2018 RESIDENT RESEARCH DAY

SURGERY, PATHOLOGY, OPHTHALMOLOGY

University of Saskatchewan

Saskatchewan Health Authority

"Science is not only a disciple of reason, but also one of passion"

- Stephen Hawking, 1942-2018

Dr. Ivar Mendez

Fred H. Wigmore
Professor and
Provincial Head

Department of Surgery

University of
Saskatchewan
and
Saskatchewan Health
Authority

Residency Research Day is the most important research event in the Department of Surgery and this year we have the participation of our colleagues from the Departments of Pathology and Ophthalmology. Over the past 5 years, we have focused on creating a fertile environment for research in Surgery and have emphasized the support for resident research. These efforts are paying off as research has flourished in the Department. The research metrics has shown a 200% increase in peer reviewed publications and a 400% increase in research funding toping 6 million dollars this past academic year.

We are convinced that research is a fundamental pillar of health care and are committed to continue to support research at all levels in Surgery. With the establishment of the Saskatchewan Health Authority, there is a great opportunity to encourage research and collaboration across the Province.

This year the number and quality of the research abstracts submitted have been unprecedented and the Research Committee led by our Research Director Dr. Francisco Cayabyab had a hard task in selecting the presentations. Twenty seven abstracts have been selected for oral presentations ranging from basic sciences to clinical studies. This year our distinguished invited Keynote Speaker is Dr. Hadi Seikaly, Professor and Head of the Division of Otolaryngology Head and Neck Surgery at the University of Alberta.

I look forward to seeing you all at this exciting day.

As the new Research Director of the Department of Surgery, I want to welcome everyone to the first ever joint Surgery, Pathology and Ophthalmology Resident Research Day! This is the crowning event in the Department of Surgery's research activity, and we are very excited to have the Departments of Pathology and Ophthalmology join us on this day to foster mutually beneficial relationships among our departments and to unite in celebrating and promoting the research accomplishments of our residents.

The Department of Surgery puts heavy emphasis on academic research and is leveraging local expertise and opportunities to strengthen research capacity. At the recent Surgery Research Winter Retreat, the Department of Surgery has committed a major investment in support of researchers to provide new funding both for residents through resident-led research project awards to support the development of residents into future clinicians and scientists, and for new faculty through seed funding research awards to empower and engage faculty to drive research success by engaging more residents to do research at the lab bench and at the bedside.

Our world-renowned clinician scientists, academic mentors, and engaged residents and medical students are mobilizing research collaborations and clinical translation of their latest findings for better health outcomes of patients and their families. I would like to thank all our faculty for their strong commitment to research and mentorship of our residents and medical students to help hone their research skills, and also to extend my congratulations to all the trainees for their hardwork and dedication and for submitting and presenting their abstracts today.

I would like to thank members of the Surgery Research Committee, Dr. Vikas Sharma (Ophthalmology) and Dr. Rajni Chibbar (Pathology), who have put together a stellar line up of 27 Resident Podium Presentations, highlighting the growing vibrant research culture of all three departments. I would also like to thank all the judges and session moderators for being part of this year's Resident Research Day. Finally, I would like to acknowledge the Surgery Communications and Surgery staff for putting together this exciting program and organizing today's scientific and social events.

It is a privilege and honour to be part of this year's joint Resident Research Day, and I am very excited to see everyone at the scientific presentations at Asher Auditorium and the Awards Banquet at the Remai Modern Art Gallery.

Dr. Francisco Cayabyab

Director of Research

Leader, Neuroscience Research Cluster

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

Dr. Fergall Magee

Associate Professor and Provincial Head

Department of Pathology & Laboratory Medicine

University of Saskatchewan
and
Saskatchewan Health Authority

Welcome to the joint Resident Research Day for the Departments of Ophthalmology, Surgery and Pathology and Laboratory Medicine.

On behalf of the Department of Pathology and Laboratory Medicine (PALM), once again I would like to thank Dr Mendez and the Department of Surgery for extending an invitation to join them for a joint Resident Research Day; that now also includes the Department of Ophthalmology. I am gratified to note that there are 6 oral presentations involving 4 presenters and their assorted teams. These presentations range from the utility of digital images in education through reviews of cytology practice, multisite studies in molecular diagnostics to Sigma Metric calculations to improve practice. Once again, I would like to commend both the Organizing Committee and Faculty from all three Departments for their mentorship of residents in all of the diverse topics to be presented.

I am pleased to announce that this year we will feature new awards for both the best presentation by a pathology resident (The Harry Emson Award) and the best presentation by a junior (PGY1 or 2) pathology resident (The Jack Adolph Award). Given that health care is increasingly based on the concept of 'team' and joint initiatives we have also created an award for the best interdisciplinary or team presentation (The Loren Massey Award).

I hope this Research Day will provide us all with a stimulus to develop many future collaborations and facilitate the development of successful research groups or clusters.

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

On behalf of the Department of Ophthalmology I am thrilled to be part of the first ever Surgery-Pathology-Ophthalmology Resident Research Day. The Department of Surgery under the leadership of Dr. Mendez has kindly allowed our residents to participate in their resident research teaching. We have been impressed with the resident workshops and the weekly educational segments called Research Bites. The Department of Ophthalmology believes in their mandate for "activities to provide mentorship and research support for faculty and residents and to promote a dynamic research culture within the department". We are proud to be a part of these research activities and look forward to participating in today's program.

I would like to thank all those involved in making this day happen, the planning committee, the keynote speaker, presenters, judges, and volunteers.

This event will give a platform to showcase the high quality resident research and give them the experience of presenting in a public forum. We hope it will strengthen the atmosphere of collegiality, allowing faculty and residents to discuss findings from their research and meet with colleagues from other specialties. With luck this will help develop research collaboration with others outside their fields of expertise.

I feel this collaboration will support, enhance and strengthen research not only in the Department of Ophthalmology but also the Departments of Surgery and Pathology. We look forward to an exciting day furthering leadership and professionalism competencies among residents and students.

Dr. Paul Murphy

Clinical Professor and Head

Department of Ophthalmology

University of Saskatchewan
and
Saskatchewan Health Authority

2017 Award Recipients

Surgery & Pathology Resident Research Day

Platform Presentations:

Excellence in Research Award	Sanchea Wasyliv
Special Judges Award	Amanda Hall

Surgical Foundations Research Awards

1st Place	Michael Kindrachuk
2nd Place	Sam Ibrahim

Pathology Research Award:

First Prize	Hui Wang

Undergraduate Medical Student Awards:

Dash-Reed Research Award	Jenna Mann

2016 Award Recipients

Surgery Resident Research Day

Platform Presentations:

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

Poster Presentations:

First Prize	Laura Sims

Undergraduate Medical Student Awards:

Dash-Reed Research Award	Kayleen Wingert Reed Gillanders

2018 SURGERY, PATHOLOGY & OPHTHALMOLOGY RESIDENT RESEARCH DAY

Surgery

May 10, 2018

Contents

Introduction

Saskatoon City Hospital
Asher Auditorium

08:00 - 08:15

WELCOME AND INTRODUCTIONS

Dr. Ivar Mendez
Fred H. Wigmore Professor of Surgery

Dr. Fergall Magee
Associate Professor of Pathology &
Laboratory Medicine

Dr. Paul Murphy
Associate Professor of Ophthalmology

Dr. Grant Miller
Program Director, Clinician Investigator Program

Session I

Saskatoon City Hospital
Asher Auditorium

CHAIR: Dr. Daryl Fourney

08:15 - 09:30

Session II

Saskatoon City Hospital
Asher Auditorium

CHAIR: Dr. Paul Murphy

09:30 - 10:30

Break 10:30 - 11:00

Session III

Saskatoon City Hospital
Asher Auditorium

CHAIR: Dr. Anil Sharma

11:00 - 12:00

Keynote Speaker

Saskatoon City Hospital
Asher Auditorium

12:00 - 12:45

Leading Change in a Canadian Health Care System: Building a Head and Neck Surgical Oncology Program

Dr. Hadi Seikaly

Professor of Surgery &
Director, Division of Otolaryngology Head and Neck Surgery
College of Medicine, University of Alberta

Zone Section Head, Division of Otolaryngology Head and Neck Surgery,
Alberta Health Services

Co-editor, Journal of Otolaryngology Head and Neck Surgery

Lunch
Foyer outside of Auditorium
Main Floor, Saskatoon City Hospital
12:45 - 13:30

Dr. Hadi Seikaly is a Professor in the Department of Surgery, Faculty of Medicine at the University of Alberta. He is presently the Director of the Division of Otolaryngology Head and Neck Surgery, and the Zone Section Head for Otolaryngology Head and Neck Surgery forAlberta Health Services. Dr. Seikaly is the co-editor of the Journal of Otolaryngology Head and Neck Surgery. He serves on several local, national, and international administrative committees and is on the Executive Council of the Canadian Society of Otolaryngology.

Dr. Seikaly graduated from the University of Toronto medical school and completed his residency training at the University of Alberta in Otolaryngology Head and Neck Surgery. He then obtained fellowship training at the University of Texas Medical Branch in advanced head & neck oncology, microvascular reconstruction and facial cosmetic surgery. Dr. Seikaly returned to the University of Alberta as an attending in the division of Otolaryngology Head and Neck Surgery in 1996 where he has been active in patient care, teaching, and research.

Dr. Seikaly continues to have a large practice dedicated to head, neck and skull base oncology and reconstruction. His research interests include functional surgical and reconstructive outcomes, microvascular head and neck reconstruction, submandibular gland transfer, digital planning and medical modeling as it applies to the head and neck region.

He has published more than 90 papers in peer reviewed journals and numerous chapters. He is the recipient of the Top 10 teacher award for the past ten years.
Dr. Seikaly previously served as Residency Program and Divisional Research Director.

Dr. Hadi Seikaly

Professor of Surgery & Director, Division of Otolaryngology Head and Neck Surgery

University of Alberta and Alberta Health Services

Session IV

Saskatoon City Hospital
Asher Auditorium

CHAIR: Dr. Kunal Jana

13:30 - 14:45

Break 14:45 - 15:15

Session V

Saskatoon City Hospital
Asher Auditorium

CHAIR: Dr. Rani Kanthan

15:15 - 16:15

2018 SURGERY, PATHOLOGY & OPHTHALMOLOGY RESIDENT RESEARCH DAY BANQUET

Remai Modern
Art Gallery of Saskatchewan

rRemai mModern

RECEPTION
18:00

DINNER
19:00

Presentation of prizes:

Drs. Ivar Mendez, Fergall Magee & Paul Murphy

Acknowledgments

The Departments of Surgery, Pathology and Ophthalmology would like to thank the following individuals for serving as judges and sessions chairs for the 2018 Resident Research Day.

Judges

Dr. Hadi Seikaly
Professor of Surgery
Director, Division of Otolaryngology
College of Medicine, University of Alberta

Dr. Gary Linassi
Associate Professor and Provincial Head
Department of Physical Medicine & Rehabilitation
College of Medicine, University of Saskatchewan

Dr. Lissa Peeling
Assistant Professor, Department of Surgery
Director, Neurosurgery Residency Program
College of Medicine, University of Saskatchewan

Dr. Silvana Papagerakis
Associate Professor, Department of Surgery
Cancer Cluster
College of Medicine, University of Saskatchewan

Dr. Rajni Chibbar
Associate Professor, Department of Pathology
College of Medicine, University of Saskatchewan

Dr. Vikas Sharma
Assistant Professor, Department of Ophthalmology
College of Medicine, University of Saskatchewan

Session Chairs

Dr. Daryl Fourney
Professor, Department of Surgery
Research Director, Division of Neurosurgery
College of Medicine, University of Saskatchewan

Dr. Paul Murphy
Clinical Professor & Department Head,
Department of Ophthalmology
College of Medicine, University of Saskatchewan

Dr. Anil Sharma
Assistant Professor, Department of Surgery
College of Medicine, University of Saskatchewan

Dr. Kunal Jana
Assistant Professor, Department of Surgery
College of Medicine, University of Saskatchewan

Dr. Rani Kanthan
Assistant Professor, Department of Pathology &
Laboratory Medicine
College of Medicine, University of Saskatchewan

2018

RESIDENT RESEARCH DAY ABSTRACTS

SURGERY

The Cost of Care or Caring about the Cost? A Comparison of ICU Tick-sheet Based Lab Test Ordering Practices Before and After the Inclusion of Cost-per-test Information

Platform Presenter: Simon Adams

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

Team Members:
Dr Alicia Andrews (Pathology Resident), Dr Bruce Cload (ICU Staff), Dr Mark James (ICU Staff), Dr Martha Lyon (Pathology Staff), Dr Joanne Kawchuk (ICU Staff)

Rationale:
We hypothesized that lab test requisitioning practices would be unaffected by the inclusion of cost-per-test information on the tick box requisition sheets (TBRS).

Methods:
The TBRS for all patients admitted to RUH ICU were collected over a 4-week period. For weeks 1-2 the standard TBRS was used (TBRS1), for weeks 3-4 a redesigned TBRS detailing the cost of each lab test (LT) was used (TBRS2). The residents and nurses were not informed of the reason for the change. Average daily LT expenditure was calculated from both the TBRS and the practitioner orders section of the charts. The 2 groups were compared for average daily LT expenditure, demographics (age, gender, presenting complaint, service) and additional clinical details (SOFA score on admission, route of feeding, heparin and/ or insulin infusion, CRRT). Statistical analysis was performed using Wilcoxon, Fisher's exact or Chi-squared testing as appropriate.

Results:
53 patients were included (25 TBRS1, 28 TBRS2). Daily LT expenditure was unaffected by the transition (TBRS1 mean $112.60 (SD $91.50), TBRS2 mean $110.10 (SD $70.9) ($p = 0.80$)). The 2 groups were comparable for all demographic and clinical detail measures tested (all p values > 0.05).

Conclusion:
These data suggest that cost was not a significant factor in deciding which LT to order during the study period. The small sample size leaves our results open to a type 2 error. The fact that the study was conducted over a single clinical block means we cannot confidently draw conclusions regarding the reproducibility of our findings.

Molecular Characterization of Recurrent Low Grade, Low-Stage Endometrioid Endometrial Carcinoma

Platform Presenter: Nick Baniak

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

Team Members:
Blake Gilks (Vancouver General Hospital, Vancouver, British Columbia), John DeCoteau (University of Saskatchewan, Saskatoon, Saskatchewan), Jessica McAlpine (Vancouver General Hospital, Vancouver, British Columbia), Martin Köbel University of Calgary, Calgary, Alberta), Naveena Singh (Barts Health NHS Trust, London, United Kingdom), Laura Casey (London, Dept of Cellular Hospital, Queens Hospital Romford, Essex), Raji Ganesan (Birmingham Women's Hospital. Norton Court, Mindelsohn Way, Edgbaston, Birmingham), Mary Kinloch (University of Saskatchewan, Saskatoon, Saskatchewan)

Rationale:
Low stage, low-grade endoemtrioid endometrial carcinomas (EECs) has 90% 5-year survivals. However, 7-23% recur. There is a modicum of data on the molecular nature of recurrent low-risk EEC and few studies differentiating vaginal versus distant recurrences. Recent molecular classification of endometrial cancer: POLE-mutated, ¬Mismatch repair (MMR) deleted, p53 mutated (copy number high) and p53 wild-type gives consistent prognostic information, but it is unclear if it will aid in recurrence prediction.

Methods:
Primary cases of recurrent low-grade (G1-2 endometrioid), low-stage (pT1, pT2) (no lymphvascular invasion), EECs were collected from six institutions. p53 and MMR immunohistochemistry (IHC) was completed. DNA was extracted and subjected to targeted next-generation sequencing for POLE, TP53, KRAS, and PIK3CA. Pathogenicity of mutations with greater than 10% allelic frequency was determined using MutationTaster and PolyPhen online databases.

Results:
52 recurrent cases (average patient age 65.6 years-old) represented 45% local versus 55% distant recurrences with an average interval time of 30.9 months (range 4.5 to 66). The cases split: 17/52 (33%) MMR-D, 2/52 (4%) POLE EDM, 2/52 (4%) TP53 mutated, and 29/52 (56%) TP53 wild type. Within the latter group, 6/29 (21%) cases harbored a PIK3CA and 6/29 (21%) a KRAS mutation. There were no significant differences between local and distant recurrences.

Conclusion:
A third of patients would be reclassified as dMMR. Importantly, no insidious serous carcinomas were missed. However, other markers portending an aggressive prognosis are still elusive. Furthermore, it remains to be determined if recurrences can be risk stratified by their location (local versus distal).

Funding Source: :
RUH Foundation Grant

Success Rates of Endoscopic Endonasal Dacrocystorhinostomy with and without Preservation of Nasal Mucosal Flap: Retrospective Chart Review

Platform Presenter: Vinay Kansal

Department of Ophthalmology
College of Medicine, University of Saskatchewan

Team Members:
Ali Jamal (Medical Student, University of Saskatchewan), Rick Jaggi (Otolaryngology – Head & Neck Surgery, University of Saskatchewan)

Rationale:
Endoscopic, endonasal approach for dacrocystorhinostomy (DCR) is a popular approach in the treatment of chronic epiphora. Preservation of a nasal mucosal flap may reduce success rates. This study records outcomes of nasal mucosa preserving versus non-preserving techniques.

Methods:
Retrospective chart review of sequential endonasal DCRs performed by a single surgeon in the Saskatoon Health Region between April 2014 and November 2017 was performed. Charts were divided into (i) mucosa preserving (n=50) and (ii) mucosa non-preserving (n=45) groups. Primary outcome was nasolacrimal system patency on irrigation. Baseline characteristics were compared with Fisher Exact tests and Mann-Whitney U tests. Generalized estimating equations adjusted for baseline characteristics and accounting for correlation between eyes were used to compare interventions.

Results:
Both groups had similar baseline characteristics ($p>0.05$). Median follow up was 7.9 (IQR 3.6-8.8) and 3.5 (IQR 1.6-4.9) months for groups (i) and (ii), respectively. The odds ratio for a patent lacrimal ductal system was 4.4 (1.2-16.9) with mucosa non-preserving technique. This translated to success in 76.0% (62.3-85.8) of mucosa-preserving and 93.3% (81.3-97.8) of non-preserving cases. Rate of reintervention was significantly higher in the mucosa preserving group (18.0% versus 2.2%, $p=0.043$).

Conclusion:
In this investigation, nasal mucosa non-preserving DCR technique was more likely than mucosa preserving technique to achieve nasolacrimal system patency on irrigation. However, the improvement in epiphora was not significantly different between groups. Future studies should be prospective, randomized and exclude patients with other causes of chronic epiphora.

Assessment of the Timing of Postoperative Apnea in Infants at Risk: A Pilot Study

Platform Presenter: Jordyn Clark

Undergraduate Medical Education
College of Medicine, University of Saskatchewan

Team Members:
Melissa Wood (General Surgery Residency Program, University of Saskatchewan), Grant Miller (Department of Surgery, University of Saskatchewan)

Rationale:
Prematurely born infants have an increased risk for apnea post-general anesthesia and routinely undergo postoperative in-patient apnea monitoring for 24 hours. The current practice is to admit for postoperative apnea monitoring all infants born prematurely with a postmenstrual age of <60 weeks. The reported incidence of apnea in this population is <5%. We hypothesize that those that experience apnea will show signs of apnea or respiratory difficulty in the first phase of recovery.

Methods:
This pilot study was a nonrandomized consecutive series of all infants <60 weeks postmenstrual age undergoing general anesthesia for inguinal hernia repair at Royal University Hospital from 2001 to 2004. Data collection includes: patient demographics, details of surgical procedure, medical history, number and timing of apneas, and length of hospital stay.

Results:
We found 30 medical records that met the inclusion criteria. One patient experienced at least one apnea episode first occurring during Phase 1 recovery in the PACU. Six patients had a documented respiratory concern such as shallow respirations, cyanosis, tachypnea, desaturations or subcostal indrawing, during Phase 1 recovery in the PACU. All six were monitored for at least 24 hours without any recorded apnea episodes.

Conclusions:
This pilot study demonstrates that a medical record review to evaluate the hypothesis is feasible. A statistical power analysis will determine the appropriate sample size required. We anticipate this data will help rationalize the postoperative care, make the best use of resources, and optimize patient care.

Limited Duration of Post-Operative Helmet Therapy in Endoscopic Sagittal Craniosynostosis Repair

Platform Presenter: Amit Persad

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

Team Members:

Vivek Mehta, Division of Neurosurgery, University of Alberta

Rationale:

Endoscopic sagittal synostosis repair with postoperative helmet therapy is a common treatment option for children with scaphocephaly. Post-operative helmeting is usually carried out for between 8-12 months. We propose to investigate the outcomes of limited helmeting for four months following endoscopic sagittal synostosis repair, as brain growth is greatest during this interval.

Methods:

Patients undergoing endoscopic strip craniectomy for sagittal synostosis repair underwent helmet therapy for average of 134.7 days, until approximately eight months of age. Success of treatment was followed by measurement of their cranial index preoperatively, after helmet therapy, and at follow-up after helmet therapy.

Results:

After shorter helmet therapy, the average cranial index of patients increased from 0.657 to 0.775, and remained at 0.761 at follow-up. The improvement in cranial index was statistically significant.

Conclusions:

Short duration helmet therapy of four months after endoscopic sagittal synostosis repair is a viable treatment option for patients.

Percutaneous Pin Fixation of Distal Radius Fractures and the Girl with the Curl

Platform Presenter: Kristi Billard

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

Team Members:

Geoffrey Johnston (Division of Orthopedic Surgery, University of Saskatchewan)

Rationale:

Distal radial fractures (DRFs) are common adult fractures. Surgical treatments include volar plating and percutaneous pin fixation (PPF). The purpose of the study was to evaluate the outcome of PPF of DRFs in adult women.

Methods:

In this retrospective review, 24 women (age 28-84) whose DRF treatment consisted of closed reduction, PPF and cast immobilization with consistent post-operative follow-up were identified and divided into subgroups; those with poor (n=7), average (n=12), and excellent outcomes (n=5).

Patient-rated wrist evalution (PRWE) scores at nine (n=13), 12 (n=17), 26 (n=15) and 52 (n=9) weeks post-fracture were reviewed.

Statistical comparisons used a two-way (treatment, time) analysis of variance (ANOVA) with a Post-hoc Tukey test. Significance was $p \leq 0.05$.

Results:

PRWE averages at nine, 12, 26, and 52 weeks were 62, 64, 41, and 53, respectively. Subgroup analysis of the poor, average, and excellent outcome groups revealed average PRWE scores at 12 weeks of 103, 62, and 18, respectively. ANOVA demonstrated statistically significant difference between the groups ($p<0.001$), and the Tukey test revealed a significant difference between the poor and excellent outcome groups ($p<0.01$).

Conclusion:

In our experience, DRFs in women treated by PPF do not fare as predictably well as their counterparts treated by plating. This reminds us of Longfellow's poem "There was a little girl, Who had a little curl, Right in the middle of her forehead. When she was good, She was very good indeed, But when she was bad she was horrid."

Surgeons should keep this unpredictability in mind when choosing surgical treatment for DRFs.

Femoral Subsidence Rates of the Zimmer Versys Stem and the Zimmer M/L Taper Stem

Platform Presenter: Matthew Mastel

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

Team Members:
Mark Abou-Ghaida, Matthew Mastel, Dr. A. King, Dr. W. Dust (University of Saskatchewan)

Rationale:
To detect and compare the rates of distal migration (subsidence) of the femoral component in patients who received a hip replacement with the Zimmer FMT vs. the Zimmer M/L Taper stem.

Methods:
Chart review examining 183 consecutive total hip arthroplasties performed over 2 years at Saskatoon City Hospital. Procedures were performed by 2 senior surgeons in a similar manner. Patient's clinical history, demographics, implant records, complications and revisions were collected in a database.

Post operative radiographic images in recovery and at 6 weeks and 1 year were assessed. Femoral component position was measured using an accepted standardized technique to assess for subsidence. Progression of migration was compared to the initial post-operative x-ray. The rate of subsidence between the two implant systems was compared for statistical significance.

Results:
One hundred and eighty three arthroplasties met our inclusion criteria. There was statistically significant subsidence noted with both the FMT and the M/L Taper stem at 6 weeks and at 1 year. The subsidence rates between FMT and M/L Taper in our study were not statistically different at 6 weeks ($p = 0.13$) or 1 year post op ($p = 0.37$). BMI was not correlated with increased subsidence rates.

Conclusion:
The subsidence rates between FMT and M/L Taper in our study were not statistically different at 6 weeks or 1 year post op. However, both FMT and M/L Taper experience statistically significant amount of subsidence from the time of surgery to at least 1 year post-operatively. This study served as a quality assurance of the implants used at our centre.

A Profile of Acute Anterior Uveitis in Saskatoon

Platform Presenter: Gabriela Campos-Baniak

Department of Ophthalmology
College of Medicine, University of Saskatchewan

Team Members:
Melody Wong, Dr. V. Erraguntla

Rationale:
To review the features of acute and recurrent anterior uveitis (AU) presenting to our tertiary care centre, aiming to develop a standardized AU work-up specific to urgent care clinics. Using a Retrospective Chart Review, all primary AU cases presenting to the Urgent Eye Care clinic at Saskatoon City Hospital between 2010 and 2015 (N = 343; 238 acute cases, 105 recurrent cases) were analyzed.

Methods:
Information regarding demographics, symptoms, prior episodes, past and family history, physical exam, initial diagnosis, investigations ordered, investigation results, treatment, number of flares, and subsequent episodes were collected. Non-documentation was also recorded.

Results:
Overall mean age was 45.2 years (± 16.4 years) and 4.4% had bilateral eye involvement. Eye pain was the most common symptom (96.3%) followed by photophobia (92.8%). Diseases commonly screened for among acute patients were autoimmune disorders (31.9%), inflammatory bowel (31.1%) disease and ankylosing spondylitis (29.8%). In the affected eye(s), 16.8% had presenting visual acuity worse than 20/50, and 20.5% had a severe clinical presentation of AU. Fifty-one acute patients (21.4%) were investigated; the most common investigations ordered were HLA-B27, CBC, CRP and ANA (≥15% of patients), and the three most common abnormal findings were HLA-B27 positivity, TSH abnormalities, ESR elevation and pelvic x-ray changes (≥ 25% abnormal results).

Conclusion:
We currently lack a standardized approach to AU documentation and evaluation. By analyzing the presentation and documentation of AU in Saskatoon, we propose a standard work-up specific for urgent care clinics.

Living in a Virtual Reality - a Cross-Over Study Comparing Resident Examination Performance with Traditional and Virtual Microscopy

Platform Presenter: Alicia Andrews

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

Team Members:
Nick Baniak (Department of Pathology and Laboratory Medicine, University of Saskatchewan), Catalin Taraboanta (Department of Pathology and Laboratory Medicine, University of British Columbia), Amy Bromley (Department of Pathology and Laboratory Medicine, University of Calgary), Tyler Hickey (Department of Pathology and Laboratory Medicine, University of British Columbia), Marilyn Kinloch (Department of Pathology and Laboratory Medicine, University of Saskatchewan)

Rationale:
Digital images (static images and virtual microscopy) are becoming commonplace in resident evaluation. The Royal College of Physicians and Surgeons of Canada changed their pathology examinations to an all-digital format in 2017, and many residency programs utilize digital images for internal examinations. The skills for evaluating virtual and glass slides are different, and concerns have been raised as to whether virtual microscopy-based examinations yield representative evaluations of residents. We hypothesize that there is no difference in resident performance between the two modalities, given that overall their similarities outweigh their differences.

Methods:
Residents from all post-graduate years, at three Canadian pathology residency programs, participated in this cross-over study. Sites were assigned to either traditional or virtual microscopy for the first of two slide examinations (25 slides, two minutes per slide). For the second sitting, the examination modalities were reversed. The data from each sitting were analysed by Wilcoxon Two-Sample Test, using SAS 9.4.

Results:
Twenty-nine residents sat the first examination: 11 virtual (mean score 9.5/25, SD 4.3) and 18 traditional (mean score 11.8/25, SD 6.0), $p = 0.38$. Twenty-eight residents sat the second examination: 16 virtual (mean score 11.1/24, SD 4.9) and 12 traditional (mean score 12.2/24, SD 4.9), $p = 0.40$. All score distributions were non-Gaussian.

Conclusion:
Our study shows no statistical difference in resident performance when examined using glass slides or virtual microscopy. This finding supports the use of digital images for resident evaluation.

An Analysis of the Factors Affecting Operating Room Efficiency in a Single Surgeon's Practice

Platform Presenter: Laura Halyk

Undergraduate Medical Education
College of Medicine, University of Saskatchewan

Team Members:
Geethan Chandran, Department of Surgery, University of Saskatchewan

Rationale:
The purpose of this retrospective study is to analyze the various components of a single surgeon's operative day and their contributions to the overall efficiency.

Method:
A retrospective analysis of a single surgeon's operative times over a one year period measured the elapsed time when the scheduled operating room was not being used for direct patient care. Excluding afterhours cases, an analysis of the operative time, anesthetic induction time, and turnover times for the day's cases was carried out. Statistical analysis comparing hospital sites and emergent/non-emergent cases was performed.

Results:
On average, patients spent 24 minutes in the operating room before surgery commenced. The surgical turnover time was about 28 minutes including cleaning time and instrument set up time.

Conclusion:
The operative turnover time on average is 28 minutes. Operative times also have some variability. A prospective study may provide insight into the current inefficiencies in the operative room and make suggestions for enhancing a low-cost, high-quality health care system.

Does Training on a Simulator Improve Percutaneous Tracheostomy Placement Compared to Didactic Training for Medical Students? A Double-Blind, Randomized, Controlled Trial

Platform Presenter: Alexis Brassard

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

Team Members:
Dr. Gordie Kaban (Department of Surgery, General Surgery), Alek Szmigielski (Medical Student, University of Saskatchewan), Jennifer St. Onge (Research Scientist - Research and Performance Support, SHA), Warren Barry (Research Analyst - Research and Performance Support, SHA)

Ratonale:
Percutaneous tracheostomies are commonly performed by general surgeons and have a steep learning curve associated with high patient risk. This concern could potentially be mitigated by practice via simulation. This project addresses the practicing of percutaneous tracheostomies on a surgical simulator and its impact on skill acquisition.

Methods:
Medical students from the University of Saskatchewan were randomized to receive tracheostomy placement instruction from a video (control group) or apply hands-on practice on a simulator (intervention group). All students then performed an evaluative tracheostomy on a simulator. Time to correct tracheostomy placement was the primary outcome, and score from a confidence survey was the secondary outcome. The study was double-blinded.

Results:
18 medical students participated in the study. The median time to correct tracheostomy placement was significantly faster in the intervention group than the control group (320.5 sec vs. 547 sec, $p<0.001$). The median confidence score of the intervention group was higher in comparison to the control group (31/45 vs. 20/45, $p=0.052$). Mann-Whitney test was performed using an alpha of 0.05.

Conclusion:
The study demonstrated to statistical significance that practice on the simulator led to improved proficiency in percutaneous tracheostomy placement on the simulator. It also showed that participant confidence was higher with the opportunity to practice first; although, this did not reach statistical significance.

Atrophy of the Hematoma Cavity after Minimally Invasive Evacuation of Intracerebral Hemorrhage

Platform Presenter: Uzair Ahmed

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

Team Members:
Jacopo Scaggiante (Division of Neurosurgery, Mount Sinai Hospital), Lissa Peeling (Division of Neurosurgery, University of Saskatchewan), Michael E. Kelly (Division of Neurosurgery, University of Saskatchewan), J Mocco (Division of Neurosurgery, Mount Sinai Hospital), Christopher Kellner (Division of Neurosurgery, Mount Sinai Hospital)

Rationale:
Intracerebral hemorrhage (ICH) remains a significant cause of morbidity and mortality. While traditional surgical techniques have shown marginal clinical benefit of ICH evacuation, minimally invasive techniques have shown some promise. Endoscopic evacuation of the hemorrhage may reduce the peri-hematoma edema and subsequent atrophy around the hemorrhage cavity. This study aims to quantify the changes in cavity volume following hematoma evacuation.

Methods:
Patients from the INVEST registry of minimally invasive endoscopic surgery (MIES) for ICH evacuation were included retrospectively if follow-up computed tomography (CT) scans were available for analysis. Hematoma cavity volumes were calculated from the immediate post-procedural and three-month follow-up CT scans using the Analyze Pro software.

Results:
Twenty patients had follow-up CT scans at a mean time of 93 days from hematoma evacuation. The average cavity size at follow-up was 11938.12 mm3 (SD: 6996.49). The change in cavity size compared to the prior CT was 6396.74 mm3 (median 2542; range: -1030-27543; SD: 8472.45). This represented mean growth in cavity volume of 54%. Four patients (20%) had a smaller cavity size at 3-month follow-up. Factors associated with growth of the cavity size included peri-ventricular location of the cavity.

Conclusions:
This study provides data describing increase in cavity size after endoscopic minimally invasive evacuation of ICH. Comparison to atrophy in conservatively-managed patients is a further planned avenue of research.

Clinical and Operative Outcomes of Patients with Acute Cholecystitis Who are Treated Initially with Image-Guided Cholecystostomy

Platform Presenter: Ida Molavi

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

Team Members:
Angela Schellenberg (Department of Surgical Oncology, University of Toronto), Francis Christian (Department of Surgery, University of Saskatchewan)

Rationale:
Percutaneous cholecystostomy (PC) tube placement followed by delayed cholecystectomy has been shown to be an effective treatment option in high risk populations such as older and critically ill patients. The goal of this study was to review the short -and long-term clinical and operative outcomes of patients with acute cholecystitis initially treated with PC tube placement.

Methods:
We conducted a retrospective review of patients who underwent imageguided PC tube insertion between 2001 and 2011 at the Royal University Hospital or St. Paul's Hospital, Saskatoon. Clinical outcomes, complications and elective cholecystectomy follow-up were noted.

Results:
A total of 140 patients underwent PC tube insertion, 76 men and 64 women with a mean age of 68.4 (standard deviation 17.7) years. Of the 140, 94 (67.1%) had an American Society of Anesthesiologists classification score of III or IV. Percutaneous cholecystostomy tubes remained in place for a median of 21.0 days, and median hospital stay was 7.0 days. Readmission due to complications from PC tubes occurred in 21 patients (15.0%), and 10 (7.1%) were readmitted with recurrent cholecystitis after tube removal. Forty-four patient (31.4%) returned for subsequent elective cholecystectomy, of whom 32 (73%) underwent laparoscopic cholecystectomy, 4 (9%) underwent open cholecystectomy, and 8 (18%) underwent laparoscopic converted to open cholecystectomy.

Conclusion:
Percutaneous cholecystostomy is a safe procedure that can be performed in patients who are older or have numerous comorbidities. However, less than one-third of such patients in our cohort subsequently had the definitive intervention of elective cholecystectomy, with a high rate of conversion from laparoscopic to open cholecystectomy.

Funding Source:
Department of Surgery Resident Research Incentive Program

An Examination into Metaplastic Breast Cancer: An Initial Understanding of Saskatchewan's Management, Treatment, and Outcomes

Platform Presenter: Lyndsey Thiessen

Undergraduate Medical Education
College of Medicine, University of Saskatchewan

Team Members:
Gary Groot (Department of Surgery, University of Saskatchewan), Henrike Rees (Department of Pathology, University of Saskatchewan), Melissa Wood (Department of Surgery, University of Saskatchewan)

Rationale:
Metaplastic breast cancer was recognized as a distinct histopathological subtype of breast cancer by the World Health Organization in 2000. It is associated with a poor prognosis, yet limited data is currently available regarding the optimal management of this rare breast cancer. We sought to describe the clinical, imaging, and pathological features of metaplastic breast cancer and its management within our region.

Methods:
This study is a case series compiled via retrospective chart review. Patients with metaplastic breast cancer diagnosed within the Saskatoon Health Region between March 1, 2015 and April 3, 2018 were identified through the pathology laboratory information system. Data was collected via review of paper charts, electronic medical records and the provincial imaging database. Descriptive analysis of the data was then completed.

Results:
Twenty-one patients were identified and 20 included in the study. All patients were female, with a median age at diagnosis of 60.5 years. Two patients (10%) had metastatic disease at diagnosis. Fourteen patients (70%) had triple negative disease. No patients received neoadjuvant chemotherapy or radiation. Twelve patients (60%) received adjuvant chemotherapy, while 8 patients (40%) underwent adjuvant radiation. Seventeen (85%) had surgery. Six patients (30%) developed recurrence. Eight patients (40%) were deceased at the time of data collection.

Conclusion:
Metaplastic breast cancer patients within the Saskatoon health region display features consistent with those described in the literature. Operative management, adjuvant chemotherapy, and radiation therapy use in our region are in keeping with existing literature. However, neoadjuvant chemotherapy is infrequently used.

POLE Mutations in Clear Cell Endometrial Carcinoma

Platform Presenter: Nick Baniak

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

Team Members:
Oluwole Fadare (UC San Diego Health), John DeCoteau (University of Saskatchewan), Martin Köbel (University of Calgary), Vinita Parkash (Yale University), Jonathan L. Hecht (Harvard University), Krisztina Z. Hanley (Emory University), Katja Gwin (University of Texas Southwestern), Wenxin Zheng (University of Texas Southwestern), Charles M. Quick (University of Arkansas for Medical Science), Elke A. Jarboe (ARUP), Sharon X. Liang (Hofstra-Northwell), Mary Kinloch (University of Saskatchewan)

Rationale:
Endometrial clear cell carcinoma (ECCC) is a rare histotype without unique identified molecular alterations. Its molecular relation to other histotypes (i.e. endometrioid/serous) is controversial. We assessed the TCGA molecular subtype in a large sample of ECCC.

Methods:
ECCCs were collected from 11 institutions. Diagnosis was confirmed by morphological review assisted by immunohistochemical markers (Napsin A, ER). Mismatch repair proteins (PMS2 and MSH6) and p53 expression was assessed by immunohistochemistry on tissue microarrays. DNA was extracted and had targeted next-generation sequencing for POLE, TP53, KRAS, and PIK3CA. Pathogenicity of mutations was determined using MutationTaster and PolyPhen online databases. For p53, IHC and sequencing were complimentarily used to assess the p53 status

Results:
Of 57 cases collected, 46 were considered prototypical ECCC by morphology and IHC profile (Napsin-positive and ER negative). 3 cases were excluded because of insufficient sample for complete IHC analysis, and 6 had failed sequencing resulting in 37 cases for the study. Of the 37 cases, 7 (19%) had pathogenic mutations in the exonuclease domain of POLE with an allelic frequency greater than 10%, however, only 1 of which was a defined hot-spot mutation (S297F, 1/37, 3%) No cases were MMR abnormal/deficient. The gene most commonly affected was TP53 (62%, 23/37), followed by PIK3CA (11%, 4/37), and KRAS (8%, 3/37).

Conclusion:
When applying strict classification criteria, prototypical ECCC seem to split over the TP53 status, with other molecular subtypes being sparsely represented. The findings support separately studying histologically/IHC defined ECCC to identify characteristic molecular alterations in future studies.

Funding Source:
College of Medicine Resident Research Grant

Laparoscopic Heller Myotomy with and without Dor Fundoplication for the Treatment of Achalasia. Do Surgical Outcomes differ?

Platform Presenter: Haven Roy

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

Team Members:
Renee Kennedy (University of Saskatchewan)

Rationale:
Laparoscopic Heller myotomy (LHM) is the standard of therapy for achalasia. There is conflicting evidence regarding the necessity of an anti-reflux procedure to supplement the myotomy. This study compares surgical and quality of life outcomes between patients receiving LHM +/- Dor fundoplication.

Methods:
Adult patients undergoing LHM in the SHR between 2006-2017 were included (n = 85). We used the Gastroesophageal Reflux Disease Health-Related Quality of Life Scale (GERD-HRQLS) and other qualitative measures to interview patients. Symptom scores were analyzed by group using the chi-square and student t-tests.

Results:
58 patients completed the survey (68%; LHMwD = 32; LHM = 26). Mean operative time was 110.9 min (LHM) vs. 127.2 min (LHMwD) ($p = 0.008$). Mean LOS was 3.6 days (LHM) vs. 2.8 days (LHMwD) ($p = 0.036$). There was no significant difference with respect to perioperative complications, postoperative heartburn, dysphagia, regurgitation, or PPI use. Patients receiving LHMwD were more likely to have postoperative gas bloat (22% vs 4%; $p = 0.047$). Overall satisfaction was 100% with both groups.

Conclusion:
The only significant differences between groups were an increase in OR time and gas bloat syndrome amongst those receiving fundoplication. LHM leads to a slightly increased prevalence of GERD and PPI use, while LHMwD slightly increases the prevalence of postop dysphagia. However, neither are statistically significant outcomes. Patient satisfaction is excellent for both procedures. Therefore, decision of whether to include a Dor fundoplication with LHM should be based on a combination of surgeon and patient preference, with consideration given to specific patient factors.

Pancreatic Vascular Malformation with Diffuse Nesidioblastosis-like Pancreatic Neuroendocrine Hyperplasia - Reactive, Dysplastic and/or Neoplastic?

Platform Presenter: Glenda Wright

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

Team Members:
S Miller and J Shaw (Department of Surgery, University of Saskatchewan), R Kanthan (Department of Pathology and Laboratory Medicine, University of Saskatchewan)

Rationale:
Pancreatic vascular malformations are rare lesions, accounting for less than 1% of gastrointestinal vascular malformations. Association with neuroendocrine lesions has not yet been reported. We describe a case of concurrent pancreatic vascular malformation with diffuse nesidioblastosis-like neuroendocrine hyperplasia and discuss the current literature on diffuse pancreatic neuroendocrine hyperplasia.

Methods & Results:
A 62 year old male on long term follow up for multiple myeloma was found to have an asymptomatic lesion in the pancreatic tail identified on routine abdominal CT scan. The silent pancreatic lesion was presumed to be a neuroendocrine lesion. However multiple investigations including an octreotide scan, were negative, and subsequent vascular subtraction imaging was suggestive of a vascular lesion. A distal pancreatectomy was performed for definitive diagnosis of the pancreatic lesion. Gross examination revealed a hemorrhagic mass corresponding to the lesion identified on imaging. This lesion was confirmed to be a vascular malformation with small and large vessels of varied size and thickness on histopathology. The background pancreatic tissue showed diffusely increased and enlarged islets of Langerhans /endocrine dysplasia with a nesidioblastosis-like proliferation of neuroendocrine cells around exocrine ducts/ endocrine hyperplasia, and a single neuroendocrine microadenoma/endocrine neoplasia. Immunohistochemical stains confirmed the expression of multiple hormones within the neuroendocrine cells and were associated with a low proliferation index. A diagnosis of a pancreatic vascular malformation with diffuse nesidioblastosis-like neuroendocrine hyperplasia and a microadenoma was confirmed.

Conclusions:
We report a unique pancreatic case of concurrent vascular malformation and diffuse neuroendocrine hyperplasia, and discuss the possible aetiology of diffuse neuroendocrine hyperplasia as reactive, dysplastic and/or neoplastic in the absence of an exocrine neoplasm.

Outcomes of Using Sutureless, Scleral-fixated Posterior Chamber Intraocular Lenses

Platform Presenter: Vinay Kansal

Department of Ophthalmology
College of Medicine, University of Saskatchewan

Team Members:
Oluwadara Onasanya (Medical Student, University of Saskatchewan), Kevin Colleaux (Department of Ophthalmology, University of Saskatchewan), Nigel Rawlings (Department of Ophthalmology, University of Saskatchewan)

Rationale:
Implantation of sutureless, scleral fixated posterior chamber intraocular lenses (SSFIOL) is a promising option in the surgical management of patients unable to undergo standard cataract surgery due to insufficient capsular support. The purpose of this study was to describe the indications, visual outcomes and complications of SSFIOL implantation.

Methods:
Retrospective, investigational cohort study. 135 eyes who underwent SSFIOL implantation at Saskatoon City Hospital from July 2013 to August 2017. Pre-operative ocular morbidity, operative indications, post-operative outcomes, complications, and reinterventions were summarized. Visual and refractive outcomes were compared between the pre- and latest post-operative visit using Wilcoxon signed-ranked test.

Results:
Mean follow-up was 10.9±10.5 months. Primary surgical indication was dislocated IOL due to zonular weakness (88 eyes (65.2%)). At latest follow-up there was improvement in uncorrected visual acuity (1.4 ± 0.9 to 0.67 ± 0.60 logMAR, $p<0.01$), best corrected visual acuity (0.7 ± 0.5 logMAR to 0.37 ± 0.38 logMAR, $p<0.01$). Changes in absolute spherical and cylindrical refraction were not significant. Post-operative complications included IOP elevation >30mmHg (23.7%), vitreous hemorrhage (VH) (17.8%), cystoid macular edema (CME) (11.9%), iris capture (10.4%), uveitis-glaucoma-hyphema (UGH) syndrome (10.4%). Operative reinterventions included SSFIOL exchange (2.9%), repositioning (5.2%), removal (2.2%). 11 (8.1%) patients required multiple re-interventions.

Conclusion:
SSFIOL implantation is a reasonable option for eyes with inadequate capsular support, resulting in visual improvement in most patients. Many of the surgical complications were related to a floppy iris-lens diaphragm (VH, UGH syndrome, iris capture), predisposed in eyes with complex pathology. Surgical modifications can minimize the iris-related complications.

Laparoscopic Repair of Perforated Duodenal Ulcers: A Retrospective Look into Management at Regina General Hospital

Platform Presenter: Nicole Rewuski

Department of Surgery, Division of General Surgery (CIP Program)
College of Medicine, University of Saskatchewan

Team Members:
Dr. Gordie Kaban (Department of Surgery, University of Saskatchewan), Matthew Martyniuk (Medical Student, University of Saskatchewan)

Rationale:
Perforated duodenal ulcers (PDU) occur when inflammation causes an ulcer in the wall of the proximal small bowel (duodenum). Without therapy, ulcers can erode through the duodenum, spilling gastric contents and bile into the abdomen, requiring emergent surgical repair. Repair of PDU can be done using open or laparoscopic surgery; laparoscopic repair (LR) being a less invasive surgery than open repair (OR).

Many patients who develop PDU are elderly and are at higher risk of complications due to diminished physical reserves; therefore, a surgical repair that is less taxing, has a shorter recovery time and is associated with fewer complications is ideal. This study compares the complication rates and length of hospital stay between LR and OR in patients with PDU.

Methods:
This is a retrospective review of 56 charts from January 2004 to December 2014 for patients admitted with PDU at Regina General Hospital.

Results:
Patients undergoing LR had overall shorter hospital stays (8.2 vs 14.9 days). Patients with LR had a nasogastric tube in situ for fewer days (2.9 vs 6.9), required fewer days of parenteral nutrition (0.5 vs 5.3) and resumed regular diets sooner (4.5 vs 7.0 days). Patients undergoing LR also had fewer wound infections (5% vs 30.6%) and lower leak rates (5% vs 30.6%). Post-operative ICU admission occurred less frequently with LR (15% vs 44.4%).

Conclusion:
Where surgeon skill set allows, LR of PDU should be considered over OR as it is a less morbid procedure.

University of Saskatchewan Experience with Mechanical Thrombectomy under General Anaesthesia

Platform Presenter: Amit Persad

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

Team Members:
Zane Tymchack (Division of Neurosurgery), Ruth Whelan (Saskatchewan Stroke Program), Michael Kelly (Division of Neurosurgery), Lissa Peeling (Division of Neurosurgery)

Rationale:
While recent clinical trials have demonstrated immense efficacy of mechanical thrombectomy in the setting of acute stroke; there remains debate over the relative safety in performing this procedure under general anesthesia (GA). With the reorganization of stroke systems of care, as a result of the Saskatchewan Acute Stroke Pathway, all patients presenting with LVO are assessed and endovascular thrombectomy is performed routinely under GA.

Methods:
Data was prospectively collected on 39 consecutive LVO in 2016 and 80 LVO in 2017 at the only tertiary stroke centre in Saskatchewan. All patients undergoing MT were place under GA for the procedure. Anatomical location of LVO and pre-MT ASPECTS score were documented. Post-MT TICI scores and 90-day NIHSS and mRS were recorded.

Results:
Of 39 LVO, 37 went on to have mechanical thrombectomy (MT) in 2016, and 78 of 80 in 2017. Available data showed favorable improvement in NIHSS score (18 to 1) and in mRS independence grading (average 2.5).

Conclusion:
In the Saskatchewan acute stroke pathway experience, general anesthesia is a safe modality for mechanical thrombectomy. Outcomes of mechanical thrombectomy for LVO in 2016 and 2017 are in keeping with national standards.

The Natural History of Small Unruptured Intracranial Aneurysms in Saskatchewan

Platform Presenter: Jenna Mann

Undergraduate Medical Education
College of Medicine, University of Saskatchewan

Team Members:
Uzair Ahmed (Division of Neurosurgery), Lissa Peeling (Division of Neurosurgery), Kotoo Meguro (Division of Neurosurgery), Michael Kelly (Division of Neurosurgery)

Rationale:
The natural history of small unruptured intracranial aneurysms (UIAs) <7mm is between 0 to 1.3% per year. Our centre provides cerebrovascular care for the entire province allowing for long-term follow-up. We studied the safety of observation for aneurysms <7mm.

Methods:
We performed a retrospective chart review of patients with intracranial aneurysm referred to the Saskatchewan Cerebrovascular Centre between July 2008 and April 2015. Aneurysm characteristics including radiographic examination, size, location, and current status (followed, treated, not followed), were collected along with patient factors. Follow-up duration for each aneurysm was used to calculate total follow-up in aneurysm-years. Statistical evaluation consisted of multivariate analysis and logistic regression analysis.

Results:
428 patients harbouring a total of 497 aneurysms <7mm in size were identified. 67 presented with rupture. Of the remaining 430 aneurysms, 40 patients were treated, creating a 9.3% treatment rate. 2 cases of rupture occurred in those patients who were followed, resulting in a 0.5% rupture rate for this cohort. 325 aneurysms were followed for a total of 631.3 cumulative aneurysm-years for an average of 1.9 aneurysm-years.
Risk factor analysis showed that smoking status and hypertension associated with presence of aneurysm (p=0.009,0.026, respectively).

Conclusion:
This data shows that in our selected patient group there is a very low yearly rate of aneurysm rupture, and that observation of aneurysms <7mm is safe. Hypertension and smoking were associated with the development of an aneurysm, and the two incidences of rupture occurred in patients who were hypertensive. 9.3% of patients were treated, likely leading to a reduced natural history risk.

Funding Source:
Funded by the U of S College of Medicine Dean's Summer Research program with support from the Saskatchewan Cerebrovascular Centre (There are no conflicts of interest to disclose)

Retrospective Study of Diagnostic Concordance of Bile Duct Brushing Cytology with Histological Follow-up

Platform Presenter: Hui Wang

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

Team Members:
Janine Benoit, Omar Al-Nourhji (Department of Pathology and Laboratory Medicine, University of Saskatchewan)

Rationale:
Retrospective review of common bile duct brushing (CBDBR) cytology to assess diagnostic accuracy in our facility and identify cytomorphological pitfalls that leads to possible error/near miss.

Methods:
All CBDBR specimens within Saskatoon Health Region from 2011 to 2017 were reviewed. 242 specimens from 196 patients were received during this time period. Among them, 57 patients had histological follow up. 53 cases (4 case' slides are un-available) were independently blindly reviewed by two cytopathologists and discrepancies were resolved by mutual consensus. Pre- and post-review accuracy was analyzed. Cellularity, background necrosis, architectural and nuclear features of each case were assessed.

Results:
The pre- vs. post-review sensitivity, specificity, positive predictive value and negative predictive value are 44% vs. 33%, 100% vs. 100%, 100% vs. 100%, and 14% vs. 20%, respectively. There are 22 vs. 25 cases diagnosed with "atypical" or "suspicious" pre- and post-review, respectively, and not contributed to accuracy analysis. The agreement between 2 cytopathologists is 49%. There are 2 cases with benign histologic follow up were diagnosed with "suspicious" in both pre-and post-review. The most significant cytomorphological features favoring malignancy are anisonucleosis, irregular nuclear membrane, and irregular chromatin distribution.

Conclusion:
CBDBR cytology interpretation is extremely challenging without knowing patient's clinical history and radiological findings. The inter-observer agreement is relatively fair. "Atypical" and "suspicious" are intermediate categories that pending further investigation in our study.

Sigma Metric Calculations for Electrolytes Measured with the Point of Care Abbott ISTAT®, Radiometer ABL 835® Blood Gas Analyzer and the Beckman Coulter DxC® Chemistry Analyzer

Platform Presenter: Glenda Wright

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

Team Members:
Anna Fuezery (Department of Pathology & Laboratory Medicine, University of Alberta), Archan A Kakadekar (Medical University of Lublin, Poland), Fang Wu and Martha E Lyo (Department of Pathology & Laboratory Medicine, Saskatoon Health Region)

Rationale:
Quality laboratory tests enable physicians to practice better medicine. Sigma metrics are calculated measures of process quality and have been used to describe the quality of laboratory tests. A sigma metric of 3 is considered a minimal performance standard accounting for 66,807 defects per million (DPM) analyses and world class quality is thought to be achievable with a sigma of 6 (3.4 DPM). The objective of this study was to calculate sigma metrics for the measurement of electrolytes (Na+, K+, Cl-) using the Abbott ISTAT® and the Radiometer ABL 835® blood gas analyzer in comparison with the Beckman Coulter UniCel® chemistry analyzer.

Materials & Methods:
Sigma metrics were calculated using the following equation: Sigma = (Total Allowable Error-Bias)/Coefficient of Variation (CV). The CV of the ISTAT® and Radiometer methods were determined following repeat analysis of a lithium heparin whole blood specimen (n = 20). Method bias was determined relative to the Beckman Coulter DxC® chemistry analyzer by analyzing 22 residual patient specimens. Sigma metrics were calculated using total allowable errors for Na+, K+, Cl- outlined by the following external quality assessment schemes (EQAS): CLIA, Belgium, France, Spain, Ontario IQMH, RCPA.

Results:
The calculated mean sigma metrics for each analyte and method showed variation depending on the total allowable error outlined by each external quality assessment scheme. A higher total allowable error corresponded to a higher calculated sigma metric.

Conclusion:
Sigma metric calculations are highly dependent upon the total allowable error outlined by external quality assessment schemes.

Protective Effect of Doxycycline against Warm Ischemic Injury to Donation after Circulatory Death (DCD) Transplant Kidneys

Platform Presenter: Sarah Schmid

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

Team Members:
Dr. Michael Moser (Department of Surgery and Saskatchewan Renal Transplant Program), Jolanta Sawicki (Department of Pharmacology), Gregory Sawicki (Department of Pharmacology)

Rationale:
Kidney injury during donation after circulatory death (DCD) includes warm ischemic (WI) injury from the time of asystole until the kidney is cooled, and cold ischemic (CI) injury during preservation. Our lab has previously shown that Matrix Metalloproteinases (MMPs) are involved in CI injury and that Doxycycline (Doxy), an antibiotic and known MMP inhibitor, protects the transplant kidney during CI. The purpose of our study was to determine if Doxy given prior to asystole is beneficial in preventing WI injury.

Methods:
A standard rat model of DCD was used. Four groups were studied (n=5-7 each); 'control', Doxy given iv 'before' asystole, Doxy in the cold perfusion solution ('after' group), and Doxy before AND after ('both' group). Left kidneys were perfused at 4C for 20 hours and perfusates were analyzed for MMPs and injury markers [neutrophil gelatinase associated lipocalin (NGAL) and LDH] from WI and CI. Right kidneys were not perfused, and tissue was analyzed to assess the effect on WI injury alone.

Results:
NGAL, the standard marker of kidney injury, was reduced in the perfusate of the treatment groups: 'before' group NGAL by 19%, 'after' group by 68% and 'both' group by 82%, $p=0.09$, <0.001, and <0.001 ($p=0.05$ between the last two groups). Similar reductions in MMP and LDH were seen. EMs suggested mitochondrial protection in the 'before', 'after', and 'both' groups.

Conclusions:
Doxycycline given prior to asystole may be useful as a means of reducing the amount of WI and CI injury that occurs to DCD kidneys.

Funding Sources:
COMrad Grant

Evaluating the Eligibility for Minimally Invasive Evacuation of Patients Presenting to a Tertiary Care Center with Intracerebral Hemorrhage

Platform Presenter: Uzair Ahmed

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

Team Members:
Brittany Vanderlot (Division of Neurosurgery, University of Saskatchewan), Michael Kelly (Division of Neurosurgery, University of Saskatchewan), Lissa Peeling (Division of Neurosurgery, University of Saskatchewan)

Rationale:
Intracerebral hemorrhage (ICH) remains a significant cause of morbidity and mortality. While traditional surgical techniques have shown marginal clinical benefit of ICH evacuation, minimally invasive endoscopic surgery (MIES) techniques have shown some promise, and new devices remain in the investigative phases. Here, we aim to estimate the number of patients who would be eligible for evacuation of hemorrhage using these techniques.

Methods:
Patient diagnostic codes were used to retrospectively collect admission data for all patients admitted with intracerebral hemorrhage to RUH between January, 2016 and December, 2017. Patient length of stay and disposition information was collected. We obtained clinical information at presentation and discharge, and imaging was used to estimate the size of hemorrhage using the ABC/2 method. The INVEST criteria were used to judge eligibility of the patients for MIES.

Results:
Over the two year period, 77 patients were admitted with a diagnosis of ICH. Of these, 44 (57%) were male. Mean age on admission was 62.2. Mean length of stay was 26 days. Thirty-six patients (47%) died in hospital, while only 9 patients (12%) were discharged home. The location of hemorrhage, size, and etiology will be used to determine eligibility for MIES. We estimate that approximately 25 patients (30%) will meet the INVEST criteria.

Conclusion:
There is significant morbidity and mortality associated with ICH. A significant number of patients would be eligible for MIES on a trial basis, to investigate the potential benefit from this technique. This evidence may be further utilized to join randomized trials.

Is Patient Satisfaction in Arthroscopic Shoulder Surgery Improved by Personalized Patient Videos? A Randomized Control Study

Platform Presenter: Laura Sims

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

Team Members:
Raymond Kahn (University of Saskatchewan), David Sauder (Department of Surgery, University of Saskatchewan)

Rationale:
Patient satisfaction is an increasingly recognized important outcome measure following shoulder arthroscopy. Multimedia represents a new modality of information delivery in modern medicine. The purpose of this study was to evaluate whether providing patients with a personalized video of their arthroscopic shoulder surgery improved patient satisfaction.

Methods:
This was a multi-surgeon, single-center randomized control study. Adult patients undergoing arthroscopic shoulder decompression, rotator cuff repair, or labral repair were enrolled and randomized. The control group received no video of their surgery whereas the intervention group was received a narrated video recording of their procedure. Patients with previous ipsilateral shoulder arthroscopy or an inability to participate in follow-up were excluded. Surgeons were blinded to group allocation. Patient satisfaction with their procedure and with information received regarding their procedure was assessed at three months using a Visual Analogue Scale (VAS), Likert Scale, and Quick Disabilities of the Arm, Hand, and Shoulder (DASH) score.

Results:
Fifty participants were assigned to the intervention group, with 41 completing follow-up and 47 were assigned to the control group, with 39 completing follow-up. Baseline characteristics between groups did not vary significantly. Mean VAS scored did not differ significantly (Control 8.5(+/-2.2) Intervention 9.0(+/-1.5) P=0.38) nor did Likert Scores and QuickDASH scores. A subgroup analysis assessing age, gender, surgeon, and procedure showed no significant differences.

Conclusion:
Providing patients with a personalized video of their surgical procedure did not improve satisfaction. While multimedia represents a new potential area of information delivery and patient empowerment, it had no influence on patient satisfaction following shoulder arthroscopy.

Funding Sources:
Department of Surgery, University of Saskatchewan

Utilization and Impact of an Ambulatory Urology Care Centre in Saskatchewan

Platform Presenter: Kirsten Jewitt

Undergraduate Medical Education
College of Medicine, University of Saskatchewan

Team Members:
Trustin Domes (Department of Surgery, University of Saskatchewan)

Rationale:
Since 2013, the Urology Centre of Health (UCH) in Saskatoon has provided consolidated ambulatory urological services to improve the quality and efficiency of care. A program evaluation was conducted in May-August, 2017 to evaluate the utilization and impact of the UCH, including any impact on acute urological visits to Saskatoon's Emergency Departments (ED).

Methods:
The logic model framework for program evaluation was used to analyze program inputs, processes, outputs and outcomes. Patient satisfaction (n=106) was assessed via surveys. Patient volume and treatment data was extracted from an electronic health records database and patient wait-time data was extracted from electronic medical records.

Results:
UCH patient volumes have increased approximately 250% from 2013 to 2017. Approximately 40% of patients treated reside outside the Saskatoon area. Patient satisfaction with UCH services and staff was outstanding to good in all variables assessed. Patient wait-times for consultations for erectile dysfunction and Peyronie's disease decreased by 60% and time from known elevated PSA to prostate biopsy result decreased by 62%. Although overall ED visits for urological diagnoses did not decrease with the introduction of the UCH, ED visits for post-operative complications/pain, renal colic, urinary retention and hematuria decreased.

Conclusion:
Patient volumes and services have greatly expanded since the UCH opened. Patients report a high level of satisfaction with UCH services and staff with shorter wait-times. The UCH is off-loading ED volume for certain urological conditions, which is likely a more efficient, cost-effective delivery of specialized patient care. The UCH has developed into a highly functional micro-system within the larger health care system.

Funding Sources:
Office of the Vice Dean Research (There are no financial conflicts or other conflicts of interest)

Notes

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UNIVERSITY OF SASKATCHEWAN

Departments of Surgery, Pathology & Ophthalmology