory Medicine  
College of Medicine, University of Saskatchewan

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## Team Members:

Denise Lehotay, Former Medical Chemistry director SDCL; Shawn Ritchie, Phenomenome Discoveries Inc; Jon Tonita, Saskatchewan Cancer Agency; Riaz Alvi, Saskatchewan Cancer Agency; James McHattie, RQHR.

**Area of Research:** Clinical

## Rationale:

This study evaluates a new serum-based biomarker for colorectal cancer (CRC) screening and diagnosis. The biomarker (GTA-446) is a member of hydroxy -polyunsaturated ultra-long chain fatty acids and was found to be reduced in CRC patients compared to CRC-free subjects. Diagnostic test performance characteristics were used to identify the effectiveness of the test.

## Methods:

Serum levels of GTA-446 were measured in 4924 subjects who underwent colonoscopy for any reason, pathology results and clinical data were also collected. Two sets of age-matched control subjects were used; First were the lab controls (number=383) which were serum samples collected from Saskatchewan Disease Control Laboratory (SDCL) along with age and gender data. Second, were the endoscopy controls (number=762) which were obtained from the colonoscopy population after being determined to be cancer-free. Cut-off values were calculated using Receiver Operating Characteristic (ROC) curve.

## Results:

Serum GTA-446 was found to be reduced in 87% of CRC patients. Compared to lab controls, the GTA-446 biomarker has a sensitivity of 87%, specificity of 75%, positive likelihood ratio of 3.6, and negative likelihood ratio of 0.16. Using endoscopy controls to calculate test performance characteristics, the biomarker has a sensitivity of 87%, specificity of 50%, positive likelihood ratio of 1.74, and negative likelihood ratio of 0.24. Also, the level of GTA-446 was found to significantly decline with age ( $r=-0.20$ ,  $p<0.01$ ).

## Conclusion:

Serum GTA-446 is a potential biomarker for minimally invasive detection of colorectal cancer that compares favorably to other serum-based biomarkers.

# A Systematic Review of Factors Influencing Women's Choice of Mastectomy Versus Breast Conserving Therapy in Early Stage Breast Cancer

Platform Presenter: Jeffrey Gu

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

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## Team Members:

Dr. Gary Groot, General Surgery; Catherine Boden, Leslie and Irene Dubé Library; Angela Busch, School of Physical Therapy; Dr. Lorraine Holtslander, College of Nursing; Dr. Hyun Lim, Community Health and Epidemiology

**Area of Research:** Clinical

## Rationale:

No previous systematic review investigating women's choice of mastectomy versus breast conserving therapy exists in the literature.

## Methods:

We have performed a narrative synthesis. PRISMA guidelines were closely adhered throughout the review. A PICO search was conducted between January 2000 to June 2014 in 7 databases. Initial search identified 2717 articles, 1125 underwent title screening, 319 underwent abstract screening, and 67 underwent full text screening. 25 final articles were included in the review. This review looked at ESBC only, excluding DCIS, stage 3+4 breast cancer, male breast cancer, BRCA positive patients, and inflammatory breast cancer. A conceptual framework was created to illustrate the central constructs underlying women's choices: clinicopathological factors, physician factors, and individual factors with subgroups sociodemographic, geographical, and personal beliefs and preferences. This framework guided our review's synthesis and analysis.

## Results:

Due to the heterogeneity of the reported results, no meta-analysis was feasible amongst any categories. For clinicopathological factors, larger tumor size and increasing stage was associated with increased rates of mastectomy. The results for age varied, but the most consistent suggested that old and young extremes of diagnostic age were associated with increased likelihood of mastectomy. Higher SES was associated with higher BCT rates. Geographical factors resident rural location and increasing distance from radiation treatment facilities were associated with lower rates of BCT. Individual belief factors influencing women's choice of mastectomy differed from factors influencing the choice of BCT. Surgeon factors including female sex, higher case number, and individual surgeon practice were associated with increased BCT rates.

## Conclusion:

The decision-making process for women with ESBC is complicated and affected by multiple factors. Organizing these factors into central constructs of clinicopathological, individual, and physician factors may aid health care professionals to better understand this process.

# Natural Progression of Middle Ear Pathology in Children with Cleft Palate

Platform Presenter: Ali Jamal

Department of Surgery  
College of Medicine, University of Saskatchewan

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## **Team Members:**

Dr. Nael Shoman, Otolaryngology

**Area of Research:** Clinical

## **Rationale:**

Otitis media with effusion (OME) is prevalent in patients with cleft palate and those who are of First Nations descent. Persistent OME early in life can impair hearing and lead to delays in language development. This study looks at the effect of being of First Nations descent and having a cleft palate on OME.

## **Methods:**

This retrospective chart review collected data from the Central and Northern Saskatchewan Cleft Lip and Palate clinic. Children cleft palate with/without cleft lip were studied. Sixty-seven charts were included in this review with all visits occurring between 2010 and 2015. Demographic data, middle ear visualization and myringotomy tube insertions were recorded. Chi-square test was used to evaluate the relationship of OME in First Nations and non-First Nations children.

## **Results:**

Sixty-four percent of the charts belonged to patients of First Nations descent. Demographic data of the participants in the two groups were similar ( $p > 0.05$ ), with the exception of smoker status in family, which was 28% vs 4% in First Nations and non-First Nations, respectively. OME was present in 91% vs 79% in First Nations and non-First Nations, respectively ( $p = 0.008$ ).

## **Conclusion:**

Children of First Nations descent with a cleft palate with/without cleft lip are at a substantially higher risk of getting persistent OME. These results should be used as a catalyst to increase an effort at intervening earlier on in the care of these children. The first two years of life are critical for development and hearing impairment secondary to persistent OME can hinder development in this vulnerable population.

# **A Diagnosis Not to Miss in Young Men with Bowel Ischemia: Idiopathic Myointimal Hyperplasia of Mesenteric Veins**

Platform Presenter: Hui Wang

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

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## **Team Members:**

Sheev Datani, General Surgery; Dr. Mary Kinloch, Pathology and Laboratory Medicine; Dilip Gill, General Surgery; Dr. Chaturika Herath, Pathology and Laboratory Medicine

**Area of Research:** Clinical

## **Rationale:**

Idiopathic myointimal hyperplasia of mesenteric veins (IMH MV) is a rare cause of ischemic colitis that can mimick inflammatory bowel disease clinically, leading to diagnostic pitfall. It generally occurs in young, previously healthy male patient with mainly rectosigmoid colon being involved. The definitive diagnosis is usually established by histopathological evaluation.

## **Method:**

A 61-year-old man with three-month history of significant diarrhea, urgency and abdominal pain was initially diagnosed with indeterminate colitis with suspicion of Crohn's disease. It was refractory to steroid and infliximab treatment and the patient was hospitalized with toxic megacolon.

## **Results:**

An abdominal total colectomy was performed. Histopathological examination of colon showed features of ischemic colitis with marked myointimal hyperplasia of mural and extramural veins. Arteries were spared. The findings were consistent with IMH MV diagnosis.

## **Conclusion:**

For patients with IBD symptoms but without specific endoscopic features and refractory to steroid or immunosuppressant, IMH MV should be suspected.

# **Completeness of Surveillance After Resection for Stage II/III Colorectal Cancer**

Platform Presenter: Sita Ollek

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

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## **Team Members:**

Eoin McFadden, General Surgery; Dilip Gill, General Surgery

**Area of Research:** Clinical

## **Rationale:**

Colorectal cancer (CRC) is the third most common cancer in North America. Five year overall survival (O) rates for stage II and III cancer are 70% and 55% respectively. Following resection, patients remain at risk for recurrence. Guidelines exist for the recommended surveillance of patients following surgical resection, with the aim of detecting recurrences earlier, thereby reducing mortality. More intense surveillance may reduce mortality. However, it has also been shown that adherence to the recommended surveillance is low. We aim to determine the proportion of patients at our center with resected stage II and III CRC who undergo complete surveillance at eighteen months.

## **Methods:**

This study is a retrospective review of patients who underwent resection for stage II and III CRC between January 1, 2014 and December 31, 2014 at a single academic tertiary hospital. Following resection, patients who had at least one CEA test, one colonoscopy and one CT scan of the chest, abdomen and pelvis within eighteen months were considered to have complete surveillance.

## **Results:**

We identified 75 eligible stage II and III CRC patients that were included in our study. At eighteen months, surveillance rates with CEA, CT scan and colonoscopy were 55%, 72% and 33% respectively. Overall, 23% of patients received the complete recommended surveillance at eighteen months.

## **Conclusion:**

In patients with stage II and III CRC, the recommended surveillance includes CEA testing, colonoscopy and CT scans. We have demonstrated that at a single center, adherence to the recommended surveillance is low. Given that more intense surveillance may reduce mortality, the rates of complete surveillance at our center must be improved. Other studies have shown that introducing measures aimed at increasing adherence to surveillance, such as a patient navigator, is effective. Our study provides evidence that the introduction of such measures should be considered at our center.

# Can a Supervised Algorithmic Assessment of Men for Prostate Cancer Improve the Quality of Care? A Retrospective Evaluation of a Prostate Assessment Pathway in Saskatchewan

Platform Presenter: Bonnie Liu

Department of Surgery  
College of Medicine, University of Saskatchewan

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## Team Members:

Dr. Kunal Jana, Urology; Dr. Gary Groot, General Surgery

**Area of Research:** Clinical

## Rationale:

The Saskatoon Prostate Assessment Pathway (SPAP) uses an algorithm, carefully designed to optimize appropriate prostate biopsy rates, in order to decrease wait times between physician referral and biopsy by allowing physicians to refer patients for biopsy without having to see a urologist. All other patients are referred to the Saskatoon Urology Associates (SUA). The present study evaluates the performance of the algorithm.

## Methods:

971 patients seen at the SUA and 302 patients seen through the SPAP were identified. Information on age, biopsy status and outcome, risk stratification, and time between referral and biopsy was collected. Biopsy wait time data was analyzed using gamma distribution. Association between referral method and biopsy rate, and between referral method and risk stratification, was analyzed using Z-test.

## Results:

The expected wait time from referral to biopsy for patients seen through SUA was 2.63 times longer than those seen through SPAP (34 days vs. 91). The biopsy rate of patients seen in the SPAP was significantly higher than those by SUA (88%vs.69%, 95% confidence interval [CI](0.14-0.26),  $p < 0.00001$ ). There was no significant difference in positive biopsy rates for patients seen through the SPAP vs. SUA (81%vs.74%, 95%CI(-0.011,0.14),  $p = 0.095$ ), for detection of low risk cancer, (12%vs.10%, 95%CI(-0.034,0.080),  $p = 0.44$ ), or for clinically relevant cancer i.e. intermediate and high risk cancer for SPAP vs. SUA (56.54%vs.56.68%, 95%CI(-0.091,0.089),  $p = 0.49$ ).

## Conclusions:

The algorithm used in the SPAP is effective in decreasing wait time to prostate biopsy, and has the same cancer/pre-cancer detection rate, but at the cost of a higher biopsy rate.

# Long-term Outcomes of Minimally Invasive Lumbar Microdiscectomy

Platform Presenter: Michael Kindrachuk

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

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## Team Members:

Dr. Daryl Fourney, Neurosurgery; Dr. Adam Wu, Neurosurgery

**Area of Research:** Clinical

## Rationale:

Lumbar microdiscectomy is one of the most commonly performed spine surgeries leading to growing interest in minimal access techniques. However, concerns that long-term outcomes of minimally invasive microdiscectomy (MIM) may be poorer than open methods, especially regarding the risk of recurrent disk herniation. More commonly, a tubular retractor system and the neurosurgical microscope are employed.

## Methods:

103 patients with lumbar disc herniation treated with MIM participated in the study. All disc protrusions demonstrated radiologic correlations to sciatica, which failed conservative management. Long-term follow up completed by telephone. Results were evaluated based on the Visual Analog Scale (VAS) for lumbar spine and leg pain, Oswestry Disability Index (ODI), Short Form 36 (SF-36) and EQ5D questionnaires.

## Results:

The average patient age was 51.3 years including 54 females and 49 males. The mean follow-up time after surgery was  $3.8 \pm 1.1$  years. Most common affected level of disc herniation was L5/S1 (44.4%). The complication rate and reoperation rate for recurrent herniation were each 3.4% based on 160 cases. The mean decrease in ODI score was  $30.5 \pm 29.1$ ; the mean decrease in leg VAS score was  $5.3 \pm 3.1$ ; and the mean decrease in lumbar VAS score was  $3.6 \pm 2.9$ . Adjusted mean differences were statistically significant in all cases ( $P < .0001$ ).

## Conclusion:

MIM offers long-term results that are comparable to conventional discectomy while maintaining a low complication and recurrence rate. Additionally, MIM reduces muscle injury, denervation, and osseous resection leading to decreased post-operative pain and length of hospital stay.



# The Role of Fine Needle Aspiration [FNA] in the Detection of Common and Uncommon Lesions of the Pancreas: A Single Institutional Series of 253 Cases

Platform Presenter: Nick Baniak

Department of Pathology and Laboratory Medicine  
College of Medicine, University of Saskatchewan

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## Team Members:

Dr. Yury Takhalov, Department of Pathology and Laboratory Medicine; Dr. Rani Kanthan, Department of Pathology and Laboratory Medicine

**Area of Research:** Clinical

## Rationale:

To evaluate the accuracy of pancreatic FNA biopsies.

## Methods:

All pancreatic FNAs completed between January 1996 and October 2015 were analyzed for FNA cytological diagnosis, patient age, and gender with histological correlation as available.

## Results:

253 cases were identified, with 84.6 % (214) yielded diagnostic material. The mean age was 66.2 years old (range 19 to 91), with 52.6 % (133) females and 47.4% (120) males. There were 77 benign diagnoses, 105 malignant lesions, and 32 suspicious or atypical specimens. Definitive histology available in 61/253 (24.1%) cases had an 86.9% (53/61) diagnostic accuracy. In almost all cases, the cytopathological and immunocytochemical findings both in the slides and cellular blocks along with the radiological correlation allowed for a precise diagnosis. Adenocarcinoma and neuroendocrine lesion was identified in 94/105 (89.5%) and 8/137 (5.8%) of cases respectively. The sensitivity for diagnosing a malignant lesion was 87.8% and the specificity was 72.7%. Discordant results included 5 cases of adenocarcinoma on histology diagnosed as negative for malignancy on FNA (presumed sampling error), chronic pancreatitis rather than low grade neoplasm (interpretive error), normal pancreas rather than adenocarcinoma (presumed sampling error), and low-grade cystic mucinous neoplasm rather than high grade neuroendocrine lesion (interpretive error). Examples of uncommon lesions identified on FNA included pancreatic tuberculosis, gastrointestinal stromal cell tumor, metastatic esophageal squamous cell carcinoma, rhabdomyosarcoma, adenosquamous carcinoma, and renal cell carcinoma.

## Conclusion:

An average of 12 pancreatic FNAs are completed each year in Saskatoon, SK, with close to 90% adequacy and diagnostic concordance.

# **Metastatic Ductal Carcinoma of the Breast to Colonic Mucosa: A Case Report**

Platform Presenter: Melissa Wood

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

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## **Team Members:**

Dr. Angela E. Schellenberg, Department of Surgery, University of Toronto; Nick Baniak, Pathology and Laboratory Medicine; Dr. Paul Hayes, General Surgery

**Area of Research:** Clinical

## **Rationale:**

Breast cancer is the most common malignancy among women and invasive ductal carcinoma is the most common type of invasive breast cancer. Metastatic spread to the colon and rectum in breast cancer is rare.

## **Methods:**

We present the case of a 69 year old woman who was referred to our institution with invasive ductal breast carcinoma who was incidentally found to have metastatic deposits to the colon on screening colonoscopy.

## **Results:**

A screening colonoscopy, prompted by family history of colon cancer, revealed a rectosigmoid polyp, which was resected endoscopically. The biopsy showed metastatic adenocarcinoma with features favouring breast as the origin based on immunohistochemical stains. No primary colonic carcinoma was identified. The patient's breast carcinoma was first diagnosed 2 years prior. Further colonic biopsies revealed metastatic adenocarcinoma consistent with a breast primary. A peritoneal fluid sample revealed atypical cells favouring metastatic breast carcinoma. She was taken to the operating room for laparoscopy and found to have carcinomatosis. Biopsy results revealed metastatic carcinoma morphologically and immunophenotypically consistent with metastatic mammary ductal carcinoma. Her condition worsened and she succumbed to her illness in 2015.

## **Conclusion:**

In patients with a history of breast cancer who present with gastrointestinal symptoms, the possibility of metastatic disease to the gastrointestinal tract should be considered. Cases of metastatic breast cancer to the gastrointestinal tract have predominantly been lobular breast carcinoma and ductal carcinoma is a rare cause of colonic metastasis. Increased awareness of colonic metastasis may lead to more accurate diagnosis and earlier systemic treatment.

# **A Retrospective Review of the Diagnosis of Papillary Lesions of the Breast – The Saskatoon Experience**

Platform Presenter: Nick Baniak (Yanping Gong)

Department of Pathology and Laboratory Medicine  
College of Medicine, University of Saskatchewan

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## **Team Members:**

Dr. Louise Quenneville, Pathology and Laboratory Medicine; Dr. Henrike Rees, Pathology and Laboratory Medicine

**Area of Research:** Clinical

## **Rationale:**

To review the diagnostic accuracy of core biopsy for papillary lesions of the breast and provide feedback to physicians involved in the multidisciplinary management of these patients.

## **Methods:**

The pathology database of the Saskatoon Health Region was searched for all breast cases containing the terms papillary or papilloma accessioned in 2015. Core biopsy reports were matched with subsequent excisions, where available. Discordant cases were reviewed with additional studies to clarify the diagnosis.

## **Results:**

44 papillary lesions were diagnosed on core biopsy in 2015. 15 (34.1%) were benign papillomas and 29 (65.9%) were atypical or malignant papillary lesions. 9 of the 15 patients diagnosed with a benign papilloma on core biopsy didn't proceed to surgical excision. Only 1 of the 6 (16.7%) that were excised had an upgrade in diagnosis; this one case showed DCIS. All 29 of the atypical or malignant lesions were excised; none gave benign results on excision. The results for this group were: DCIS in a papilloma (1 case; 2.3%), papillary DCIS (26 cases; 59.1%), and papillary lesion with atypical epithelial proliferation (2 cases; 4.5%).

## **Conclusion:**

The likelihood (16.7%) of atypia or malignancy on excision of a papillary lesion called benign on core biopsy is similar in our center to numbers reported from other centers. Close clinical follow-up of those patients is needed if non-surgical management is chosen.

# **Surgical Practices in Saskatchewan: Researching a Surgeon's Perception of Total Mesorectal Excision**

Platform Presenter: Julie Kickbush

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

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## **Team Members:**

Dr. Louise Quenneville, Pathology and Laboratory Medicine; Dr. Henrike Rees, Pathology and Laboratory Medicine

**Area of Research:** Clinical

## **Rationale:**

Meticulous rectal cancer surgery is imperative in the treatment of rectal cancer. Total mesorectal excision (TME) is required to decrease local recurrence and improve overall survival after surgical resection of rectal cancer.

## **Methods:**

This prospective study on all adult rectal cancer patients in Saskatchewan occurred from August 2014 to August 2016, and included a total of 16 patients. The purpose of this study was to evaluate a surgeon's perception of TME by asking surgeons to predict the pathology results of surgeries they perform prior to obtaining pathology data. We hypothesized that the majority of surgeons are accurately perceiving and performing complete TMEs, during rectal cancer resections. We wanted to quantify the accuracy of surgeons' perceptions of complete total mesorectal excisions.

## **Results:**

276 patients were registered in the database. First limb revascularized critical limb ischemia patients who underwent CTA or angiogram first were selected (74 patients). Mean time to treatment for Rutherford 4 patients (30) with CTA first (18) was 89.8 days (SD 85.1) compared to angiogram first (12) in 14.5 days (SD 14.3) ( $p$ -value  $< 0.05$ ). Similarly, of Rutherford 5 patients (37), 15 had CTA initially (mean 40.8 days, SD 35.6), and 22 patients had angiogram before treatment (mean 7.7 days, SD 7.0) ( $p$ -value  $< 0.05$ ). For Rutherford 6 patients (7), 3 had CTA before treatment (mean 22.5 days, SD 27.1) and 4 had angiogram initially (mean 2.3 days, SD 3.9) ( $p = 0.188$ ).

## **Conclusion:**

Data analysis was performed using a kappa agreement calculation. The calculation was performed using a cross tabulation of surgeon prediction of TME as nearly complete or complete versus pathology results of nearly complete, complete or incomplete. There were a total of 16 cases and specimens analyzed. The data demonstrated a kappa value of 0.067 which corresponds with a  $p$ -value of 0.733, suggesting poor and non-significant correlation between surgeon prediction of completeness of total mesorectal excision and pathology result.

# Facilitators and Barriers to Clinical Pathway Uptake and Utilization Among Primary Care Providers in Saskatchewan

Platform Presenter: Zane Tymchak

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

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## **Team Members:**

Dr. Gary Groot, General Surgery; Dr. Donna Goodridge, College of Nursing; Dr. Thomas Rotter, College of Pharmacy and Nutrition.

**Area of Research:** Clinical

## **Rationale:**

Clinical pathways are multidisciplinary, evidence-based interventions designed to standardize care for specific patient populations. They have gained wide popularity; however, they have failed to accrue the anticipated participation among primary care providers in Saskatchewan.

## **Methods:**

This project will utilize qualitative methods to identify the facilitators and barriers to clinical pathway uptake and utilization among primary care providers in Saskatchewan. Face-to-face and focus group interviews will be conducted using a semi-structured questionnaire based on the theoretical domains framework. Data from interviews will be analyzed using interpretative description and thematic analysis.

## **Anticipated Results:**

We will identify current barriers and facilitators to clinical pathway uptake and utilization among primary care providers in Saskatchewan.

## **Conclusions:**

Results from this study will inform the development of a follow-up survey tool to be more widely distributed to further investigate clinical pathway utilization by primary care providers.

# The FAST VAN Tool for Identifying Large Vessel Occlusion in Acute Stroke

Platform Presenter: Sanchea Wasyliv

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

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## **Team Members:**

Dr. KR Whelan, Saskatoon Stroke Program; Dr. Michael Kelly, Neurosurgery; Dr. G Hunter, Saskatoon Stroke Program

**Area of Research:** Clinical

## **Rationale:**

Acute stroke management has been revolutionized by recent clinical trials demonstrating the immense reduction in morbidity and mortality associated with endovascular thrombectomy for severe strokes presenting with a large vessel occlusion (LVO). There is an urgent need to identify potential LVO patients so they can bypass primary stroke centers and be transported directly to a tertiary stroke center providing endovascular therapy. An array of screening tools have been developed that are often cumbersome and require specific training. We developed a simplified tool, FAST VAN. A previous retrospective analysis of this tool identified a high sensitivity and acceptable specificity.

## **Methods:**

The tool was applied prospectively on 172 consecutive stroke cases at our center who reported as having VAN symptoms or signs which were then assessed for the presence or absence of large vessel occlusion.

## **Results:**

Eighty patients were positive LVO, whereas 58 were found to have no LVO. There were 11 true false positives. The overall positive predictive value of the FAST VAN screen in identifying LVO was 58%. When including only the true false positives, the PPV rose to 88%.

## **Conclusion:**

This supports that the FAST VAN tool for identifying LVO in the field is easy to implement even without specific training, sensitive, and with acceptable PPV. It is reassuring that all false positive patients did need to be assessed at our center vs the referring sites, leaving little concern for excessive unnecessary bypass and expense to the system.

# Patient-Rated Outcomes of Fragility Distal Radial Fractures No Less Than 5 Years Post Fracture in Women 50 Years and Older

Platform Presenter: Sam Ibrahim

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

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## Team Members:

Dr. Geoffrey Johnston, Orthopedics

**Area of Research:** Clinical

## Rationale:

To contrast, in a cohort of women 50 years and older who had experienced distal radial fractures, the patient-rated wrist evaluation (PRWE) scores were recorded during their first post-fracture year and compared to the PRWE scores in the same patients at an interval no less than five years post-fracture. We wanted to evaluate the influence of radiographic and clinical outcomes documented in the first year post-fracture and how the effect that they might have had on the 5-year PRWE score.

## Methods:

From a cohort of women 50 years or older treated for an isolated distal radial fracture, radiographic and clinical data were recorded prospectively for up to one year post fracture, all who were at least five years post-fracture were invited by telephone to participate in this study. Participants returned the (PRWE) questionnaire via mail. Their new scores were contrasted to their first year scores.

## Results:

143 women out of 250 women that were eligible for the study were available to participate. 128 completed questionnaires were received. The average follow-up was 6.1 years. For the whole cohort the average PRWE scores at nine, 12, 26 and 52 weeks post fracture were 64, 47, 27 and 23, respectively. Approximately 74% of women were treated non-operatively. Their average PRWE at late follow-up was 11; it was 12 in those treated operatively. Of the 128 respondents, 95 (74%) recorded lower PRWE scores, 10 (8%) recorded no change, and 24 (19%) recorded higher PRWE scores. Of the 67 patients who had 1 year PRWE scores, 41 (61%) were improved, 9 (13%) were unchanged, and 17 (25%) were worse.

## Conclusion:

The majority of women with fragility DRF expressed, at a minimum of five years post fracture, via the PRWE tool, improvement in their symptoms from their first post fracture year. Significant, however, was that 25% recorded worsening of their symptoms.

# **Do Vascular Surgery Patients Investigated with an Angiogram First Approach Receive Faster Treatment in Saskatchewan vs. Those Investigated with CTA?**

Platform Presenter: Joel Herback

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

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## **Team Members:**

Dr. David Kopriva, Vascular Surgery; Dr. Kylie Kvinlaug, Vascular Surgery

**Area of Research:** Clinical

## **Rationale:**

To investigate if patients presenting to Regina or Saskatoon vascular surgeons with infrainguinal arterial occlusive disease receive more timely surgical intervention if they are first investigated with conventional angiogram vs. CT angiography.

## **Methods:**

A provincial prospective registry was created by Saskatchewan's Vascular Surgeons in 2013, in an attempt to address practice variation. Patients presenting to clinic or emergency department with infrainguinal PAD were consented and enrolled. Patient demographics, Rutherford classification, investigations, and treatment details were collected to a database at the Saskatchewan Health Quality Council. Time from clinical review to first investigation, and eventual open or endovascular treatment were calculated. Mean time to treatment with standard deviation were compared with t-tests.

## **Results:**

276 patients were registered in the database. First limb revascularized critical limb ischemia patients who underwent CTA or angiogram first were selected (74 patients). Mean time to treatment for Rutherford 4 patients (30) with CTA first (18) was 89.8 days (SD 85.1) compared to angiogram first (12) in 14.5 days (SD 14.3) ( $p$ -value  $< 0.05$ ). Similarly, of Rutherford 5 patients (37), 15 had CTA initially (mean 40.8 days, SD 35.6), and 22 patients had angiogram before treatment (mean 7.7 days, SD 7.0) ( $p$ -value  $< 0.05$ ). For Rutherford 6 patients (7), 3 had CTA before treatment (mean 22.5 days, SD 27.1) and 4 had angiogram initially (mean 2.3 days, SD 3.9) ( $p = 0.188$ ).

## **Conclusion:**

The available data demonstrates that patients investigated with an angiogram first approach for critical limb ischemia experience significantly shorter wait times for definitive intervention.



# Follicular Lymphoma with Plasmacytic Differentiation – A Rare Entity

Platform Presenter: Jana Kunasingam

Department of Pathology and Laboratory Medicine  
College of Medicine, University of Saskatchewan

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## **Team Members:**

Dr. Anurag Saxena, Pathology and Laboratory Medicine; Dr. Julie Stakiw, Hematological Oncology;  
Dr. John DeCoteau, Pathology and Laboratory Medicine

**Area of Research:** Clinical

## **Background:**

Plasmacytic differentiation is rare but known in follicular lymphomas. Two different lymphoproliferative disorders may also coexist at the time of diagnosis in some patients. The distinction can be very difficult and some of the cases in the literature may represent marginal zone lymphomas or composite tumors.

## **Methods:**

Herein we report case of follicular lymphoma in a tonsil associated with extensive plasma cells in the bone marrow that highlights the difficulties in making the distinction between follicular lymphoma with plasmacytic differentiation and dual lymphoproliferative disorders.

## **Results:**

A 67 year old patient was diagnosed with follicular lymphoma in a tonsillar biopsy (grade 1-2) with classic morphologic, immunohistochemical and molecular features. At staging, the bone marrow showed a small reactive lymphoid aggregate (but) no immunophenotypic or molecular evidence of follicular lymphoma. The core biopsy had numerous mature appearing plasma cells (approx 3%) which were monotypic and immunophenotypically abnormal. There was no monoclonal protein in the serum and no clinical or radiographic evidence of involvement by a plasma cell dyscrasia. Molecular analysis identified clonal gene rearrangements in both the tonsil and the bone marrow clot section with peaks in the similar bandwidth. Next generation sequencing could not be performed as the core biopsy did not yield enough DNA. Fluorescence in situ hybridization (FISH) demonstrated two separate signals indicating normal molecular cytogenetic. The patient is being treated for dual pathologies – follicular lymphoma grade 1A treated with focal radiation and probable MGUS under ongoing observation.

## **Conclusion:**

The collective evidence suggests this case to be most likely a follicular lymphoma with plasmacytic differentiation.

# Neurological Symptoms associated with Distal Radial Fractures in Women

Platform Presenter: Jenna Mann

Department of Surgery  
College of Medicine, University of Saskatchewan

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## **Team Members:**

Dr. Jonathan Norton, Neurosurgery; Dr. Geoffrey Johnston, Orthopedics

**Area of Research:** Clinical

## **Rationale:**

Neurological impairment associated with distal radius fractures (DRFs) can occur at the time of injury, develop as a result of injury-related factors, or occur in association with an intervention. Despite their frequency the impact that nerve impairment has on patient outcomes has not yet been established. The objectives of this study were to document the prevalence of nerve symptoms in two cohorts of women with a DRF, in those treated operatively and non-operatively, and to contrast the recovery timelines for patients who experienced nerve symptoms to those who did not.

## **Methods:**

Retrospectively a database of adult women in the Saskatoon Health Region treated for a DRF and EMR data were cross-referenced to identify nerve symptoms reported by the patients in the hand or wrist of the injured arm and to link these to the outcomes of treatment.

## **Results:**

Nerve symptoms were experienced in 11.3% of 300 women treated non-operatively and 17.8% in 190 women treated operatively. Radial nerve deficits occurred exclusively in patients treated operatively. Nerve symptoms were associated with less restoration of motion and grip strength at each of four time points (9, 12, 26 and 52 weeks post-fracture) and worse patient self-reported evaluations ( $p < 0.05$ ).

## **Conclusion:**

It is important to acknowledge that nerve symptoms frequently occur post DRF in adult women (11.3% in those treated non-operatively and 17.8% in those treated operatively) and have a negative impact on functional recovery. Patient identification of nerve symptoms upon questioning, or when volunteered, should alert the treating physician to this prospect.

# Demonstrating the Feasibility of a National Resident-Led Research Collaborative Using an Observational Study of the Operative Landscape at Canadian Training Programs

Platform Presenter: Uzair Ahmed

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

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## Team Members:

Mark Bigder, University of Manitoba; Ayoub Dakson, Dalhousie University; Cameron Elliott, University of Alberta; Daipayan Guha, University of Toronto; Christian Iorio-Morin, Université de Sherbrooke; Michelle Kameda-Smith, McMaster University; Pascal Lavergne, Université Laval; Serge Makarenko, University of British Columbia; Michael S. Taccone, University of Ottawa; Michael K. Tso, University of Calgary; Bill Wang, Western University

**Area of Research:** Clinical

## Rationale:

The Canadian Neurosurgery Research Collaborative (CNRC) is a newly formed resident-led research network involving 13 neurosurgery residency programs across Canada. We describe the first study conducted by the CNRC, whose objective was primarily to assess the feasibility of such a collaborative and thus setting up the infrastructure for future multicentre clinical studies.

## Methods:

We provide neurosurgical operative case volumes in a Canadian context, which may influence neurosurgery residency curriculum design. Anonymized administrative operative data were gathered from each neurosurgery residency program from January 1, 2014, to December 31, 2014. Procedures were broadly classified into cranial, spine, peripheral nerve, and miscellaneous procedures.

We propose a future study to measure the incidence of complications associated with external ventricular drain (EVD) catheter insertion, retention, and removal.

## Results:

Overall, there was an average of 1845 operative cases per neurosurgery residency program. The mean numbers of cranial, spine, peripheral nerve, and miscellaneous procedures were 725, 466, 48, and 193, respectively.

## Conclusions:

In this study, the CNRC has presented neurosurgical operative data from 13 neurosurgery residency programs across Canada. In doing so, we have successfully completed a multicentre study led by a nationwide network of neurosurgery residents, which bodes well for future collaborative studies. The study of EVD complications aims to recruit > 500 patients over an 8-month period. Adult neurosurgical patients (age > 18 years old) requiring EVD catheter insertion are eligible for study enrollment.

# The Views of Health Care Providers in Saskatchewan Regarding Multidisciplinary Cancer Conference Standards

Platform Presenter: Niomi Singh

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

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## **Team Members:**

Dr. Gary Groot, General Surgery; Amir Reza Azizian, Community Health & Epidemiology

**Area of Research:** Clinical

## **Rationale:**

Multidisciplinary care is the hallmark of high-quality cancer management. The key element is the multidisciplinary cancer conference (MCC) or “tumour board”, which is defined as a regularly scheduled multidisciplinary conference. Multidisciplinary cancer conferences have the ability to bring together an entire team of cancer care professionals that can make decisions regarding the best treatment for each patient. In other provinces such as Ontario, specific guidelines exist regarding the structure and function of their MCC’s (Wright, 2006). Currently in Saskatchewan, there are no set standards or guidelines regarding MCC’s.

## **Methods:**

The objective of our study was to gather information on the views on health care providers in Saskatchewan regarding MCC standards. Our longer term aim is to provide recommendations for development of standards in Saskatchewan based on our findings. A total of 132 surveys were electronically sent out to surgeons, radiation oncologists and medical oncologists in Saskatchewan.

## **Results:**

We received a total of 61 (46% response rate) responses with participants representing both community and academic practice. Our study demonstrated statistically significant results for various cancer-related questions as well as specific questions on the structure and function of MCC’s. Ninety-six percent of participants felt that the intent of a multidisciplinary cancer conference is to make recommendations on the best management, however the individual physician is still responsive for making the ultimate decision.

## **Conclusion:**

We conclude that there is a definite role in setting standards for MCC’s in Saskatchewan. Our next step will be to bring this information to the Saskatoon Cancer Agency along with recommendations based on our findings to inform the development of provincial MCC standards.

# Surrogate Molecular Biomarkers to Identify Aggressive Human Prostate Cancer

Platform Presenter: Heather Neufeld (Yanping Gong)

Department of Pathology and Laboratory Medicine  
College of Medicine, University of Saskatchewan

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## Team Members:

Pouneh Dokouhaki, Department of Pathology and Laboratory Medicine; Heather Neufeld, Department of Pathology and Laboratory Medicine ; Ali El-Gayed, Royal University Hospital and Saskatchewan Cancer Agency; Murray Pettitt, Department of Animal and Poultry Science, AgBio; Elisabeth Snead, Small Animal Clinical Sciences, WCVM; Rajni Chibbar, Department of Pathology and Laboratory Medicine

## Rationale:

Literature review was performed and emerging molecular biomarkers were selected based on their function and expression in molecular pathways involved in prostate carcinogenesis. We hypothesized that there is a relative abundance of androgen receptor variant (AR-V7), than Androgen Receptor (AR), in high-risk cancer biopsies from patients that responded poorly to treatments. We also hypothesized that this increase in AR-V7 correlates with activation of Hh/Gli1 pathway.

## Methods:

Research ethics board approval was obtained for this double-blinded, retrospective case controlled study. Sixty patients with diagnosis of prostate cancer and with different clinical outcomes, from the years 1993-2003, were selected from Saskatchewan Cancer Centre database. Immunohistochemistry (IHC) methods for AR-V7, Gli1, ubiquitin-conjugating enzyme E2C (UBE2C), and AR were optimized using two positive control cell lines, VCaP and 22Rv1. Protein expression and IHC staining intensity of AR-V7, Gli1, UBE2C, and AR, in the prostate cancer specimens, were graded and compared by pathologists.

## Results:

The preliminary data demonstrated that AR-V7 staining varied among patients – stronger cancer cell nuclear staining in certain patients whereas no staining in others. No AR-V7 staining was observed in benign prostate tissue. The staining of UBE2C and AR didn't differ among patients. Due to the double-blinded study design, further image and statistical analysis is needed to correlate the AR-V7 staining pattern with patients' outcomes, before the completion of the study.

## Conclusion:

Our on-going study indicated that AR-V7 expression differed among prostate cancer patients, and its significance in patients' risk stratification will be analyzed towards the end of the study.







# UNIVERSITY OF SASKATCHEWAN

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Departments of Surgery and Pathology & Lab Medicine