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Western

Department of Surgery
WESTERN UNIVERSITY

21st DR. ROBERT ZHONG ANNUAL RESEARCH DAY

Wednesday, June 25, 2025
Darryl J. King Student Life Centre
King's University College

Dr. Robert Zhong Lecture

"Quantum Creativity: Small Life Changes, Bigger Impact!"

Dr. Mohit Bhandari, O.Ont, C.M. MD, PhD, FRCSC, Distinguished University Professor and Chair, Senior Tier Canada Research Chair, Editor-In-Chief, The Journal of Bone and Joint Surgery

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PROGRAM AT A GLANCE

Department of Surgery Annual Research Day 2025

King's University College
Wednesday, June 25, 2025

10:00 AM	Registration and Coffee
10:15 AM	Poster Session
11:15 AM	LUNCH
12:00 PM	Opening Remarks: Dr. Emil Schemitsch Department of Surgery
12:15 PM	Division Award Winning Resident/Fellow Research Papers
1:35 PM	MSc in Surgery Best Colloquium Presentation
1:45 PM	BREAK
2:00 PM	Dr. Robert Zhong Keynote Address Dr. Mohit Bhandari
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3:00 PM	Node Presentation Fundamental Sciences & Surgical Innovation
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3:30 PM	Node Presentation Patient Centered Research
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4:00 PM	Awards & Closing Remarks

Biography of Dr. Robert Zhong

The Robert Zhong Department of Surgery Research Day was named in honour of Dr. Robert Zhong, a brilliant scientist and colleague who passed away in 2006.

Dr. Robert Z. Zhong was born in Shanghai, China on January 16, 1946. He graduated from Shanghai No 1 Medical University and was then assigned by the government to work as a general surgeon in a community hospital. Dr. Zhong attended a seminar led by Dr. Sun Lee – considered to be the founding father of experimental microsurgery – and whom he would later credit to be one of the most important mentors of his life. Dr. Zhong arrived in Canada first as a research fellow under the supervision of Drs. John Duff and Calvin Stiller in 1984. His persistence and vision led to a full-time appointment in microsurgical animal models that would be applied in human transplantation clinical practice.

Recognizing that molecular biology and transplant immunology were critical to the future of transplantation, Dr. Zhong began his study of these fields in Canada to become one of the world's leading experts in transplantation and microsurgery. He went on to become a Tier One Canada Research Chair in Transplantation and Experimental Surgery in 2004 and was appointed a full Professor in the Departments of Surgery, Pathology, and Microbiology & Immunology at The University of Western Ontario. Dr. Zhong was a scientist at the Robarts Research Institute; Director of the Microsurgery Laboratory at LHSC; and a scientist at the Lawson Health Research Institute.

Dr. Zhong's influence into the fields of transplantation and microsurgery were profound and far-reaching. He was Past President of the International Society of Experimental Microsurgery; a member of the Canadian Society of Transplantation, American Society of Transplantation; and the American Society of Transplant Surgeons. Dr. Zhong was awarded the Lifetime Achievement Award by the Canadian Society of Transplantation posthumously in 2007.

Dr. Zhong published over 180 peer-reviewed publications and achieved millions of dollars in research grant funding. He supervised more than 70 graduate students and fellows and trained over 70 microsurgeons worldwide during his 21-year career at Western. His superb leadership and vision were recognized as having created an internationally renowned program in experimental transplantation. A brilliant scholar, teacher, and mentor, Dr. Zhong is also remembered as a man of great humility, kindness, and respect.

Dr. Robert Zhen Zhong passed away in London, Ontario on September 8, 2006.

[1]Zhong T. (2007), Dr. Robert Zhen Zhong: A tribute by his daughter. Microsurgery, 27:214-215.

Poster Abstracts: Fundamental Sciences and Surgical Innovation

Presenter: Mary Sun

Automatic Labelling of Scapular Anatomic Landmarks using a Deep Learning Model

M. Sun, G. Spangenberg, J. Banks, G. Langohr, K, Faber

INTRODUCTION: Many different radiographic parameters and anatomical landmarks can be used to assess and predict pathologies in patients with different shoulder problems. We believe the ability to automatically and accurately detect these anatomical landmarks will help to improve the efficiency and accuracy of surgical planning and imaging software.

MATERIALS AND METHODS: We trained a deep learning pipeline to detect all the anatomic landmarks present on 278 scapulae. Meshes were used on automatically segmented CT scans using armcortnet for unsupervised training of Point2SSM++. An orthopaedic surgeon and a layperson separately labelled predetermined anatomical locations on 42 new scapulae and the index of the points that correspond to these labels were found on the mean point cloud of all scapulae. Distance between the ML (machine learning) model's prediction and annotators' labelled points was recorded.

RESULTS: There was closer replication of the desired anatomical point by the model prediction than the layperson annotator and the result was statistically significant for posterior glenoid (P=0.04), glenoid centre (P=0.02) and os trigonum (P=0.02) by Wilcoxon test.

DISCUSSION / CONCLUSION: Our machine learning model can automatically label and replicate the desired anatomic landmarks on 3D CT scapulae. Greater deviation was seen for the acromion landmarks likely owing to greater variability in acromion morphology across the different scapulae. This study demonstrates that our model reliably identifies anatomical structures at consistent locations across patients and scans. This could be applied to existing surgical planning software and in imaging software to improve efficiency.

Presenter: Serina Chahal

Impact of Circular RNA ZMIZ1 Silencing on Dendritic Cell Function and Immune Regulation

S Chahal, S Li, X Zheng

INTRODUCTION: Dendritic cell (DC)-based vaccines for cancer immunotherapy have shown great promise in the past; however, optimization of DC function is necessary to increase therapy efficacy. Recently, circular RNAs have been shown to be differentially expressed between tolerogenic versus inflammatory, immunogenic DCs. Our study examines the role of circular RNA ZMIZ1 (circZMIZ1) and its role in DC function. Our preliminary data on bone marrow-derived DCs (BMDC) shows that circZMIZ1 is up-regulated in immunosuppressive DCs, suggesting circZMIZ1 is antagonistic to immunogenic DC production.

HYPOTHESIS: We aim to demonstrate that circZMIZ1 is immunosuppressive, and that silencing of circZMIZ1 can promote the production of inflammatory, immunogenic DCs and anti-tumour responses in vivo.

METHODS: BMDC were treated with immune modulating small molecules, circZMIZ1 siRNA in vitro. In vivo, expression of circZMIZ1 was quantified in tumour-bearing mice. The expression of circZMIZ1, PD-L1 and cytokines were measured using qRT-PCR. DC phenotype was determine using flow cytometry.

RESULTS: CircZMIZ1 expression is found to be is positively correlated with PD-L1 expression in vitro. In vivo, circZMIZ1 shows increased expression in tolerogenic DCs isolated from mice bearing EO771 breast tumours relative to wild-type mice. SiRNA-mediated silencing of circZMIZ1 decreases the expression of PD-L1 and further reduces DC-mediated T cell exhaustion. CircZMIZ1 overexpression in melanoma cells was found to promote pro-tumorigenic effects in vivo.

DISCUSSION: Here we propose the circZMIZ1–DC axis as a novel regulator of DC function and immune responses, providing insight on how DCs can be optimized for use in immunotherapeutic treatment of immune dysfunction diseases.

Presenter: Liam McFarlane

The Effect of Pharmacological Inhibition of Endogenous Hydrogen Sulfide Production on Bladder Cancer Gemcitabine Resistance

L. McFarlane

INTRODUCTION: Intravesical gemcitabine (GEM) and sequential GEM-docetaxel are emerging alternatives to Bacillus Calmette-Guérin (BCG) for intermediate- and high-risk non-muscle invasive bladder cancer (NMIBC), respectively. GEM is also used in BCG-unresponsive and BCG-refractory cases. Hydrogen sulfide (H_2S), an endogenously produced gaseous signaling molecule, is elevated in bladder tumors and correlates with tumor grade. Inhibition of H_2S synthesis has been shown to sensitize cancer cells to various chemotherapies. We investigated the effects of D-Lpropargylglycine (PAG), an inhibitor of the H_2S-producing enzyme CSE, on the proliferation, migration, and GEM sensitivity of human NMIBC cells.

HYPOTHESIS: We hypothesized that PAG would attenuate the proliferation and migration of BCa cells and increase sensitivity to gemcitabine.

METHODS: 5637 bladder cancer cells were treated with varying concentrations of PAG, and cell proliferation was assessed using a CCK-8 assay over 72 hours. Migration was evaluated via scratch-wound assay with/without 100 μM PAG, imaged every 12 hours. GEM (1 μM) was administered with/without PAG, and CSE expression, intracellular H_2S, and cell viability were analyzed via qPCR and flow cytometry at 24 and 48 hours.

RESULTS: PAG treatment significantly attenuated 5637 cell proliferation and migration. GEM alone induced upregulation of CSE and consequently elevated intracellular H_2S levels; co-treatment with PAG attenuated this increase of intracellular H_2S. Cells treated with both GEM and PAG exhibited significantly reduced viability compared to GEM alone.

DISCUSSION / CONCLUSION: PAG impairs NMIBC cell proliferation and migration and enhances GEM cytotoxicity. These findings suggest that targeting H_2S signaling may improve the efficacy of intravesical GEM and offer a novel adjuvant strategy for NMIBC.

Presenter: Kevin Vytlingam

Preventing Immune Rejection After Heart Transplantation Using Circular RNA ZMIZ1-Engineered Dendritic Cells

K. Vytlingam, A. Greasley, S. Chahal, W. Min, X. Zheng

INTRODUCTION: Patients undergo lifelong immunosuppression after organ transplantation to prevent immune rejection. Consequently, transplant patients are especially vulnerable to infections and cancer, which signals a need for targeted therapies against rejection. Tolerogenic dendritic cells (Tol-DCs) promote allograft tolerance by limiting T cell activation and stimulating regulatory T cells (Tregs). Circular RNA may be ideal for inducing Tol-DCs.

HYPOTHESIS: CircZMIZ1 overexpression in dendritic cells (DCs) will promote a tolerogenic phenotype, conducive to preventing immune rejection after heart transplantation.

METHODS: We used an allogeneic mouse heart transplantation model to determine the efficacy of circZMIZ1 pre-operative treatment in preventing immune rejection. We monitored the heart allografts for 100 days or until graft failure. At endpoint, we harvested the grafts to assess histopathologic injury and fibrosis. We also collected the spleens and lymph nodes for DC phenotyping and assessing Treg generation via flow cytometry. Finally, we performed mixed lymphocytic reactions, in which we co-cultured DCs from circZMIZ1-treated mice with allogeneic T cells, to measure donor-specific T cell activation.

RESULTS: CircZMIZ1 overexpression in primary bone marrow-derived DCs had lower expression of co-stimulatory markers, CD80 and CD86, and generated a higher proportion of Tregs when co-cultured with allogeneic T cells. Grafts from circZMIZ1-treated mice generally remained functional at 100 days post-transplantation, whereas control mice had undergone allograft failure, as shown by representative video footage.

DISCUSSION: CircZMIZ1 treatment can prolong allograft survival by modulating DC immune reactivity. This work could contribute to the development of targeted Tol-DC therapies to promote allograft tolerance and patient quality of life.

Presenter: Pious Jose

Preventing Alloimmune Rejection in Transplantation using circMAP2K2 and circFSCN1 Silenced Dendritic Cells

P. Jose, S. Li, B. Wang, X. Zheng

INTRODUCTION: Alloimmune rejection is an immune-mediated attack on transplanted tissue, requiring lifelong immunosuppressive therapy, which increases infection and cancer risks. Dendritic cells (DCs) regulate immune tolerance by modulating T-cell responses. Circular RNAs (circRNAs), particularly circMAP2K2 and circFSCN1, have been implicated in DC immunosuppression. Silencing these circRNAs promotes tolerogenic DC phenotypes in mice, suggesting a potential therapeutic strategy for transplantation. This study hypothesized that dual siRNA targeting of circMAP2K2 and circFSCN1 enhances immune tolerance more effectively than individual silencing.

MATERIALS AND METHODS: Mouse bone marrow-derived DCs (BMDCs) were transfected with siRNA targeting circMAP2K2 and circFSCN1. After 48 hours, cells were stained for CD11c, MHC Class II, CD40, CD80, and CD86 and analyzed via flow cytometry. qRT-PCR confirmed circRNA silencing while leaving linear genes unaffected.

RESULTS: Preliminary data (n=3) showed a significant reduction in CD11c+CD40+CD80+ and CD11c+CD86+CD80+ cells in dual-silenced DCs compared to controls, indicating a tolerogenic shift.

CONCLUSION: Dual siRNA knockdown of circMAP2K2 and circFSCN1 promotes a tolerogenic DC phenotype. Further studies are needed to compare dual versus single knockdown effects and assess functional T-cell modulation via mixed leukocyte reactions.

Presenter: Anayra Goncalves

Exploring Molecular and Tumour Immune Microenvironment Alterations in Pathogenesis of Triple-Negative Breast Cancer Using Spatial Proteomics

A. Goncalves, V. Bhat, E. Goebel, C. Postenka, M. Brackstone, A. Allan, A. Parsyan

INTRODUCTION: Triple-negative breast cancer (TNBC) is an aggressive subtype with poor outcomes and limited biomarkers and targeted therapies. Axillary lymph nodes (ALN) are a central gateway for metastasis and the interplay between cancer cells and the immune tumour microenvironment (iTME) is a major contributor to this metastatic progression. Understanding this process may reveal novel biomarkers and therapeutic targets.

HYPOTHESIS: We hypothesize that region-specific alterations in tumor cells and the surrounding iTME within heterogeneous TNBC tissues contribute to ALN metastasis.

MATERIALS AND METHODS: Samples from 50 treatment-naïve TNBC patients with ALN metastases—including primary tumours, metastatic ALNs, and normal breast tissue—were selected. H&E staining guided the region selection for tissue microarrays, based on tumour location and tumour infiltrating lymphocytes (TIL) levels. Spatial proteomics was performed using GeoMx Digital Spatial Profiler, with regions of interest selected using PanCK and CD45 fluorescent antibodies. Spatial proteomics was done with an nCounter immuno-oncology panel.

RESULTS: Bioinformatics analysis comparing normal breast tissue, primary tumours, and ALN regions with high and low TIL areas, identified differentially expressed genes and proteins, enriched pathways, and changes in iTME cellular composition. For example, our preliminary analysis suggested a potential upregulation of S6, which is associated with chemotherapy resistance, and HLA-DR, which is linked to an improved response to immunotherapy, in TIL-high regions of primary breast tumour compared to normal breast tissues.

DISCUSSION / CONCLUSION: These insights may inform biomarker discovery and the development of therapeutics for TNBC.

Poster Abstracts: ICES / Big Data

Presenter: Marcus Milantoni

A Non-Invasive Artificial Intelligence Approach to Stage Esophageal Adenocarcinoma

M. Milantoni, R. Nayak, R. Malthaner, M. Qiabi, S. Mattonen

INTRODUCTION: Endoscopic resection (ER) provides minimally invasive treatment for managing early stage (T1N0) esophageal adenocarcinoma (EAC). Currently, EAC staging comprises of PET-CT scans followed by endoscopic ultrasound (EUS) to assess the TNM stage. However, EUS has a limited accuracy (30%) in differentiating superficial lesions suitable for ER. Convolutional neural networks (CNNs) offer a promising non-invasive alternative to interpret PET-CT scans, with the potential to stage tumors without EUS.

HYPOTHESIS: A CNN based model will be able to classify T1N0 EAC with an accuracy greater than EUS.

METHODS: A retrospective study of 164 EAC patients treated with upfront esophagectomy at the London Health Sciences Centre was conducted. Prior to treatment, PET-CT scans were acquired. Ground truth labels were assessed by histopathology of the resected specimen. The dataset was split into 70% training, 15% validation, and 15% testing. Esophageal volumes were auto-segmented, and image pre-processing was applied. A custom 3DConvNeXt model was developed and evaluated using area under the receiver operator characteristic curve (AUC) and accuracy from the unseen testing dataset.

RESULTS: The 3DConvNeXt based model showed strong performance with a validation accuracy of 84%, validation AUC of 0.8, testing accuracy of 84% and testing AUC of 0.72.

CONCLUSION: The 3DConvNeXt model demonstrates potential for classifying EAC based on PET-CT scans alone, with high accuracy in distinguishing superficial lesions suitable for ER. These findings suggest that CNN-based analysis of PET-CT scans could reduce the need for invasive EUS and shorten the time from diagnosis to treatment.

Poster Abstracts: Patient Centered Research

Presenter: Gavin Raner

Effect of Perioperative Testosterone Use and Other Factors on Hematoma Formation After Gender-Affirming Top Surgery

G. Raner, T. DeLyzer, A. Grant

INTRODUCTION: Bilateral mastectomy for gender affirmation (i.e. "top surgery") is a generally low-risk surgery. The main postop complication is hematoma formation requiring reoperation for evacuation. Some centers require patients to stop testosterone for weeks prior to surgery to reduce the risk of complications, but stopping hormone therapy also carries risks. The evidence remains unclear whether perioperative testosterone use increases complications. Other theories describe higher incidences of postoperative bleeding between surgical approaches (double-incision versus circumareolar).

HYPOTHESIS: Perioperative testosterone use does not increase postoperative hematoma or seroma formation.

MATERIALS AND METHODS: At a single center, all patients who underwent gender affirming top surgery by the senior authors between January 1, 2018 and December 31, 2024 were identified. In addition to testosterone, other potential factors related to hematoma formation were collected. Statistical analyses included Fisher's test and logistic regressions.

RESULTS: A total of 221 charts were screened based on OHIP billing codes; 99 met inclusion criteria. Ten patients developed a hematoma (9 on testosterone; P=1), 3 required surgical evacuation (all on testosterone; P=1). Seven developed a seroma (all on testosterone, P=0.593). Independently, none of the factors showed statistically significant correlation with hematoma formation. Multivariate logistic regression on age, BMI, smoking, surgical approach, and testosterone dose showed the circumareolar approach was significantly correlated with hematoma (P=0.039) and seroma formation (P=0.033).

DISCUSSION / CONCLUSION: Testosterone was not shown to predispose hematoma or seroma formation after top surgery, and may not require perioperative suspension. Circumareolar top surgery patients, however, may benefit from being counselled on a potentially higher risk for postoperative hematoma/seroma formation.

Presenter: Kathy Zhang

Buddy Taping Versus Splinting for Pediatric Volar Plate Injuries: Pilot Study and Systematic Review

K. Zhang, T. Behtashi, K. Garland

INTRODUCTION: Hand fractures are the most common fractures among Canadian children. Among hand fractures, volar plate injuries are common among children referred to pediatric plastic surgery. These injuries are typically treated non-operatively in the absence of any other complicating factors. Non-operative management of volar plate injuries includes both buddy taping and splinting.

HYPOTHESIS: We hypothesize that there is no significant difference in range of motion and pain post-injury across conservative treatment groups for pediatric volar plate injuries.

MATERIALS AND METHODS: The pilot study is a prospective observational study comparing outcomes (range of motion and pain) for different treatment groups (one week splint and three weeks buddy tape, two weeks splint and three weeks buddy tape, four weeks buddy tape). Patients received initial treatment from the Emergency Physician and had their first follow up at the Plastic Surgery Clinic. Outcome measures were assessed and later reassessed at four weeks post-injury. A systematic review is in progress for consolidating existing evidence of buddy taping versus splinting in the pediatric population with isolated volar plate injuries.

RESULTS: The pilot study enrolled 10 patients per treatment group over a period of 8 months and found no differences in range of motion or pain at four weeks post-injury across treatment groups.

DISCUSSION / CONCLUSION: This pilot study is currenting expanding into a multisite equivalence observational study to build on evidence regarding non-operative management for the pediatric population. The findings from both studies will be interpreted in conjunction with the systematic review for guiding consensus in future practice.

Presenter: Sukhmeet Sachal

Bridging Gaps in Burn Care: Understanding Outcomes in Survivors of Domestic Violence - A Scoping Review

S. Sachal, A. Achunair, S. Rizvi, A. Iansavitchene, L. Wylie, C. Symonette, K. Garland, T. DeLyzer, K. Jackson, R. Spiwak, S. Logsetty

INTRODUCTION: Burn injuries are a major global health concern, with low- and middle-income countries disproportionately affected by domestic violence (DV)–related intentional burns. This scoping review examines the prevalence, injury patterns, and outcomes of DV-related burn injuries among vulnerable populations.

HYPOTHESIS: DV-related burn injuries are associated with severe clinical, surgical, and psychological consequences, particularly among marginalized groups in LMICs.

METHODS: Using PRISMA-ScR guidelines, we systematically searched MEDLINE, Embase, APA PsycInfo, and CINAHL for studies published from January 1, 2000, to January 1, 2025. Included studies assessed outcomes of DV-related burns using qualitative or quantitative methods, including case reports, case series, and observational designs.

RESULTS: Seventy studies were included from an initial 1,567. DV-related burns were linked to worse outcomes than accidental burns, including greater total body surface area involvement, higher ICU admissions, longer hospital stays, more surgical interventions, and increased mortality. Children were most often victims of scalds by caregivers, women sustained flame burns tied to intimate partner or dowry-related violence, and men were typically injured in acid attacks from interpersonal conflicts. Survivors required complex surgical care, such as early grafting in children and staged reconstruction in adults, and frequently experienced significant psychological trauma with limited access to mental health services.

CONCLUSION: DV-related burn injuries reflect both physical harm and deep-seated societal violence. A multidisciplinary approach is essential, combining surgical care with culturally-sensitive psychosocial support. Future research should focus on developing evidence-based treatment guidelines, improving identification and screening for abuse, and expanding survivor-centered social services to ensure comprehensive recovery and prevent further harm.

Presenter: Isaac Wangai

Anterior Versus Posterior Surgery for Two or Three Level Compression in Degenerative Cervical Myelopathy (DCM): Findings from the Canadian Spine Outcomes and Research Network.

I. Wangai, C.Bailey

OBJECTIVE: To compare outcomes for patients with two or three levels of DCM treated with either an anterior or posterior surgical approach based on the location of pathologic compression.

HYPOTHESIS: There is no difference in patient rated outcomes at 12-month follow-up between anterior and posterior surgical approaches based on the location of pathologic compression.

MATERIALS AND METHODS: This was a retrospective cohort study of patients enrolled in the CSORN DCM cohort study (2015-2021) who underwent 2 or 3 level decompression with either an anterior or posterior surgical approach, had a pre-operative MRI, and completed a 1-year follow-up. Patients were excluded if they had combined anterior-posterior approach, previous neck surgery, or if they had OPLL, ankylosing spondylitis, or DISH.

RESULTS: Patients with anterior pathology were more likely to have an anterior approach while those with circumferential compression were more likely to have a posterior approach. After adjusting for baseline variables, the odds of achieving Mean Clinically Important Difference (MCID) for mJOA, NDI, neck and arm pain between the two surgical approaches for both anterior and posterior compression were similar at 12-months.

DISCUSSION / CONCLUSION: The location of compression dictated the direction of surgery but neither of the two approaches accorded better outcomes at 12-months over the other in both the anterior and posterior compression patient groups respectively.

Presenter: Bojana Misheva

Paraganglioma Masquerading as a Sub-Carinal Mass

B. Misheva, B. Misheva, D. Nagpal, R. Inculet

BACKGROUND: During investigation of tinnitus, a 55-year-old male who was found to have a hyperfunctioning paraganglioma near the left carotid artery with a second mass in the sub-carinal space. Both tumors were Ga-68 DOTATATE PET/CT positive. The patient underwent radiation to the jugular foramen paraganglioma and was considered for surgical resection of the subcarinal mass. Pre-operative imaging including CT, MRI and echocardiogram reported no cardiac involvement. Angiography demonstrated tumor blood supply arising from the right coronary artery.

METHODS: Pre-operative embolization was undertaken. Surgical exposure was performed through a right thoracotomy. The subcarinal tumor was found to be intrapericardial, arising from the left atrium. Under cardio-pulmonary bypass, the tumor and portion of left atrium were excised. Post op recovery was complicated by Tachy-Brady syndrome requiring a pacemaker.

RESULTS: Six month follow up imaging shows no recurrence and normalization of metanephrines.

CONCLUSION: Cardiac paragangliomas are extremely uncommon tumors and surgical experience with this neoplasm is limited. Left atrial paragangliomas may be mistaken for an extra-pericardial subcarinal tumor. Pre-operative angiogram showing blood supply from a coronary artery suggests a cardiac origin of the tumor. We review the different options for surgical management of this rare cardiac tumor in the current literature.

Presenter: Alexandra Rocha

Postoperative Infections in Immunocompromised, Metastatic Spine Tumor Patients

A. Rocha, M. Renaud, J. Urquhart, S. Singh

INTRODUCTION: Surgical debulking, stabilization, and neurologic decompression are treatment options for metastatic spine disease. Preventing surgical site infection (SSI) in this cohort is important as infection delays ultimate oncologic therapy. Literature reports 30-50% SSI risk in metastatic spine patients following surgery. This study's aim was to determine the SSI rate at our centre and understand post-operative infection microbiology in metastatic spine patients.

HYPOTHESIS: Metastatic spine patients will have a 40% SSI rate requiring an irrigation and debridement, with polymicrobial predominance.

MATERIALS AND METHODS: A retrospective chart review of operatively managed, metastatic adult spine patients over a 5-year period was conducted. Demographic, clinical, and perioperative data were collected. Of 137 patients who underwent a primary metastatic tumor procedure, 14 required an irrigation and debridement for post-operative spine SSI. Statistical analysis was completed for between group differences and descriptive analysis regarding microorganism profiling.

RESULTS: No statistical differences for age (68 vs 69), BMI (28 vs 25), sex (40% vs 57%), preoperative radiation dose (54 vs 20), intraoperative-operative minutes (188 vs 205) and intraoperative vancomycin powder (36 vs 57%) between non-infected and infected groups, respectively. A significant difference for all-cause 30-day (23 vs 50%) ($p<0.05$) and one-year (12 vs 46%) ($p<0.005$) adverse events between the two groups. Of SSI patients, 64% exclusively had post-operative gram-positive antibiotic coverage, and 75% of culture-positive SSI patients had polymicrobial infections.

DISCUSSION / CONCLUSION: Metastatic spine patients with post-operative SSI are at increased risk of short and long-term adverse events. Furthermore, these patients are more likely to develop polymicrobial SSI.

Presenter: Cohen Chaulk

Evaluating the Impact of Advanced Trauma-Team Leader Notification

C. Chaulk, L. Allen, F. Priestap, N. Parry, R. Leeper, B. Moffat, D. Gray, A. Ackery, M. Lewell, B. Nolan, K. Vogt

INTRODUCTION: A new policy governing Ontario's air ambulance service mandates pre-transport trauma-team leader (TTL) notification for patients with hypotension, aiming to enable early interventions at referring hospitals and mobilization of trauma teams at the lead trauma hospital (LTH). This pilot study evaluates implementation of this policy, focusing on its impact on time-sensitive interventions and patient outcomes at a single centre.

HYPOTHESIS: Advanced-TTL notification results in improved times to critical intervention (CI) and post-trauma bay destination.

METHODS: This retrospective pre-post analysis compared trauma patients transported to a single LTH before
and after policy implementation. Patients were included if they suffered traumatic injuries and had documented pre-hospital hypotension. Data on pre-hospital communication, time to interventions, and patient outcomes were collected. The primary outcome was time to CI or departure from the emergency department (ED) to their next phase of care.

RESULTS: A total of 29 patients were included: 12 before and 17 after policy implementation. There was 100% policy compliance with advanced TTL notification after policy implementation. Median time to CI or ED departure was 29 minutes post-policy compared to 17 minutes pre-policy (p=0.21). Both time to chest tube placement and operating room arrival were notably shorter post-policy (13 vs. 48 minutes chest tube; 61 vs. 71 minutes for OR), however time to transfusion and arrival to the CT scanner was longer (8 vs. 15 minutes blood transfusion; 40 vs. 49 minutes CT scanner). Mortality in the post-policy period was 12% vs. 33% pre-policy (p=0.198).

CONCLUSION: Advanced TTL notification was associated with a trend toward improvement in the time to some CIs, though statistical significance was not achieved. Findings inform a larger, appropriately powered multi-center provincial study to assess the policy's impact comprehensively.

Presenter: Winston Jin

Radial Head Arthroplasty for Acute Versus Delayed Treatment of Radial Head Fractures

W, Jin C, Fleet. R, Grewal. G, King

INTRODUCTION: While studies have shown favourable outcomes in patients treated with acute Radial Head Arthroplasty (RHA), little is known about the outcome of patients who undergo delayed RHA. The purpose of this study was to compare the clinical, radiographic, and patient-reported outcomes between acute and delayed RHA.

HYPOTHESIS: Patients with delayed RHA have poorer outcomes compared to acute RHA.

MATERIALS AND METHODS: Patients ≥16 years old who underwent a delayed RHA (>4 weeks from injury) between 2000-2020 retrospectively reviewed. They were matched based on injury type, sex, and age with patients who underwent an RHA acutely (≤ 4 weeks).

RESULTS: There were 19 females and 10 males in each group. There were no significant differences in the development of capitellum osteopenia, periprosthetic lucency, or heterotopic ossification on radiographs. The Mayo Elbow Performance Index (MEPI) was not significantly different. No significant differences were observed in the flexion, extension deficit, pronation, and supination. Significantly more patients developed ulnohumeral arthritis in the delayed (69%) versus the acute (41%) group.

DISCUSSION: Our results showed favourable outcomes with both acute and delayed RHA. There were no significant differences in the objective measures, nor the patient reported outcomes between the two groups. Patients who underwent RHA in a delayed fashion had a higher incidence of ulnohumeral arthritis compared to matched patients who underwent RHA acutely. This data suggests that RHA remains a valuable delayed treatment option for patients who fail non-operative treatment or ORIF of the radial head and neck.

Presenter: Dyanna Melo

Incidence of Retained and Recurrent Hemothorax in Trauma Patients

D. Melo, D. Cui, M. Ahmed, L. Allen, R. Malthaner, B. Moffat, R. Nayak, K. Vogt

INTRODUCTION: Retained/recurrent hemothorax (RH) after severe thoracic injury increases the risk of developing an empyema or fibrothorax, requiring surgical intervention and prolonged hospitalization. The contemporary rate of RH after hospital discharge is unknown.

HYPOTHESIS: The incidence of RH is suspected to be ~30%. Increased injury severity score, pre-injury use of anticoagulation, heart failure and COPD are likely to increase the risk of RH.

METHODS: Patients with thoracic trauma presenting to follow-up clinic (January 2022 - December 2023) were identified. Chest x-rays were reviewed to determine the presence of new or worsening pleural effusion, identified as RH. Electronic records were used to obtain patient demographics, injury details, past medical history and management. Multivariable logistic regression was used to identify risk factors for RH requiring chest tube insertion.

RESULTS: 363 patients with thoracic trauma were enrolled, of whom, 75 (20.7%) had RH and 41 (11.3%) had respiratory symptoms in clinic. 12 (3.3%) of these required a chest tube reinsertion. On univariate analysis, a history of heart failure ($p < 0.001$) and effusion present on discharge chest x-ray ($p = 0.003$) were associated with a need for chest tube insertion. Multivariable logistic regression identified an effusion on discharge to be associated with the need for chest tube insertion (OR 5.03, 95% CI 1.40-18.09).

CONCLUSION: This contemporary series defines the incidence of RH after discharge from severe thoracic injury. The presence of an effusion on discharge from index hospitalization is predictive of requiring a chest tube for RH.

Presenter: Omar Siddiqi

Cage Subsidence in ACDF, a Comparison Between Autograft, Allograft, and Synthetic Cages

O. Siddiqi, K. Wangai, T. Alenezi, T. Walker, J. Urquhart, R. Raj

INTRODUCTION: Anterior cervical discectomy and fusion (ACDF) surgery is a routine procedure for spinal pathologies, with various techniques/materials described. There has yet to be a head-to-head comparison between autograft, allograft, and PEEK cages investigating subsidence.

HYPOTHESIS: We hypothesize that autograft will have the least subsidence followed by allograft then synthetic cages.

METHODS: A consecutive series of patients who underwent ACDF for degenerative radiculopathy or myelopathy at a single center between 2011 and 2022 were retrospectively reviewed. Baseline demographics, interbody device type, and disc height were obtained from charts with radiographic measurements at 6 weeks and 6 months- 2-years after surgery. Subsidence was calculated as ³ 3 mm change in anterior/posterior disc height compared to immediate postop up to 2 years after surgery.

RESULTS: 89 had autograft (tricortical iliac strut), 87 had allograft (cornerstone or fibular strut), and 49 had synthetic (PEEK or Zero P). Subsidence rate was 11.8% in the allograft group, 10.2% in the autograft group, and 4.3% in the synthetic group (p=0.358). There was a greater change in posterior disc height in the allograft group (meanffISE, -1.4ffI0.1 mm) compared to the autograft group (1.1ffI0.1 mm, p=0.021) and synthetic group (-1.0ffI0.1; p=0.001). The loss in anterior disc height was not different among groups.

CONCLUSION: Subsidence rates were similar between allograft, autograft, and synthetic devices. The loss in disc height was greatest in the allograft group. Clinical significance of these differences not ascertained. Further study is required to investigate factors associated with subsidence, effect on alignment, and fusion rate.

Presenter: Lee Benaroch

Does a Postoperative Colonoscopy Increase the Risk for Hip and Knee Prosthetic Joint Infection: A Systematic Review and Meta-Analysis

L. Benaroch, V. Roy, R. Alatassi, E. Vasarhelyi, B. Lanting

INTRODUCTION: Prosthetic joint infections (PJI) are a serious complication of lower extremity total joint arthroplasty (TJA), leading to increased morbidity, mortality, re-operations, and strain on healthcare systems. Haematogenous spread from remote sites is the most common cause of PJI, prompting guidelines recommending antibiotic prophylaxis for several procedures. However, evidence on whether colonoscopies increase PJI risk post-TJA remains conflicting. This study is the first meta-analysis to assess the risk of PJI following colonoscopy in patients with TJA.

HYPOTHESIS: We hypothesise that a postoperative colonoscopy will not increase the risk for PJI.

METHODS: A systematic search was conducted following predefined criteria. Studies comparing patients who underwent colonoscopy post-TJA with those who did not were included. Study data on cohort demographics, colonoscopy timing, and PJI rates were extracted. Random-effects models and the generic inverse variance method were used for meta-analyses.

RESULTS: Pooled data from five studies (n = 293,238) showed no significant increase in PJI risk at three (OR = 0.86; 95% CI, 0.73–1.02), six (OR = 1.01; 95% CI, 0.81–1.27), nine (OR = 1.15; 95% CI, 0.88–1.51), or twelve months (OR = 1.06; 95% CI, 0.86–1.31) post-colonoscopy. Independent risk factors, including diabetes, rheumatoid arthritis, chronic kidney disease, alcohol abuse, tobacco use, pulmonary disease, male sex, and post-traumatic arthritis, significantly increased PJI risk.

CONCLUSION: Colonoscopies do not significantly increase PJI risk in TJA patients. While routine antibiotic prophylaxis does not appear beneficial for all patients, identifying and modifying risk factors in those scheduled for colonoscopies may help reduce PJI rates and improve overall outcomes.

Presenter: Jennyfer Paulla Galdino Chaves

Does fat matter? The Association Between Extension of Fusion and Paraspinal Muscle Fat Infiltration

J.P. Galdino Chaves, S. Sima, B. Hsu, B. Singh, V. Kulkarni, A. Diwan

OBJECTIVES: Fat infiltration of the paraspinal muscles reflect muscle atrophy and degeneration and has been known to lead to dysfunction of the low back. We hypothesize that patients who require extension of a primary Lumbar spinal fusion exhibit pre-operative higher levels of paraspinal fat infiltration compared to patients who only underwent primary fusion..

METHODS: This study was conducted as a retrospective case-control study. Fat infiltration of the paraspinal muscles was measured at the superior adjacent segment level by two investigators using the Goutallier and Four Grade Fat classification. Data is presented as median and IQR's. A Kruskal Wallis test with post hoc Mann-Whitney U test was used to analyze the difference in fat infiltration between the extension of fusion and no-extension of fusion group.

RESULTS: Of the 88 patients included in the study, 41 underwent extension of fusion and 47 underwent primary fusion alone. In patients who underwent extension of fusion, the level of paraspinal fat infiltration as measured by the Goutallier T1W and T2W classification was more severe in the MRIs conducted prior to the extension compared to MRIs conducted prior to the primary fusion. The level of paraspinal fat infiltration as measured by all three classifications was more severe in the MRI of patients requiring extension of fusion compared to patients who underwent primary fusion only. There was no difference between pre-operative fat infiltration in the superior adjacent segment when comparing MRI scans prior to the primary fusion of both groups.

CONCLUSION: Extension of fusion is associated with elevated paraspinal muscle fat infiltration in the superior adjacent segment level and should be considered as one of the risks for adjacent segment disease and proximal junctional failure in fusions. Further predictive analytical work with the data is underway.

Presenter: Jennifer He

Neuromuscular Scolioses Are Not Created Equal

V Roy, J He, K Morash, D Bartley, S Singh, P Rasoulinejad, T Carey, P Thornley.

INTRODUCTION: Patients with a neuromuscular disorder(NMD) have an increased risk of developing neuromuscular scoliosis(NMS). Surgical management is indicated for progressive deformities and reliably demonstrates functional improvements. Gold standard surgical management involves posterior spinal fusion(PSF). While ample literature is available on adolescent idiopathic scoliosis PSF shortcomings, there remains a paucity of evidence on outcomes in NMS.

HYPOTHESIS: We believe that not all NMS PSF evolve similarly over time and that patient-specific factors are associated with hardware failure.

MATERIALS AND METHODS: A monocentric, retrospective cohort of known NMD and NMS that underwent PSF between January 2013 and December 2023, was conducted. Patient demographics, clinical factors, and postoperative outcomes were collected. Bivariate analyses via non-parametric tests were conducted to explore variables associated with postoperative outcomes at 90 days and ≥1 year. Cobb changes over time was assessed using mixed ANOVA.

RESULTS: The main NMD was undifferentiated CP(62%). Hardware failure at ≥1-year was higher in non-CP NMS($p=0.003$). Patients with hardware failure had a significantly lower median pre-op major Cobb angle(64.50°) compared to those who did not(80.65; $p=0.02$), while major Cobb angle were not different between CP and non-CP($p=0.227$). Patients who developed hardware failure had a greater median difference in Cobb from immediately post-op to ≥1-year follow-up(12.45°) compared to those without(-0.20°; $p<0.001$). A mixed ANOVA with Greenhouse-Geisser correction revealed a difference in Cobb over time between CP and non-CP patients($p<0.001$) and non-CPs were shown to have a significant worsening in Cobb angle over time post-op ($p=0.036$).

CONCLUSION: We conclude that non-CP NMS acts differently when it comes to reduction maintenance and hardware evolution, and that careful considerations should be taken when planning surgery and assessing their X-ray images.

Poster Abstracts: Quality Improvement

Presenter: Ahmed Eltom Mohamed

Evaluating the Sustainability of the Canadian Urological Workforce: Present and Future

A. Eltom Mohamed, S. Ul-Haq, J. Davidson, A. Ahmad, P. Wang

INTRODUCTION: Canada faces a significant nationwide physician shortage, particularly in urology. The aging population and increasing incidence of urologic conditions have exacerbated pressure on the existing workforce, contributing to extended wait times and regional disparities. While these issues are acknowledged, the long-term impacts of retirement trends and geographic and gender imbalances remain uncertain.

HYPOTHESIS: We hypothesize that, under current trends, several provinces will fail to meet the recommended urologist-to-population ratio, limiting access to timely and equitable care.

MATERIALS / METHODS: This study assesses Canada's current and projected urologist workforce through 2049, utilizing data from the Canadian Institute for Health Information and the Canadian Post-M.D. Education Registry. Workforce trends by province were analyzed, urologist-to-population ratios calculated, and future supplies projected under four population growth scenarios. A benchmark of 2.0 urologists per 100,000 population was used, with statistical analyses performed in RStudio & R (ver3.7).

RESULTS: Results from 2001 to 2023 show Alberta, Manitoba, and Saskatchewan consistently below the benchmark despite national growth. Alberta is expected to remain below the benchmark across all scenarios, with Manitoba and Saskatchewan reaching it only under low-growth conditions. Other provinces generally met benchmarks. Demographic shifts indicate rising female representation and more urologists aged over 50. A notable workforce reduction around 2020 likely reflects pandemic-related effects.

DISCUSSION / CONCLUSION: Proactive workforce planning is critical. This includes expanding training capacity, implementing targeted retention strategies, and offering incentives for rural practice. In addition, policy interventions must address demographic imbalances. These actions are essential to maintain an adequate, diverse, and responsive urology workforce capable of meeting future healthcare demands.

Presenter: Rachel Peet

Improving Sustainability Outcomes of Post-operative Bloodwork for General Surgery Inpatients at London Health Sciences Center – A Quality Improvement Initiative

R. Peet, H. Orr, T. Tung, T. Zwiep

BACKGROUND: Unnecessary bloodwork has been shown to have negative patient-centered consequences. The aim of this project is to reduce unnecessary post-operative bloodwork and improve sustainability outcomes measured by quantity of bloodwork complete, estimated carbon dioxide emissions and cost.

METHODS: We established the baseline quantity of routine post-operative bloodwork ordered for General Surgery inpatients at London Health Sciences Centre (LHSC) over a four-month period. Semi structured interviews were complete to assess perceptions on the utility of post-operative blood, establish need for routine post-operative bloodwork, and generate change ideas to reduce unnecessary post-operative bloodwork.

RESULTS: Sixty percent of elective and urgent surgery patients had routine CBC, creatinine and electrolytes drawn daily. This increases to greater than 80% of patients with daily bloodwork within the first 7 postoperative days. The quantity of bloodwork done totaled $66,446 spent and 234,338g CO2 emission equivalents emitted, independent of number of phlebotomies done. Residency culture, cognitive burden and electronic medical records contribute to unnecessary post-operative bloodwork. Residents and faculty interviewed agreed that patient factors and surgery performed should be considered in determining the appropriate amount of postoperative bloodwork.

CONCLUSION: This study demonstrates the baseline quantity of post-operative bloodwork for General Surgery inpatients at LHSC, measured by sustainability outcomes, and highlights barriers to decreasing routine post-operative bloodwork including residency culture, cognitive burden and electronic medical records. Our data suggests that there is an opportunity to reduce routine bloodwork for post-operative patients with a high degree of clinical stability, dependent on surgical procedure complete, and patient co-morbidities.

Presenter: Emily Evans

Delirium Prevention Strategies in Geriatric Traumatology Patients: A Quality Improvement Initiative

E. Evans, A. Makish, T. Zwiep, E. Tang, K. Vogt

INTRODUCTION: Geriatric patients account for approximately 30% of traumatology admissions[1]. In hospitalized patients age 65 years, the estimated incidence of delirium is 15-56%[2,3]. Delirium has been associated with increased length of stay and mortality[2].

HYPOTHESIS: We aim to reduce the rate of delirium with an Older Adult Trauma Admission Order Set (OATAOS) in our electronic medical record.

MATERIALS AND METHODS: We performed a review of trauma inpatients age 65 years at London Health Sciences Centre from May 14 to December 31, 2024, after implementation of the OATAOS. Data collected included order set use, delirium incidence, Trauma Specific Frailty Index (TSFI), mortality, non-home discharge, and new mobility aid use.

RESULTS: One hundred sixty-seven patients were included. The incidence of delirium ranged from 0-25% per month. Patients with delirium had a TSFI score within the frail range (0.36), while patients without delirium fell within the pre-frail range (0.18) ($p<0.001$). Mortality rate was 25% in patients with delirium and 8% in patients without delirium ($p=0.02$). Average length of stay was 19.1 days in patients with delirium and 6.9 in patients without delirium ($p<0.001$). Rate of discharge to higher levels of care was 87.5% in patients with delirium and 41.9% in patients without delirium ($p<0.001$).

DISCUSSION / CONCLUSION: Delirium is associated with several negative patient outcomes. Implementation of the OATAOS brought attention to delirium screening for geriatric trauma inpatients. More time in use is needed to determine if the order set reduces delirium and determine modifiable risk factors.

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Poster Abstracts: Surgical Education

Presenter: Sarah Hunt

A Qualitative Exploration of Factors Influencing Practice Decisions Among Plastic Surgery Residents in Canada

S. Hunt, AL. Nguyen, A. Grant, SE. Appleton

INTRODUCTION: Canadian plastic surgery workforce trends are changing. A recent study demonstrated that mixed practices that include aesthetics were most popular among plastic surgery residents, especially in urban settings. Important factors in practice decision-making included a supportive workplace and local environment, with adequate operating time and resources. This study aimed to gain a richer understanding of factors influencing how plastic surgery residents in Canada choose their eventual practice.

HYPOTHESIS: Plastic surgery residents will prioritize factors both intrinsic and extrinsic to their jobs.

MATERIALS AND METHODS: Plastic surgery residents across Canada were recruited to participate in semi-structured interviews between February-April 2025. Interview transcripts underwent thematic analysis by two independent reviewers. Final themes were identified via consensus coding.

RESULTS: Of the resident respondents, 47% preferred mixed practices that include aesthetics (20% community/aesthetic, 20% academic/aesthetic, 7% undecided). Those wanting exclusively academic practice (27%) outnumbered those wanting exclusively community practice (7%). Common themes identified among most participants included family considerations, community considerations, and working conditions. Family considerations deemed most important included proximity to family and friends, and spouse/partner preferences. Residents preferred communities in which they previously lived and/or worked in, and those that offered opportunities aligning with their hobbies and interests outside of work. For job-specific factors, residents preferred collegial working groups and participation in medical education.

DISCUSSION / CONCLUSION: Factors influencing practice decisions among plastic surgery residents are multi-faceted, with many factors existing outside of the typical terms of contract negotiation. A more holistic approach to recruitment and retention efforts should be considered to increase success.

Presenter: Khalifa Al-Ghanim

From Internet Search to Scalpel: Is A.I influencing our patients?

K. Al-Ghanim, S. Hunt, S. Appleton, T. DeLyzer, J. Ahmad

INTRODUCTION: Artificial intelligence (AI) platforms such as ChatGPT are increasingly used by patients to learn about surgical procedures and guide their healthcare decisions. These tools offer rapid, accessible, and seemingly authoritative responses, often bypassing traditional sources of medical information. While AI may enhance patient education and engagement, concerns remain about the accuracy, consistency, and potential biases in AI-generated content, particularly in high-stakes contexts such as elective surgery.

HYPOTHESIS: AI-generated content can provide accurate and comprehensive responses to common patient questions about surgery but may also introduce subtle biases or omissions that impact decision-making.

METHODS: ChatGPT-4 was queried with nine standardized questions reflecting typical preoperative (Rhinoplasty) patient inquiries, including surgical indications, risks, benefits, eligibility, cost considerations, and provider selection. Each question was submitted three times to assess reproducibility. Responses were evaluated independently by two board-certified plastic surgeons and a senior resident using the Vanderbilt Assessment Scale for accuracy, completeness, and consistency. Reviewers also assessed potential bias in AI guidance.

RESULTS: ChatGPT-4's responses were highly accurate (mean 5.5/6, STD 0.7) and rated as adequately comprehensive (mean 2.5/3, STD 0.7). Response reproducibility was high. However, in context-specific queries—particularly those involving cost or location—responses occasionally revealed selective emphasis or omitted balanced alternatives, reflecting subtle bias.

CONCLUSION: AI tools like ChatGPT hold promise as supplementary educational resources in surgical care, offering patients accessible, high-quality information. However, limitations in nuance, context sensitivity, and potential bias underscore the importance of integrating AI with, rather than replacing, professional surgical consultation and shared decision-making.

Abstracts For Award Winning Resident/Fellow Research Papers

Presenter: Mohsyn Malik
Division of Cardiac Surgery

Random Survival Forest: An Artificial Intelligence Machine-Learning Model for Personalized Prediction of Long-term Mitral Valve Repair Durability

M. Malik, R. Nedadur, M. Chu

INTRODUCTION: This study compared the performance of a nonparametric machine learning model, Random Survival Forest (RSF), with a penalized Cox Proportional Hazards (CPH) model in predicting the long-term durability of mitral valve (MV) repair in patients with degenerative mitral regurgitation (MR). The goal was to assess model discrimination, calibration, and interpretability to support personalized surgical decision-making.

HYPOTHESIS: RSF, as a flexible, nonparametric survival model, would provide improved predictive performance and better calibration than the penalized CPH model in assessing MV repair durability.

METHODS: A prospective cohort of 444 patients who underwent primary MV repair between May 2008 and January 2024 was analyzed. The primary endpoint, symptomatic MV repair failure (sMRF), included the need for re-intervention or moderate-to-severe MR/stenosis with NYHA class ≥2 symptoms. Missing data (<10%) were imputed using K-nearest neighbor multiple imputation. Models were built using the RandomForestSRC and glmnet packages in R and evaluated using the C-index and Integrated Brier Score (IBS).

RESULTS: RSF outperformed CPH with a C-index of 0.874 vs. 0.796 and demonstrated superior calibration. Both models identified post-repair coaptation length as a key predictor, but RSF also highlighted mitral valve mean gradient.

CONCLUSION/DISCUSSION: RSF offers a more flexible and accurate alternative to CPH by capturing complex, non-linear, and time-dependent effects, improving personalized risk stratification and surgical decision-making.

Presenter: Bojana Misheva
Division of Thoracic Surgery

Video-Based Assessments of Thoracic Surgery Trainees' Operative Skills as Adjuncts in Competency-Based Medical Education

B. Misheva, N. Stachura, R. Malthaner, R. Nayak, D. Fortin, R. Inculet, M. Qiabi

BACKGROUND: Video-based assessments (VBA) of thoracic surgery trainees' operative skills may provide a solution to the barriers faced with live assessments. In the current literature, there is significant variability in the development and implementation of video review for assessment of surgical performance. The purpose of this study was to determine whether VBA by external consultants are in agreement with real-time assessment of the trainee by the operating surgeon (gold standard) using two different tools: the VATS lobectomy Assessment Tool (VATSAT) and a modified Thoracic Competency Assessment Tool (mTCAT).

METHODS: Thirteen Video-Assisted Thoracic Surgery (VATS) procedures were video-recorded. After surgery, the operating surgeon and trainee completed the VATS lobectomy Assessment Tool (VATSAT) and a modified Thoracic Competency Assessment Tool (mTCAT). External consultants completed VBA using the same tools. Agreement was assessed using weighted kappa.

RESULTS: Fifty-one assessments were performed. Slight agreement was found between live and VBA consultants for the VATSAT (Kw=0.166) and mTCAT (Kw=0.144). Linearized scores were similar between live assessments and VBA for both tools (VATSAT 72.1 vs 71.6 p=0.908; mTCAT 74.4 vs 78.6 p=0.300). Trainees' scores did not significantly change after video review (65.2 vs 64.3, p=0.713). VATSAT and mTCAT were found to strongly correlate (r=0.87, p<0.001).

CONCLUSION: Although direct observation remains the gold standard for summative appraisal of surgical skills, this study showed that VBA can be used to assess trainees' performance in Thoracic Surgery and could improve objectivity in their technical skills' assessment. This study also contributes to consolidate validating the use of the VATS lobectomy Assessment Tool (VATSAT) and the modified Thoracic Competency Assessment Tool (mTCAT).

Presenter: Brandon Herrington
Division of Orthopaedic Surgery

Vancomycin Antibiotic Prophylaxis Compared to Cefazolin Increases Risk of Surgical Site Infection Following Spine Surgery

B Herrington, J Urquhart, P Rasoulinejad, F Siddiqi, K Gurr, C Bailey

OBJECTIVE: Surgical site infection (SSI) after spine surgery has severe negative health and financial consequences. Surgical antibiotic prophylaxis (SAP) is a routinely used method to prevent SSIs in the spine patient population. The most commonly used antibiotic is cefazolin, with vancomycin often being substituted in the case of penicillin or cephalosporin allergy. Vancomycin as SAP has been associated with increased SSI in the joint replacement literature, but this is not yet well defined in the spinal surgery population. The purpose of this study is to determine whether vancomycin SAP compared to cefazolin SAP is associated with increased risk of SSI.

METHODS: A retrospective analysis was conducted on previously gathered data from a single-center randomized controlled trial on 552 patients, aged 16 years or older who underwent elective, multi-level open posterior spinal fusion surgery at the thoracic, thoracolumbar, or lumbar levels. Demographic and operative characteristics as well as post-operative outcomes were compared between the following groups: 1) noninfected-cefazolin, 2) noninfected-vancomycin, 3) infected-cefazolin, and 4) infected-vancomycin. The primary outcome measures were superficial and complicated (deep and organ/space) infections. Risk factors were then identified with statistical analysis using multivariate logistic regression.

RESULTS: The following risk factors for SSI were identified in a logistic regression analysis: vancomycin (OR 2.498, 95% CI, 1.085-5.73, p=0.031), increasing operating time (OR 1.006, 95% CI, 1.001-1.010 p=0.010), weight (OR 1.020, 95% CI 1.006-1.034, p=0.005), revision procedure (OR 2.343, 95% CI 1.283-4.277, p=0.006), and depression (OR 2.366, 95% CI 1.284-4.360, p=0.006).

CONCLUSION: In open posterior approach spinal fusion surgery, vancomycin SAP is associated with increased risk of infection compared to cefazolin SAP, and this increased risk is not necessarily a result of inadequate dose or timing of administration. Clinicians should ensure patients with a suspected beta-lactam allergy receive appropriate pre-operative investigation into the nature of their allergy in order to prevent unnecessary administration of vancomycin in those who can ultimately tolerate cefazolin.

Presenter: Jovana Momic
Division of General Surgery

Creation of a New Urgent General Surgery Clinic – Assessment of Clinical Outcomes, Healthcare System and Economic Impacts, and Patient Perspectives

J. Momić, L. Allen, R. Hilsden, S. Rashid, M. Brackstone, B. Moffat, K. Leslie, K. Vogt

BACKGROUND: A new Urgent General Surgery Clinic was created to provide expedited access to general surgery consultation for patients presenting to the Emergency Department with concerns requiring urgent but not emergent assessment. This study evaluated the clinical activity and outcomes of the clinic's first two years, its healthcare resource use and economic impacts, and patient perspectives of the clinic experience.

METHODS: Patients referred to the Urgent General Surgery Clinic from November 2022 until November 2024 were prospectively tracked. Patient demographics and comorbidities, reason for clinic visit, investigations performed prior to assessment, timing and need for surgery, and post-operative complications were collected. Economic evaluation was undertaken to assess potential cost savings as a result of the new clinic/day surgery pathway. Patients were surveyed for their experiences with the clinic using a combination of Likert scale and open-ended questions.

RESULTS: 382 patients were assessed during the study period (218 females, 164 males; mean age 49 years, SD 16.6). The most common reason for referral was gallbladder/biliary disease (200, 52.4%), followed by inguinal (43, 11.3%) and abdominal wall hernias (26, 6.8%), wound concerns (37, 9.7%), and non-specific pain/non-surgical issues (54, 14.1%). 239 patients required surgery (62.6%), with 102 patients (42.6%) undergoing surgery on the same day as their clinic assessment. 58 patients (15.2%) required admission. Economic analysis revealed a 50% reduction in costs of care per patient seen in the urgent clinic. Overall, patients were satisfied with their experience, with 46/59 rating it "excellent" and 11/59 rating it "good".

CONCLUSION: The Urgent General Surgery Clinic has been successful in enabling rapid access to surgical consultation and expedited time to surgery without hospital admission, decreasing costs associated with urgent general surgery care, and creating a positive patient experience.

Presenter: Lee Benaroch
Division of Paediatric Surgery

Risk of Secondary Surgery, Residual Dysplasia, and Avascular Necrosis Following Late Closed or Open Reduction of Developmental Dysplasia of the Hip: a Systematic Review and Meta-Analysis

L. Benaroch, P. Thornley, M. Ross, B. Charron, D. Bartley, T. Carey, T.E. Benaroch

BACKGROUND: For late-detected DDH (6-24 months), it remains unclear whether open reduction (OR) offers better outcomes than closed reduction (CR), despite being more invasive. The primary concern for families and surgeons is the need for secondary surgery to correct RD following delayed treatment. This meta-analysis compares OR and CR by evaluating their association with the need for secondary surgery, residual dysplasia (RD), and avascular necrosis (AVN).

METHODS: A systematic review and meta-analysis were conducted following the Cochrane Handbook for Systematic Reviews of Interventions. Studies published prior to December 2024 comparing OR and CR for DDH in children aged 6–24 months with ≥2 years of follow-up were included. Two authors independently screened studies based on predetermined criteria, performed data extraction, and assessed quality.

RESULTS: Nine high-quality retrospective studies yielded data from 1044 hips (CR: 540 hips & OR: 504 hips). The mean age at intervention was 8.62 months for CR and 9.64 months for OR. Pooled analysis showed that CR significantly increases the risk for the need of secondary surgery when compared to OR (RR = 1.48; 95% CI, 1.18–1.85; I^2 = 69%). A sensitivity analysis removing 1 study showed that the new RR was 1.88 (95% CI, 1.46–2.43; I^2 = 0%). OR showed a trend toward greater radiographic improvement when compared to CR. No significant difference in AVN or RD was identified between OR and CR groups.

CONCLUSION: Our results indicate that CR for DDH is linked to a higher risk of secondary surgery in children aged 6-24 months compared to OR. These findings may help surgeons better counsel families regarding long-term outcomes and the likelihood of further intervention following CR or OR for late-presenting DDH. Future prospective randomized controlled trials comparing OR versus CR, the need for secondary surgery and the potential influence of surgeon bias in treatment decisions would further help the decision-making process in the treatment of late-detected DDH.

Presenter: Eric Mitchell
Division of Plastic & Reconstructive Surgery

The Impact of Time to Reduction on Outcomes After Perilunate Injury

E. Mitchell, M. Curran, R. Grewal, N. White

INTRODUCTION: Perilunate injuries are rare carpal dislocations, and a standard management recommendation is urgent reduction to restore anatomy and alleviate nerve compression.

HYPOTHESIS: Patients undergoing earlier reduction would have improved postoperative patient-reported outcomes compared to those undergoing later reduction.

METHODS: This was a multi-centre retrospective and prospective analysis of patients who underwent operative intervention for a perilunate injury from 1992 to 2023, with at least one-year followup. Data were collected on 81 subjects, including demographic and injury-related details and outcome variables including PRWE, QuickDASH, VAS, PROMIS Upper Extremity (UE), PROMIS Physical Function (PF), PROMIS Pain. The primary explanatory variable was days to reduction from injury (earliest of either successful closed reduction preoperatively or definitive operative reduction). We fit linear regression models predicting the outcome variable with adjustments.

RESULTS: Median days to reduction was 1.0 (range 0-40). Seventeen patients were reduced on the same day as their injury and 64 patients were reduced ≥1 days from injury. In the adjusted model, the additive effect of same-day reduction versus ≥1 days was only borderline statistically significant for log-QuickDASH (coefficient 1.2, 95% CI=-0.1,2.6, p=0.067), translating to a multiplicative effect on the original QuickDASH scale of 3.5 (95% CI=0.9, 13.1). Days to reduction was not significant for the other five outcomes.

CONCLUSION: Injury patients undergoing reduction on the same day as their injury had borderline significantly worse QuickDASH compared to those reduced ≥1 days after injury, with no difference in PRWE sum, VAS, PROMIS UE, PROMIS PF, PROMIS Pain.

Abstract For Award Winning MSc In Surgery Colloquium Presentation

Presenter: Brynn Charron
Division of Orthopaedic Surgery

Midterm Analysis of Acetabular Migration Using Conventional and CT-Based Radiostereometric Analysis

BP. Charron, JS. Polus, B. Kaptein, BA. Lanting, MG. Teeter

INTRODUCTION: Aseptic loosening continues to significantly contribute to the revision rates of total hip arthroplasty (THA). The goal standard for measuring implant migration remains conventional radiostereometric analysis (RSA); however the use of RSA clinically is limited due to technical barriers. CT based migration analysis (CT BMA) does not require bone marker beads and can be clinically adopted. The objective of this study was to investigate the validity of CT BMA for assessment of acetabular stability and hip wear in comparison to RSA.

METHODS: Patients (n=48) from a previous cementless THA RSA study returned at five-years post-operation to be re-examined for implant stability using CT BMA and RSA imaging. Patients underwent THA by means of direct anterior or direct lateral approach. For CT BMA, inducible displacement was measured between CT examinations with the leg externally versus internally rotated. For RSA, ID was measured between supine and weight-bearing examinations. Hip wear was calculated by both RSA and CT BMA at the 5 year follow up. The precision of measurements was calculated between double examinations for both methods. Migration up to five-years post-operation was compared using RSA.

RESULTS: The average age of study participants was 71.4 years. 71% of patients underwent direct anterior approach with the remainder undergoing direct lateral approach. All cups were positioned within the zone of safety and variable number of screws from zero to three were utilized. Secondary to imaging or intraoperative challenges in acquiring high quality RSA data 35% of patients were excluded from analysis. Of the examined patients, no acetabular component experienced significant migration nor required revision among the study population. Less than 0.2mm/year of migration was seen in each axis from 2 years to 5 years postoperatively. CT BMA had increased precision when compared to RSA for all axes of translation and rotation. Hip wear was measured by RSA and CT BMA with excellent agreement between the methods..

CONCLUSION: For a cohort with well-fixed acetabular implants at 5-year follow-up, CT BMA was utilized to measure inducible displacement and hip wear. Novel approach to measure hip wear by CT BMA demonstrated good agreement to RSA measurements. Greater precision was achieved by CT BMA in comparison to RSA for all axes of translation and rotation with regards to inducible displacement. In conclusion, CT BMA continues to demonstrate advantages when compared to conventional RSA with regards to obtaining hip wear measurements, ease of

obtaining high quality data, and increased precision. Further work to utilize CT BMA to evaluate components suspected of aseptic loosening is ongoing.

Department Of Surgery Node Presentations

ICES/Big Data:

Ahmad Elnahas

Optimizing Surgical Efficiency: Using Machine Learning Algorithms to Predict Case Duration of Common General Surgery Procedures

Patient Centered Research:

Patrick Thornley

Trust the Process: Patient Centered Research

Quality Improvement:

Brad Moffat

One Third of Trauma Patients are Missing Doses of VTE Prophylaxis: A Trauma Quality Improvement Study

Surgical Education:

Oonagh Scallan

Returning to Surgical Residency After Maternity Leave: Exploring Challenges and Shining a Light on the Motherhood Advantage

Fundamental Sciences & Surgical Innovation:

Brant Inman

Single Cell Sequencing for Determining How Cancer Evolves Within Patients. An Example With Prostate Cancer

THE ROBERT ZHONG LECTURE:

Quantum Creativity: Small Life Changes, Bigger Impact!

Mohit Bhandari, O.Ont, C.M. MD, PhD, FRCSC
Distinguished University Professor and Chair, Senior Tier Canada Research Chair,
Editor-In-Chief, The Journal of Bone and Joint Surgery

Dr. Bhandari currently serves as Professor and Academic Head of the Division of Orthopaedic Surgery at McMaster University. He is a designated University Scholar at McMaster, an honor held by less than 2% of McMaster Faculty. He is the Associate Chair of Research in the Department of Surgery and holds a Canada Research Chair in Evidence-Based Orthopaedics - the only chair of its kind in Canada. He received his Master's degree in Health Research Methodology from McMaster University and his PhD degree from Goteborg University (Sweden). He is a recognized global leader in evidence-based surgery and Orthopaedic research receiving the field's highest awards including the Royal College of Physicians and Surgeons Medal, the Edouard Samson Award, and the Kappa Delta Award. He has been acknowledged among the top 10 most cited orthopaedic fracture surgeons in the world.

To this end, Dr. Bhandari has published over 1000 papers and has lead edited several of his field's major research textbooks, including the best seller "Evidence-Based Orthopaedics". Receiving over 55 million dollars in research funding over his career, Dr. Bhandari's vision for his research program includes the identification and dissemination of novel therapies with high quality collaborative research practices to improve the lives of persons with musculoskeletal trauma. Three core research themes are operationalized primarily by the conduct of multi-national large randomized trials and large observational cohort studies.

Source: https://orthohub.xyz/mohit-bhandari/

Previous Robert Zhong Lecturers:

2024	**Jason Frank,** MD, MA(ED), FRCPC, FAOA(HON) Clinician-Educator, Professor, Department of Emergency Medicine;

	Founding Director, Centre for Innovation in Medical Education, University of Ottawa
2023	Victor Yang, MD, PhD, FRCSC, FACS Professor of Neurosurgery, Medical Imaging, Orthopedic Surgery, and Medical Biophysics, Western University
2022	Najma Ahmed, MD, PhD, FRCSC, FACS Professor and Vice Chair of Education, Department of Surgery at University of Toronto and Professor of Surgery
2021	Chad Ball, MD, MSc, FRCSC, FACS Associate Professor of Surgery and Oncology, University of Calgary Hepatobiliary, Pancreas, Trauma and Acute Care Surgery, Foothills Medical Centre
2019	Toni Zhong, MD, FRCS, MHS Associate Professor in the Department of Surgery and the inaugural Belinda Stronach Chair in Breast Cancer Reconstruction at University Health Network (UHN)
2018	David Urbach, MD, MSc, Chief of Surgery and Director of Perioperative Services at Women's College Hospital, and Professor of Surgery and Health Policy, Management and Evaluation at The University of Toronto
2017	Clifford Ko, MD, MS, MSHS, FACS, FASCRS, Director National Surgical Quality Improvement Program and Division of Research and Optimal Patient Care, American College of Surgeons
2016	Marston W. Linehan, MD, Surgeon-in-Chief, National Institutes of Health
2015	Ivar Mendez MD, PhD, FRCSC, FACS, DSc(hon), FCAHS
2014	Jonathan Meakins, retired McGill Professor and Chair of McGill's Department of Surgery, former surgeon-in-Chief of the MUHC and current director of the MUHC Heritage Centre
2013	Jeremy Nicholson, Head of the Department of Surgery & Cancer at Imperial College in London University, UK.
2012	Garth Warnock, C.N. Woodward Professor, Head of the Department of Surgery, University of British Columbia, Co-Director, Ike Barber Human Islet Transplant Laboratory and British Columbia Islet Transplant Program
2011	Amitai Ziv, Deputy Director, Chaim Sheba Medical Center; Director, Israel Center for Medical Simulation, Tel-Hashomer, Israel
2010	John Monson, Chief of Colorectal Surgery, Vice-chair, Department of Surgery The University of Rochester, Rochester, New York
2009	Anthony Atala, Professor and Chair of Urology, Director of Regenerative Medicine, Wake Forest University School of Medicine

2008	Richard M. Satava, Professor of Surgery, University of Washington
2007	James Shapiro, Wyeth-Ayerst Canada/CIHR Clinical Research Chair in Transplantation, Director, Clinical Islet Transplant Program, University of Alberta