RD 2025 APRIL 8

DALHOUSIE UNIVERSITY Department of Surgery

RESEARCH DAY 2025

Program and Abstracts

DALHOUSIE UNIVERSITY
Department of Surgery

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DALHOUSIE UNIVERSITY | CONTINUING PROFESSIONAL DEVELOPMENT & MEDICAL EDUCATION

Dr. Gail Darling
Head, Department of Surgery

It my pleasure to welcome you to our 35th Annual Research Day in the Dalhousie University Department of Surgery. This day is a flagship event in the Department, as it is the one day we bring together faculty, alumni, residents, medical students, graduate students, allied health professionals and friends of the Department to celebrate each other, and our outstanding research.

Thirty-two inquisitive minds will present their research projects spanning the full breadth of impactful research we do here in the Department of Surgery.

Dr Muhammad Mamdani from the University of Toronto is this year's Dr. Gordon Bethune Visiting Professor and Collaborative Research Day Speaker. His noon time keynote lecture "Applied Artificial Intelligence in Health Care" will be of interest to all.

We welcome Dr. Michael Bezuhly as the new Research Director in the Department. He is taking over the reins from Dr. Micheal Dunbar and will continue the good work of leading a motivated research committee who thrive to develop a culture of research within our department.

One of my major goals as Department Head is to promote a culture of research in our department and to provide support to all our researcher in basic and translational science, quality, education, health systems patient outcomes. We aim to promote a culture of inquiry, laying solid foundations across the Department for all our members. I am confident that the Departments efforts towards these research initiatives will be apparent to all by the end of the day. Thank you for joining us for the academic highlight of the year.

Dr. Michael Bezuhly
Director of Research
Department of Surgery Research Day

Welcome to the 35th Department of Surgery Research Day. In a spirit of collaboration, we are once again delighted to hold this event with our colleagues in the Department of Ophthalmology & Visual Sciences and Department of Anaesthesia, Pain Management & Perioperative Medicine.

I would like to thank our Planning Committee who had the difficult tasks of selecting presenters from among the over 60 abstracts submitted. Today is particularly an opportunity to celebrate the research being conducted by our surgical residents, clinical fellows, medical students and graduate students. Trainees represent the future of our specialty, and based on today's program the future is bright indeed!

Our keynote lecture by **Dr. Muhammad Mamdani** of the University of Toronto, will be followed by the inaugural **3D Spotlight Series.** Each Department will have a trainee present on research that showcases a collaborative link between Surgery, Anaesthesia and Ophthalmology. The Department of Surgery's presenter this year is **Dr. Vibha Gaonkar**, a Clinical Fellow in Neurosurgery whose abstract is entitled "*Predicting Programming Thresholds in Subthalamic Nucleus Deep Brain Stimulation using Intraoperative Motor Evoked Potentials: General versus Local Anesthesia.*"

Additionally, **Dr. Greg Hirsch** will highlight **Quality Improvement** initiatives within the Department, while **Dr. Jim Fawcett** will speak on the critical role of **Basic Discovery Research**. Each of these talks will be followed by trainee presentations which exemplify the critical research being conducted in these important areas.

Finally, I would like to take this opportunity to thank the members of the Planning Committee, and **Elaine Marsh** without whom today would not be possible. I hope you enjoy the Program!

Department of Surgery Research Day Planning Committee

Dr. Michael Bezuhly, Chair
Director of Research
Department of Surgery

Dr. Emily Krauss
Director of Research
Division of Plastic Surgery

Dr. Adrienne Weeks
Director of Research
Division of Neurosurgery

Dr. Phil Tremblay
Director of Research
Division of Cardiac Surgery

Department of Surgery Research Day Judges

Dr. Jessica Mills
Department of Pediatric Surgery

Dr Joseph Corkum
Division of Plastic Surgery

Dr. Bernard Burgesson
Division of Orthopaedic Surgery

EVENT Schedule

8:00 AM:	**Opening Remarks- Dr. Michael Bezuhly**
8:10 AM	**Session I – Chair: Dr. Andrew Glennie**
10:00 AM	**BREAK**
10:20 AM	**Session II – Chair: Dr. Elise Graham**
12:00 PM	**LUNCH BREAK**
12:45 PM	**Collaborative Keynote Speaker** **Dr. Muhammad Mamdani**
1:30 PM	**3-D Presentations: A spotlight on Interdisciplinary Research in the Departments of Anesthesia, Ophthalmology and Surgery**
2:00 PM:	**BREAK**
2:30 PM	**Session III – Chair: Dr. Sam Jessula**
4:25 PM:	**Closing Remarks- Dr. Gail Darling**
430 PM:	**Cocktail/Social**
5:00 PM:	**Announcement of Winners**

All trainee presentation are 7 minutes, with a 2.5 minute Q & A
Keynote presentation is 30 minutes, with a 15 minute Q & A
3D Presentations are 8 minutes, with a 2 minute Q & A

DEPARTMENT OF SURGERY/COLLABORATIVE RESEARCH DAY KEYNOTE

"Applied Artificial Intelligence in Health Care"

Muhammad Mamdani, PharmD, MA, MPH
Vice President - Data Science and Advanced
Faculty Affiliate – Vector Institute
Professor – University of Toronto
Director - University of Toronto Temerty Centre for Analytics
Odette Chair- in Advanced Analytics Artificial Intelligence Research and Education in Medicine (T-CAIREM)

Dr. Mamdani is Vice President of Data Science and Advanced Analytics at Unity Health Toronto and Director of the University of Toronto Temerty Faculty of Medicine Centre for Artificial Intelligence Education and Research in Medicine (T-CAIREM). Dr. Mamdani's team bridges advanced analytics including machine learning with clinical and management decision making to improve patient outcomes and hospital efficiency. Dr. Mamdani is also Professor in the Department of Medicine of the Temerty Faculty of Medicine, the Leslie Dan Faculty of Pharmacy, and the Institute of Health Policy, Management and Evaluation of the Dalla Lana Faculty of Public Health. He is also adjunct Senior Scientist at the Institute for Clinical Evaluative Sciences (ICES) and a Faculty Affiliate of the Vector Institute, which is a leading institution for artificial intelligence research in Canada.

Dr. Mamdani holds a Doctor of Pharmacy degree from the University of Michigan, a fellowship in pharmacoeconomics from the Detroit Medical Centre, a Master of Arts degree in econometric theory from Wayne State University, and a Master of Public Health from Harvard University with a focus on statistics and epidemiology. He has previously been named among Canada's Top 40 under 40. Dr. Mamdani's research interests include pharmacoepidemiology, pharmacoeconomics, drug policy, and the application of advanced analytics approaches to clinical problems and health policy decision-making. He has published over 500 studies in peer-reviewed healthcare journals.

Welcome Dr. Mamdani!

2025 DEPARTMENT OF SURGERY RESEARCH DAY: LEARNING OBJECTIVES

1. Participants will review and discuss research in the Surgical Department. (Medical Expert, Scholar)
2. Participants will identify opportunities and challenges in the implementation of AI in health care research (keynote). (Medical Expert, Scholar)
3. To develop oral presentation skills needed to effectively present scientific research data. (Communicator)
4. To develop skills related to defending their research results (through Q&A format). (Communicator)

DR. MUHAMMAD MAMDANI, KEYNOTE: LEARNING OBJECTIVES

1. Review AI and machine learning applications and their relevance to clinical and surgical environments
2. Describe key opportunities and challenges in the implementation of AI in clinical practice.
3. Critically examine the implications of increasingly available AI solutions for clinicians, researchers, educators and trainees

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DALHOUSIE UNIVERSITY | CONTINUING PROFESSIONAL DEVELOPMENT & MEDICAL EDUCATION

Educationally approved/co-sponsored by Dalhousie University Continuing Professional Development and Medical Education.

In keeping with CMA Guidelines, program content and selection of speakers are the responsibility of the planning committee. Support is directed toward the costs of the course and not to individual speakers.

*As an accredited provider, Dalhousie University Continuing Professional Development and Medical Education, designates this continuing professional development activity for up to **6.5 HOURS** as an accredited group learning Section 1 activity as defined by the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada.*

Through an agreement between the Royal College of Physicians and Surgeons of Canada and the American Medical Association, physicians may convert Royal College MOC credits to AMA PRA Category 1 Credits™. Information on the process to convert Royal College MOC credit to AMA credit can be found online at edhub.ama-assn.org.

8:00:00 AM **Morning Announcements**
Dr. Michael Bezuhly, Director of Research – Department of Surgery

8:15:00 AM SESSION I
CHAIR: Dr. Andrew Glennie

8:15:00 AM Diagnostic and Treatment Timelines for Patients Diagnosed with Glioblastoma in Nova Scotia
Ellen Parker - RESIDENT- NEUROSURGERY ----------13

8:24:30 AM Correlation of Sit-to-Walk and Sit-to-Stand Performance with Gait Kinematic Outcomes and Self Reported Pain and Function in End-Stage Knee Osteoarthritis
Ryan Ong - MEDICAL STUDENT – ORTHOPAEDICS ----------14

8:34:00: AM: Genomic and Immunological Mechanistic Insights of Targeted Hyperthermia Therapy and its Synergy with Immunotherapy in Solid Tumors
Kate Clark - GRAD STUDENT –GENERAL SURGERY ---------- 15

8:43:30 AM: **DEPARTMENT OF SURGERY BASIC SCIENCE COLLECTIVE**
Dr. Jim Fawcett – DOS Basic Science Lead

8:53:00 AM: Immunophenotyping of Longitudinal Peripheral Blood Mononuclear Cells from Patients with Glioblastoma to Distinguish Pseudoprogression from True Progression
Lauren P. Westhaver - GRAD STUDENT – NEUROSURGERY----------16

9:02:30 AM: Characterizing Renal Tubular Epithelial Injury During Donation after Circulatory Death (DCD) and Possible Amelioration with Pkx-001.
Yara Azizieh -GRAD STUDENT – PATHOLOGY -GENERAL SURGERY ------17

9:12:00 AM: Rehabilitation Goals for Hand and Upper Extremity Function After Cervical Spinal Cord Injury: A Retrospective Study.
Tammy Selman - RESIDENT- PLASTIC SURGERY----------18

9:21:30 AM: The Oncologic Outcomes of Buccal Squamous Cell Carcinoma: A Multi-Institutional Study
Usman Khan - RESIDENT – OTOLARYNGOLOGY----------19

9:31:00 AM: Analysis of Patient Presentation to the ED within 90-days of Infra-inguinal Bypass
Danika Knight -MEDICAL STUDENT – VASCULAR----------20

9:40:30 AM: Unveiling the Drivers of Ninety-Day Emergency Department Visits Post Thoracic Surgery: A Nova Scotia Health Study
Anthony Dame -RESIDENT – THORACIC----------21

9:50:00 AM Predicting Flap Survival in Autologous Breast Reconstruction Using Multispectral Near Infrared Spectroscopy (MS-NIRS) Imaging
Olivia MacIntyre- MEDICAL STUDENT- PLASTIC SURGERY----------22

10:00 AM BREAK

10:20:00 AM: SESSION II
CHAIR: Dr. Elise Graham

10:20:00 AM: Commitment to Excellence: Six-Year Review of a Longitudinal Quality Improvement Program in the Division of Cardiac Surgery
Joel Bierer - CIP RESIDENT – CARDIAC SURGERY----------23

10:29:30 AM: Lymphedema Severity and QoL as a Function of Selective Neck Dissection Technique: A Retrospective Cohort Pilot Study
Skylah McLeod Van Wagoner - MEDICAL STUDENT – ENT ----------24

10:39:00 AM: Targeting Functional Deficits: Associations Between Distal Femur Morphology and Passive and Dynamic Frontal Plane Knee Kinematics in Arthroplasty Patients for Personalized Robotic Surgery.
Nadim Ammoury -GRAD STUDENT – BIOMEDICAL ENGINEERING – ORTHOPAEDICS ----------25

10:48:30 AM: **QUALITY RESEARCH IN THE DEPARTMENT OF SURGERY**
Dr. Greg Hirsch – Director of Perioperative Care NSHA

11:59:00 AM: Quality Improvement in Neurosurgery: The Success of the Spine Assessment Clinic in Reducing Post-Op Emergency Department Visits
Jenna Smith-Forrester -RESIDENT –NEUROSURGERY/ORTHOPAEDICS--26

11:08:30AM: Patient Perspectives of Quality Compared to Quantity of Life Regarding Orbital Exenteration
Kalpesh Hathi - RESIDENT – OTOLARYNGOLOGY----------27

11:18:00 AM: Self Inflicted Hand Fractures as a Predictor of Future Psychiatric Conditions in Pediatric Population
Piccolo, Olivia - MEDICAL STUDENT – PLASTIC SURGERY----------28

11:27:30 AM: Indications, Findings, and Follow-Up Recommendations Among Patients Who Underwent Frequent Colonoscopy at Tertiary Care Centre
Allison Keeping - RESIDENT -GENERAL SURGERY ----------29

11:37:00 AM: The Impact of BMI on Operative Decision Making in Patients Undergoing Colorectal Surgery in Nova Scotia, Canada
Moamen Bydoun -MEDICAL STUDENT- GENERAL SURGERY----------30

11:46:30 AM: Associations between SSRIs and Adverse Events Following Arthroplasty for Total Hip and Knee Arthroplasty
Michael Whitcomb -RESIDENT- ORTHOPAEDICS ----------31

12:00:00 PM: LUNCH – Main Foyer Meeting Area

12:45:00 PM: COLLABORATIVE KEYNOTE – Dr. Muhammad Mamdani
"Applied Artificial Intelligence in Health Care" – Room C1-C2

1:30:00 PM: 3-D Presentations: A spotlight on Interdisciplinary Research in the Departments of Anesthesia, Ophthalmology and Surgery
Chair: Dr. Michael Bezuhly

1:30 PM: Surgery
Predicting Programming Thresholds in Subthalamic Nucleus Deep Brain Stimulation using Intraoperative Motor Evoked Potentials: General versus Local Anesthesia
Vibha Gaonkar -CLINICAL FELLOW – NEUROSURGERY ----------32

1:40 PM: Anesthesia
Implementation of Enhanced Recovery after Cardiac Surgery at the QEII Initial Phase and Baseline Data
Parnian Hosseini ----------33

1:50 PM: Ophthalmology
proteomic Analyses for Different Stages of Primary Open Angle Glaucoma- A Pilot Study of 8000 Markers with Stringent Criteria
Ellen Zhou – CLINICAL FELLOW – GLAUCOMA ----------34

2:00 PM: BREAK

2:30 PM: SESSION III
CHAIR: Dr. Sam Jessula

2:30:00 PM: Establishing A Spatio-Temporal Atlas of Gene Expression After Traumatic Spinal Cord Injury
Laura Dauphinee -GRAD STUDENT – NEUROSURGERY ----------35

2:39:30 PM: Modified Ultrafiltration Does Not Reduce Inflammatory Mediator Burden after Children's Heart Surgery with Cardiopulmonary Bypass.
Tony El-Rabahi -MEDICAL STUDENT – CARDIAC SURGERY ----------36

2:49:00 PM: Psychologic Disorders May Be Associated with Longer LOS After Colorectal Surgery in Multicenter Cohort
Latefa Almazroui - **RESIDENT – GENERAL SURGERY ----------37**

2:58:30 PM**:** Environmental Carcinogenesis in Lung Cancer: Sodium Arsenite-Induced PML Dysregulation and Line-1 Activation
Kennedy Whelan- GRADUATE STUDENT – BASIC SCIENCE- THORACIC SURGERY ----------38

3:08:00 PM: Multifaceted Program to Improve Discharge on Antiplatelets and Statin Medications
Loukman Ghouti - MEDICAL STUDENT -VASCULAR SURGERY ----------39

3:17:30 PM: Ketotifen Inhibits the Pro-Fibrotic Phenotype of Activated Skin Fibroblasts
Leong, Edwin - POST DOC – MICROBIOLOGY/IMMUNOLOGY - PLASTIC SURGERY ----------40

3:27:00 PM: The Yield of MSI testing and Clinical Pathological Profile in Colon Cancer Patients in a Resource Limited Population
Shaliza Ali - RESIDENT- VISITING – GLOBAL SURGERY - GENERAL SURGERY ----------41

3:36:30 PM: Predictors of Depressive Symptoms in Traumatic Upper Extremity Peripheral Nerve Injury: A Prospective Cohort Pilot Study.
Salem Alshammari - RESIDENT- PLASTIC SURGERY ----------42

3:46:00 PM: Watch & Learn: Nursing Shadowing by Surgical Residents
Roggeveen, RJ -MEDICAL STUDENT – VASCULAR SURGERY ----------43

3:55:30 PM: Identification of Novel Genetic Mutants in Nephrotic Syndrome – A Case for Understanding Personalized Medicine
Kavita Krueger- GRAD STUDENT – PHARMACOLOGY ----------44

4:05:00 PM**:** Care Maps for Open Atrial Septal Defect Repairs in Pediatrics: Are They Really Decreasing Hospital Length of Stay?
Tatiana El-Rabani - MEDICAL STUDENT – CARDIAC SURGERY ----------45

4:14:30 PM Benchmarking Colorectal Cancer (CRC) Surgical Outcomes in Nova Scotia Against an International Cohort
Logan Macdonald -RESIDENT- GENERAL SURGERY----------46

EVALUATION LINK: OPINIO

4:25:00 PM: Closing Remarks
Dr. Gail Darling
Head, Department of Surgery

4:30:00 PM: Collaborative Research Day Social

5:00:00 PM: Announcement of Winners

Prize Categories:

Dr. Robert Stone Travelling Fellowship	$ 3,500.00
Best Resident Presentation	$ 1,000.00
Best Medical Student Presentation	$ 1,000.00
Best Basic Science Presentation	$ 1,000.00

The Robert Stone Travelling Fellowship Past Winners

2024: Dr Mark Maclean
2023: Dr. Anna Duncan
2022: Dr. Joel Bierer
2021: Dr. Chad Purcell
2020: Dr. Catherine Deshaies
2019: Dr. David Forner
2018: Dr. Ashely Drohan
2017: Dr. Ben Taylor
2016: Dr. Timothy Phillips
2015: Dr. Phil Magown
2014: Dr. Scott Livingston
2013: Dr. Fawaz Makki

2013: Dr. Fawaz Makki
2012: Dr. Phillipe Magown
2011: Dr. Scott Livingstone
2010: Dr. Devon Richardson
2009: Dr. Michael Bezuhly
2008: Dr. Jane Watson
2007: Dr. Lara Williams
2006: Dr. Ansar Hassan
2005: Dr. Chris Drover
2004: Dr. Rakesh Arora
2003: S Christie/A Skaro

2002: Dr. A. Skaro
2001: Dr. Sean Chritis
1999: Dr. C Ikejiani
1998: Dr. W Leong
1997: Dr. Vivek Mehta
1996: Dr. N Yoshida
1995: Dr. Stacy O'Blenes
1994: Dr. C Giacomantonio
1993: Dr. J Collicut
1991: Dr. T Barnhill
1990: Dr. G Caputy

The Robert Stone Traveling Fellowship is named in honour of Dr. Stone, who was the Head of our Department 1993-2006.

The Dr. Stone Traveling Fellowship is awarded to the 1st place resident, carrying a cash prize of $3,500.00 to be used for travel to conferences to present research, and aid in travel expenses to secure fellowship training after residency.

Inauguration of the Dr. Stone Traveling Fellowship was in 2006 – Its recipient was Dr. Ansar Hassan.

DIAGNOSTIC AND TREATMENT TIMELINES FOR PATIENTS DIAGNOSED WITH GLIOBLASTOMA IN NOVA SCOTIA

Ellen Parker, Alwadei A, Han J, Bonang J, Siler S, Hebb A, Pickett GE, Roy J, Weeks A.

Resident - Neurosurgery

Objectives: Glioblastoma is the most common primary brain cancer, and it is unfortunately incurable. Standard treatment involves maximal safe resection followed by concomitant radiation and chemotherapy. In this study, we sought to investigate the diagnostic and treatment timelines experienced by patients diagnosed with Glioblastoma in Nova Scotia.

Methods: We conducted a retrospective chart review of the diagnostic and treatment timing of all patients diagnosed with Glioblastoma in Nova Scotia from January 2023 to September 2024. We extracted patient age, sex, and dates of: initial neuroimaging, neurosurgical consult, surgery, final pathology, first oncology appointment, and oncology treatment start dates. Results were represented as median time and range in days.

Results: A total of 112 patients were identified, and after excluding those who underwent repeat surgery for recurrence, N=98 patients were included in the analysis. Of these, 54% were male (n=53) and 46% were female (n=45). The average age at time of diagnosis was 66 years old.

It took a median of 1 day (range 0-21) from initial neurosurgical consultation to obtain brain MRI required for surgery. It took 7 days (range 1-30) from initial consultation until surgery, and 7 days (range 4-17) from surgery until final pathology results were available. Following surgery, it took 19 days (range 7-47) until the first oncology appointment. The time from surgery until the first radiation or chemotherapy treatment was administered was 38 days (range 16-62).

Conclusions:

1. Overall, patients are being treated within acceptable time frames per the literature. However, there are outlier cases which we can learn from.
2. Turnaround time for obtaining MRI can be a delay. We have altered our communication with outside hospitals to improve this area.
3. Initiation of post-surgical oncology care can be a delay. Future work will seek to identify barriers to the initiation of radiation and chemotherapy treatment.

CORRELATION OF SIT-TO-WALK AND SIT-TO-STAND PERFORMANCE WITH GAIT KINEMATIC OUTCOMES AND SELF-REPORTED PAIN AND FUNCTION IN END-STAGE KNEE OSTEOARTHRITIS

Ryan Ong, Stephanie Civiero, Jo-Anne Douglas, Janie Astephen Wilson, Glen Richardson, Michael Dunbar

Medical Student- Orthopaedics

Background: Sit-to-Walk (STW), 30-second Sit-to-Stand (30s-STS), gait kinematic outcomes, and patient-reported outcome measures (PROMs) are used to assess pain and functionality in knee osteoarthritis (OA). However, the relationships between these measures in end-stage knee OA are not well understood. This study investigates the correlations between STW and 30s-STS performance, gait kinematic outcomes, and PROMs in individuals with end-stage knee OA.

Methods: Eleven individuals (8 females, 3 males) with end-stage knee osteoarthritis performed walking, STW, and 30s-STS tests. These were recorded using a markerless motion capture system and analyzed with Visual3D software to obtain 30s-STS repetitions, STW task time, knee flexion ROM, stride width, and gait speed. Within 2 weeks of performing the tests, participants completed the EQ-5D-5L, Oxford Knee Score, and Numerical Pain Rating Scale to assess pain and function. Spearman rank-order was used to determine the correlations between these measures.

Results: A significant moderate negative correlation was found between STW completion time and knee flexion ROM ($\rho = -0.71$, $p = 0.02$). A significant moderate positive correlation was found between 30s-STS repetitions and gait speed ($\rho = 0.69$, $p = 0.02$). No other significant relationships were identified.

Conclusion: Reduced knee flexion is associated with longer STW completion times, while faster walking speeds is correlated with higher 30s-STS repetitions. By understanding these relationships, clinicians could better predict functional outcomes and identify individuals at risk for increased disability. This may also contribute to the development of targeted interventions and rehabilitation strategies, potentially improving outcomes for individuals with knee OA

GENOMIC AND IMMUNOLOGICAL MECHANISTIC INSIGHTS OF TARGETED HYPERTHERMIA THERAPY AND ITS SYNERGY WITH IMMUNOTHERAPY IN SOLID TUMORS

Kate Clark, Kennedy B.E., Dean, C., Marivel, G., Noftall, E., Giacomantonio, C.

Grad Student – Pathology – General Surgery

Objective/Background: Targeted Hyperthermia Therapy (THT) is an emerging strategy for inducing immunogenic cell death (ICD) and reshaping the tumor microenvironment (TME). While THT enhances antigen presentation and immune infiltration, its effects are dynamic and can lead to immune suppression and tumor regrowth. This study investigates the genomic and immunological mechanisms underlying THT and evaluates its therapeutic potential in combination with immunotherapy across multiple solid tumor models, including breast, melanoma, and colorectal cancer.

Methods: Gold nanorods (GNRs) were intratumorally injected into melanoma, colorectal, and breast cancer-bearing mice and activated with near-infrared (NIR) light to induce controlled hyperthermia (42–48°C). Tumor samples were collected at multiple time points post-treatment for RNA sequencing (RNA-seq), flow cytometry, and histological analysis to assess gene expression changes and immune dynamics. Mice received either THT alone or in combination with intra-tumoral IL-2 or systemic PD-1 blockade, and tumor regression kinetics were monitored.

Results/Observations: THT induced a strong ICD signature, marked by calreticulin exposure, upregulation of the cGAS-STING pathway, and activation of type I interferon signaling, leading to enhanced antigen presentation. This was accompanied by increased CD8+ T-cell and NK cell infiltration; however, a subsequent immunosuppressive phase emerged, characterized by the expansion of M2 macrophages. In combination therapy, IL-2 amplified CD8+ T-cell activation and memory formation, promoting systemic anti-tumor immunity. PD-1 blockade further restored T-cell function, reversing exhaustion and enhancing tumor clearance. These effects were consistently observed across melanoma, breast, and colorectal cancer models.

Conclusions: THT acts as a potent immune priming agent, initiating an anti-tumor response but requires immunotherapy to sustain long-term efficacy. Combining THT with intra-tumoral IL-2 and/or systemic PD-1 blockade mitigates transient immune suppression, fostering durable anti-tumor immunity across multiple solid tumor types. These findings highlight THT’s potential as a synergistic modality in cancer immunotherapy, warranting further clinical exploration.

IMMUNOPHENOTYPING OF LONGITUDINAL PERIPHERAL BLOOD MONONUCLEAR CELLS FROM PATIENTS WITH GLIOBLASTOMA TO DISTINGUISH PSEUDOPROGRESSION FROM TRUE PROGRESSION

Lauren P. Westhaver, Kathleen M. Attwood, Jeremy W. Roy, Adrienne C. Weeks

Grad Student – Pathology – Neurosurgery

Background: Immune dysfunction is a mediator of cancer progression, influencing both disease trajectory and therapeutic response. We have developed multiparametric flow cytometry antibody panels to simultaneously differentiate immune cell populations and activations states. These panels provide a standardized approach to profiling immune responses throughout disease progression in glioblastoma (GBM) and in other malignancies.

Methods: Over the past year, we designed and optimized two 28-parameter immune-profiling antibody panels to categorize immune states in patient blood, throughout the clinical journey. These high-parameter panels will allow for simultaneous assessment of phenotype and function of immune populations including CD4+ and CD8+ T cells, B cells, natural killer cells, NKT-like cells, innate lymphoid cells, and monocytes such as dendritic cells and myeloid-derived suppressor cells. Data are analyzed using dimensionality reduction and unsupervised clustering.

Results: We have established the largest longitudinal blood collection for brain tumour patients in Atlantic Canada. This cohort will enable the study of how the immune system responds to GBM and to treatment. We have begun profiling the immune landscape of our GBM patient cohort using our multiparametric antibody panels. This resource enables immune system characterization, allowing us to track immune status in patients at any stage of disease. Further, these antibody panels are broadly applicable across various disease processes, offering a scalable tool for profiling immune responses beyond GBM.

Conclusion: Understanding changes in immune system profiles in patients undergoing treatment for GBM is crucial for improving diagnostic accuracy and reducing delays in care, thereby improving quality of life for patients with GBM. Additionally, immune profiling panels can be leveraged to investigate immune states in a variety of disease processes, supporting future research endeavors within the department.

SESSION I

CHARACERIZING RENAL TUBULAR EPITHELIAL INJURY DURING DONATION AFTER CIRCULATORY DEATH (DCD) AND POSSIBLE AMELIORATION WITH PKX-001.

Yara Azizieh, Lisette Gonzalez-Chavez, Riley Arseneau, Matheus D. Faleiro, Riley Somerville, Laurette Geldenhuys, Jeanette E. Boudreau, Boris L. Gala-Lopez.

Grad Student – Pathology – General Surgery

Background: Kidney transplantation is the preferred treatment for end-stage renal disease, yet organ shortages remain a critical issue. Donation after cardiocirculatory death (DCD) has helped expand the donor pool, but DCD kidneys are susceptible to ischemia-reperfusion injury (IRI), contributing to acute kidney injury (AKI) and delayed graft function (DGF). Machine perfusion (MP) has been shown to reduce DGF compared to static cold storage (SCS). This study characterizes renal epithelial damage in DCD kidneys to evaluate pre-transplant tubular integrity. Additionally, we assess whether PKX-001, a synthetic antifreeze protein with anti-inflammatory properties, can further mitigate AKI.

Methods: A DCD rat model was established, with kidneys surgically procured and allocated to receive PKX-001 (5 mg/mL) or saline during in-situ flush.
Experiment 1 (Ischemia): Organs were preserved in static cold storage (SCS) or hypothermic machine perfusion (HMP) (~4°C) for 24 hours to mimic ischemia. 4 groups of Wistar rats were studied: **SCS + saline, SCS + PKX-001, MP + saline, and MP + PKX-001**. Two additional groups of Zucker rats were included to evaluate sex and strain differences: **SCS + saline and MP + PKX-001**. Perfusate samples were collected throughout and analyzed for N-acetyl-β-D-glucosaminidase (NAG). Tissue samples were stained for Kidney Injury Molecule-1 (KIM-1) and cleaved caspase-3. Homogenized tissue lysate was used to quantify cytokines, chemokines, and caspase-3.
Experiment 2 (Ischemia-Reperfusion Injury): To further assess reperfusion injury, two additional groups (**SCS + NMP and MP + PKX-001 + NMP**) underwent normothermic machine perfusion (~37°C) for 2 hours following hypothermic storage. Perfusate and tissue samples were collected and analyzed for the same biomarkers.

Results: NAG activity increased across all ischemia groups, particularly at the onset of reperfusion, aligning with IRI pathophysiology. MP resulted in lower NAG activity compared to SCS. While cleaved caspase-3 staining suggested increased apoptosis in MP groups, likely due to higher perfusion pressures, histological analysis indicated that MP better preserved tubular integrity. The addition of PKX-001 increased damage in SCS but reduced injury in MP, suggesting that continuous circulation may enhance its protective effects.

Conclusion: MP improved kidney preservation compared to SCS. NAG activity in perfusate was the most accurate marker of damage. PKX-001 showed promise in mitigating AKI when used in MP but not in SCS. These findings highlight the potential of machine perfusion and targeted therapies to enhance kidney preservation and improve transplant outcomes.

REHABILITATION GOALS FOR HAND AND UPPER EXTREMITY FUNCTION AFTER CERVICAL SPINAL CORD INJURY: A RETROSPECTIVE STUDY.

Tammy Selman, Rachel Holland, Julia M Harrison, Ben Keefe, Edman Abukar, Sonja McVeigh, Alexander Whelan, and Emily M Krauss

Resident - Plastic Surgery

Objectives: Patient goals are critical when determining surgical options for restoration of hand function in Spinal Cord Injury (SCI). We characterized the discussion of goals specific to hand function during acute rehabilitation admission at a single centre following cervical SCI, before the introduction of a hand surgery program for the tetraplegia population.

Methods: A retrospective chart review of a single-centre adult rehabilitation hospital from 2012-2022 of traumatic cervical SCI admissions was conducted. Charts were reviewed for discussion of specific goals that require hand function and recorded for analysis. Hand function goals were categorized and mapped to Canadian Occupational Performance Measures (COPM) domains, and patterns were analyzed on a population level.

Results: Over ten years, 134 individuals with acute traumatic SCI were admitted, 88 met study inclusion criteria with documented goals requiring hand function, and 32 unique goal types were recorded. The most common goal domain across all AIS categories was functional mobility. Motor-complete patients primarily had self-care goals. Leisure and productivity goals were rarely captured overall. Most documented goals focused on basic activities of daily living (ADLs).

Conclusions: We observed a historical emphasis on hand function goals of ADLs, but not capturing the depth and breadth of other domains where hand function is essential. With the development of hand surgery programs in the tetraplegia population, standardized tools and detailed discussion of hand function goals may better capture patient priorities, including productivity and leisure, and improve our discussion of functional outcomes when evaluating the success of surgery.

THE ONCOLOGIC OUTCOMES OF BUCCAL SQUAMOUS CELL CARCINOMA: A MULTI-INSTITUTIONAL STUDY

Usman Khan, J Gardella,C MacKay; W Magner, L Sigurdson, V Gupta,W Hicks Jr, M Rigby, J Trites,SM Taylor, A Al Afif

Resident – Otolaryngology

Objectives: To determine the oncologic and survival outcomes of patients with primary squamous cell carcinoma (SCC) of the buccal mucosa treated with upfront surgery. To our knowledge, we present one of the largest, contemporary, survival analysis on this rare oral cancer in the current literature.

Methods: A retrospective series of patients treated with initial surgical resection for buccal SCC from two separate tertiary head and neck cancer centers was utilized in this study. Survival analysis was performed using the Kaplan-Meier method and descriptive statistics were generated using R. Software.

Results: A total of 41 patients met our inclusion criteria. The mean age of patients was 67 (SD 10.4) with a gender ratio of 58.5% male to 41.5% female. Patients presented with T1-T2 disease in 24/41 cases (59%). Nodal metastasis was observed in 41% of patients, whereas positive margins, perineural invasion, and extra-nodal extension were seen in 17%, 22% and 24% respectively. Twenty out of 41 patients (49%) received adjuvant radiation, and 6/41 patients (15%) received adjuvant chemotherapy. Two-year disease-free survival (DFS) was 63.2% (SE=13.1%, 95% CI=49–81.7%) and 5-year DFS was 42.3% (SE=22.3%, 95%CI=27.3–65.6%). Five-year overall survival was 47.8% (SE=20.5%, 95%CI=32–71.5%, n=41).

Conclusion: SCC originating in the buccal mucosa tends to exhibit aggressive pathologic features and disease recurrence. The 5-year DFS and OS of 42.3% and 47.8% respectively support the need for comparing outcomes of buccal SCC with other subsites of the oral cavity. Ongoing analyses are investigating the impact of RT vs. CRT on survival in these patients and the impact of individual pathological features on recurrence.

ANALYSIS OF PATIENT PRESENTATION TO THE ED WITHIN 90-DAYS OF INFRA-INGUINAL BYPASS

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Medical Student – Vascular Surgery

Postoperative re-presentation to the hospital causes patient distress and increases resource utilization. However, patients who re-present without requiring readmission are often not factored in traditional quality improvement datasets. This study aimed to identify risk factors for emergency department (ED) visits without readmission following infra-inguinal bypass.

A retrospective cohort study reviewed infra-inguinal bypasses performed at the QEII Health Sciences Centre between January 1, 2020, and December 31, 2021. Data from the Vascular Quality Initiative database was merged with provincial ED (NSHA sites) records to identify patients presenting to the ED within 90 days postoperatively. Descriptive statistics and multivariable logistic regression were used to identify predictors of ED visits without readmission.

Of 212 infra-inguinal bypasses performed, 67.9% did not re-present to health care, 27.2% re-presented to the ED and were discharged and 5.2% were readmitted. Of the bypasses that re-presented to the ED and were discharged, 90% were performed for critical limb-threatening ischemia; 27% were tibial bypasses, 28% were above-knee and 45% were below-knee popliteal bypasses. Median length of hospital stay was 5 days [IQR 2-9]. The median time between discharge and re-presentation to ED was 12.5 days [IQR 7-25.5]. The median number of ED visits without readmission is 4 visits [IQR 2-6]; the median number of ED visits with readmission was 2 visits [IQR 1.5-2.5]. Indications for presentation to ED included surgical site infections (19.7%), wound complications (33.1%), non-wound complications (18.3%), planned reassessment (2.8%), and other (26.1%). Predictors of re-presentation without readmission included diabetes requiring medication for control (OR 0.38, 95% CI 0.15-0.98) and prior lower extremity revascularization (OR 0.12, 95% CI 0.03-0.41).

A considerable proportion of patients return to the ED without requiring readmission after infra-inguinal bypass, most frequently for wound complications. Addressing this population in quality improvement initiatives would reduce unnecessary healthcare utilization and improve patient outcomes.

UNVEILING THE DRIVERS OF NINETY-DAY EMERGENCY DEPARTMENT VISITS POST THORACIC SURGERY: A NOVA SCOTIA HEALTH STUDY

Anthony Dame, Jo-Anne Douglas, Evan Nemeth, Michael Dunbar & Alison Wallace

Resident – Thoracic Surgery

Objective: Emergency Department (ED) overcrowding is a growing concern in Nova Scotia, with many patients returning within 90 days of thoracic surgery. This study examines patient characteristics and system-level factors contributing to these visits, aiming to inform perioperative care improvements and alternative care pathways to reduce ED utilization.

Methods: We analyzed thoracic surgery patients from April 2016 to March 2022 who presented to the ED within 90 days postoperatively. Data on demographics, surgical details, and ED visit characteristics were extracted from administrative datasets and verified through medical record review. Descriptive statistics (frequencies, proportions, means, ranges, and standard deviations) were calculated using SAS version 9.4, with significance set at $p<0.05$.

Results: Among patients undergoing the three main oncologic thoracic surgeries, 58 (40.6%) post-esophagectomy, 560 (33.3%) post-lobectomy, and 84 (41.8%) post-pleuroscopy presented to the ED within 90 days. Surgery-related issues accounted for 65.1% of ED visits within 30 days, with wound concerns being the most common reason. Overall, medical and surgical issues were nearly equally responsible for ED visits. Patients with surgical complications presented earlier (mean: 10 days) compared to those with medical issues (mean: 34 days).

Conclusions: This study identifies key drivers of post-thoracic surgery ED visits, emphasizing the need for targeted interventions. In response, our division has introduced a prehabilitation program, enhanced patient and provider communication tools, expanded VON engagement, and established a post-discharge nurse practitioner–led follow-up clinic. These initiatives aim to reduce ED burden and improve postoperative care through proactive education and structured follow-up.

PREDICTING FLAP SURVIVAL IN AUTOLOGOUS BREAST RECONSTRUCTION USING MULTISPECTRAL NEAR INFRARED SPECTROSCOPY (MS-NIRS) IMAGING

Olivia MacIntyre, A Marshall, A Khimchenko, K Cross, & M Wheelock

Medical Student – Plastic Surgery

Objectives:

1. Recognize the benefits of MS-NIRS technology in microsurgical breast reconstruction care
2. Understand the significance of StO_2 values in predicting flap compromise

Purpose: Current best practices for assessing microsurgical breast reconstruction flap viability include various forms of clinical observation, which are limited in their ability to provide objective measurements of perfusion. MS-NIRS imaging is a novel technology that uses wavelengths of near-infrared and infrared light to assess tissue oxygenation (StO_2) and has been shown to detect anastomotic thromboses prior to clinical observation in free flap transfers. Our study aimed to investigate the utility of MS-NIRS in microsurgical breast reconstruction.

Methods: This study utilized a handheld mobile MS-NIRS and thermal imaging device (MIMOSA Pro, MIMOSA Diagnostics Inc.) to non-invasively measure tissue oxygenation and skin surface temperature. Seven patients (10 breast areas) undergoing deep inferior epigastric perforator (DIEP) flap breast reconstruction were enrolled. Preoperative, perioperative, and postoperative flap images were collected. Image processing was performed using Python, with flap regions of interest chosen manually. Mean StO_2 values and 95% confidence intervals were calculated and compared using t-tests and ANOVA.

Results: The preoperative abdomen donor region showed a mean StO_2 of 83 ± 8%. Postoperatively, flap oxygenation decreased on average to 80 ± 5% at 2 hours, recovered to 83 ± 6% at 24 hours, and stabilized at 83% by 48 hours. Seven cases had no complications, demonstrating either a positive change or a decrease in tissue oxygenation of less than 6%. Three cases showed a mean oxygenation decrease of greater than 7% within 24 hours postoperatively, which corresponded to two flap failures and one partial flap loss.

Conclusion: MS-NIRS imaging with an easy-to-use handheld device is a promising adjunct in microsurgical breast reconstruction management, providing clinicians with immediate, quantifiable insights into tissue perfusion which may better inform clinical outcomes.

COMMITMENT TO EXCELLENCE: SIX-YEAR REVIEW OF A LONGITUDINAL QUALITY IMPROVEMENT PROGRAM IN THE DIVISION OF CARDIAC SURGERY

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CIP Resident – Cardiac Surgery

Background: Morbidity and mortality (M&M) rounds are the foundation of surgical quality programs, facilitating bottom-up analyses for adverse patient outcomes. This study reports the results of a longitudinal program implemented by the Division of Cardiac Surgery in 2019.

Methods: Since January 2019, a multidisciplinary team has reviewed all operative mortalities under a phase-of-care framework with demographic data, inflection points and event factors collected under the Quality Improvement Information Protection Act (QUIIPA). Case volumes were determined from the division's discharge abstract database. A landmark distribution of the program's results occurred in January 2023 and several clinical program changes were implemented around that time. An interrupted time series (ITS) analysis using linear regression was conducted to determine if there was a measurable improvement in operative mortality after this intervention.

Results: Over the six years (2019-2024), the crude mortality rate was 5.5%, which varied significantly throughout the period (3.1% in 2023 and 7.2% in 2022). The ITS showed a significant reduction in mortality in 2023 and 2024 relative to prior years ($p = 0.03$). Accordingly, 240 mortalities were reviewed in the longitudinal M&M program. The patient population was predominantly male (68%), was of different ages (66 [61-75]), and had a moderate or high predicted risk of mortality (17 [3-20]), which was consistent across the annual periods ($p>0.05$). The inflection points were most common in the pre-operative phase (38%), intra-operative (32%) and then post-operative (30%). High-operative risk (53%), operative technical challenges (28%) and post-operative heart failure (31%) were the most common event factors discussed by the team.

LYMPHEDEMA SEVERITY AND QoL AS A FUNCTION OF SELECTIVE NECK DISSECTION TECHNIQUE: A RETROSPECTIVE COHORT PILOT STUDY

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Medical Student – Otolaryngology

Objective: Combined lymphatic and venous insufficiency has been described as a consequence of lymph node dissections, but never in the context of selective neck dissections (SND). The objective of this retrospective pilot study was to compare two methods of SND; one (PFV) which preserves the facial vein (FV) and external jugular vein (EJV), and one (RFV) which resects the FV and often the EJV.

Methods: Head and neck lymphedema was assessed with a modified external lymphedema-fibrosis scale and with the revised Patterson scale (internal lymphedema). The FACT-HN questionnaire was used to assess quality of life (QoL). Regression modeling was used to determine the effect of SND method on lymphedema, controlling for other factors.

Results: A total of 76 patients were included in the analysis, with 77.6% PFV patients, and the remainder RFV. There were no statistically significant differences in demographics (age, sex, site, stage) or adjuvant treatment type and dose between the two treatment groups. The average score for QoL out of a possible 108, was 93.1 +/- 11.7 for the PFV group, and 88.3 +/- 11.8 for RFV ($p=0.121$). RFV patients were observed to have significantly higher external lymphedema assessment scale scores compared to PFV patients ($p=0.046$). There were no significant differences between PFV and RFV in the Patterson scale.

Conclusion: While limited by the size of this pilot study, results show that resection of the FV is associated with more severe external lymphedema. A prospective study which investigates differences in lymphedema between different SND methods may be warranted.

TARGETING FUNCTIONAL DEFICITS: ASSOCIATIONS BETWEEN DISTAL FEMUR MORPHOLOGY AND PASSIVE AND DYNAMIC FRONTAL PLANE KNEE KINEMATICS IN ARTHROPLASTY PATIENTS FOR PERSONALIZED ROBOTIC SURGERY.

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Grad Student – Biomechanical Engineering/Orthopaedics

Background/Objectives: Restoring knee function to pre-diseased levels after arthroplasty remains challenging, as common surgical approaches do not easily account for the variability in joint-level function, leaving some patients with unmet functional expectations (*Husain & Lee, 2015; Scott et al., 2012*). Robotic-assisted knee arthroplasty (RAKA) enhances surgical precision and accuracy, but opportunities remain to better consider patient-specific morphological and anatomical variability and its influence on both passive and dynamic joint function in optimizing surgical decisions for the individual. This study examines the relationships between distal femur morphology, joint alignment, intraoperative passive knee kinematics, and active kinematics during walking to inform tailored knee arthroplasty surgical protocols.

Methods: Forty patients with end-stage knee osteoarthritis participated to date. Pre-operative gait kinematics were captured using markerless motion analysis. Passive kinematics were recorded intraoperatively under varus-valgus stress conditions with a robotic system. Morphological variables were measured on distal femurs modeled from computed tomography images to which principal component analysis was applied to reduce dimensionality and identify key morphometric shapes among this patient population.

Results: PC1, characterized by wider femurs with elevated anterior condyles, was correlated with higher mean knee adduction angles during gait, and was smaller for females. PC2, reflecting longer femurs with flatter anterior condylar grooves, correlated with greater range of adduction angles during gait and higher passive angular movement under varus stress at 10° flexion.

Conclusions: These results highlight the influence of femoral morphology on knee mechanics and underscore the potential of integrating anatomical and morphometric variability into RAKA protocols to target functional outcomes. Continued exploration of these relationships could lead to improved post-arthroplasty functional outcomes tailored to individual patient needs.

QUALITY IMPROVEMENT IN NEUROSURGERY: THE SUCCESS OF THE SPINE ASSESSMENT CLINIC IN REDUCING POST-OP EMERGENCY DEPARTMENT VISITS

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Resident – Neurosurgery/Orthopaedics

Introduction: Our prior “Emergency Department Bounce Backs Project”, a six-year retrospective analysis (n=2165), revealed 24% of patients undergoing posterior decompression surgeries (laminectomy or discectomy) sought emergency department (ED) care within three months post-surgery. Comprehensive chart reviews of ED visits (n=912) revealed primary drivers for seeking care were inadequate pain control, concerns over the surgical site, and bladder related issues (urinary retention or infections). We established an integrated Spine Assessment Clinic (SAC) to enhance peri-operative spine care and target these three primary drivers of the post-op ED visits. Our aim was to minimize unnecessary ED visits through pre-operative education, targeted QI interventions, and early post-operative follow-up.

Methods: We reviewed 13 months (October 1, 2023 – October 31, 2024) of posterior decompression data (n=205) following SAC implementation. These patients received individualized, comprehensive pre-operative education, were offered pre-operative bladder scans and had follow-up phone calls within 7 days post-surgery or hospital discharge. ED visits within 90 days post-surgery were tracked using provincial databases and compared to our pre-SAC implementation data.

Results: Out of 205 surgical patients meeting inclusion criteria, 24 (11.6%) accounted for 34 ED visits within 90 days post-op, showing a significant reduction in ED visits from 24% to 11.6%, and decreased overall ED utilization from 42.1% to 16.6% (when accounting for multiple visits by the same patient). Early interventions including wound monitoring, outpatient bloodwork, and prescription adjustments for pain management, helped mitigate ED visits. Patient satisfaction surveys (n=62) indicated 92% were "highly satisfied" and 100% would recommend the SAC.

Conclusions: The SAC reduced ED visits after posterior decompression surgery by over 50%, and decreased ED resource utilization by over 60%, with pre-operative education, focused QI initiatives, and its individualized, proactive approach.

SESSION II

PATIENT PERSPECTIVES OF QUALITY COMPARED TO QUANTITY OF LIFE REGARDING ORBITAL EXENTERATION

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Resident- Otolaryngology

Objective: Orbital exenteration can result in psycho-social, cosmetic, and functional consequences for patients. Eye-sparing strategies through the advent of immunotherapy have developed the potential to avoid orbital exenteration but may result in suboptimal oncologic outcomes and reduced survival. This study assesses patients' perceptions regarding quantity vs. quality of life when considering orbital exenteration compared to alternative treatment modalities.

Methods: This was a mixed-methods study, utilizing quantitative health utility tasks and qualitative patient interviews. Fifty-one patients previously treated for head or neck cutaneous malignancies completed interviews utilizing well-established methodology to assess health state utility values (HSUV) through time trade-off (TTO) and standard gamble (SG) tasks. This methodology assessed the level of risk patients would be willing to accept to avoid orbital exenteration in the context of alternate treatment options. Open-ended discussions regarding factors influencing decision-making when considering orbital exenteration facilitated an inductive qualitative analysis highlighting patient priorities.

Results: Patients were willing to accept 40.6 +/- 28.7% risk of death or give up 3.2 +/- 2.8 years of survival to avoid orbital exenteration. This translated to a health state utility value for orbital exenteration of 0.68. There was no significant difference in patient responses based on age or type of cutaneous malignancy. The main factors influencing treatment decisions were: 1) family; 2) healthcare perceptions; 3) age; 4) social consequences; and 5) risk tolerance.

Conclusion: The consequences of orbital exenteration on patients' quality of life impact their decision-making. Patients may be willing to accept relatively high levels of risk to avoid orbital exenteration. This highlights the importance of eye-sparing strategies and shared decision-making to ensure patient-centred care which may not be solely prioritized to survival when it comes to orbital exenteration.

SELF INFLICTED HAND FRACTURES AS A PREDICTOR OF FUTURE PSYCHIATRIC CONDITIONS IN PEDIATRIC POPULATION

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Medical Student- Plastic Surgery

Objectives: Hand fractures are a common reason for presentation to pediatric fracture clinics. There is currently no literature investigating the link between pediatric hand injuries and subsequent presentation to mental health services. This study aimed to assess correlation between hand injury mechanisms and secondary presentation to mental health services.

Methods: A retrospective cohort study assessing all patients presenting to a pediatric fracture clinic 2012 to 2017 was performed. Fracture mechanism, location and subsequent presentation to mental health services were recorded.

Results: Between 2012 and 2017, 1190 patients presented with pediatric hand fractures. Most patients were right-handed (90.8%) with accidental injuries (87.9%). The most common mechanism of injury was sports-related (52.4%). Within the cohort, 144 (12.1%) presented with a self-inflicted injury. Among these patients, the most common mechanism of injury was punching a solid object (53.5%) or another individual (45.1%). There was a relative risk of 5.59 (3.74-8.36, $p < 0.001$) for self-inflicted fractures being assessed by mental health services in the future. Self-inflicted injuries demonstrated a shorter time to presentation to mental health services compared to accidental injuries (24 +/- 8.4 vs 36 +/- 5.1 months), but this was not significant ($p = 0.239$). A stepwise logistic regression analysis demonstrated self-inflicted injury was predictable for mental health presentation ($p < 0.001$). Additionally, a stepwise logistic regression analysis demonstrated that patients diagnosed with ADHD (OR 5.9, $p <0.001$), general anxiety disorder (OR 3.5 $p = 0.015$), major depressive episode (OR 3.6, $p = 0.007$) or substance use disorder (OR 11.2, $p < 0.001$) were more likely to have a self-inflicted hand fracture.

Conclusions: Our data indicates that self-inflicted hand fractures in the pediatric population are a predictable variable for eventual mental health assessment, which suggests consideration for early referral to mental health services when pediatric patients present with self-inflicted hand fractures.

INDICATIONS, FINDINGS, AND FOLLOW-UP RECOMMENDATIONS AMONG PATIENTS WHO UNDERWENT FREQUENT COLONOSCOPY AT TERTIARY CARE CENTRE

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Resident – General Surgery

Background: Appropriate intervals between colonoscopy exams are needed to ensure timely identification of pathology, avoid unnecessary exposure to procedural risk and optimize access to a valuable resource. The purpose of this research was to examine the indications and outcomes among patients who underwent frequent colonoscopy.

Methods: Patients who received ≥3 colonoscopies within a six-year period were identified. Patients with inflammatory bowel disease, symptomatic strictures or emergency scopes were excluded. Data were collected regarding patient demographics, scope indications, findings, and follow-up recommendation. These recommendations were compared to published guidelines and categorized as within guidelines, overuse, or underuse.

Results: 846 patients, who underwent a total of 2538 colonoscopy procedures, were included. The mean age was 61.8 years (range 21-89) and 51.2% were male. Most patients were having colonoscopy for polyp and cancer surveillance, and 137 patients (16.2%) were scoped frequently for Lynch syndrome or FAP. Overall, the recommendations made after 527 procedures (20.8%) were classified as overuse, and 57 (2.2%) were considered underuse. The most common overuse recommendation was for reassessment after removal of polyps <2cm. Patient history of polyps and family history were also cited as reasons to perform the next scope before guideline recommendations. New symptoms were the most common reason (64%) for the 142 scopes that were unplanned based on the recommendations after the prior procedure. The majority of patients who had colonoscopy after an “overuse” recommendation had polyps <1 cm, 19.6% were normal, 8.4% had polyps >1cm and 1.4% had cancer.

Conclusion: Most patients who had colonoscopy sooner than recommended by guidelines had adenomas <1cm and 10% had advanced neoplasia. If these scopes had been performed in accordance with guidelines the impact on clinical outcomes is unclear. There may be a population of patients who benefit from short interval colonoscopy who are not identified in current guidelines.

SESSION II

THE IMPACT OF BMI ON OPERATIVE DECISION MAKING IN PATIENTS UNDERGOING COLORECTAL SURGERY IN NOVA SCOTIA, CANADA

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Medical Student – General Surgery

Background: BMI has a long-standing association with intra-operative complications and poor post-operative outcomes. In minimally invasive colorectal surgeries (MIS), excess adiposity, surgeon preferences and training level are all amongst factors that may hinder MIS adoption. Amongst Canadian provinces, Nova Scotia (NS) has one of the highest obesity rates (45% have BMI $\geq$ 30) and one of the lowest MIS adoption rates (27.6%).
Objective: The objective is to explore the extent to which BMI predicts choice of surgical approach (open vs. laparoscopic) as well as unplanned conversion in colorectal surgeries in NS, benchmarked against NSQIP (National Surgical Quality Improvement Program).
Methods: A retrospective NS cohort study was completed to assess univariate and multivariate associations of BMI with operative approach and conversion rates. The NS (n=3,373) and NSQIP (n=243,221) cohorts included colectomies and proctectomies (2018 to 2022). Categorical and continuous variables were compared using chi-square test and simple linear regression, respectively. Subset selection followed by data imputation per CPT codes were used to build a stepwise logistic regression model. All data analysis was performed using RStudio.
Results: Colectomies constituted 92.3% and 90.8% of NS and NSQIP cohorts respectively. 37.6% of colectomies and 22.4% of proctectomies were performed laparoscopically in NS as compared to NSQIP (51.1% and 32.2% respectively). NS had a lower MIS adoption rate (36.4% vs 49.3%) and a higher rate of unplanned intra-operative conversion in colectomies (22.6% vs. 19.4%) and proctectomies (32.1% vs. 17.1%). Notably, BMI was significantly associated with operative approach in NSQIP but not in the NS cohort (*p=0.643*). BMI, rectal involvement, urgent/emergent acuity, non-cancer diagnosis, CPT, surgeon, disseminated disease, bleeding disorder, sepsis, high WBC, non-mechanical bowel prep and having more than one concurrent/other procedure were all significantly associated with conversion in the NS cohort. A stepwise logistic model was then optimized to benchmark the impact of BMI in NS against NSQIP in matched cohorts which revealed a 79% higher conversion risk in NS (OR 4.67 p=0.034 vs. OR 3.04 p<0.001). The conversion rates varied depending on the primary procedure proxied using CPT codes. For instance, higher BMI patients undergoing an elective right hemicolectomy with terminal ileum involvement has higher conversion rates than the matched NSQIP cohort (NS: *OR 4.34 p<0.001*; NSQIP: *OR 1.61 p=0.012*). Operative approach preferences of individual providers as well as and their conversion rates were significant contributors to the increased conversion risk in NS patients with higher BMI.
Conclusion: BMI serves as an independent factor in driving conversion in the provincial cohort at a higher risk than the matched NSQIP standards. This association is particularly robust for certain procedures and providers. Quality improvement regarding remote proctoring, routine NSQIP benchmarking of conversion and data capture may improve outcomes of colorectal surgeries in NS.

ASSOCIATIONS BETWEEN SSRIS AND ADVERSE EVENTS FOLLOWING ARTHROPLASTY FOR TOTAL HIP AND KNEE ARTHROPLASTY

Michael Whitcomb, Glen Richardson, Lynn Lethbridge, Emily Johnson, Michael J Dunbar

Resident – Orthopaedics

Objectives: Selective serotonin reuptake inhibitors (SSRIs) are a commonly prescribed anti-depressant medication known to be associated with lower bone mineral density, increased bleeding, and higher infection rates. The purpose of this study was to test for associations between SSRIs and post-surgical adverse events for Total Hip and Knee Arthroplasty patients.

Methods: Provincial health utilization data were used to select all Total Hip (THA) and Total Knee (TKA) Arthroplasty procedures from 2017-2021. Provincial prescription (RX) data was used to identify cases which had an SSRI RX filled in the 180 day period prior to surgery. Outcomes studied were emergency department (ED) visits, infection, mortality, and revision in the 180-day follow-up period.

Results: There were 12259 TKA patients and 7971 THA patients included in the study. Of those 1794 TKA (29.6%) and 975 THA (12.2%) had an SSRI RX filled in the 180 days prior to surgery. For TKA the only statistically significant change with SSRI use was increased ED visits post TKA. There was a more pronounced effect of SSRIs for THA with significant increase in infection, ED visits, revision, and blood transfusion. IPTW-weighted ED visits were higher for those with an SSRI RX with TKA OR 1.18 [CI 1.04-1.34], whereas infection, ED visits, revision, bleeding event and blood transfusion were all higher for THA. Multivariate results for THA showed odds ratios of 1.59 [CI 1.03-2.44], 1.24 [CI 1.04-1.47], 1.73 [CI 1.14-2.62], 1.52 [CI 1.06-2.18] and 1.72 [CI 1.11-2.66] for Infection, ED visits, revision, bleeding event, and blood transfusion respectively.

Conclusion: SSRIs are commonly prescribed for TKA and THA patients and can lead to serious adverse events following arthroplasty. The association with negative outcomes was particularly noted with THA recipients. Surgeons should discuss SSRI RX history with patients and develop strategies to mitigate risk.

SURGERY

PREDICTING PROGRAMMING THRESHOLDS IN SUBTHALAMIC NUCLEUS DEEP BRAIN STIMULATION USING INTRAOPERATIVE MOTOR EVOKED POTENTIALS: GENERAL VERSUS LOCAL ANESTHESIA

Vibha Gaonkar, Allyster Klassen, Christine Potvin, Peggy Flynn, Lutz Weise

Clinical Fellow - Neurosurgery

Objectives: In Deep Brain Stimulation (DBS), precise positioning of the stimulation electrode is essential for therapeutic success. Motor evoked potentials (MEP) offer confirmation of electrode position based on individual anatomy. The primary objective of this study was to identify relationships between intraoperative MEPs and 4-week programming thresholds of non-subsiding side effects under general and local anesthesia. The secondary outcomes were relationships between MEP and anatomical distance from stimulating electrode to motor tract and differences in operative length.

Methods: This single-center prospective interventional study included patients diagnosed with Parkinson's Disease undergoing DBS surgery in the subthalamic nucleus. MEP thresholds of the face, upper extremities, and lower extremities were assessed in asleep and awake patients. Anatomical distance from final implanted electrode to motor tracts at individual contacts was measured based on deterministic Diffusion Tensor Imaging. Monopolar review of each contact was performed 4-weeks post-surgery to determine threshold of non-subsiding motor side effects. Correlations and significant differences were analyzed in the overall cohort as well as the awake and asleep groups.

Results: In patients who underwent awake DBS, a significant correlation ($p=0.05$) was found between the average upper extremity MEP (2.6 mA) and 4-week programming threshold (4.1 mA). In asleep DBS, a significant correlation ($p<0.001$) was present between face MEP (3.4 mA) and 4-week threshold (3.8 mA). A significant correlation between distance to motor tract and MEP was found in the upper extremities in the awake DBS group ($p<0.001$) and the lower extremities in both groups ($p<0.05$). Operative times were significantly reduced ($p<0.05$) in the asleep group (457.3 ± 86.0 min) compared to awake group (503.8 ± 63.1min).

Conclusions: Two operative groups were compared in regards to their relationships between intra-operative MEPs and post-operative programming thresholds, distance to the motor tract, and more general aspects such as operative time.

3-D Presentation: Spotlight on Interdisciplinary Research in the Departments of Surgery, Anesthesia and Ophthalmology

ANESTHESIA

IMPLEMENTATION OF ENHANCED RECOVERY AFTER CARDIAC SURGERY AT THE QEII INITIAL PHASE AND BASELINE DATA

Parnian Hosseini, A Rosa, M Barry, P de Jager

Parnian Hosseini – Resident

Background: ERAS protocols optimize perioperative care, improving patient outcomes and resource utilization. In cardiac surgery, ERAS guidelines have demonstrated reductions in hospital/ICU length of stay, mechanical ventilation duration, and postoperative opioid use. However, implementation remains inconsistent. This study represents the initial phase of a multidisciplinary quality improvement study to implement ERAS for cardiac surgery at the QEII Health Sciences Centre.

Methods: Following the Plan-Do-Study-Act cycle methodology, a multidisciplinary team identified three key priorities: (1) surgical site infection reduction, (2) perioperative red blood cell management, and (3) early extubation and mobilization. Baseline morbidity outcomes and intervention feasibility were assessed through prospective data collection and chart review. A qualitative survey evaluated frontline staff perspectives and implementation barriers.

Results: Between August 1st and November 19th, 2024, 129 patients were included, with partial data available for all patients. Surgical site infections occurred in 13%, and postoperative pulmonary complications in 17.4%. ICU stays >48 hours and hospital stays >5 days were observed in 23.6% and 74.3%, respectively. Only 50% of eligible patients were referred to preoperative blood management, and no patients received smoking cessation interventions. Early extubation in the operating room was achieved in 7.5%, with an additional 9% extubated within three hours postoperatively. Mobilization within three hours of extubation occurred in 29.5%, but no patients ambulated within six hours. Staff surveys highlighted need for improved education, standardized protocols, and interdisciplinary communication.

Conclusions: Findings support the need for structured ERAS implementation, including standardized protocols, enhanced perioperative education, and improved data collection methods. Future PDSA cycles will refine interventions and optimize adherence.

OPHTHALMOLOGY

PROTEOMIC ANALYSES FOR DIFFERENT STAGES OF PRIMARY OPEN ANGLE GLAUCOMA-A PILOT STUDY OF 8000 WITH STRINGENT CRITERIA

Tianwei E. Zhou, David J. Mathew, Karen Wigg, Carmen Balia, Irfan N. Kherani, Matthew B. Schlenker, M Jeremy.

Ellen Zhou – Clinical Fellow - Glaucoma

Background and Purpose: Primary open-angle glaucoma (POAG) makes up 90% of glaucoma cases in developed countries and is associated with trabecular meshwork (TM) dysfunction, leading to increased intraocular pressure (IOP). In the literature, several studies investigated the biomarkers in different types of glaucoma. However, there is a lack of unbiased studies linking biochemical profiles of aqueous humor (AH) to glaucoma stages. To address this gap, this study explores proteomic biomarkers in the AH of POAG patients at early and advanced stages to uncover biological pathways that may influence disease progression.

Methods: In this prospective comparative study, three groups (control, mild glaucoma, advanced glaucoma; n = 10/group) were identified and consented. Glaucoma staging was based on visual field mean deviation (MD) values within 6 months of enrollment. AH samples (100 µL/eye) were collected prior to any intraocular surgery. The samples were subjected to quantitative multiplex analysis using L8000 RayBio® Biotin-Label Based Antibody Arrays. Patient demographics and clinical data, such as IOP, visual fields and OCT measurements, were also collected and incorporated in the principal component analysis (PCA). Significantly differentially expressed biomarkers were identified using Wilcoxon or t test (FDR<0.01) for advanced glaucoma versus control, advanced glaucoma versus mild glaucoma, and mild glaucoma versus control.

Results: The advanced glaucoma group had a decision IOP of 18.8+/-4.5 mmHg, a visual field MD of -13.7+/-7.7 dB, an average RNFL thickness of 60.4 +/- 10.9 µm, and an average GCC of 55.9 +/-10.0 µm. These parameters for the mild glaucoma group were: 15.6+/-5.9 mmHg, -4.7+/-3.2 dB, 67.5+/-7.5 µm, and 59.7+/-7.6 µm, respectively; and for the control group were: 12.1+/-2.1 mmHg, -1.0+/-2.5 dB, 83.4+/-17.2 µm and 68.2+/-14.8 µm, respectively. AH samples underwent a multiplexed proteomic analysis of 8000 molecules. PCA, heatmaps and dendrograms from hierarchical clustering demonstrated clear clustering, consistent with their distinct clinical background. The Wilcoxon or t test identified numerous differentially expressed molecules when the 3 groups were compared between each other. Gene ontology (GO) analysis highlighted multiple pathways related to immune activation and regulation in the advanced glaucoma group when compared to the mild group.

Conclusion: To our knowledge, this is the first study that simultaneous analyzed a large proteomic data set and correlated patients' proteomic profiles with clinical POAG staging. A deeper understanding of the proteomic signature of POAG will ultimately provide valuable insights towards the progression and management of these patients.

ESTABLISHING A SPATIO-TEMPORAL ATLAS OF GENE EXPRESSION AFTER TRAUMATIC SPINAL CORD INJURY

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Following traumatic spinal cord injury (tSCI), secondary spinal cord injury (sSCI) mechanisms represent potential treatment targets to prevent further functional loss and promote recovery. Past tSCI studies have focused on tissue-level analyses of gene expression and cellular reactions following injury. These standard tissue transcriptomic methods utilize homogenized tissue samples, resulting in the loss of spatial context. This information is critical because pathologies such as tSCI are often characterized by abnormal spatial organization within tissues. The varying resilience within heterogenous cell populations calls for a more granular understanding of gene expression throughout sSCI. Therefore, the goal of this research is to construct a spatio-temporal atlas of gene expression following tSCI.

Transgenic female mice underwent standard laminectomy at the T9 and T10 vertebrae. A graded contusion injury of moderate force (50 kdyn) was delivered at the T12 spinal segment. Spinal cords were extracted at 4 hours, 48 hours, and 7 days after tSCI, along with a healthy mouse as control. Longitudinal sections ~420µm deep from the dorsal surface and coronal sections ~1.25mm distal to lesion epicenter were selected to undergo 10x Genomics Visium HD spatial transcriptomic analysis.

The coronal sample contains 195,934 cells and 16,312 genes. The longitudinal sample contains 484,233 cells and 16,970 genes. Standard analyses, such as graph-based clustering, cell-type deconvolution, spatially variable gene detection, and gene expression heat maps were completed. Follow-up analyses investigating specific genes/gene families of interest are ongoing, and will include gene scoring within varying tissue regions, ligand-receptor analysis, Gene Ontology (GO) enrichment analysis, and Kyoto Encyclopedia of Genes and Genomics (KEGG) mapping.

Results focusing on the established gene expression patterns present in varying tissue regions at different time points will be discussed in the context of current knowledge.

MODIFIED ULTRAFILTRATION DOES NOT REDUCE INFLAMMATORY MEDIATOR BURDEN AFTER CHILDREN'S HEART SURGERY WITH CARDIOPULMONARY BYPASS

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Background/Objectives: Cardiopulmonary bypass (CPB) during cardiac surgery dilutes clotting factors, triggers complement-activated inflammation, and endothelial dysfunction. Whether modified ultrafiltration (MUF) contributes to improved hemodynamic stability via the removal of inflammatory mediators or through hemoconcentration is unclear. We compare the inflammatory mediators before and after MUF at the end of CPB pediatric cardiac surgery patients.

Methods: This is a sub-analysis of a prospective study (NCT05154864) with forty pediatric patients undergoing cardiac surgery with CPB enrolled. The difference in inflammatory mediator concentration between Pre-MUF and Post-MUF was assessed in a paired fashion with Wilcoxon signed-rank test. The within-individual magnitude of mediator concentration change upon MUF initiation relative to Pre-MUF baseline was expressed as a median fold change ([Post-MUF] – [Pre-MUF] / [Pre-MUF]) with the [95% confidence interval] estimated by 1000 non-parametric bootstrap samples. Statistical significance was alpha = 0.05.

Results: Data comparing 33 mediators are presented. Mediators C2 (FC = 0.22 [0.05-0.35]), CCL2 (FC = 0.59 [0.33-0.78]), CCL4 (FC = 0.16 [0.02-0.35]), IL1ra (FC = 0.28 [0.10-0.48]), IL6 (FC = 1.28 [0.82-1.91]), IL8 (FC = 0.70 [0.34-1.06]), Psel (FC = 0.21 [0.04-0.27]), and ICAM (FC = 0.02-0.24]) increased in concentration post-MUF. No mediators showed a significant decrease post-MUF.

Conclusion: Statistically significant, yet modest, increased inflammatory mediator concentrations are found in patients post-MUF due to hemoconcentration. Further investigation will focus on mediator mass circulating in patient and extracted during MUF. Our findings contradict popular opinion and may implicate increased inflammatory burden on patients. MUF should not be labelled as an “immunomodulatory treatment”.

SESSION III

PSYCHOLOGIC DISORDERS MAY BE ASSOCIATED WITH LONGER LOS AFTER COLORECTAL SURGERY IN MULTICENTER COHORT

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Background: Psychologic disorders significantly impact clinical health outcomes including postoperative recovery, posing significant challenges to healthcare systems. Previous research has demonstrated that patients with underlying psychologic disorders experience worse surgical outcomes, have longer lengths of stay (LOS), and higher medical costs. There is a paucity of studies that evaluate the impact of psychologic disorders on surgical outcomes in colorectal surgery. The primary objective of this study is to evaluate the association between psychologic disorders and LOS after colorectal surgery in a multicenter cohort.
Methods: A retrospective clinical database of colorectal resections from across 6 hospitals spanning Europe, Canada and USA was utilized in this analysis. 3,414 patients who had a colon or rectal resection between January 2012 and December 2021, with information available on underlying psychologic disorders and treatment thereof were identified. Data collected included patient factors, surgical factors, and disease factors known to influence LOS. Hospital site was considered a heavy confounder and thus we used a generalized linear mixed model to run regressions with site as the random effect. A sensitivity analysis was performed removing outliers of LOS > 100 days.
Results: In our cohort of 3414 patients, the mean age was 57.5 years, 52.9% male, with a mean ASA score of 2.4. Of these, 18.9% had emergency surgery, 44.4% were laparoscopic, 59.6% were for cancer. Complications were seen in 50.7%, anastomotic leak rate was 8.1%. Underlying psychologic disorder was found in 502 patients (14.7%), with depression being the most prevalent of the disorders (31.5%), followed by anxiety (15.5%). The median LOS for the cohort was 9.0 days [IQR 6.0-14.0], with a large degree of variability between sites (median ranging 4.0-7.0 days for North American sites, 11-12 days for European sites). Increased LOS was associated with psychologic diagnosis on the unadjusted regression, however when adjusting for covariates the signal did not reach statistical significance. On the sensitivity analysis where outliers of LOS>100 days were removed (10 patients removed, cohort size 3404), there was a statistically significant increase in LOS by 1.04-fold (95% CI 1.00-1.09, $p<0.05$) for patients with a psychological disorder. Anxiety did not seem to increase the LOS (0.98, 95%CI 0.96-1.00) whereas depression increased LOS by 1.04-fold (95%CI 1.02-1.06, $p<0.01$). The presence of depression on average lead to one extra day in hospital after colorectal surgery.
Conclusion: In this exploratory analysis we found a possible association between underlying psychological disorder and increased length of stay in colorectal surgery patients, which underscores the importance of considering psychological health, particularly depression, in the management of colorectal surgery patients. This study may help define parameters for further scientific query pertaining to psychologic disorders in surgical patients.

ENVIRONMENTAL CARCINOGENESIS IN LUNG CANCER: SODIUM ARSENITE-INDUCED PML DYSREGULATION AND LINE-1 ACTIVATION

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Background: Lung cancer is the leading cause of cancer-related mortality, killing more Canadians than prostate, breast, and colon cancer combined. Sodium arsenite (NaAsO2) is a known environmental carcinogen implicated in lung cancer development, potentially through the activation of LINE-1 (L1) retrotransposons. The promyelocytic leukemia protein (PML), a tumor suppressor, is under-expressed in lung cancer. This study examines the role of PML and L1 as biomarkers of NaAsO2 exposure and their potential contributions to lung cancer pathogenesis.

Methods: Human bronchial epithelial (HBEC3-KT) and small airway epithelial (HSAEC1-KT) cell lines were treated with low doses (0.08-10μM) of NaAsO2. Immunofluorescence microscopy, Western blot, qPCR, and ELISA-based assays were used to assess PML localization and L1 activation. A L1 retrotransposition reporter assay was performed in U2OS cells.

Results: Immunofluorescence microscopy revealed that NaAsO2 exposure led to cytoplasmic accumulation of PML and a reduction in nuclear PML bodies (PML NBs). Given that PML plays a role in suppressing L1 retrotransposons, we used RT-qPCR to assess L1 expression and found increased endogenous L1 activation following NaAsO2 treatment. Additionally, a L1 reporter assay confirmed upregulated L1 integration, which was suppressed by PML overexpression.

Conclusions: These findings suggest that NaAsO2 exposure activates L1 and disrupts PML NBs, both of which are implicated in genomic instability and tumor suppression. Chronic NaAsO2 exposure may promote lung cancer development by degrading PML, thereby impairing its ability to repress L1 activity. This process could enhance genomic instability and activate inflammatory pathways, such as the cGAS-STING pathway, contributing to tumor progression. Understanding these mechanisms is essential for identifying environmental risk factors, refining biopsy techniques, and developing targeted therapies to improve patient outcomes. Ultimately, advancing our knowledge in this area is crucial to devising effective treatments and working toward a cure for this devastating disease.

MULTIFACETED PROGRAM TO IMPROVE DISCHARGE ON ANTIPLATELETS AND STATIN MEDICATIONS

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Introduction: Guidelines suggest all vascular surgery patients be discharged on antiplatelet and statin medications unless contraindicated; however, compliance varies across hospitals. This study evaluates the impact of a multifaceted, targeted, quality improvement (QI) program on discharge compliance for these medications.

Methods: A multifaceted program was developed to improve medication compliance for antiplatelets and statins at discharge by addressing barriers at patient, staff, and organizational levels. Organizational initiatives included prioritizing medication reconciliation for same-day discharge patients, training project champions on compliance importance, and standardizing discharge documentation. Patient-level interventions included the dissemination of educational posters with QR codes linking to informative videos. Staff-focused efforts included badge reminders and education sessions for nurses and prescribers. Compliance rates for antiplatelet and statin prescriptions at discharge were compared using the local Vascular Quality Initiative database before (2022) and after (2023) program implementation.

Results: Our analysis included 385 patients (218 from 2022; 167 from 2023). Pre-intervention compliance rates were suboptimal, ranging from 75 to 100%, particularly for endovascular aneurysm repair (EVAR) patients (ranging from 75 to 87.5%). Following program implementation, discharge compliance rates improved overall from 89 to 96% ($p=0.009$) and across all groups, with the most significant increase in EVAR patients (80% to 95%, $p=0.016$). Antiplatelet compliance rose by 5% ($p=0.039$) and statin compliance by 4% ($p=0.012$).

Conclusion: A multifaceted educational program targeting patient, nursing, and prescriber awareness can significantly improve discharge prescription compliance for antiplatelet and statin therapy.

KETOTIFEN INHIBITS THE PRO-FIBROTIC PHENOTYPE OF ACTIVATED SKIN FIBROBLASTS

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Objectives: Abnormal scarring results from dysregulated tissue repair. At the cellular level, pathologically activated fibroblasts produce proteins promoting and exacerbating scar formation. We determined the direct effects of ketotifen (a well-described mast cell stabilizer) on the phenotype and function of pro-fibrotic human dermal fibroblasts (HDFs) similar to those observed in cutaneous scars from burns, surgeries, and scleroderma. These effects were also examined in an animal model of skin scarring.

Methods: HDFs were activated with recombinant TGFβ1 [10ng/mL] for 48hrs to induce a pro-fibrotic phenotype. Ketotifen [25uM] was added to fibroblasts 24hrs after TGFβ1 activation. Gene and protein expression were analyzed using qPCR, immunofluorescence, and western blotting. Collagen lattices were generated for functional assessments of contraction. Skin fibrosis was induced in C57BL/6 mice using intradermal bleomycin who then received drinking water with or without ketotifen. Collagen density in the fibrotic skin was determined after 21 days using Masson's trichrome histological staining.

Results: TGFβ1-activated HDFs treated with ketotifen demonstrated decreased cytoskeletal and contractility-associated genes such as *ACTA2*. Ketotifen treatment also resulted in significantly reduced αSMA expression via western blot and immunofluorescence, indicating impaired differentiation into pro-fibrotic myofibroblasts. Ketotifen modified protein levels of transcriptional regulators instrumental to fibroblast activity. Additionally, collagen lattice contraction by TGFβ1-activated HDFs was decreased with ketotifen treatment. Ketotifen reduced dermal collagen density in an animal model of skin scarring.

Conclusion: We show that ketotifen directly influences activated HDFs by inhibiting differentiation and function through impairment of cytoskeletal and contractility-associated mechanisms *in vitro* and impairs collagen deposition *in vivo*. These results demonstrate a previously unknown mechanism and effect of a clinically-approved mast cell stabilizer in fibrotic settings. Together, our findings suggest that a topical formulation of ketotifen may have therapeutic potential in treating post-surgical scarring, burn wounds, and other skin fibroses.

THE YIELD OF MSI TESTING AND CLINICAL PATHOLOGICAL PROFILE IN COLON CANCER PATIENTS IN A RESOURCE LIMITED POPULATION

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Background: Colon cancer is the leading cause of death in Barbados. An estimated 77.4% of the population is of African ancestry, which is known to have an earlier onset and higher incidence of microsatellite instability (MSI). Currently, there is no local capacity for MSI testing in Barbados. We sought to examine the frequency and results of MSI testing in a Barbadian cohort.

Methods: The study was a retrospective cohort study using data from a public institution Queen Elizabeth Hospital (QEH) Barbados and Surgical Solutions Inc (SSI) a single private institution. Data was extracted from all available patient charts of primary colorectal cancer cases for the period 2015 to 2024. Demographic, surgical and pathological variables were examined.

Results: In total, data for 229 patients were examined, including 84 from the private and 129 from the public facility (QEH). The mean age of the public cohort was 65.7 years and the mean age of the private cohort was 64 years. 9.3% (12/129) and 10% (11/101) of colorectal cancer cases from the public and private data sets respectively were < 50 years. Patients < 50 in both cohorts had a predominance of left side tumors (75%). Both cohorts had a predominantly Black population (90% private vs. 97% public). Overall, 65.5% (150/229) of patients had either locally advanced or metastatic disease at presentation (i.e. ≥Stage III). 15% of patients had documented MSI results, all of which were from the private facility. The frequency of MSI in the subset of tested cases was 20% (3/15). All MSI cases were right sided and one had mucinous features.

Conclusion: In this 10-year retrospective cohort study of CRC from private and public patients in Barbados, the frequency of MSI testing is low. The frequency of MSI in the cohort of 20% (3/15) is above the expected 10-15% reported in North American and European populations. The small sample of tested patients is a limiting factor, but this finding underscores the need to minimize local barriers to universal testing. The high frequency of advanced stage disease may reflect the aggressive biology in Afrocentric populations and underscores the need for an organized national colon cancer screening program.

PREDICTORS OF DEPRESSIVE SYMPTOMS IN TRAUMATIC UPPER EXTREMITY PERIPHERAL NERVE INJURY: A PROSPECTIVE COHORT PILOT STUDY

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Resident - Plastic Surgery

Objectives: Depression has been reported in patients with peripheral nerve injury (PNI) and has been associated with factors such as pain and disability. This prospective cohort pilot study explores the relationships between demographic and injury factors and depression in individuals with traumatic upper-extremity PNI from consultation to recovery to identify predictors of depressive symptoms.

Methods: Between 2022 and 2024, patients seen within a dedicated peripheral nerve injury multidisciplinary clinic with brachial plexus or injury to major mixed motor and sensory nerves in the upper extremity were included. Prospectively collected patient demographic, injury characteristics and patient-reported outcome measures including the Personal Health Questionnaire (PHQ-9), Brief Pain Inventory (BPI), and Disabilities of the Arm, Shoulder, and Hand (DASH) were analyzed at longest follow-up. Multiple linear regression modeling was used to identify predictors of depression severity, adjusting for previously known clinical and demographic variables predictive of depression (e.g. pre-existing mental health disorder).

Results: 62.5% of patients displayed depressive symptoms based on PHQ9 scores. As has been reported previously, pain severity and interference were both significantly ($p<0.001$) correlated with depressive symptoms. The duration between injury and first appointment with a nerve surgeon significantly correlated with increased depressive symptoms ($p=0.027$). DASH scores did not correlate with depressive symptoms.

Conclusions: While PNI are complex injuries with numerous contributors to poor mental health, the discovery that time from injury to appointment has a significant impact on depressive symptoms is striking and opens a discussion on optimal timing of surgical consults following PNI. These results can help inform strategies to better support this patient population, including incorporation of pain and mental healthcare professionals into multidisciplinary upper extremity PNI care.

WATCH & LEARN: NURSING SHADOWING BY SURGICAL RESIDENTS

RJ Roggeveen & Sam Jessula

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Objectives: Interprofessional collaboration is essential in healthcare, yet surgical residency programs have not widely implemented interprofessional educational experiences to enhance understanding between residents and nurses. The objective of this study was to evaluate a novel program where first-year surgical residents shadowed nursing staff.

Methods: First-year surgical residents were paired with nurses from their respective specialty inpatient unit for a six-hour shadow shift. Surveys were distributed to residents pre and post shadow experience and to nursing staff post shadow experience. Surveys included quantitative Likert scale questioning as well as qualitative short answer response. Data was analyzed using the Wilcoxon-Ranked test and thematic analysis.

Results: A total of 25 shadow days were conducted, with 23 resident pre-surveys, 24 resident post-surveys, and 23 nurse post-surveys completed. Following the shadowing experience, residents reported a statistically significant increased understanding of nurses' roles in patient care ($p=0.0209$), skills with compassionate care ($p=0.0023$), management of intravenous pumps ($p=0.0049$), blood drawing ($p=0.0253$), medication administration ($p=0.0026$) and progression of care rounds ($p=0.070$). On thematic analysis, residents noted that the program facilitated relationship-building and provided insights into nurses' day-to-day work. A minority of residents found the experience lacked structure and did not believe it would influence their future practice. Nurses supported the program, stating that it enhanced interprofessional collaboration, should be included in resident orientations, and improved their own understanding of residents' needs.

Conclusions: The shadow day program successfully increased mutual understanding between surgical residents and nurses, with potential for improved interprofessional collaboration and patient care. Future iterations of the program may benefit from additional structure to maximize its impact on clinical practice.

IDENTIFICATION OF NOVEL GENETIC MUTANTS IN NEPHROTIC SYNDROME – A CASE FOR UNDERSTANDING PERSONALIZED MEDICINE

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Grad Student - Pharmacology

Objective/Background: Glomerular diseases account for ~50% of end-stage kidney disease (ESKD) in adults and ~29% in children. They are marked by dysfunction in the key kidney filtering cells, podocytes. Genetic podocytopathies (GPs) are a severe form of glomerular disease, and patients develop proteinuria, treatment-resistance, and irreversible renal scarring (e.g. focal segmental glomerulosclerosis, FSGS). Numerous GP-associated proteins, specifically, regulate the actin cytoskeleton—a central hub for podocyte function. Elucidating novel regulation of the podocyte actin cytoskeleton can reveal therapeutic avenues for both genetic and acquired glomerular disorders.

Methods: Molecular and cellular techniques including qPCR, Western blotting, histological and EM. In addition, we have utilized several different proteomic approaches including quantitative proteomics together with human genetic studies and the development of a novel mouse model.

Results/Observations: We have identified a novel isoform of a nitric oxide synthase regulatory protein that is necessary for the development of the kidney podocyte cells. Humans with mutations in this gene present with treatment resistant nephrotic syndrome and are treatment resistant. Consistent with these clinical manifestations, EM studies reveal mice lacking this isoform show podocyte foot process effacement and increased glomerular basement membrane thickness. Mechanistic studies have revealed a novel connection with focal adhesion and Hippo dependent signaling.

Conclusions: Combinations of genetic, molecular and cellular approaches have identified a novel isoform of the nitric oxide synthase adaptor 1 protein in nephrotic syndrome. Interrogation of the cellular and molecular mechanism of action provide novel treatment avenues that will be used for novel drug discovery. Together this work provides an example of the need to understand the role of protein isoforms when considering personalized medicine approaches.

CARE MAPS FOR OPEN ATRIAL SEPTAL DEFECT REPAIRS IN PEDIATRICS: ARE THEY REALLY DECREASING HOSPITAL LENGTH OF STAY?

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Objectives: Secundum atrial septal defect (ASD) repair is a low-risk pediatric cardiac surgical procedure. In this homogenous, predictable surgical population, many factors can prolong hospital length of stay (HLOS). To enhance recovery after surgery (ERAS), care maps are commonly implemented within surgical specialties. The purpose of this study is to evaluate the effectiveness of an ASD care map at enhancing recovery by reducing HLOS for pediatric patients undergoing ASD surgery.

Methods: In this single centre (IWK Health Centre) retrospective study, we compared HLOS between patients who underwent secundum ASD surgical repair before (2010-2016; pre-group) and after (2017-2023; post-group) implementation of an ASD care map. After chart review, a descriptive analysis was conducted to compare differences in baseline characteristics of both groups. Differences in HLOS, ICU LOS, and other perioperative data between groups were assessed using the Kruskal Wallis non-parametric test (statistical significance: $p<0.05$).

Results: Fifty-seven patients were included, with 33 in the pre-group and 24 in the post-group. Median (IQR) cardiopulmonary bypass (CPB) and cross clamp times were higher in the post-group (pre-group = 52.0 [23.0] minutes CPB and 25.0 [9.0] minutes cross clamp vs. post-group = 67.0 [22.0] minutes CPB and 33.5 [14.2] minutes cross clamp; $p<0.05$). Median ICU LOS was similar between groups. Median (IQR) HLOS was higher in the post-group (pre-group = 73.7 [25.6] hours (3.0 [1.0] days) vs. post-group = 95.5 [38.4] hours (4.0 [1.0] days); $p<0.05$).

Conclusions: Contrary to previous reporting that ERAS decreases HLOS, in this single institutional study, HLOS was extended by one day with implementation of an ASD care map. Since the groups are in two different eras, quality improvement initiatives need to be established to investigate barriers to earlier discharge in the post-group era compared to the previous era (i.e. multidisciplinary staff change, adherence to care map parameters, and other factors).

BENCHMARKING COLORECTAL CANCER (CRC) SURGICAL OUTCOMES IN NOVA SCOTIA AGAINST AN INTERNATIONAL COHORT

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Resident – General Surgery

Objectives: Surgical outcomes for colorectal cancer (CRC) in Nova Scotia (NS) have been reported as inferior to national benchmarks from limited retrospective data. We aimed to develop a prospective database aligned with value-based care models and the International Consortium for Health Outcomes Measurement (ICHOM) to assess risk-adjusted CRC outcomes at local and provincial levels.

Methods: A multiphasic approach began with designing a 167-variable database, based on a modified Delphi process conducted by ICHOM. Data collection commenced at the QEII Health Sciences Centre in January 2023, expanding provincially in November 2023 (86-100% data completion rate). Risk-adjusted surgical outcomes were benchmarked against the Dutch Institute of Clinical Auditing cohort to assess the quality of surgical care.

Results: QEII Outcomes (n=115): Complication rate was 44.3%, anastomotic leak rate 2.6%, and 90-day mortality 3.5%. Provincial Outcomes (n=173): Complication rate was 20.8%, anastomotic leak rate 4.6%, and 90-day mortality 1.2%. Benchmarking of QEII Outcomes: Post-colon (6-8.1%) and post-rectal (10.2-14.7%) resection surgical complications were lower than the international benchmark (11.9-13% and 19.4-22.9%, respectively). Negative margin rates for pT4 colon resections (77.8-85.7%) and local excisions for rectal carcinoma with a negative margin (63.6-75%) were below the international benchmark (91.5-92.7% and 75.6-79%, respectively). Despite this, radical resection rates for pT4 rectal carcinoma (83.3-100%) exceeded international standards (68.1-69.5%).

Conclusions: We established a province-wide, risk-adjusted CRC database, enabling international benchmarking. Our preliminary findings suggest, while surgical post-operative complication rates meets or exceeds established international standards, targeted improvements in resection margins may be needed. The clinical significance of these early comparisons of resection margin rates is not yet determined in our premature follow-up. This database provides a framework for ongoing quality improvement and policy development to enhance surgical outcomes for CRC in NS.