Dr. Robert Zhong Lecture
“Quality improvement in breast reconstruction to optimize patient-centred experience”

Dr. Toni Zhong, M.D., FRCS, MHS – is an Associate Professor in the Department of Surgery, and the inaugural Belinda Stronach Chair in Breast Cancer Reconstruction at University Health Network (UHN).
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**ABSTRACTS FOR AWARD WINNING RESIDENT/FELLOW RESEARCH PAPERS**

PRESENTATION #1: Dr. Dubois for Dr. Wang
PRESENTATION #2: Dr. Ali Hage
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**ABSTRACT FOR AWARD WINNING MSc IN SURGERY COLLOQUIUM PRESENTATION**
PRESENTER: Dr. Spencer Chambers

**DEPARTMENT OF SURGERY NODE PRESENTATIONS:**
FUNDAMENTAL SCIENCES & SURGICAL INNOVATION NODE SPEAKER: Dr. Hassan Razvi
SURGICAL EDUCATION NODE SPEAKER: Dr. Peter Wang
PATIENT CENTERED RESEARCH NODE SPEAKER: Dr. Alan Getgood
ICES/BIG DATA NODE SPEAKER: Drs. Kelly Vogt, Luc Dubois and Blayne Welk

**DEPARTMENT OF SURGERY DRAGON’S DEN PITCHES**
Fundamental Sciences & Surgical Innovation Node Pitches
Surgical Education Node Pitches
Patient Centered Research Node Pitches
ICES/Big Data Node Research Pitches

**THE ROBERT ZHONG LECTURE: Dr. Toni Zhong**
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# PROGRAM AT A GLANCE

## RESEARCH DAY 2019
KENNY THEATRE, KING’S COLLEGE  
Monday, June 24, 2019

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**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.

POSTER #1: Aushanth Ruthirakanthan
Comparison of Temperatures for Optimal Preservation of Donor Kidneys during Oxygenated Pulsatile Perfusion
Urology

Introduction: The current hypothermic methods of preserving donor kidneys in non-oxygenated conditions minimally protect the kidney against ischemia-reperfusion injury, a major source of complications in clinical transplantation. However, preserving kidneys with oxygenated perfusion is not currently feasible due to the lack of an ideal perfusion mechanism that facilitates perfusion with blood at warm temperatures. Here, we have designed an innovative renal pump that can perfuse blood or acellular oxygen-carrier under flexible temperatures, pressures and oxygenation. We have tested this apparatus to study optimal conditions of storage of our porcine model of donation after cardiac death (DCD) kidneys.

Methods: Porcine kidneys were retrieved after 30 minutes of cross-clamping the renal artery in situ. Cessation of blood mimics postcardiac death in human and simulates DCD warm ischemic injury. Procured kidneys were flushed and subjected to static cold storage for 4h. For warm perfusion, kidneys were cannulated for pulsatile oxygenated perfusion with blood:Plasmalyte for 4h at 15ºC, 22ºC and 37ºC. To mimic post-transplant scenario, all kidneys were reperfused with blood for additional 4h at 37ºC.

Results: Compared with all other groups, 22ºC perfusion resulted in significant reduction of acute tubular necrosis, apoptosis, kidney damage markers, Toll-like receptors signaling and cytokine production. It was associated with maximal renal blood flow and urine output. Kidneys stored at 15ºC thrombosed within 2h under this condition. MSB staining confirmed that 22ºC was the optimal temperature to minimize hemorrhage and blood clots.

Conclusion: Our novel study shows that oxygenated perfusion at near-room-temperature provides optimal donor kidney storage conditions.
POSTER #2: Ayesha Warsi

**circRNA’s Role in Cytokine Expression During Sepsis**

Ayesha Warsi, Tina Mele, Xiufen Zheng
Division of General Surgery

**Introduction:** Sepsis results from gram-negative bacterial infection and is the primary cause of death in intensive care units worldwide. Circular RNA (circRNA) are a new type of non-coding RNAs and have been implicated in several diseases; however, it is unknown whether circRNAs participate in sepsis. HIF1α, a transcription factor, has been found to be upregulated in sepsis patients and to influence the expression of pro-inflammatory cytokines. This study aims to determine whether circRNAs are involved in sepsis and to investigate the role of circRNA and HIF1α in septic inflammation.

**Hypothesis:** CircRNAs are involved in macrophage’s response to sepsis.

**Materials and Methods:** Mouse macrophage cell line Raw 264.7 were treated with LPS to determine HIF1α, cytokine, and circRNA expression by qPCR and western blot. For the clinical portion, PBMC were isolated from sepsis blood samples during sepsis and recovery. PBMC were used for qPCR and western blot to determine the expression of HIF1α, cytokines, and circRNA. To determine the effect of circRNA and HIF1α on proinflammatory cytokine expression, macrophages were transfected with siRNA prior to LPS treatment.

**Results:** Treatment with 500 ng/mL LPS upregulated HIF1α, IL-6, and circAEBP2 gene expression. Experiments with siRNA and PBMCs are currently being conducted.

**Conclusions:** LPS upregulates HIF1α and circAEBP2, as well as pro-inflammatory cytokines, suggesting that circRNAs are involved in sepsis. Gene knockdown experiments are expected to show how circAEBP2 may influence cytokine expression. PBMC experiments are expected to show how HIF1α and circAEBP2’s expression varies throughout sepsis and recovery.
POSTER #3: Supriya Singh

Design and Biomechanical Testing of a Novel Fusion Device for Atlantoaxial Instability
Singh, S., Lasswell, T., Medley, J., Bailey, C., Siddiqi, F., Gurr, K., Rasoulinejad, P.
Division of Orthopedic Surgery

Introduction: Atlantoaxial cervical spine instability due to excessive motion at the C1-C2 segment is most commonly caused by traumatic odontoid fractures. Current surgical treatment involves posterior cervical fusion. Instrumentation of C1 vertebrae is a technically challenging procedure associated with prolonged OR times and excessive blood loss. The purpose of this study is to design a less invasive C1 implant that would reduce intraoperative risk and allow for safe surgical treatment of odontoid fractures.

Methods: A team of engineers and surgical experts designed a novel cervical implant clamp that grasps the posterior arch of C1 and connects to C2 translaminar/C2 pedicle screws with rods. It was manufactured using 3D printing techniques (selective laser melting). The biomechanical stability of the novel construct was compared to the current gold standard (Harm’s procedure) using standard non-destructive range of motion testing in cadaveric specimens with odontoid fractures.

Results: The results of this study showed that constructs with the new device were significantly more stable than the current gold standard construct for all motions tested (p<0.05).

Conclusions: These results present a strong clinical promise for the novel C1 posterior arch clamp in terms of high fusion rates, reduced operating times, less intraoperative risks and less invasive surgeries. The use of this device could result in better clinical outcomes for the growing elderly patient population with surgically treated odontoid fractures.
POSTER #4: Meng Zhang

**microRNA-5119 engineered DC Vaccine for breast cancer immunotherapy**
Meng Zhang, Yifan Wang, Faizah Alotaibi, Rakesh Joshi, Mathanky Jeyakumar, Daheng Liu, Rebecca Ma, Karen Yang, Jemes Koropatnick, Weiping Min

**Introduction:** Dendritic cell (DC)-based immunotherapy is a promising clinical cancer treatment approach. MicroRNAs are a class of small non-coding RNA molecules that can epigenetically interfere transcription by binding to mRNAs and/or increasing mRNA degradation in diverse biological processes, which may be a potent mechanism for amplifying the DC-based immunotherapy against cancers.

**Hypothesis:** We hypothesize microRNA-5119-engineered DC vaccine will improve anti-tumor immunity by restore T cell exhaustion.

**Materials and Methods:** The expressions of ligands of iRs and miR-5119 in DCs from 4T1 breast cancer tumor-bearing mice were determined using qPCR, western blot and flow cytometry, respectively. miR5119 mimic or inhibitor transfecting DC vaccines were used to determine the recovery of exhausted CD8⁺ T cells and the efficiencies of anti-breast cancers *in vitro* and *in vivo*.

**Results:** We found that miRNA-5119 was significantly downregulated in spleen DCs from breast cancer-bearing mice. *In-silico* and q-PCR data showed that miRNA-5119 specifically targeted mRNAs encoding multiple negative immune regulatory molecules, such as PD-L1 and IDO2, which were highly overexpressed in spleen DCs and were associated with T cell exhaustion in breast cancer-bearing mice. Secondly, miRNA-5119 engineered DCs can effectively restore the functions of exhausted CD8⁺ T cells *in vitro* and *in vivo*, resulting in much higher anti-breast cancer immune response. In addition, the miRNA-5119-engineering DCs inhibited the generation of Treg cells *in vivo* as well due to targeting the FoxP-3 molecule. Finally, treatment of tumor-bearing mice with miRNA-5119-engineered DC vaccine reduced T cell exhaustion and suppressed mouse breast tumor homograft growth.

**Discussion and Summary:** This study evidences miRNA-5119-engineered DC vaccines is an effectively novel strategy for DC-based anti-cancer immunotherapy.
POSTER #5: Yifan Wang

**Prolong allograft survival in heart transplantation using microRNA-manipulated DCs**

Karen Yang, Meng Zhang, Yifan Wang, Rakesh Joshi, Mathanky Jeyakumar, Daheng Liu, Rebecca Ma, Vivian McAlister, Anton Skaro, Douglas Quan, Weiping Min

**General Surgery**

**Introduction:** Heart transplantation (HTx) is the only current, effective therapy to improve the quality of life and extend the survival of terminal heart failure patients. T cells are believed to be central to the graft versus host immune engagement that governs acute rejection. T cell exhaustion is an immune modulatory event that can reduce T cell activity, a favorable process for graft acceptance in recipients. T cell activation is highly dependent on antigen presenting cells (APC), including dendritic cells (DCs). MicroRNAs (miRNAs/miRs) are a class of small non-coding RNA molecules that can modulate mRNA expression by binding to 3'UTR of target gene. miRNA regulation of inhibitory receptor (iR) ligands in DCs can induce T cell exhaustion and increase allograft survival after heart transplantation.

**Hypothesis:** We hypothesize that the miR-5119 inhibitor-transfected DC vaccine can suppress the T cell response and prolong heart transplantation allograft survival by inducing T cell exhaustion.

**Materials and Methods:** We evaluated the expressions of ligands of iRs in DCs from mouse that tolerated allogeneic heart transplantsations for long periods. An miRNA Affymetrix array was subsequently used to screen up/downregulated miRNAs in PD-L1+ tolerogenic DCs from these allograft-tolerant mice. Mimics or inhibitors of miR-5119 were transfected into DCs for in vitro and in vivo experiments, followed by an allogeneic (C56/BL6 to Balb/c) heart transplantation.

**Results:** We first found that miRNA-5119 was significantly downregulated in rapamycin-induced tolerant mouse after heart transplantation. miRNA array analysis and RT-qPCR results. *In silico* analysis indicated that miR-5119 targets immune regulatory molecules, such as PD-L1 and IDO2. Treatment of allografted recipients using miRNA-5119 inhibitors-tin heart transplanted mice asignificantly prolonged allograft survival. The tolerance is associated with upregulation of PD-L1 and IDO2 expression and the generation of Treg cells in vivo.

**Discussion and Summary:** MicroRNA can simultaneously target multiple immune-reactive molecules in DCs, which regulate immune response and generate immune tolerance, thus prevent allograft from rejection in heart tyranstplantation.
POSTER #6: Bowen Wang
Treatment of donor hearts with AP39 protects heart grafts from prolonged ischemia reperfusion injury in heart transplantation
Cuilin Zhu, Suyale Hu, Bowen Wang, Jifu Jiang, Smriti Juriasingani, Alp Sener, Dave Nagpal, Xiufen Zheng
Division of General Surgery

Introduction: Heart transplantation (HT) has been widely accepted as the standard treatment for end-stage heart failure. Ischemia reperfusion injury (IRI) still remains as a major cause of graft dysfunction. AP39, a mitochondria-targeted hydrogen sulfide releasing compound, has been shown to be protective on IRI in kidney transplantation. This study aims to investigate the role of AP39 in protecting hearts from prolonged IRI in HT.

Hypothesis: Preserving donor hearts with AP39 can protect hearts from prolonged IRI in HT.

Materials and methods: Mouse cardiomyocyte cell line HL-1 cells were treated with different concentrations of AP39 during IR. Cell death was dynamically detected using an Incucyte system, by the LDH method, and by the MTT assay. Gene expressions were detected by qRT-PCR. Mitochondria membrane potential was to measure mitochondria damage. For in vivo study, donor hearts from mice were preserved with the UW solution supplemented with 100nM AP39 for 24 hrs at 4°C, followed by a syngeneic heterotopic HT. Ultrasound scan was used to measure cardiac function. HE and Trichrome staining were used to detect pathological changes and allograft fibrosis.

Results: Treatment with 100nM AP39 significantly reduced cell death and apoptosis induced by in prolonged cold IR. 100nM AP39 reduced the expression of pro-apoptotic and pro-inflammatory genes. 100nM AP39 decreased mitochondria damage. Donor heart preserved with 100nM AP39 significantly improved allograft function, reduced tissue injury and prevented fibrosis.

Discussion and summary: Preservation solution with AP39 supplementation can protect cardiac allograft from prolonged IRI, highlighting its therapeutic potential in preventing IRI in HT
**POSTER #7: Veramkovich Vitali**  
**The Role of GDF15 in T cell function**  
Vitali Veramkovich¹, Hao Zheng¹, Cuiling Zhu¹, Suyale, Xiufen Zheng¹,²  
¹Department of Pathology and Laboratory Medicine, ²Department of Surgery

**Introduction:** Elevated plasma levels of growth differentiation factor 15 (GDF15) have been observed in patients suffering from a wide variety of ailments. While GDF15 is implicated in immunomodulation, there is limited research on the effects of GDF15 on lymphocytes. In the present study, we attempt to characterize the effects and potential mechanisms involved in the activity of GDF15 on T cells.

**Hypothesis:** GDF15 suppresses CD4 and CD8 T cell proliferation, increases T cell viability and increases CD4 T cell differentiation into regulatory T cells. In melanoma, GDF15 promotes tumor growth through immunosuppression resulting in reduced immune response.

**Methods:** In order to evaluate the effects of GDF15 on T cell proliferation and differentiation we are using knockout and transgenic mouse models. A combination of flow cytometry, PCR and colorimetric assays is used to evaluate the cell differentiation and cytokine secretion profiles of CD4 and CD8 positive T cells.

**Results:** Using GDF15 knockout (KO) and Wild Type (WT) mice we determined that lack of GDF15 promotes T cell proliferation in vitro. Furthermore, GDF15 enhances T cell viability and promotes the expression of Treg associated cytokines. In melanoma, GDF15 reduces tumor antigen response of T cells and GDF15 expression in mice promotes tumor growth. The expression of GDF15 in tumor cells results in reduced tumor growth.

**Conclusion:** Preliminary data suggests that GDF15 is involved in T cell viability, proliferation and immunomodulation. Furthermore, GDF15 expression affects Treg cell populations and affects tumor growth.
POSTER #8: Jennifer Bjazevic

The Effect of Antibiotic Exposure and Escherichia coli Infection on Calcium Urolithiasis

Jennifer Bjazevic¹, Kaitlin Al², Hassan Razvi¹, Jeremy Burton¹,²
1. Department of Surgery, Division of Urology, Schulich School of Medicine & Dentistry, Western University
2. Department of Microbiology & Immunology, Division of Urology, Schulich School of Medicine & Dentistry, Western University

Introduction: Growing evidence suggests that calcium-based stone disease may be impacted by both urinary bacteria and antibiotics. However, the nature of this relationship and the potential mechanisms involved have yet to be elucidated. We aimed to further investigate the potential effect of a non-urease producing bacteria, and treatment with antibiotics on the formation of calcium oxalate (CaOx) stones utilizing a Drosophila melanogaster (DM) fly model, and the adherence of CaOx crystals to renal epithelial cells.

Methods: DM flies were treated with a combination of Escherichia coli (UTI89), 0.1% sodium oxalate food, ciprofloxacin (0.2 μg/mL) or trimethoprim-sulfamethoxazole (TMP-SMX, 30/10 μg/mL). MDCK renal epithelial cells were exposed to UTI89 (10³ CFU), and then incubated with CaOx crystal suspension (0.5mg/mL) with or without the addition of ciprofloxacin (0.2 μg/mL), TMP-SMX (30/10 μg/mL). Stone burden and crystal adherence was assessed with a measured pixel intensity under birefringent microscopy.

Results: Treatment with UTI89 (p=0.005), ciprofloxacin (p<0.001), and TMP-SMX (p=0.003) resulted in increased CaOx stone formation in DM flies. CaOx crystal adherence was also increased with UTI89 (p=0.036) and ciprofloxacin (p<0.001) but not TMP-SMX exposure. No difference in stone formation or crystal adherence was observed with the combination of UTI89 and either ciprofloxacin or TMP-SMX treatment.

Conclusions: Our findings further support that antibiotic exposure with ciprofloxacin and SMP-TMX and infection with a non-urease producing E. coli impact both CaOx stone formation in a DM urolithiasis model and crystal adherence to renal epithelial cells. Further investigation is required to further delineate the potential mechanisms involved.
POSTER #9: Smriti Juriasingani
Subnormothermic machine perfusion at 21ºC with H₂S-supplemented blood improves the outcomes of DCD porcine renal grafts
Departments of Surgery, Microbiology and Immunology and Pathology, Western University.

Introduction: While static cold storage (SCS) at 4ºC is the clinical standard of care for renal graft preservation, it can lead to negative outcomes, especially for donation after cardiac death (DCD) organs. We have previously shown that cold storage with AP39, a hydrogen sulfide donor, improves renal graft outcomes. However, preservation at higher temperatures is of interest to avoid the negative effects of SCS. In this study, we compared the outcomes of kidneys preserved using SCS to kidneys preserved using normothermic machine perfusion (NMP) at 37ºC and subnormothermic machine perfusion (SMP) at 21ºC with or without AP39-supplemented blood.

Hypothesis: SMP+AP39 will lead to better DCD graft outcomes than SCS and NMP.

Methods: Warm ischemia was induced in pigs via 30m of renal pedicle clamping to mimic DCD injury. After flushing, kidneys were preserved for 4h on ice (SCS-4ºC) or perfused with non-stressed blood at 37ºC (NMP-37ºC) or at 21ºC with or without 200nM AP39 (SMP+AP39-21ºC, SMP-21ºC). To evaluate the potential post-transplant outcomes, all kidneys were reperfused with stressed blood at 37ºC for 4h to mimic reperfusion. Urine and histopathological analyses were performed.

Results: During reperfusion, SMP+AP39-21ºC kidneys showed significantly greater urine output than SCS-4ºC kidneys. During preservation and reperfusion, SMP+AP39-21ºC kidneys showed significantly higher urine output than SMP-21ºC and NMP-37ºC kidneys. Additionally, SMP+AP39-21ºC led to significantly lower tissue injury than SCS-4ºC and NMP-37ºC.

Conclusions: We demonstrate, for the first time, that SMP with H₂S-supplemented blood leads to improved DCD renal graft outcomes compared to SCS, the clinical standard of care.
POSTER #10: Austin Kemp
Mitigating the effects of renal ischemia-reperfusion injury with hydrogen sulfide and carbon monoxide combination therapy
Department of Surgery, Microbiology and Immunology, Western University.

Introduction: Renal transplantation is the preferred treatment option for patients suffering from end-stage renal disease. We have previously shown that AP39, a hydrogen sulfide (H₂S) donor, and CORM-401, a carbon monoxide (CO) donor, improves cell viability during models of renal ischemia reperfusion injury (IRI). Combining H₂S and CO is of interest to determine if synergistic effects may arise. In this study, we used an in vitro model of renal IRI to determine the cytoprotective effects of combination AP39 and CORM-401 therapy.

Hypothesis: Combination AP39 and CORM-401 therapy will lead to greater cell viability than AP39 or CORM-401 alone.

Methods: An in vitro model of renal IRI was used. Pig tubular epithelial cells (LLC-PK1) were treated with various concentrations of AP39 and CORM-401 (nM - µM range). CORM-401 was applied pretreatment, whereas AP39 was administered during hypoxia. Flow cytometry was used to evaluate cell viability, apoptosis and necrosis. Statistical analysis was performed.

Results: Renal tubular epithelial cells treated with AP39 and combination AP39 with CORM-401 exhibited significantly greater cell viability than cells treated with only phosphate buffered saline. There was no significant difference between the cell viability of AP39 and combination AP39 with CORM-401 treatments.

Conclusions: We demonstrate that combining the optimal doses for AP93 and CORM-401 does not lead to higher cell viability
POSTER #11: Rabindra Bhattacharjee

A comparative study of centrifugal and pulsatile perfusion to preserve donor kidneys on a porcine DCD model ex vivo

Larry Jiang5,* , Rabindra N. Bhattacharjee 1,3,5,* , Aushanth Ruthirakanthan5, Qizhi Sun1, Mahms Richard-Mohamed 2, Masood Akbari1, Justin Kwang3, Smriti Juriasinga5, Rafid Ogaili2, Aaron Haig 4,5, Alp Sener2,3,5, Patrick P.W. Luke1,2,3,5

1Matthew Mailing Centre for Translational Transplantation Studies; 2 Multi-Organ Transplant Program; 3 Division of Urology; 4 Department of Pathology and Laboratory Medicine, 5 Western University

Introduction: Donor kidneys are commonly stored at 4°C with non-oxygenated static or machine perfusion. Although these methods can prolong storage times, it fails to provide optimal protection of kidneys from storage injury. Our previous study has shown significant beneficial effects of the oxygenated preservation with a hemoglobin-based oxygen carrier (HBOC) at sub-normothermia (22°C). To further optimize the method of machine perfusion (MP), this study was conducted to directly compare continuous vs. pulsatile flow during DCD kidney subnormothermic MP using a centrifugal and RM3pump respectively.

Methods: To simulate DCD condition, pig kidneys were procured following 30 min of warm ischemia by cross-clamping renal arteries then randomly assigned to group 1 (n=5, centrifugal pump) or group 2 (n=5, pulsatile RM3 pump) for oxygenated perfusion with HBOC:PlasmaLyte solution (1:3) for 4hrs at 22°C. Urine produced during 4hr reperfusion with autologous blood was analyzed. Acute tubular necrosis (ATN) and apoptosis (TUNEL) in tissue sections were scored.

Results: Both pump systems performed equally well; Creatinine clearance (539±189ml vs. 546±153ml) and Upro/cre ratio (12.7±5.4 g/mmol vs.10.7±2.9 g/mmol) were similar in two perfusion modes. Comparable kidney damage/inflammation markers (NGAL/IL-6) were detected. ATN (2.4±0.6 vs. 2.8±0.5) and TUNEL (3.7±0.5 vs. 4.2±0.2) score were indifferent. A trend toward greater urine output following centrifugal preservation was observed (1038±385ml vs. 328±94ml). However, data was not significant (p=0.1364). Importantly, no interstitial hemorrhage or blood clot was found in either perfusion systems.

Conclusion: In our DCD renal transplant porcine model, there was no statistical difference in outcomes following pulsatile vs. centrifugal kidney preservation.
POSTER #12: Rabindra Bhattacharjee

Evaluation of an acellular oxygen carrier for Kidney preservation in a porcine DCD model

Rabindra N. Bhattacharjee 1,3,5, *, Aushanth Ruthirakanthan5, Qizhi Sun1, Mahms Richard-Mohamed 2, Rafid Ogaili2, Shaid Aquil2, Aaron Haig 4, 5, Alp Sener2, 3, 5, Patrick P.W. Luke1, 2, 3, 5

Matthew Mailing Centre for Translational Transplantation Studies; 2 Multi-Organ Transplant Program; 3 Division of Urology; 4 Department of Pathology and Laboratory Medicine, 5 Western University

Background: Non-oxygenated static or machine perfusion in cold (4°C) remains the current standard-of-care in transplantation. By using porcine model DCD kidneys, we concluded that oxygenated blood perfusion at 22°C is superior to static cold storage. We proposed to evaluate the benefits of oxygenation during subnormothermic machine perfusion with a bloodless hemoglobin-based oxygen carrier (HBOC) to protect DCD kidneys from storage injury.

Methods: To simulate DCD condition, kidneys were retrieved after 30 min warm ischemia by cross-clamping the renal pedicle in situ. Organs were flushed and subjected to pulsatile perfusion at 22°C for 4h with HBOC and blood. All kidneys were then reperfused with normothermic (37°C) oxygenated blood for 4h. Total urine output, albumin/creatinine ratio, and flow rate were measured. ATN by H&E and apoptosis (TUNEL) were scored. Martius Scarlet Blue staining confirmed intra-renal hemorrhage.

Results: HBOC perfusion significantly reduced ATN and apoptosis in histology sections (score 10±5% vs. 60±10%). Reduced expression of damage markers (KIM1 & NGAL), decreased urinary protein and lower protein/creatinine ratio (50±10 vs. 90±18 mg/mmol) were associated with HBOC perfusion. Moreover, increased renal blood flow rate (100mL/min vs. 50mL/min) and higher urine output (750±60mL vs. 250±80mL) were observed in HBOC groups. HBOC-perfused kidneys manifested no intra-renal hemorrhage and blood clot.

Conclusion: HBOC perfusion at 22°C showed significant advantages compared to both static cold storage as well as blood perfusion. It improves flow rate and urine output ex vivo, reduces cell death during preservation and offers promise as a new and innovative technique for organ preservation.
POSTER #13: Tony Huang
A 3D in vitro model of periprosthetic shoulder joint infection with C. acnes
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Introduction: *Cutibacterium acnes*, an opportunistic anaerobic pathogen, causes ~60% of post-surgical periprosthetic joint infections (PJIs) in the shoulder. There are currently no reproducible in vitro models in which to study *C. acnes* PJIs.

Hypothesis: A bioengineered human tissue model of PJIs with *C. acnes* will identify novel targets for clinical intervention.

Materials and Methods: A Shoulder-Joint Implant Mimetic (S-JIM) of *C. acnes* PJIs was developed using rotator cuff (HRC) cells derived from patients undergoing shoulder arthroplasties (HSREB #104888). *C. acnes* and HRC cells were distributed into a collagen-impregnated cellulose strip and wrapped around a titanium-coated mandrel in several layers to generate a cylindrical 3D “tissue mimetic”.

Results: Viability staining of HRC cells in S-JIMs cultured under 5% pO₂ in the absence of *C. acnes* displayed no evidence of oxidative stress or apoptosis after 10 days. Gene expression analyses indicated cellular responses to reduced pO₂ in interior strip layers relative to exterior layers. Co-culture assays with *C. acnes* resulted in HRC cell lysis after 96 hours.

Conclusions: We have developed a Shoulder-Joint Implant Mimetic (S-JIM) of *C. acnes* infections that can generate an anaerobic core favorable for *C. acnes* proliferation and support HRC cells in co-culture. S-JIMs have the potential to provide reproducible, human cell-based evidence for novel therapeutic approaches to treat *C. acnes* PJIs.
POSTER #14: Jeffrey Law
Missed Opportunities for DCD Kidney Donors: Evaluation of Warm Ischemic Time and Associated Functional Warm Ischemic Time
Division of Urology

Introduction: Many transplant centres utilize a hard cut off of 2 hours warm ischemic time (WIT), defined as time from withdrawal of life-sustaining measures to cold organ flush, to exclude donation after circulatory determination of death (DCD) kidney donation. As a result, 30% of withdrawals to retrieve DCD organs fail to produce kidney transplants in Ontario. To assess our ability to increase organ yield, we characterized WIT, functional WIT (fWIT, time from systolic blood pressure <50 mmHg to cold organ flush), and determined the time at which potential donors eventually die in those that did not become organ donors.

Methods: Retrospective review of all DCD kidney donors in Ontario was performed utilizing the Trillium Gift of Life Database from April 2013 - February 2018.

Results: Of 350 DCD kidney donors analyzed, 46.9% had <0.5 hours, 51.7% between 0.5 – 2 hours and 1.4% >2 hours of WIT. In each of these categories (WIT <0.5h, 0.5 – 2 hours and >2 hours), the percentage of patients with fWIT <30min were 100%, 94.4% and 100% respectively (p = NS). There were 106 potential donors who did not end up donating due to WIT >2 hours. Of these, 20.8% died between 2-4 hours, 10.4% between 4 – 6 hours and 68.8% beyond 6 hours.

Discussion: The percentage of donors with fWIT > 30 min did not increase with increasing WIT in DCD donors that went on to donate organs. These data support assessment of waiting up to 4 hours for DCD kidney donation as long as fWIT remains low given the shortage of available organ donors.
POSTER #15: Kathleen Nelligan

Saline Versus Silicone Implants in Breast Reconstruction: A Cost-Utility Analysis

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Division of Plastic Surgery, Department of Surgery

Introduction: Rates of implant-based breast reconstruction are increasing. However, saline and silicone implants vary in complication rates, initial cost and associated quality of life. The relative cost-effectiveness of these implant types is not known. This study examines the cost-utility of saline and silicone implants in the context of immediate, unilateral, implant-based reconstruction.

Materials and Methods: A cost-utility analysis comparing saline and silicone implants was conducted from the perspective of the Ministry of Health and Long-Term Care. Health states, probabilities and utilities were derived from the literature. Costs were obtained from institutional case-costing and purchasing centres. A decision tree model developed in TreeAge Pro was populated with probabilities, costs and QALYs. Expected values were generated through the roll-back method. Costs and QALYs were discounted at 3% per year to account for future values. The willingness-to-pay threshold was set at $50K/QALY.

Results: The cost-utility analysis revealed an incremental cost of $103.63 associated with the use of silicone implants and a gain of 0.89 QALYs. The incremental cost-utility ratio was $116.51 per QALY for silicone implants. Silicone implants remained cost-effective through sensitivity analyses varying implant complication and discounting rates.

Conclusions: Silicone implants are cost-effective for implant-based breast reconstruction. Given the improved quality of life-associated with silicone implants and only a marginal increase in cost, this analysis supports continued use of silicone implants despite higher initial cost. This analysis may be beneficial to physicians, policy-makers and hospital administrators when justifying choice of implant in the context of breast reconstruction.
POSTER #16: Jeffrey Metz
Outcomes of laparoscopic converted to open elective colon resections, compared to laparoscopic and open resections: A retrospective review using the National Surgical Quality Improvement Program (NSQIP) registry
Metz JJ, Garcia-Ochoa C, Van Koughnett JA
Division of General Surgery

Introduction: Laparoscopic colon resections require conversion to an open approach in up to 30% of cases. Conversion is dependent on patient and surgeon factors. The morbidity associated with conversion-to-open, compared to open and completed laparoscopic colon resections, has not been well documented recently.

Methods: We identified patients who underwent elective colonic resections for all indications from the ACS NSQIP registry from 2014-2017. Procedure codes for open, laparoscopic converted-to-open, and laparoscopic colon resections were targeted. The primary outcome was a composite of post-operative complications. Secondary outcomes included superficial surgical site infections (SSI), and operative time.

Results: We identified 84,038 patients; 43.8% had an open resection, 11% were converted-to-open, and 45.1% were completed laparoscopically. Converted-to-open cases were associated with more complications compared to planned open cases (RR 1.05; 95% CI 1.01-1.09; p<0.01) and completed laparoscopic cases (RR 1.26; 95% CI 1.22-1.3). Superficial SSIs were significantly increased in the converted-to-open cases compared to open procedures (RR 1.19; 95% CI 1.09-1.3; p<0.01) and laparoscopic procedures (RR 1.62; 95% CI 1.49-1.77). Operative time was increased for converted procedures compared to open (RR 1.47; 95% CI 1.42-1.52; p<0.01) and laparoscopic cases (RR 1.43; 95% CI 1.39-1.47; p<0.01).

Conclusion: There are negative consequences of conversion-to-open during elective colon resections. The likelihood of conversion should be considered, and the ideal approach discussed with patients.
POSTER #17: Clayton Inculet

Meta-analysis comparing radiographic outcomes between surgical approaches to total hip arthroplasty
Inculet C, Lanting B, Howard J, Somerville L
Orthopedic Surgery

Introduction: The surgical approach to Total Hip Arthroplasty (THA) is one of the variables that affects component implant positioning in addition to patient biomechanical outcomes. Current literature has focused on differences in patient reported outcomes as well as early function between the different surgical approaches, however, little has been done to synthesize how the different surgical approaches may impact arthroplasty implant position.

Methods: We performed a meta-analysis of the current literature comparing the radiographic outcomes (acetabular cup inclination and anteversion, femoral offset, stem alignment, limb length discrepancy and heterotopic ossification) between the common surgical approaches in THA: Direct anterior, posterior, direct lateral and anterolateral approaches. We conducted a systematic search of the online bibliographic databases MEDLINE, AMED, OVID Healthstar and EMBASE (through December 2017) to identify eligible studies. Cochrane’s Review Manager was used for the meta-analysis model.

Results: 15 randomized control trials and 42 comparative cohort studies (14 prospective and 28 retrospective) were included in the review. Approach comparison including anterior vs. posterior, anterior vs. direct lateral, posterior vs. anterolateral and anterolateral vs. direct lateral highlighted no statistically significant differences for any of the radiographic outcomes. The posterior vs. direct lateral comparison of acetabular anteversion was the only statistically significant radiographic difference with a weighted mean acetabular cup anteversion of 17.5° and 20.1° (p = 0.003) for the posterior and direct lateral approach respectively.

Conclusion: The only statistically significant variation in radiographic implant positioning between THA approaches was acetabular cup anteversion in comparison of the posterior vs. the direct lateral approach.
POSTER #18: Ernest Chan

Identifying systems delays in assessment, diagnosis, and operative management for testicular torsion
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Division of Urology in Department of Surgery

Introduction: Testicular torsion (TT) is a common pediatric urologic emergency. Management of TT is time-sensitive, and often confirmed on doppler ultrasound (DUS). Acquiring DUS, however, can result in delays in the management, affecting testicular salvage rates.

Hypothesis: Patient flow analysis can be used to identify delays in the assessment, diagnosis, and management of TT at a Canadian academic hospital and inform areas for optimization.

Materials and Methods: A retrospective review was performed for patients presenting to our emergency department (ED) who underwent DUS to rule out TT between 2012 to 2017. Our primary outcome was median time intervals between points along the clinical flow pathway. The secondary outcomes assessed diagnostic characteristics of standard scrotal DUS components.

Results: A total of 609 patients required DUS to rule out TT, of which 46 underwent scrotal exploration. Testicular salvage rate was 82.6%. Median time from onset of symptoms to ED arrival was 4 hours. Following triage, a median of 79.8 minutes was required for ED physician assessment and an additional 48 minutes for scrotal DUS to be performed. Absence of doppler flow on scrotal DUS had a 97.4% PPV for diagnosing TT confirmed during scrotal exploration.

Conclusion: Patient flow delays to surgical intervention for patients with TT represents a preventable cause of orchiectomy in young men. This study identifies intervention points where delays to surgical intervention can be potentially reduced by up to 2 hours. Our findings support the need for further studies into the optimization of patient flow and management protocols to expedite the diagnosis and management of TT.
POSTER #19: Michael Ching

The Evolution of Scoliosis Surgery: Which Advancements Have Improved Patient Outcomes?
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Department of Orthopaedic Surgery

Background: Scoliosis corrective surgery has many risks and complications. Infection rate is 5-10% and re-operation rate is 20-40%. At London Spine Centre, halo-femoral traction, intra-operative 3D imaging, SmartLinks sequential rod reducers, bone scalpel, and two consultant surgeons operating simultaneously have been instituted over the last ten years. The purpose of this study was to determine the effect of these measures on the infection, complication, and re-operation rates.

Methods: Retrospective review identified 262 scoliosis cases from 2007-2018. Inclusion criteria was surgery. Exclusion criteria were staged surgeries, revision surgeries, incomplete data, and atypical constructs. Intra-operative records and clinic follow-ups were analyzed. Outcomes were infection and complication rate, blood loss, and re-operation. Statistical analysis was performed with SPSS.

Results: 218 cases with a mean of two years follow-up were identified. Mean age was 15.5±5.8 years. 181(83%) were pediatric patients. Two surgeons were present for 101(46%) cases. 156(71%) cases used traction, 45(21%) cases used 3D imaging, 84(39%) cases used SmartLinks, and 75(34%) cases used the bone scalpel. Infection rate was 10%(n=23), complication rate was 20%(n=44), and re-operation rate was 18%(n=40). Two surgeons had less infections(p=0.006), less re-operations(p=0.006), and shorter procedures(p=0.04). Traction was associated with less re-operation(p<0.001). There were no differences with 3D imaging, SmartLinks, or the bone scalpel.

Discussions/Conclusions: At London Spine Centre, two surgeons operating simultaneously decreased infection rate, re-operation rate, and operative duration. Traction was associated with lower re-operation rate. This study did not find any significant differences attributable to 3D imaging, SmartLinks, or the bone scalpel.
POSTER #20: Shane Smith
The effectiveness of junctional tourniquets: A systematic review and meta-analysis
Shane Smith, John White, Kerollos Nashat Wanis, Andrew Beckett, Vivian McAlister, Richard Hilsden
Division of General Surgery

Introduction: Junctional tourniquets have been incorporated into casualty care for junctional vascular trauma. They apply external compression to stop blood flow in the groin and axilla.

Materials and Methods: The primary outcome was effectiveness in achieving arterial occlusion. Secondary outcomes included time to application and pain scores. Medline and EMBASE databases were searched. A random-effects meta-analysis was conducted to estimate the average effectiveness and time to effective application.

Results: Eight studies were included. Average effectiveness was 52% (95% confidence interval [CI], 15–87%) for the abdominal application of the abdominal aortic and junctional tourniquet (AAJT), 83% (95% CI, 73–89%; I², 26%) for the Junctional Emergency Treatment Tool, 87% (95% CI, 79–92%; I², 15%) for the SAM junctional tourniquet (SJT), and 95%(95%CI, 90–98%) for the Combat Ready Clamp. The groin application of the AAJT was studied in two articles with 100% in both studies. The average time to application was 101 seconds for the SAM junctional tourniquet (95% CI, 50–152 seconds) and the Combat Ready Clamp (95% CI, 63–139 seconds), while it was 130 seconds (95% CI, 85–176 seconds) for the Junctional Emergency Treatment Tool. The abdominal application of AAJT had a time to application of 92 and 171 seconds in two studies.

Conclusions: All four Food and Drug Administration–approved devices demonstrate the ability to achieve vascular occlusion in healthy volunteers; however, effectiveness in patient transport has not been evaluated, and outcomes of their use in the field need to be captured and reported.
POSTER #21: Christine Li
Embolization in non-splenic trauma: outcomes at a Canadian trauma hospital
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Division of General Surgery - Department of Surgery, Division of Interventional Radiology –
Department of Medical Imaging

Introduction: Angiography and embolization for hemorrhage control is first-line treatment for
solid organ and pelvic injuries in hemodynamically stable trauma patients. We undertook this
study to evaluate outcomes in trauma patients who underwent angiography with or without
embolization for non-splenic injuries over a 7-year period.

Methods: After obtaining research ethics board approval, the Interventional Radiology and
Trauma Registry databases at London Health Sciences Centre were accessed to identify patients
between 2010 and 2017 who underwent angiography with or without embolization for non-
splenic injuries. Data were extracted for demographics, injury details, hospital course, and
outcomes.

Results: We identified 5161 adult patients in the trauma registry, 59 of whom met study
inclusion criteria. On arrival, 26 patients were hemodynamically unstable (44.1%). Embolization
occurred for the pelvis (45.8%), liver (15.3%), kidney (8.5%), gluteal region (8.5%), abdominal
wall (6.8%), thorax (5.1%), arm (5.1%), leg (1.7%), and mesenteric vessels (1.7%). Active arterial
bleeding was the most common indication for embolization (84.7%). Embolization was
successful in 95% and no patients required repeat embolization. The most common
embolization technique was coil with gel-foam (22%), and many procedures combined at least
two techniques (45.7%). Twenty-one patients (35.6%) required surgery on a related body area,
but seven patients (33.3%) underwent surgery prior to embolization. Only 2 patients (3.4%) had
complications from their procedures. Nine patients died, with 2 deaths secondary to bleeding
(22.2%).

Conclusion: Transarterial embolization procedures are being used successfully in cases of non-
splenic traumatic injury. These procedures have high rates of success in our institution with low
rates of complications.
POSTER #22: Michaela Fernandes

Systematic review and meta-analysis of preventative strategies for acute kidney injury in patients undergoing abdominal aortic aneurysm repair

Michaela Fernandes, BSc, Melissa Majoni, BSc, Amit X. Garg, MD, Neil Klar, PhD, and Luc Dubois, MD, London, Ontario, Canada
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Objective: To assess the effect of various preventative interventions, such as remote ischemic preconditioning (RIPC), versus standard therapy or placebo for reducing the incidence of postoperative acute kidney injury (AKI) in patients undergoing abdominal aortic aneurysm (AAA) repair.

Methods: We searched the relevant online databases for randomized controlled trials testing preventative interventions versus standard therapy, another intervention or placebo in patients undergoing AAA repair using the open or endovascular approach. Risk of bias of included studies was assessed regarding randomization, allocation concealment, blinding, incomplete outcome data, selective outcome reporting and other potential biases. Where possible we pooled the results of similar interventions using random effects meta-analysis.

Results: We included 16 trials involving 1403 participants. Most trials were small, single-centre studies, and had varying definitions of AKI. The preventative strategies with possible protective effects were mannitol, a composite of antioxidant supplements, sodium bicarbonate, an open extraperitoneal approach and hydroxyethylstarch combined with crystalloid solutions. Curcumin, methylprednisolone, carbon dioxide contrast medium, hemodynamic monitoring and N-acetylcysteine were found to lack a beneficial effect. Six trials of 355 participants reported on ischemic preconditioning and our meta-analysis showed no statistically significant difference between RIPC and standard treatment (OR 1.20, 95% CI 0.37, 3.89). None of the interventions studied significantly reduced mortality or renal replacement therapy (RRT).

Conclusion: No strategy was found to be conclusively beneficial for the prevention of AKI in patients undergoing AAA repair. Mannitol, a composite of antioxidant supplements, sodium bicarbonate, and extraperitoneal approach have all been suggested to be beneficial but their effects need to be confirmed by larger, properly conducted and powered randomized trials.
POSTER #23: Max Levine

Prospective assessment of the need for mannitol during renal transplantation
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Division of Urology/Multiorgan Transplant Program, Department of Surgery, Western University

Introduction: During kidney transplantation (KTx), mannitol has been utilized to try and avoid delayed graft function (DGF). However, it has been suggested to promote hyperkalemia in the early postop period. The overall benefit of mannitol in the clinical setting is unclear, and its use varies.

Hypothesis: DGF rates will not differ when mannitol is administered intraoperatively vs an alternative diuretic (furosemide).

Methods: An analysis of all KTx recipients performed by two surgeons at our institution from Mar 1, 2018 – Dec 31, 2018 was performed during which one surgeon provided furosemide (F) and the other mannitol (M) (0.5 g/kg). Data was collected prospectively. Descriptive statistics were use with comparisons made using t-test and Chi-square.

Results: Ninety-nine patients received a KTx, with 46 in the F group. The M group did not differ from the F group with respect to mean age (52 vs 47, p = 0.12), body mass index (BMI) (27.4 vs 28.5, p = 0.25), anastomosis time (41min vs 43min, p = 0.41). DGF rates were not significantly different (20% vs 11%, p = 0.24), nor were donor profiles. Potassium levels did not differ between the groups in the post op period and 1 month creatinine levels did not differ.

Conclusions: The administration of mannitol vs an alternative diuretic during KTx did not influence DGF rates, potassium levels or creatinine at 1 month. The interpretation of results is limited by the non-randomized design. Further study is warranted to better define the role of intraoperative diuretics during KTx.
**POSTER #24: Stacy Fan**  
**Regional wait times for patients with non-melanoma skin cancer**  
Fan S, Hackett J, Lutz K, Heaton G, Symonette C, Grant A  
Division of Plastic and Reconstructive Surgery

**Introduction:** Non-melanoma skin cancer (NMSC) affects many Canadians. Although morbidity and mortality are rare, the burden to patients and the healthcare system is significant. This study evaluates Plastic surgery wait times for patients with NMSC in Southwestern Ontario.

**Hypothesis:** We hypothesize that patients with NMSC referred to community surgeons wait shorter periods from referral-to-consultation, referral-to-excision, and consultation-to-excision in comparison to those referred to an academic centre.

**Methods:** A retrospective chart review of patients who underwent excision of an NMSC in Ontario, from 2015-2018, was conducted. Referral information was compared. Primary outcomes were wait times from: referral-to-consultation, referral-to-excision, and consultation-to-excision. Data was analyzed using Students t-test with equal variance.

**Results:** One-hundred forty-three patients were included from the academic cohort, and 82 from the community cohort. Referrals to surgeons included lesion location (90% & 82%, respectively), but less frequently included size (18.6% & 29.2%, respectively). Most referrals to academic surgeons included biopsy results (78.6%), as opposed to community referrals (25.6%). Patients in the academic cohort waited 15.3±12.7 weeks from referral-to-consultation, and 15.7±13 weeks from referral-to-excision. Patients from the community cohort waited significantly shorter periods of 4.9±3.1 (p<0.001) and 11.7±9.9 weeks (p=0.016), respectively. However, patients of the academic cohort waited 2.4±7.1 weeks from consultation-to-excision, while patients in the community cohort waited 6.7±9.6 weeks (p<0.001).

**Conclusions:** Patients referred to academic centres waited significantly longer in several parameters compared to those referred to the community. However, academic surgeons had expedited consultation-to-excision timeframe. This study provides important data for quality improvement initiatives in NMSC care.
POSTER #25: Mehdi Qiabi

Post-Esophagectomy Cervical Anastomotic Leaks Treated by Silicone Stents: A Decade of Experience in a Tertiary Canadian Center.

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Division of Thoracic Surgery

Introduction: Anastomotic leak is a dreaded complication after esophagectomy. We report our unique experience managing post-esophagectomy with cervical anastomotic leaks using silicone stents.

Hypothesis: Silicone stents are effective in managing anastomotic leaks in the neck.

Material and Methods: All patients treated with a stent between January 2009 and December 2018 at a single institution were identified in our prospectively maintained database and retrospectively reviewed.

Results: 412 patients underwent esophagectomy during this time period by 3 consultants. 31 patients had a silicone stent inserted to treat a post-esophagectomy cervical anastomotic leak. In 94% (n=29/31), the esophagectomy was performed as an oncologic treatment. One patient was lost to follow-up. The leak was successfully healed (stent removed and patient able to eat) in 83% (n=25/30). Ninety-days mortality was 17% (n=5/30), and all patients who expired had persistent leaks (2 also had metastatic disease, 3 had tracheoesophageal fistula). An aerodigestive fistula developed in 13% (n=4/30). More than one stent was required in 32% (n=8/25) of successfully treated patients. The stent was kept a median duration of 29 days (range 9-282 days). Distal migration of the stent requiring endoscopic intervention occurred in 28% (n=7/25), none since the introduction of the buttressed nasal anchoring suture (“moustache”). Additional surgery was performed in 24% (n=6/25) (1 pectoralis flap, 3 thoracic duct ligation, 2 decortication). After the leak was healed, 64% (n=16/25) required at least one anastomotic dilation procedure to treat dysphagia.

Conclusions: Post-esophagectomy cervical anastomotic leaks can be managed with a high success rate with silicone stents.
POSTER #26: Katharine Pacoli
Investigating renal H₂S-producing enzyme expression patterns as a potential tool for predicting renal cell carcinoma aggressivity, metastasis, and recurrence

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Introduction: The most common histotype of renal cell carcinoma (RCC) is clear cell (ccRCC). We have shown, in a chick embryo model, that hydrogen sulfide (H₂S) is elevated in the pseudohypoxic conditions of ccRCC. Its role in human ccRCC is unknown. H₂S is endogenously produced by cystathionine γ-lyase (CSE), cystathionine β-synthase (CBS), and 3-mercaptopyruvate sulfurtransferase (MPST). Increased expression of these enzymes has been observed in human colon, ovarian, and bladder cancer. If there is correlation between H₂S-producing enzyme expression and clinical outcomes, this may serve as a prognostic and therapeutic tool.

Hypothesis: It was expected that expression of CSE, CBS, and MPST will be increased in human ccRCC, and will correlate with increased cancer aggressivity, metastasis, and recurrence.

Methods: 17 ccRCC human kidney specimens with healthy and cancerous tissue were immunohistochemically stained for CSE, CBS, and MPST and graded according to fluorescence intensity. Retrospective analysis of patient medical charts was conducted to determine rates of metastasis/recurrence and prognostic characteristics. Relationships between enzyme expression and patient outcomes were analyzed.

Results: There was greater expression (p<0.0001) of CSE, CBS, and MPST in ccRCC compared to healthy tissue. The change in expression of CSE was greater than that of CBS (p<0.0001) and MPST (p<0.0001). We found no relationship of enzyme expression with cancer recurrence/metastasis, nuclear grade, or margin status.

Conclusions: This is the first report of differential increase of CSE, CBS, and MPST in human ccRCC. Although this does not appear to correlate with patient outcomes, their increase suggests a potential therapeutic target.
POSTER #27: Mehul Garach

Does Post-operative Alignment Affect Implant Migration in Total Knee Arthroplasty

Author: Dr. Mehul Garach (PGY-3)
Co-Authors: JL Howard, RW McCalden, EM Vasarhelyi, M Teeter, DD Naudie

Background: Radiostereometric Analysis (RSA) has been well validated as a means of assessing temporal implant migration in cases of total joint arthroplasty. Prior research utilizing RSA has shown that post-operative coronal plane alignment has no effect on implant migration at 10 years. Our study aimed to validate these results utilizing a similar protocol in a larger cohort of patients.

Methods: Fifty patients underwent total knee arthroplasty (TKA) with a goal of neutral (0° hip knee angle) alignment. Within this cohort, patients were randomized to receive surgery with either conventional or patient-specific instrumentation. Tantalum beads were placed intraoperatively using a standardized protocol for post-operative RSA data collection. At the standard 2-week post-operative visit 3-foot standing roentgen films were obtained to assess alignment. RSA data, patient reported outcome measures, and demographic data were also collected. This protocol was repeated at 6 weeks, 3 months, 6 months, 1 year, and 2 years to allow for temporal comparisons against our index data. Mann-Whitney testing was utilized to compare non-parametric groups. Linear regression analysis was used to assess for relationships between HKA and maximum total point motion (MTPM) at 2 years.

Results: Forty-three patients satisfied the criteria for inclusion in our study. Thirty-four patients had a neutral alignment (mean -0.37°) and nine had a varus alignment (mean -4.47°). One patient, with an overall valgus alignment, was removed from the study due to low numbers for comparison. No significant difference in demographic data or patient reported outcome measures were seen. No difference was seen in MTPM—the largest change in alignment in any direction—for both femoral and tibial components at all time points. This result was replicated for both translational data (mm of translation in X, Y, and Z planes) and rotational data (degrees of rotation in X, Y, and Z planes). Linear regression analysis showed no significant correlation between HKA and MTPM at 2 years.

Discussion/Conclusions: This study adds further support to prior findings that show equivalent survivorship in total knee arthroplasty regardless of differences in post-operative alignment. Our data did not show a relationship between increased implant motion and changes in coronal plane alignment at 2 years. Further testing is required to determine if pre-operative kinematic alignment or changes in tibial slope have a role in affecting implant migration.

Level of Evidence: II
POSTER #28: Kyla Huebner

How much is too much: Assessing varying pump pressures in post operative pain in shoulder arthroscopy

Author: Dr Kyla Huebner (PGY-5) Co-Author: ME LeBel
Division of Orthopaedic Surgery

Introduction: Post operative surgical pain has been extensively study with regard to anaesthetic pain modalities, however, little is published with regards to various arthroscopic shoulder surgical techniques. An intriguing characteristic of shoulder arthroscopy is the various arthroscopic pump pressures used by different surgeons. Pressure-flow system use shorter operating times and have less soft tissue extravasation when compared to a gravity system. Manufactures of these pumps have suggested pressure guidelines, but they vary greatly and are often set to a pre-set pressure according to surgeon preference. There is no evidence regarding varying pump pressure settings on post operative pain control. To determine if varying pump pressures have an effect on post operative pain control we looked at pain outcomes in patients undergoing arthroscopic rotator cuff repairs with high, medium and low pump pressures.

Methods: Twenty-five participants (preliminary data from 100 participants) were randomized to either high pump pressure (65mmHg), medium pump pressure (45 mmHg) or low pump pressure (25mmHg). Participant and surgeon were blinded. Visual analogue scale (VAS), SF36, L’Insalata shoulder score, patient satisfaction, and medications taken were recorded pre-operatively and then post-operatively up to two years (data presented is up to 3 months). Surgeon satisfaction including visualization and ease was recorded. Data were analyzed with repeated measures ANOVA, Friedman’s test, Kruskal-Wallis and ANOVAs using Bonferroni correction post-hoc.

Results: Of the twenty-five participants ten were randomized to 25mmHg, seven to 45 mmHg and eight to 65mmHg pump pressure. Eleven female subjects and fourteen male subjects participated. Eight left shoulders and seventeen right shoulders were operated on. There was no difference in demographics between groups. There was significantly less bleeding and improved overall surgeon satisfaction at 45mmHg and 65 mmHg pump pressure respectively. There was no significant difference in VAS scores, SF36 scores, L’Insalata scores, or medication use between groups. There, however, was significant improvement in pain, decreased medication use and improved functional outcome scores overtime.

Discussion/Conclusions: High pump pressures have been associated with tissue extravasation and theoretically may increase post-operative pain while improving intraoperative visualization and decreasing bleeding. We found that while there was less bleeding and overall improved intraoperative surgeon satisfaction with higher pump pressures there was no difference in pain outcomes or function between pressures. Pain and function improved over time post-operative regardless of pressure as expected. Therefore, it appears in our preliminary data that patient
outcomes are not affected by pump pressures and therefore surgeons should use their preferred setting.

**Level of Evidence:** II Double blind RCT

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**POSTER #29: Katie Garland**  
**Safety and outcomes of Latham appliance in a consecutive series of unilateral cleft lip in a single surgeon’s practice**  
Katie Garland, Jessica Truong, Damir Matic  
Division of Plastic and Reconstructive Surgery

**Introduction:** Patients born with cleft lip and palate with an alveolar gap of over 4mm are often treated with pre-surgical infant orthopedic (PSIO) devices before cleft lip repair in an attempt to improve lip and nasal reconstruction outcomes. This treatment is undertaken at 6 weeks of age and can include an active device (eg. Latham appliance). It has been postulated that the active nature of this device, which moves the palatal segments closer together, may be associated with a growth disturbance through pre-maxillary suture fusion/necrosis.

**Hypothesis:** We hypothesize that there is no difference in alveolar gap between patients treated with the active device compared to no PSIO at the time of palate repair, 9months after formal lip repair.

**Methods:** A consecutive series of 41 patients with unilateral cleft lip from a single surgeon’s practice were examined. Horizontal and vertical measurements of the alveolar gap were taken before appliance, after appliance, and 9months post-PSIO from 2000-present. Measurements were taken from pre-device molds and patient charts.

**Results:** Of the 41 patients, 10 received no PSIO and 31 had an active device. PSIO patients had a 66% and 98% decrease in vertical and horizontal gap measurements respectively between initial measurements and at time of palate repair. There was no statistically significant difference between alveolar measurements at 9month follow up between those treated with PSIO and no PSIO.

**Conclusions:** There does not appear to be any difference in alveolar gap measurements at 9months between patients treated with active PSIO versus no PSIO.
POSTER #30: Shahid Aquil
The impact of reduction of warm ischemia removing the second warm ischemic period on DCD kidney transplantation outcomes
Department of Surgery, Multi-Organ Transplant Unit, London Health Sciences Center, London, ON, Canada.

**Purpose:** Warm ischemic time (WIT) during donation after cardiac death (DCD) kidney transplantation has significant effects on post-operative outcomes, such as graft survival, function, and post-operative mortality and morbidity. As second WIT also occurs while the kidney rewarms during the anastomosis (WIT2). We applied cooling effect using an the ice blanket technique (IBT) to see if eliminating WIT2 will decrease the incidence of delayed graft function (DGF) and improve renal functional outcomes.

**Methods:** Adult DCD kidney transplants performed at our center b/w 2017 and 2018 were reviewed (N=32). Transplants were performed as standard and in ice blanket group. A comparison was done in regards to total WIT between a group that received the IBT (N=17) and those that received transplants without ice blanket (non-IBT, N=15). Outcomes included DGF and post-operative renal function.

**Results:** Demographic characteristics were not different between the groups of recipients. There was no difference in procurement WIT (WIT1) or cold ischemic times between the two groups (p = 0.58 and p = 0.19, respectively). Both groups were followed up for 3 months period. Donor and recipient demographics were similar between groups. Standard criteria donors and expanded criteria donors comprised about 70% and 30% in both groups. By definition, overall WIT (WIT1+2) was greater in the IBT group. 17 of the 32 patients underwent transplantation using IBT. On days 1, 3, and week 4, IBT grafts had superior renal function vs. non-IBT (p < 0.05). Although there was no difference in DGF b/w groups, the median number of dialysis sessions was 2 (2-3) in the IBT and 4 (2-6) in the non-IBTS groups. Slow graft function rates were higher in the non-IBTS group, accordingly.

**Conclusion:** Decrease in overall WIT using IBT improved renal function and slow graft function. This is a preliminary study with ongoing data collection and larger studies with IBT will be necessary in order to truly determine whether the elimination of WIT2 provide improved outcomes.
POSTER #31: Leandra Stringer

Point of Care Ultrasound (POCUS) for the Diagnosis of Testicular Torsion: A Resident Education and Quality Improvement Initiative

Authors: Leandra Stringer, Ernest Pang Chan, Frank Myslik, Alex Jiang, Sara Cocco, Gary Brahm, Hassan Razvi, Sumit Dave, Peter Zhan Tao Wang

Division of Urology, Western University.

Introduction: Scrotal doppler ultrasound (DUS) is an adjunct for the diagnosis of testicular torsion (TT) when clinical assessment is equivocal. Our group identified that acquiring a DUS results in a 48-minute delay. POCUS may be used to negate this delay. The purpose of this study was to develop and evaluate a scrotal POCUS curriculum for Urology and emergency medicine (EM) residents.

Methods: Experts from urology, EM and radiology collaborated in The Delphi method to design a practical and didactic curriculum for scrotal POCUS. The study followed a pre-post design. The OASUS scale was used to evaluate for competency in scrotal POCUS skills. Residents were also asked to rate their comfort and confidence with scrotal POCUS before and after the curriculum.

Results: Twenty-four urology (n=12) and EM (n=12) residents participated in a scrotal POCUS curriculum. Pre-post testing showed significant improvements in knowledge (6.3 versus 8.0, p < .001) amongst the residents. Residents were more comfortable (pre 0.6 versus post 3.6, p < .001) and confident (pre 1.0 versus post 2.1, p < .001) utilizing scrotal POCUS to assess for TT after the curriculum (5-point Likert scale). Lastly, 23 out of the 24 residents were rated as competent at performing scrotal POCUS.

Conclusion: Our scrotal POCUS curriculum was effective and acceptable to both Urology and EM residents. This skill may potentially reduce delays in diagnosing TT and improve testicular salvage rates.
POSTER #32: George Pang
Factors influencing resident teaching evaluations: the relationship between resident interest in teaching, career plan, training level, and their performance in teaching junior learners
George Pang, Julie Ann Van Koughnett
General Surgery

Background: Residents play an important role in the education of medical students. Numerous studies have focused on teaching programs and evaluation of resident teaching. Few studies have addressed motivational factors and their influences on teaching performance.

Objective: To examine factors that may impact the quality of teaching provided by surgical residents, as assessed by medical students.

Methods: Surgical residents at a Canadian university were invited to complete a survey assessing factors that may influence their interest and performance in teaching. Teaching performance was evaluated by third year medical students using a modified Copeland’s Clinical Teaching Effective Instrument (CTEI). Demographic and survey data were described. Teaching performances between groups were compared for statistical significance using Mann-Whitney U test. Open-ended responses were analyzed for themes.

Results: Ninety-three of 137 (68%) surgical residents responded to the survey. 134 residents (98%) were evaluated by 136 of 141 (96%) medical students, for a total of 1089 teaching evaluations (mean 8/resident). Resident teaching performance was not significantly different between academic vs non-academic career interest (p=0.484), enjoyment vs non-enjoyment of teaching (p=0.057), clinical duty interference vs non-interference (p=0.330), high vs low self-rated performance (p=0.811), and junior vs senior level of training (p=0.492). However, residents interested in teaching were evaluated significantly better than those who reported low interest (p=0.013).

Conclusion: Resident teaching interest may play an important role in resident teaching performance, as assessed by medical students. Resident teaching curricula should include strategies to cultivate and nurture resident interest in teaching.
ABSTRACTS FOR AWARD WINNING RESIDENT/FELLOW RESEARCH PAPERS

PRESENTATION #1: Dr. Dubois for Dr. Wang
DIVISION: VASCULAR SURGERY

Discrepancies in Research Productivity Among Canadian Surgical Specialties
Han Wang¹, Michael W. A. Chu², Luc Dubois¹,³

1. Department of Surgery, Western University, London, Ontario
2. Division of Cardiac Surgery, Western University, London, Ontario
3. Department of Epidemiology and Biostatistics, Western University, London, Ontario

Introduction. Academic productivity as measured by number and impact of publications is central to the career advancement and promotion of academic surgeons. We hypothesized that large variations in productivity metrics exist between surgical disciplines in Canada.

Objective. Explore differences in publication metrics between surgical specialties in Canada to establish benchmarks and identify predictors of productivity.

Methods. Academic surgeons were identified through Departmental web-pages and their scholarly metrics were collected through Scopus in a standardized fashion. We collected total number of documents, citations, H-index, and average number of publications/year (last five years). We explored whether presence of training program, graduate degree, academic rank, and size of clinical group affected productivity metrics. Linear regression was used for multivariable analysis.

Results. We collected data on 2172 surgeons from 15 separate academic centers across Canada. Wide variability existed in metrics between specialties with cardiac (CS) and neurosurgery (NS) being the most productive, on average, while vascular surgery (VS) and plastic surgery (PS) were the least productive (Table 1). For VS, average number of total publications was 25.7 and average number of publications/year was 1.4/year; while CS had 71 total publications and 3.4 publications/year (P<.001). Similarly, average H-index for VS was 8.3 versus 18.7 for CS. Our multivariable model identified academic rank, surgical specialty, graduate degree, presence of training program, and larger size of clinical group as positive predictors of increased academic productivity. The average productivity metrics per academic rank differed greatly between specialties as well (Table 2).

Conclusions. There exists in Canadian academic surgery a wide variability in average research productivity. Obtaining a graduate degree, being part of a larger clinical group, and the presence of a training program were all associated with higher productivity even after adjusting
for academic rank and specialty. Vascular surgery underperforms academically relative to other specialties. Strategies to improve this should be developed, such as changing institutional culture, better protected time and networking opportunities.

PRESENTATION #2: Dr. Ali Hage
DIVISION: CARDIAC SURGERY

Impact of Brain Protection Strategies on Mortality and Stroke in Patients undergoing Aortic Arch Repair with Hypothermic Circulatory Arrest: Evidence from the Canadian Thoracic Aortic Collaborative
Dr. Ali Hage

Background: Contemporary techniques in aortic arch repair include more liberal use of brain perfusion strategies and performing circulatory arrest at warmer temperatures; however, evidence supporting these trends remains controversial.

Methods: A total of 2520 patients (692 (30%) female) underwent aortic arch repair with hypothermic circulatory arrest (HCA) from 2002 until 2018 in 11 centres of the Canadian Thoracic Aortic Collaborative. Primary outcomes included mortality; stroke; a composite of mortality or stroke; and a modified version of the Society of Thoracic Surgeons-defined composite endpoint for mortality or major morbidity (STS-COMP), including stroke, reoperation, renal failure, prolonged ventilation, and deep sternal wound infection. Multivariable logistic regression and propensity score matching were performed for cerebral perfusion and nadir temperature practices to identify independent predictors of outcomes.

Results: Antegrade cerebral perfusion was found on multivariable analysis to be an independent protective predictor against mortality (OR 0.64, 95% CI 0.48-0.86, p=0.005), stroke (OR 0.55, 95% CI 0.37-0.81, p=0.006), composite of mortality or stroke (OR 0.57, 95% CI 0.45-0.72, p=0.0001), and STS-COMP (OR 0.53, 95% CI 0.41-0.67, p<0.0001), as compared to circulatory arrest with hypothermia alone. Retrograde cerebral perfusion yielded similar outcomes as compared to antegrade cerebral perfusion (mortality: OR 0.77, 95% CI 0.27-2.23, p=0.6; stroke: OR 0.84, 95% CI 0.49-1.46, p=0.5; composite of mortality or stroke: OR 0.81, 95% CI 0.44-1.49, p=0.5; STS-COMP: OR 0.87, 95% CI 0.58-1.28, p=0.4). When compared to hypothermic circulatory arrest with nadir temperature <24°C, a propensity score analysis of 647 matched pairs identified nadir temperature ≥24°C as an independent predictor of lower mortality (OR 0.62, 95% CI 0.40-0.98, p=0.04), stroke (OR 0.51, 95% CI 0.31-0.84, p=0.008), composite of mortality or stroke (OR 0.62, 95% CI 0.43-0.89, p=0.01), and STS-COMP (OR 0.64, 95% CI 0.49-0.85, p=0.002).

Conclusions: Antegrade cerebral perfusion and nadir temperature ≥24°C during hypothermic circulatory arrest for aortic arch repair are independent predictors of improved survival and neurological outcomes.
PRESENTATION #3: Dr. Alexandra Istl
DIVISION: GENERAL SURGERY

Call for improved study design and reporting in soft tissue sarcoma research: a systematic review and meta-analysis of chemotherapy and survival outcomes in resectable STS
Alexandra C. Istl, Jessica M. Ruck, D. Morris Adam S. Levin, Christian F. Meyer, Fabian M. Johnston

Introduction: The heterogeneity of soft tissue sarcomas (STS) and patient reluctance to accept therapy of uncertain benefit has limited the development of chemotherapy trials for STS. Changes in chemotherapeutic regimens for STS demand an updated analysis of the efficacy of chemotherapy as an adjunct to surgery.

Methods: We searched Embase, MEDLINE, CENTRAL, and clinicaltrials.gov. We included studies since 1997 assessing adult patients with resectable STS who received systemic therapy and met histologic inclusion criteria. Quality of studies was assessed using Cochrane risk of bias tool for RCTs and Newcastle Ottawa Scale for observational studies. Pooled hazard and risk ratios were calculated when appropriate for OS, PFS, and local and distant recurrence (LRFS and DRFS).

Results: 10 studies totaling 3157 patients were included. Five studies assessed only adjuvant chemotherapy, 2 assessed retroperitoneal sarcoma (RPS), and 3 assessed extremity STS. Most assessed mixed histologies. Only one study reported survival outcomes at 1 year, and standard reporting of survival outcomes at 5 years was inconsistent. Pooled analysis for 5-year OS, PFS, LRFS, and DRFS showed no significant benefit of chemotherapy over locoregional therapy alone. On combined analysis, hazard of death, progression, and recurrence were not improved with chemotherapy. Subgroup analyses of 800 extremity STS patients also showed no survival benefit with chemotherapy. Median survival was only reported in two studies, which showed an improved OS of 33 months with chemotherapy over locoregional therapy alone (p<0.01). Quality indices were poorly reported across randomized trials and variably reported in observational literature.

Conclusions: This updated meta-analysis demonstrated no improvement in OS, PFS, or local or distant RFS after receipt of chemotherapy in all-comer or site-specific STS.

Standard outcomes and quality indices were poorly reported. RCTs for STS are challenging, and higher-quality observational studies are needed with consistent reporting of standard outcomes; recommendations have been provided to this end.
PRESENTATION #4: Dr. Ernest Chan  
DIVISION: UROLOGY  

Identifying systems delays in the assessment, diagnosis and operative management of testicular torsion at London Health Sciences Centre  
Ernest P. Chan, Peter Z. T. Wang, Frank Myslik, Hanny Chen, Sumit Dave  

Introduction: Testicular torsion (TT) is a common pediatric urologic emergency. Management of TT is time-sensitive, and often confirmed on scrotal doppler ultrasound (DUS). Acquiring DUS, however, can result in delays in the management of TT, affecting testicular salvage rates. The objective of this study is to identify delays in the assessment and diagnosis for patients presenting with TT to a Canadian academic hospital using patient flow analysis.  

Study Design: A retrospective review was performed for patients presenting to our emergency department (ED) who received a scrotal DUS to rule out possible TT between 2012 to 2017 (Figure 1.). Our primary outcome measured cycle-time measurements (median time) between different points along the clinical flow pathway for a patient with suspected TT. The secondary outcome assessed diagnostic sensitivity, specificity, positive and negative predictive values of standard scrotal DUS components (doppler flow, arterial waveform, heterogeneous echotexture).  

Results: A total of 609 patients presented with an acute scrotum warranting a scrotal DUS to rule out TT, of which 46 underwent scrotal exploration. Testicular salvage rate was 82.6% in our series (38 testes were salvaged, 8 underwent orchiectomy). Median time from onset of symptoms to presentation to the ED for patients with possible TT was 4 hours. Following triage, a median of 79.8 minutes was required for ED physician assessment and an additional 48 minutes for scrotal DUS to be performed. Absence of doppler flow on scrotal DUS had a 97.4% PPV for diagnosing TT confirmed during scrotal exploration.  

Conclusion: Patient flow delays to surgical intervention for patients with TT represents a preventable cause of orchiectomy in young men. This study identifies intervention points in patient-care flow pathways where delays to surgical intervention can be up to 2 hours. Our findings support the need for further studies into the optimization of patient flow and management protocols to reduce delays in the diagnosis and management of TT. Proposed strategies include the implementation of standardized clinical pathways for acute scrotum, point of care ultrasound (POCUS) as a diagnostic adjunct, and public health initiatives.
PRESENTATION #5: Dr. Kitty Wu
DIVISION: PLASTIC & RECONSTRUCTIVE SURGERY

Developing a 3D bio-artificial tissue model for breast capsular contracture
Kitty Wu, Ana Maria Pena Dias, David O’Gorman, Eva Turley, Tanya DeLyzer

Introduction: Breast capsular contracture is an unpredictable and difficult complication in implant-based breast reconstruction. There is a paucity of non-surgical treatment options, in part due to the lack of human pre-clinical models for capsular contracture. The objective of this study is to develop a 3D bio-artificial tissue (BAT) model of capsular contracture and test the efficacy of an anti-fibrotic RHAMM function blocking peptide (NPI-110).

Methods: Seven breast capsular tissue samples from seven patients undergoing capsulectomy or implant exchange were collected and classified according to Baker grade. Capsular tissue was sectioned and incubated in DMEM media to allow outgrowth of primary fibroblasts. The FlexCell TissueTrain system was used to create bio-artificial collagen 1 tissue cords. $3 \times 10^5$ primary fibroblasts from grade 1 and grade 4 cells were embedded into each cord and contraction measured over 14 days. Contracture was then measured over 14 days with the application of 20uM of peptide NPI-110 on day 0 and then 5uM on days 4 and 8 in grade 1 and grade 3 primary fibroblast-embedded cords.

Results: The BAT model reproduces the increased contractility of grade 4 fibroblasts, which demonstrate ongoing cord contractility over 14 days. Grade 1 and 4 cells contract to 50% of control cords by day 2; however, grade 4 cells demonstrate ongoing contraction until day 14 whereas Grade 1 cells plateau after day 9. Peptide testing did not demonstrate any statistically significant difference between Grade 1 and Grade 3 cells with or without treatment at any time point.

Conclusions: The bio-artificial tissue model accurately replicates enhanced contractility of grade 4 capsular fibroblasts and presents a robust pre-clinical model with applications in future anti-fibrotic peptide testing and personalized medicine. Future experiments will include optimization of peptide dosing and timing.
PRESENTATION #6: Dr. Nicholas Pasic
DIVISION: ORTHOPAEDIC SURGERY

Practice Patterns for the Treatment of Acute Proximal Hamstring Ruptures
Nicholas Pasic

Introduction: Proximal ischial hamstring avulsion injuries are relatively uncommon. As such, the management of these injuries is often highly variable. Consensus agreement is lacking for the indications for repair, along with the operative technique, and post-operative rehabilitation. The purpose of this study was to survey surgeons who treat proximal hamstring avulsion injuries to identify current trends in the management of this injury.

Methods: After IRB approval, a 46-question cross-sectional survey was distributed using a secure electronic survey portal. The survey sought to determine surgeon experience, diagnostic preferences, treatment patterns, surgical indications/technique, perceived patient outcomes, surgical complications, as well as post-operative management and rehab protocols. Surveys were completed electronically and anonymously, with invitations distributed to members of the American Orthopedic Society for Sports Medicine (AOSSM) and Arthroscopy Association of Canada (AAC).

Results: A total of 108 surgeons who manage proximal hamstring injuries completed the survey. Most respondents (77%) treat one to five of these injuries per year. MRI was the preferred imaging modality to confirm diagnosis. Despite 98% of respondents indicating that there was a role for surgical management of proximal hamstring avulsions, operative treatment was reportedly undertaken in only 50% of cases seen by each respondent. The top three reported surgical indications were: number of tendons involved (most important factor=42%, second most=26%, third most=13%), amount of tendon retraction (28%, 41%, 16%), and patient activity level (16%, 18%, 24%).

Discussion: Based on the practice patterns of the surgeons who completed the survey, there is continued disparity in the management of proximal hamstring avulsions. A lack of agreement exists with regards to surgical indications, operative technique and post-operative protocols. Most striking is the rate of non-operative treatment and perceived rate of poor outcomes within this cohort. Future research should focus on objective evaluation of non-operative management, and additional variables involved in surgical treatment and post-operative rehabilitation.
PRESENTATION #7: Dr. Mehdi Qiabi
DIVISION: THORACIC SURGERY

Post-Esophagectomy Cervical Anastomotic Leaks Treated by Silicone Stents: A Decade of Experience.
Qiabi M, Malthaner RA, Fortin D, Inculet RI.

Introduction: An anastomotic leak is a severe complication after an esophagectomy. We report our unique experience managing post-esophagectomy cervical anastomotic leaks using silicone stents.

Methods: All patients treated with a stent between January 2009 and December 2018 at our institution were retrospectively identified from our thoracic database and billing records. 412 patients underwent esophagectomy during this time period.

Results: Thirty-one patients (25M:6F) had a silicone stent inserted to treat a cervical anastomotic leak. 94% of these patients (n=29/31) had the esophagectomy for cancer. Successful healing (stent removed, patient eating) occurred in 81% (n=25/31). More than one stent was required in 32% (n=8/25) of the successfully treated patients. The stent was kept in place for a median duration of 29 days (range 9-282 days). Ninety-day mortality was 19% (n=6/31). All patients who died had ongoing leaks. 13% (n=4/31) of stented patients developed an aerodigestive fistula. Early in our experience, distal migration of the stent requiring endoscopic intervention occurred in 28% (n=7/25), but none migrated distally after the introduction of the buttressed nasal anchoring suture. Subsequently, one patient had proximal stent migration. One patient had obstruction of the stent secondary to a food bolus. Following stent removal, 64% (n=16/25) required at least one anastomotic dilation procedure.

Conclusion: The use of the silicone stent to heal post-esophagectomy cervical anastomotic leaks has a high success rate. The advantages of the silicone stent include modest cost, low external wall pressure and lack of adherence of healing epithelium to its smooth surface. This may facilitate its removal without damaging the underlying mucosa.
PRESENTATION #8: Dr. Leandra Stringer

DIVISION: PAEDIATRIC SURGERY

Point of Care Ultrasound (POCUS) for the Diagnosis of Testicular Torsion: A Resident Education and Quality Improvement Initiative

Leandra Stringer, Ernest Pang Chan, Frank Myslik, Alex Jiang, Sara Cocco, Gary Brahm, Hassan Razvi, Sumit Dave, Peter Zhan Tao Wang
Division of Urology, Western University.

Introduction: Scrotal doppler ultrasound (DUS) is an adjunct for the diagnosis of testicular torsion (TT) when clinical assessment is equivocal. Our group identified that acquiring a DUS results in a 48-minute delay. POCUS may be used to negate this delay. The purpose of this study was to develop and evaluate a scrotal POCUS curriculum for Urology and emergency medicine (EM) residents.

Methods: Experts from urology, EM and radiology collaborated in The Delphi method to design a practical and didactic curriculum for scrotal POCUS. The study followed a pre-post design. The OASUS scale was used to evaluate for competency in scrotal POCUS skills. Residents were also asked to rate their comfort and confidence with scrotal POCUS before and after the curriculum.

Results: Twenty-four urology (n=12) and EM (n=12) residents participated in a scrotal POCUS curriculum. Pre-post testing showed significant improvements in knowledge (6.3 versus 8.0, p < .001) amongst the residents. Residents were more comfortable (pre 0.6 versus post 3.6, p < .001) and confident (pre 1.0 versus post 2.1, p < .001) utilizing scrotal POCUS to assess for TT after the curriculum (5-point Likert scale). Lastly, 23 out of the 24 residents were rated as competent at performing scrotal POCUS.

Conclusion: Our scrotal POCUS curriculum was effective and acceptable to both Urology and EM residents. This skill may potentially reduce delays in diagnosing TT and improve testicular salvage rates.
ABSTRACT FOR AWARD WINNING MSc IN SURGERY COLLOQUIUM
PRESENTATION

PRESENTER: Dr. Spencer Chambers
DIVISION: PLASTIC & RECONSTRUCTIVE SURGERY

The Impact of Scaphoid Malunion on Radioscaphoid Joint Contact: A Computational Analysis
Dr. Spencer Chambers

Introduction: The clinical significance of scaphoid malunion is controversial as the biomechanical sequelae remains poorly understood. In this computational study, the effect of increasing scaphoid malunion on radioscaphoid joint contact was assessed.

Materials & Methods: A total of 6 computational wrist models created from cadaveric limbs using a previously validated active wrist motion simulation and landmark registration technique were used. For each of these specimens 6 different scaphoid models simulating varying degrees of malunion were created using 3D imaging software. Each scaphoid was shortened at the waist by 2mm to recreate fracture comminution and the distal pole was angulated volarly from 15 to 55 degrees in 10 degree intervals to create a total of 6 scaphoid malunion models per specimen. Each malunion model was then placed with the wrist in 3 positions: neutral, 40 degrees flexion, and 40 degrees extension. The radioscaphoid contact area as well as the contact centroid was subsequently calculated

Results: There was a statistically significant association between malunion severity and amount of contact at the radiocarpal joint (p = 0.011). The centroid of this radioscaphoid contact area also trended in an ulnar direction for all tested wrist positions (p = 0.017). In the extended wrist position, the centroid also moved volarly (p=0.009).

Conclusion: Radioscaphoid joint contact was significantly associated with scaphoid malunion severity in this computational model. Furthermore, the contact centroid had a significant trend ulnarly in all wrist positions with increasing scaphoid malunion. The clinical significance of this contact is yet to be elucidated, but this computational model serves as a basis for understanding the biomechanical consequences of scaphoid humpback deformities.
DEPARTMENT OF SURGERY NODE PRESENTATIONS:

FUNDAMENTAL SCIENCES & SURGICAL INNOVATION NODE SPEAKER: Dr. Hassan Razvi
Talk Title: “Bench to Bedside” – Surgical Research – Is this a Realistic Goal?

SURGICAL EDUCATION NODE SPEAKER: Dr. Peter Wang
Talk Title: The Surgical Personality Revisited

PATIENT CENTERED RESEARCH NODE SPEAKER: Dr. Alan Getgood
Talk Title: From Instability to Stability: Results of a Multicentre RCT in ACL Reconstruction

ICES/BIG DATA NODE SPEAKER: Drs. Kelly Vogt, Luc Dubois and BlayneWelk
Talk Title: Narcotic Use After Surgery

DEPARTMENT OF SURGERY DRAGON’S DEN PITCHES

Fundamental Sciences & Surgical Innovation Node Pitches:

Pitch #1 - Dr. Tanya DeLyzer “BioArtificial Tissue (BAT) model to test novel peptides for attenuating radiotherapy induced implant capsular contracture in breast cancer reconstruction patients.”

Pitch #2 – Dr. Parham Rasoulinejad “MRI based patient-specific drill templates for pedicle screw fixation”

Pitch #3 – Dr. Hassan Razvi “The Effect of Antibiotics on Calcium-Based Urinary Stone Disease through Immune Modulation”

Pitch #4 – Dr. Nicholas Power “Novel fail-safe adaptor to prevent traumatic accidental urinary catheter removal”
Surgical Education Node Pitches

Pitch #1 – Drs. Sayra Cristancho & Megan Cashin “An exploration of allowing failure as an educational strategy in surgical training”

Pitch #2 – Dr. Peter Wang “Video-based education: comparing YouTube to surgeon-specific videos on resident performance and self-confidence”

Patient Centered Research Node Pitches

Pitch #1 – Dr. Parham Rasoulinejad “Serum Metal Ion Levels Post Multi-Level Spine Surgery”

Pitch #2 – Dr. Ken Leslie “An Incentivized Opioid-Return System Through the Disposal of Unwanted Medications Program (DUMP trial)”

ICES/Big Data Node Research Pitches

Pitch #1 – Dr. Chris Vinden “Ontario Surgeons vs United States Surgeons: who has better outcomes?”

Pitch #2 – Dr. Elnahas - “Does Surgical Start Time Lead to Complications?”

Pitch #3 – Dr. Chris Bailey “The financial cost of redundant radiology reporting for orthopedic surgeons”

Pitch #4 – Dr. Kelly Vogt “Who is providing emergency surgical care, and does it matter?”
THE ROBERT ZHONG LECTURE: Dr. Toni Zhong

We are very pleased to have Toni Zhong as our 2019 Dr. Robert Zhong Lecturer.

Dr. Toni Zhong, M.D., FRCS, MHS is an Associate Professor in the Department of Surgery, and the inaugural Belinda Stronach Chair in Breast Cancer Reconstruction at University Health Network (UHN). She is also the Clinical and Research Director for the Breast Reconstruction Program at UHN and Mount Sinai Hospitals, leading centres’ for advanced techniques in breast reconstruction in North America. She was recruited by University of Toronto in November 2008 from Memorial Sloan Kettering Cancer Center in New York City. In 2011, she also obtained her Masters of Health Sciences in Clinical Epidemiology from the Harvard School of Public Health.

To complement her clinical expertise in the field of breast reconstructive surgery, her research aims to improve the access of women to optimized techniques of post-mastectomy reconstruction through clinical trials and health services research. In 2012, she was awarded the prestigious 2012 Career Development Award from the American Society of Clinical Oncologists. She holds a five-year Canadian Institute for Health Research (CIHR) grant and leads a national team to examine barriers to breast reconstruction surgery across Canada. She was also awarded the highly competitive CIHR New Investigator Award in 2015. Recently, she was appointed as the Provincial Lead in the development of clinical guidelines to set new provincial standards for breast cancer reconstruction in Ontario. She currently has over 65 peer-reviewed publications in high impact oncology and surgical journals, holds 5 active national level research grants, and numerous Canadian and American Plastic Surgery Foundation Funds.

Dr. Zhong is also active in humanitarian activities. She is one of the founding members of WomenforWomen, a non-profit international humanitarian organization and annually leads international surgical teams overseas. She is a co-founder the UHN Helps Fund, a humanitarian fund to support patients from developing countries to receive their life-saving or life-enhancing
surgeries at UHN. To recognize her volunteerism, she was awarded the Dean’s Alumni Award in Community Service from University Of Western Ontario in 2018.

Previous Robert Zhong Lecturers:

2018  Dr. 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  Dr. 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  Dr. Marston W. Linehan, MD, Surgeon-in-Chief, National Institutes of Health

2015  Dr. Ivar Mendez MD, PhD, FRCSC, FACS, DSc(hon), FCAHS

2014  Dr. 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  Dr. Jeremy Nicholson, Head of the Department of Surgery & Cancer at Imperial College in London University, UK.

2012  Dr. 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  Dr. Amitai Ziv, Deputy Director, Chaim Sheba Medical Center; Director, Israel Center for Medical Simulation, Tel-Hashomer, Israel

2010  Dr. John Monson, Chief of Colorectal Surgery, Vice-chair, Department of Surgery The University of Rochester, Rochester, New York

2009  Dr. Anthony Atala, Professor and Chair of Urology, Director of Regenerative Medicine, Wake Forest University School of Medicine

2008  Dr. Richard M. Satava, Professor of Surgery, University of Washington

2007  Dr. James Shapiro, Wyeth-Ayerst Canada/CIHR Clinical Research Chair in Transplantation, Director, Clinical Islet Transplant Program, University of Alberta