The 25th Annual
WB & MH Chung
Lectureship and Research Day
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*The Surgical Times was formerly the newsletter of the UBC Department of Surgery produced by two distinguished emeriti professors: Dr. Phil Ashmore and Dr. John MacFarlane. With the advent of electronic communications, the Surgical Times is now only printed in paper form once a year for Chung Research Day.*
Message from the Department Head, Dr. Gary Redekop

The WB & MH Chung Research Day is our annual opportunity for our large and diverse Department of Surgery to highlight the wide range of basic and clinical research conducted by our faculty and trainees. The program this year includes topics ranging from pure basic science to translational research, education, and clinical outcome studies.

Our 2019 Chung Lecturer, Dr. Grantcharov, is a Professor of Surgery at the University of Toronto. He holds the Keenan Chair in Surgery at St. Michael’s Hospital in Toronto and a Canada Research Chair in Simulation and Surgical Safety. Dr. Grantcharov developed the surgical black box concept, which aims to transform the safety culture in medicine and introduce modern safety management systems in the high-risk operating room environment.

I would like to acknowledge the energy and creativity that the event organizers have put into making Chung Day a success. Dr. Alice Mui and her scientific program committee have carefully reviewed the submissions and selected a cross section of high quality projects representative of the many avenues of research in the Department of Surgery, which will be presented in a variety of formats.

Dr. Mui has also worked along with Susan Nye, my Executive Assistant, and Meredith Edwards, our Interim Director of Administration, to look after the planning and logistics for the day. My sincere thanks to all of you!

I would also like to acknowledge the outstanding accomplishments of the many faculty, residents, fellows, and graduate students in the Department of Surgery, and sincerely hope that you will share with me a deep satisfaction that comes from noting our Department’s many research activities.

Gary Redekop
Head, Department of Surgery
November 2019
Learning Objectives

This event is an Accredited Group Learning Activity eligible for up to 6 Section 1 credits as defined by the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada. This program has been reviewed and approved by UBC Division of Continuing Professional Development. Each physician should claim only those credits he/she actually spent in the activity.

1. To describe and evaluate the clinical, education and basic science research being conducted in the Department of Surgery.
2. To discover new and innovative research techniques.
3. To participate in the collaborative research environment within the Department of Surgery.
# Research Day Schedule

## Plenary sessions

### MORNING SESSION Paetzold Lecture Theatre

*8 minute paper with 2 minute discussion*

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<th>Time</th>
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<th>Department</th>
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<tbody>
<tr>
<td>08:00</td>
<td>Gary Redekop</td>
<td>Chung Research Day Welcome</td>
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<tr>
<td>08:05</td>
<td>Craig, Michael</td>
<td>Performance of the Subaxial Cervical Spine Injury Classification tool: A retrospective review across centres in Australia, Canada, and New Zealand</td>
<td>Neurosurgery</td>
</tr>
<tr>
<td>08:15</td>
<td>Ayling, Oliver GS</td>
<td>The effect of peri-operative adverse events on long-term patient reported outcomes after lumbar spine surgery: A Canadian multi-centre prospective study</td>
<td>Neurosurgery</td>
</tr>
<tr>
<td>08:25</td>
<td>Sasaki, Shugo</td>
<td>Engineering Human Stem Cell-Derived Pancreatic Beta Like Cells To Protect From Immune Attack</td>
<td>General Surgery</td>
</tr>
<tr>
<td>08:35</td>
<td>Landry, Evie C.</td>
<td>Early Health Economic Modelling of Novel Therapies in Hearing Loss: Accelerating Access and Implementation</td>
<td>Otolaryngology</td>
</tr>
<tr>
<td>08:45</td>
<td>Van Slyke, Aaron</td>
<td>Something Stinks! Finding Ways to Manage Noxious Odours in the Operating Room: A Randomized Controlled Trial</td>
<td>Plastic Surgery</td>
</tr>
<tr>
<td>08:55</td>
<td>Karimi, Navid</td>
<td>In Vivo Application of The First Generation of MeshFill-Plus; A Liquid Wound Healing Scaffold with Inherent Antimicrobial Properties</td>
<td>Plastic Surgery</td>
</tr>
<tr>
<td>09:05</td>
<td>Que, Jessica</td>
<td>The Impact of Daily Probiotics on the Incidence and Severity of Necrotizing Enterocolitis in Very Low Birth Weight Infants</td>
<td>Pediatric Surgery</td>
</tr>
<tr>
<td>09:15</td>
<td>Li, Yunyuan</td>
<td>Targeting M-CSF-mediated myeloid cells as treatment option for skin autoimmune disease (alopecia areata)</td>
<td>Plastic Surgery</td>
</tr>
<tr>
<td>09:25</td>
<td>Luc, Jessica G.Y.</td>
<td>Effect of Operating Room Personnel Generation On Perceptions and Responses to Surgeon Behavior</td>
<td>Cardiac Surgery</td>
</tr>
<tr>
<td>09:35</td>
<td>Luc, Jessica G.Y.</td>
<td>Social Media Improves Cardiothoracic Surgery Literature Dissemination: Results of a Randomized Trial</td>
<td>Cardiac Surgery</td>
</tr>
<tr>
<td>09:55</td>
<td>Maleki, Saeideh</td>
<td>Epigenetic silencing of SMPD3 in oral cancer alters cell migration, invasion, and drug response</td>
<td>Otolaryngology</td>
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**Refreshment Break (10:05 – 10:20)**

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<tr>
<td>10:20</td>
<td>Keyes, Mira</td>
<td>Patterns of prostate cancer recurrence after brachytherapy imaged with PSMA-targeting 18F-DCFPyL PET/CT</td>
<td>Radiation Oncology</td>
</tr>
<tr>
<td>10:30</td>
<td>Singh, Navneet</td>
<td>The Efficacy of Topical 0.3% Hydrogen Peroxide Solution Rinse in the Management of Biofilm-Associated Chronic Rhinosinusitis</td>
<td>Otolaryngology</td>
</tr>
<tr>
<td>10:40</td>
<td>Sarwal, Gautam</td>
<td>The physical toll of working in operating rooms: A survey of the Canadian Society of Vascular Surgery</td>
<td>Vascular Surgery</td>
</tr>
<tr>
<td>10:50</td>
<td>Sagarin, Zach</td>
<td>Gender-Based Compensation Disparity Among General Surgeons in British Columbia</td>
<td>General Surgery</td>
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<tr>
<td>11:00</td>
<td>Amanian, Ameen</td>
<td>Assessing Post-Operative Patient-Centred Care Education Administration in Head and Neck Cancer Patients – A Pilot Study</td>
<td>Otolaryngology</td>
</tr>
<tr>
<td>11:10</td>
<td>Skarsgard, Peter</td>
<td>Percutaneous Mitral Valve Repair: Proof of Concept for a Novel Medical Device</td>
<td>Cardiac Surgery</td>
</tr>
<tr>
<td>11:20</td>
<td>Joshua, Temitope Grace</td>
<td>A systematic review on treatments outcomes of patients with sudden sensorineural herring loss</td>
<td>Otolaryngology</td>
</tr>
<tr>
<td>11:30</td>
<td>Hsiang, York</td>
<td>The development of a smart stent to detect in-stent restenosis.</td>
<td>Vascular Surgery</td>
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</table>

**11:40:00** Grantcharov, Teodor | CHUNG LECTURE: Surgical innovation, surgical education and patient safety |                                      |
12:40 SIMULTANEOUS SESSIONS & LUNCH

AFTERNOON SESSION Paetzold Lecture Theatre

*8 minute paper with 2 minute discussion*

13:55 376 Lalande, Annie General Surgery
Standardizing peri-operative VTE prophylaxis in orthopedic trauma patients at VGH – is there room for improvement?

14:05 377 Dhatt, Saroop Pediatric Surgery
Improving the Diagnostic Accuracy of Pediatric Appendicitis using a Multidisciplinary Pathway

14:15 378 Lalande, Annie General Surgery
Reflecting on 5 years of Primary Trauma Care course experiences in Gondar, Ethiopia.

14:25 381 Lalande, Annie General Surgery
Stewardship of laboratory investigations and rational resource utilization in acute care surgery.

14:35 384 Lie, Jessica Jin General Surgery
Emergency Use of Group A Plasma in Trauma Patients at a Level 1 Trauma Center

14:45 386 Roller, Janine Michele Plastic Surgery
A Clinical and Histological Analysis of Double Capsules and Adherence in Augmentation Mammoplasty with Textured Implants

14:55 387 Butt, Abdalla Vascular Surgery
Evaluating the Role of Perioperative Medicine Consult on Clinical Outcomes in Vascular Surgery Patients

15:05 389 Mak, Nicole General Surgery
Intraoperative Parathyroid Hormone Measurement During Parathyroidectomy For Treatment of Primary Hyperparathyroidism: When Should You End The Operation?

15:15 395 Rokui, Sorush Otolaryngology

15:25 396 Fatehi, Mostafa Neurosurgery
Low grade gliomas: to operate, or not to operate?

15:35 397 Guo, Ru Neurosurgery
Next-Generation Sequencing and Functional Studies for Rare, Highly-Penetrant Mutations in Familial Intracranial Aneurysms

15:45 399 Salterio, Nicholas Neurosurgery
Short- & Long-Term Gait and Cognitive Outcomes After Primary Endoscopic Third Ventriculostomy in Adult Obstructive Hydrocephalus

Evening Reception (RSVP required)

Program
6:00 pm - Cocktails
6:30 pm – Award Presentations
7:00 pm – Dinner

Location
The University Golf Club in the heart of the Pacific Spirit Park and the University Endowment Lands
5185 University Blvd, Vancouver, BC V6T 1X5
Simultaneous Session A
Paetzold Multipurpose Room, 12:30 – 1:45 pm

*2.5 minute paper with 0.5 minute discussion

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<td>Urban, Ryan</td>
<td>Radiation Oncology</td>
<td>316</td>
<td>PET Scan Assessment of Response 12 weeks Post Radical Radiotherapy in Oropharynx Head and Neck Cancer: The Impact of p16 Status</td>
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<td>Verly, Myriam Maude</td>
<td>General Surgery, Plastic Surgery</td>
<td>318</td>
<td>Topical Application of a Novel Powdered Scaffold for Rapid Treatment of Skin Injuries</td>
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<td>Mordhorst, Alexa</td>
<td>Vascular Surgery</td>
<td>319</td>
<td>Vascular Access Complications Following Transcatheter Aortic Valve Implantation (TAVI)</td>
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<td>Pripotnev, Stahs</td>
<td>Plastic Surgery</td>
<td>323</td>
<td>Destination Design msTRAM – For Greater Reconstructive Certainty</td>
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<tr>
<td>D’Souza, Karan</td>
<td>General Surgery</td>
<td>324</td>
<td>Evaluating Management and Outcomes of Blunt Cerebrovascular Injuries at a Canadian Level-1 Trauma Center: Are we meeting the grade?</td>
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<td>Dandurand, Charlotte</td>
<td>Neurosurgery</td>
<td>325</td>
<td>Quality of life measured with SF36 and EQ5D5L in patients diagnosed with unruptured cerebral aneurysm: prospective cohort study</td>
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<td>Mankowski, Peter</td>
<td>Plastic Surgery</td>
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<td>Outcome assessment of facial orthopedics with taping for cleft lip deformities using 3D stereophotogrammetry.</td>
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<td>Mankowski, Peter</td>
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<td>Reporting Outcome and Outcome Measures in Male-to-Female Transgender Chest Surgery: A Systematic Review</td>
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<td>Landry, Evie C.</td>
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<td>Systematic Review and Network Meta-analysis of Cognitive and/ or Behavioral Therapies (CBT) for Tinnitus</td>
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<td>Allen, Laura Katheline</td>
<td>Otolaryngology</td>
<td>331</td>
<td>A systematic review of the Harmonic Scalpel in parotidectomy</td>
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<td>Medikeri, Gaurav</td>
<td>Otolaryngology</td>
<td>332</td>
<td>Frontal Ostium Grade (FOG): A Novel CT Grading System for a Safe Endoscopic Approach to the Frontal Sinus</td>
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<td>Dhillon, India</td>
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<td>A Phase I Tolerance Evaluation of Topical Nitric Oxide Sinus Irrigation (NOSi) Dose Escalation in Individuals with Recalcitrant Chronic Rhinosinusitis (CRS)</td>
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<td>Adebola, Stephen O</td>
<td>Otolaryngology</td>
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<td>Use of confocal microscopy and clinical data to understand Chronic Rhinosinusitis (CRS)</td>
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<td>Zivkovic, Irena</td>
<td>Pediatric Surgery</td>
<td>336</td>
<td>Surgical Capacity and Trauma System Functionality in Rural Uganda</td>
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<td>Choi, Sally Hye Ji</td>
<td>Vascular Surgery</td>
<td>337</td>
<td>Evaluation of aortic zone 2 landing accuracy during TEVAR following carotid-subclavian revascularization</td>
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<td>Wong, Jordan</td>
<td>Radiation Oncology</td>
<td>338</td>
<td>Validation of Deep Learning-based Auto-Segmentation for Organs at Risk in Lung Stereotactic Body Radiotherapy Using Retrospective Radiotherapy Plans</td>
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<td>Muathen, Sumaiya</td>
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<td>Subcutaneous Nucala Injection: An adjunctive Treatment for Recalcitrant Allergic Fungal Rhinosinusitis</td>
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<td>Li, Yunyuan</td>
<td>Plastic Surgery</td>
<td>341</td>
<td>De novo sweat gland-like structures generated at dorsal skin of Balb/C mice upon dermal injury</td>
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<td>Adreak, Najah</td>
<td>Cardiac Surgery</td>
<td>343</td>
<td>Short- and long-term survival rate of mini-sternotomy vs full sternotomy in aortic valve replacement: The St. Paul’s Hospital experience</td>
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<td>Luc, Jessica G.Y.</td>
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<td>Valvectomy Versus Replacement for the Surgical Treatment of Infective Tricuspid Valve Endocarditis: A Systematic Review and Meta-Analysis</td>
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<td>Boroditsky, Matthew</td>
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<td>How good is the Mustarde Otoplasty?</td>
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<td>Mousa-Doust, Dorsa</td>
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<td>Excision of breast Fibroepithelial lesions: when is it still necessary?</td>
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<td>Factors Associated with Failure of Botulinum Toxin Injection in Adductor Spasmodic Dysphonia</td>
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<td>Ollek, Sita Oza</td>
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<td>354</td>
<td>Location of the Primary Tumor within the Breast: A Unique Predictor for Local Recurrence After Skin Sparing Mastectomy with Immediate Reconstruction</td>
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<td>Taqi, Kadhim Mustafa</td>
<td>General Surgery</td>
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<td>Trends for acute surgical consultations for oncology patients in British Columbia.</td>
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<td>Angeli Ji</td>
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<td>Dr Google: Quality of Internet Resources on Ganglion Cysts</td>
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<td>Kapur, Hannah</td>
<td>General Surgery</td>
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<td>Calculating quality indicators for mastectomy at Mount Saint Joseph Hospital</td>
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<td>Quarter Century Evaluation of General Surgery Residency at the University of British Columbia</td>
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<td>Deane, Emily</td>
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<td>Voice Outcomes following Secondary Tracheoesophageal Puncture in Gastric Pull-up Reconstruction following Total Laryngopharyngectomy</td>
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<td>Pilot Study for Development of a Descriptive and Clinically Relevant Endoscopic Sinus Scoring System</td>
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<td>Samson, Laura</td>
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<td>Vitamin D Supplementation and Reduction of Severity and Frequency of Epistaxis in Hereditary Hemorrhagic Telangiectasia</td>
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<td>Sit, Daegan</td>
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<td>Treatment and Outcomes in pT4 Well-Differentiated Thyroid Carcinoma</td>
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<td>Role of oxidative stress-related miRNAs in idiopathic sudden sensorineural hearing loss (SSNHL) etiopathogenesis.</td>
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<td>Al Muqaimi, Nawaf</td>
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<td>Hospital Length of Stay after Cleft Palate Surgery: An Analysis of 200 Consecutive Cases.</td>
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<td>Early and Delayed Functional Outcomes after the Treatment of Posterior Inferior Cerebellar Aneurysms</td>
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<td>The effectiveness of motivational interviewing on hearing aid use</td>
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<td>Roshan, Aishwarya</td>
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<td>Back (Door) to the Future: Dorsal Lumbotomy for Pediatric Upper Pole Heminephrectomy</td>
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<td>Talbot, Martha L</td>
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<td>Population-based treatment, regional recurrence patterns and survival in Merkel cell carcinoma: a 15-year review</td>
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<td>Knight, Paige</td>
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<td>Pre-operative tranexamic acid reduces peri-operative blood loss: A meta-analysis</td>
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<td>Limited clinical utility of intraoperative frozen section during parathyroidectomy for treatment of primary hyperparathyroidism</td>
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<td>Brar, Shanjot</td>
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<td>Discharge VTE Prophylaxis Prescribing Patterns of VGH Trauma and Orthopedic Surgeons Following Orthopedic Trauma Surgery at Vancouver General Hospital</td>
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<td>Fouladirad, Saman</td>
<td>Neurosurgery</td>
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<td>Challenges Associated with Transitioning from Pediatric to Adult-Care for Youths with Hydrocephalus</td>
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<td>Mak, Nicole</td>
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<td>Relationship Between Thyroid Surgical Oncological Quality Indicators</td>
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<td>Damage Control in Liver Transplantation: a strategy in managing hemorrhage</td>
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<td>Association between Nutritional Risk Index and Outcomes for Head and Neck Cancer patients receiving Concurrent Chemo-Radiotherapy</td>
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<td>Lim, Jonathan Zhu-En</td>
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<td>Late effects assessment in survivors of pediatric brain tumors and rhabdomyosarcoma</td>
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<td>Caval Reconstruction in Orthotopic Liver Transplantation: is there a superior technique?</td>
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<td>Upper Extremity Performance Changes in Children with Spastic Cerebral Palsy following Lumbo-sacral Selective Dorsal Rhizotomy</td>
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<td>Forbes, Diana</td>
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<td>Practice pattern among Canadian plastic surgeons on the use of hyaluronidase for treating complications related to HA fillers</td>
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<td>Lustig, Daniel</td>
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<td>Preoperative Calcium and Parathyroid Hormone Levels Affect Dual Energy Computed Tomography (DECT) and Conventional Preoperative Localization Studies in Patients with Primary Hyperparathyroidism</td>
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Founders of the W.B and M.H. Chung Lectureship

Prior to the establishment of the W.B. and M.H. Chung Research Day, the Department of Surgery only had Division specific research days. In 1995, the Dr. W.B. and M.H. Chung created an endowment that allows us to hold an annual research day that has become the premier, department-wide event at which we recognize our research achievements.

Wallace B. Chung, MDCM, FRCSC, DSc ’94

Dr. Chung was born and raised in Victoria, British Columbia. After pre-medical education at Victoria College and UBC, he attended the McGill University and received his M.D. in 1953. Following internship and surgical residency training at VGH and UBC, Dr. Chung was appointed to the Department of Surgery at UBC as an Instructor in 1960. After being appointed to an Assistant Professor in 1961, Dr. Chung rose quickly through the ranks to become a full Professor in 1972. For his many professional and community contributions, Dr. Chung has received many awards, including being appointed to the Order of Canada in 2005.

Professional Career

Dr. Chung was noted as a technically gifted surgeon who pioneered Vascular Surgery in Western Canada. In particular, Dr. Chung was known for his excellent surgical results for carotid artery surgery for transient ischemic attacks. He established Vascular Surgery as a new specialty in BC, and as a separate division of surgery at VGH and UBC. He was one of founders of the Canadian Society for Vascular Surgery, and served as its president in 1982. Throughout his academic career, Dr. Chung has taken positions of responsibility (appointed University Head of the Division of General Surgery in 1970, Head of the University Division of General and Vascular Surgery in 1978, Head of the Department of Surgery at the University Hospital in 1981). During his nine year tenure he built the University Hospital Department of Surgery into an excellent academic unit with international recognition for vascular surgery and gastrointestinal surgery. He was also the Governor of the American College of Surgeons from 1980 to 1986. Dr. Chung has received many awards for his teaching and service, including being honoured by the vascular surgeons of British Columbia with a named day – The Wallace B. Chung Clinical Day.

Community Service

Dr. Chung has also been an effective and tireless pillar of the community. He has used his extraordinary gifts of wisdom and diplomacy to help advance the integration of the Chinese Community. He was one of the founding executives of the Chinese Cultural Centre of Vancouver serving as Chair from 1983-87. Under Dr. Chung’s leadership, the Centre has become a model for other multicultural programs in Canada. Among his other community activities, Dr. Chung is a founding member and patron of the Sun Yat-Sen Gardens, served on the Board of Directors International Dragon Boat Festival Society, and Vice Chair of the Canadian Multiculturalism Council. Dr. Chung’s contributions have been recognized by awards (Chinese Cultural Centre Outstanding Achievement Award in 1989 and Chinese Benevolent Association Outstanding Citizen Award in 1990) and his appointment to the B.C. Heritage Trust in 1993.

History Scholar

An avid reader and collector of first edition rare books, Dr. Chung became a renowned authority and collector of one of Canada’s best libraries on the history of the Pacific Northwest exploration and Chinese Canadian immigration. Due to his interest in the Canadian Pacific Steamship Company, Dr. Chung was a guest curator of the Vancouver Maritime Museum for the “Empress to the Orient Exhibition” in 1991. In recognition of this interest, the Vancouver Maritime Museum has named its library, the W.B. and M.H. Chung Library. In 1999 he made a gift of more than 25,000 rare and unique items to the University of British Columbia. The Chung Collection is housed in the Ike Barber Learning Centre (http://chung.library.ubc.ca/) and attracts scholars and visitors from around the world.
Madeline Chung, MD, FRCSC

Dr. Madeline Chung was born in Shanghai, China. Her medical education took place at the Yale Medical College of China. She did her internship in Victoria, B.C. followed by specialty training in Obstetrics and Gynecology in Montreal and at the Mayo Clinic in Rochester, Minnesota. Upon coming to Vancouver in the late 1950's, she was the first female and first Chinese-Canadian specialist in Obstetrics and Gynecology in British Columbia. She was appointed as a Clinical Instructor at the University of British Columbia and by the time of her retirement she had delivered over 6,500 babies over a 40 year career, and held the rank of Clinical Professor. Shortly after her retirement from clinical practice she was made an Honorary Life Member of the College of Physicians & Surgeons of British Columbia. Dr. Madeline Chung is also a Clinical Professor Emeritus of the Department of Obstetrics and Gynecology in the Faculty of Medicine at the University of British Columbia.

Physician

She was known as a compassionate and empathic physician who gave freely and willingly of her time to her patients, often acting as a counselor to her patients and mentor to the children and adults who she had previously delivered. Frequently, the children she delivered would return to see Madeline years later when it was time for them to have their own babies.

Community Service

Dr. Madeline Chung extended her philosophy of volunteerism and service to the community in all aspects of her life. Not only was this evident in her professional life but she was active in her church and community as well. She served on boards of the Chinese United Church, the Vancouver Academy of Music, and was the founding Executive Director of the True Light Chinese School in Vancouver. Well into her eighties, she was given an honorary graduation certificate from York House School in recognition of her contributions to the school.

Family

Despite her tireless devotion and dedication to her patients she was still able to balance a healthy family life providing endless support to her husband, Wally, while raising two children who felt inspired enough by their home life to pursue careers in medicine. Their daughter Dr. Maria Chung is in the Division of Geriatric Medicine at the University of British Columbia. Their son Dr. Stephen Chung is the past University of British Columbia Head of the Division of General Surgery and the current Vancouver General Hospital Head of Hepatobiliary & Pancreatic Surgery. Late in her career, she experienced a life-threatening illness but was able to return to full-time work. At the same time, she was the primary caregiver to her elderly mother whom she looked after in her home.
Dr. Teodor Grantcharov completed his surgical training at the University of Copenhagen, and a doctoral degree in Medical Sciences at the University of Aarhus in Denmark. He holds the Keenan Chair in Surgery at St. Michael’s Hospital in Toronto & Canada Research Chair in Simulation and Surgical Safety.

Dr. Grantcharov’s clinical interest is the area of minimally invasive surgery, with a focus on foregut disease including cancer and bariatric surgery. Dr. Grantcharov’s area of academic interest is in the field of surgical innovation, surgical education and patient safety. He has become internationally recognized as a leader in this area with his work on curriculum design, assessment of competence and impact of surgical performance on clinical outcomes. Dr. Grantcharov developed the surgical black box concept, which aims to transform the safety culture in medicine and introduce modern safety management systems in the high-risk operating room environment.

Dr. Grantcharov has more than 170 peer-reviewed publications and more than 180 invited presentations in Europe, South- and North America. He sits on the Board of Governors of the American College of Surgeons (ACS) and on numerous committees with Surgical Professional Societies in North America and Europe. He sits on the Editorial Boards of the British Journal of Surgery and Surgical Endoscopy.
Background: The epidemiology of oropharynx cancer is evolving with the increasing prevalence of human papillomavirus (HPV) related disease characterized by p16 positivity on immunohistochemistry. Metabolic response to definitive radiotherapy in oropharynx cancer is assessed by positron emission tomography (PET) scans completed 12 weeks post radiotherapy. Stratification of the predictive value of post-radiotherapy PET scans based on p16 status has yet to be investigated in a large cohort.

Objective: To evaluate the predictive value of PET scans for detection of residual disease after radical radiotherapy for patients with squamous cell carcinoma (SCC) of the oropharynx, comparing p16 positive (+) versus p16 negative (-) disease. Given the excellent outcomes in p16+ oropharynx cancer, we hypothesized that the risk of a false positive post-radiotherapy PET scan was higher in p16+ versus p16- disease.

Methods: A retrospective analysis of patients with SCC of the oropharynx at our institution treated with radical radiotherapy between 2012 to 2016 was performed. The primary and lymph node metabolic responses were evaluated independently on the post-treatment PET. The reference standard was pathology when available, subsequent post-treatment PET results or clinical follow-up.

Results: Median follow-up time was 32 (30-34) months. 556 patients had p16+ disease and 92 had p16- disease. The median time of post-treatment PET was 96 (45-744) days after radiotherapy completion: 68% had complete metabolic response (CMR), 10% residual primary disease, 11% residual regional lymph node disease, 5% residual primary and regional disease, and 6% distant metastatic disease. The local positive predictive value (PPV) was 26% for p16+ versus 54% for p16- (p=0.01) and the regional PPV was 31% for p16+ versus 50% for p16- (p=0.01). The local negative predictive value (NPV) was 100% regardless of p16 status and the regional NPV was 100% for p16+ versus 99% for p16- (p=0.33). For p16+ cases, regional specificity was 76.2% versus 91.1% (p=0.0003), local PPV was 0 versus 30% (p=0.06) and the regional PPV was 12% versus 35% (p=0.06) for PET scans performed at ≤12 weeks versus >12 weeks. Five-year overall survival for those with CMR was 87% versus 51% without CMR (p=<0.001). The local PPV was 26% for p16+ versus 54% for p16- (p=0.01) and the regional PPV was 31% for p16+ versus 58% for p16- (p=0.01). The local negative predictive value (NPV) was 100% regardless of p16 status and the regional NPV was 100% for p16+ versus 99% for p16- (p=0.33). For p16+ cases, regional specificity was 76.2% versus 91.1% (p=0.0003), local PPV was 0 versus 30% (p=0.06) and the regional PPV was 12% versus 35% (p=0.06) for PET scans performed at ≤12 weeks versus >12 weeks. Five-year overall survival for those with CMR was 87% versus 51% without CMR (p=<0.001).

Conclusions: Metabolic response on post-treatment PET has excellent NPV regardless of p16 status. The PPV is significantly lower in those with p16+ versus p16- disease, with a significantly reduced regional specificity and a trend towards inferior predictive value if performed ≤12 weeks. CMR predicts for a significantly improved overall survival.

Introduction: Wound healing is a complex and dynamic process involving not only cell-cell interaction, but also cell-matrix signalling. In large skin injuries, lack of matrix deposition impedes timely healing process. The longer a wound remains open, the greater is the risk of infection, non-healing, and other complications. It is therefore crucial to find effective means to promote rapid closure of skin defects. Our group has previously developed a liquid in situ-forming nutritional scaffold, known as MeshFill (MF). MF has been proven to be very effective in accelerating the wound repair process, notably that of complex wounds. However, MF is limited in its application to deep and tunneling wounds, and requires reconstitution with a solvent as well as maintenance at cold temperature until application. To address these limitations, our group has developed a powdered form of MF for rapid topical application on superficial skin injuries such as dehisced surgical wounds.

Objectives: Our goal was to investigate whether a powdered form of MF could be directly applied onto the wounds to accelerate healing. It was thought that the powdered MF would absorb the moisture within the wound environment and reconstitute into the gel form in situ.

Methods: We examined the efficacy of powder MF (PMF) compared to reconstituted gel MF (GMF) and to a standard dressing protocol. To do so, splinted full thickness wounds were generated on the back of mice and treated with either PMF or GMF or were bandaged with no treatment (NT). The healing process was monitored until wounds were fully closed. Clinical wound measurements and histological assessments were performed to compare different treatment regimens.

Results: Application of both PMF and GMF accelerated wound epithelialization at days 7 and 14, compared to NT, and had faster wound closure times. On average, the PMF treatments healed 17% faster than the NT control, and the GMF treatments healed 21% faster than the NT control. No significant difference between PMF and GMF was found for any outcomes. Additionally, our results suggest that epidermis formation was more effective in PM and MF conditions compared to NT.

Conclusion: These findings suggest that topical application of a powdered form of MeshFill is as effective as standard reconstituted MeshFill gel in accelerating the healing process of skin injuries. As such, topical application of PMF may be a very convenient and practical method for rapid treatment of large superficial wounds such as dehisced surgical wounds and filling gaps in meshed skin grafts.
Background: Translational aortic valve implantation (TAVI) procedures have revolutionized the treatment of aortic stenosis. However, due to large sheaths, improperly deployed closure devices, and the comorbidities and challenges innate to this population, vascular access complications can be devastating.

Objective: The objective of this study is to evaluate vascular access complications in one of the largest TAVI sites in North America.

Methods: This was a retrospective single centre review between January 2014 and December 2018 of vascular access complications necessitating operative intervention by vascular surgery. Patient demographics and pre-operative comorbidities were collected. Type of vascular access complications, repair, device used, and post-operative outcomes were analyzed.

Results: A total of 37 cases out of a total of 985 TAHI procedures were identified. TAHI was carried out in the operating suite (70%) or the catheterization lab (30%). Consults to vascular surgery were requested intraoperatively (60%), immediately post-operative (14%), later in the day of the TAHI (20%), and on post-operative day 1 (6%). The location of injury included common femoral artery (49%), superficial femoral artery (11%) and external iliac artery (41%), with some cases injuring multiple vessels. Closure devices were found in the subcutaneous tissue (26%), anterior wall (37%), posterior wall (11%), intraarterial (11%), closing the anterior to the posterior wall (16%), and in the inguinal ligament (5%). Injuries included tears (11%), dissections (38%), and vessel rupture (19%). The majority of repairs were done primarily (64%), with patch (28%) and bypass (8%) less frequently. Four patients died perioperatively (11%), two from hemorrhage, one from cardiac arrest, and one from progressive respiratory disease.

Conclusion: Access complications during TAHI procedures predispose complex patients to increased risk of morbidity and mortality. Careful patient selection, proper access techniques, and performing high risk patients in the operating suite with vascular surgery is fundamental in minimizing complications.
immediate nipple reconstruction. This new technique offers consistent results in a single stage with significantly reduced revision rates.

Methods: A retrospective chart review and a BREAST-Q questionnaire of a single surgeon’s practice was performed to compare revision rates and patient satisfaction following Destination Design msTRAM reconstruction compared to a historical cohort of patients that received traditional free TRAM reconstruction.

Results: The chart review identified 39 patients treated with the traditional technique from 1997-2004 and 88 patients treated with the novel technique from 2004-2017. Chart review results showed that traditional technique patients had a breast revision rate of 64.1% and a nipple revision rate of 42.3% after secondary nipple reconstruction. Destination Design patients had a breast revision rate of 44.3% (p=0.0403) and a nipple revision rate of 37.9% (p=0.687) after primary nipple reconstruction. Rates of minor and major TRAM necrosis between both methods were statistically non-significant (minor 10.2% and major 5.1% in the traditional group and minor 13.5% and major 5.6% in the Destination Design group). The BREAST-Q questionnaire was sent to 12 traditional technique patients with 11 responses (92%), and 35 Destination Design patients with 23 responses (66%). Survey results showed that traditional technique and Destination Design patients had an overall breast satisfaction rate of 67.5% and 63.9% respectively.

Conclusions: The novel described Destination Design msTRAM unilateral delayed breast reconstruction technique leads to a statistically significant reduction in breast flap revisions and allows for equally accurate immediate nipple reconstruction compared to traditional methods with no additional complications. Overall patient satisfaction with the final result is comparable with both techniques.

324 Dr. Karan D’Souza General Surgery
Title: Evaluating Management and Outcomes of Blunt Cerebrovascular Injuries at a Canadian Level-1 Trauma Center: Are we meeting the grade
Authors: Karan D’Souza MD1, Blake Birnie BSc1, Yi Man Ko MD 1, Emilie Joos MD1CM1.
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Introduction: Traumatic blunt injuries to the carotid or vertebral artery, collectively termed blunt cerebrovascular injury (BCVI), are uncommon but potentially devastating events. The incidence of blunt cerebrovascular injury in patients sustaining blunt trauma is estimated to be 3–6%. Untreated BCVI is associated with high mortality rates (23–28 percent), with a significant portion of survivors suffering permanent severe neurologic deficits. Despite improvements in characterizing BCVI, optimal treatment modalities and long-term progression remain unclear.

Objective: The purpose of the study is to investigate incidence of BCVI and understand the current in-hospital and post-discharge management of these patients in the province of British Columbia.

Methods: The Trauma Services BC Registry was retrospectively reviewed to identify all trauma patients greater than 18 years old, who suffered any grade of BCVIs from January 2013 to December 2018. The registry, hospital databases and patient charts were used to summarize patient demographics, fulfillment of screening guidelines, choice and initiation of appropriate therapy, adherence to treatment recommendations after discharge, and post-discharge follow-up.

Results: From 2013 to 2018, a total of 196 patients were included in the study. The incidence of BCVI was 3%. Patients were predominately male (68%), with a mean age of 49 ± 20 years (range 18-97). Mechanism of injury was primarily motor vehicle collisions (n = 132). The majority of BCVIs were BIFIL Grade 1-2 (n = 179). The expanded Denver Criteria was the most sensitive screening tool identifying 88% of BCVIs. Majority of patients were treated with ASA 81mg (71.1%), while larger doses of ASA, heparin, and other anti-thrombotic were used as well. Repeat scans in 7 days to reassess the injury and guide duration of therapy were only completed in 39% of patients. Twenty-five patients (16%) developed strokes. Only 59.2% of patients had appropriate follow-up plans in regards to medication regimens, follow-up imaging and appointment timing listed in their discharge summaries.

Conclusions: BCVI, although rare, carries a high mortality and may be functionally debilitating. Therefore, prompt diagnosis and effective therapy is critical in the management of BCVI. The incidence of BCVI in B.C. is approximately 3 percent in line with what others have reported in literature. In collaboration with the stroke prevention clinic, we plan to implement a BCVI protocol to better identify these patients and streamline their care. We hope to study this cohort prospectively and inform future guidelines for BCVI in trauma.

325 Dr. Charlotte Dandurand Neurosurgery
Title: Quality of life measured with SF36 and EQ5D5L in patients diagnosed with unruptured cerebral aneurysm: prospective cohort study
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Background: Living with the diagnosis of an unruptured cerebral aneurysm can understandably cause anxiety for a patient. The goal of preventative treatment of an aneurysm is to increase the number of patients with good quality of life (QoL).

Objective: This study aimed at measuring the effect of unruptured intracranial aneurysm treatment on QoL scores measured by SF36 and EQ5D5L.

Methods: We prospectively collected SF-36 and EQ-5D-5L in patients with unruptured intracranial aneurysm at three time-points over 1 year in 2 groups: observation and treatment (microsurgical and endovascular). Multivariable linear regression and propensity score was used to examine treatment group differences in the mean change scores from baseline to 1 year when adjusted for covariates.

Results: 92 patients were included in the observation group and 60 patients were included in the surgical group for a total of 160 patients. The treatment group had lower SF-36 total scores at baseline (p=0.001) and at 1 year (p=0.02). EQ visual analogue scale did not differ between groups at all time-points. With multivariate linear regression models, the effect of treatment on mean change score from baseline to 1 year was not statistically significant (p=0.4). When performing propensity score matching, the effect of treatment on mean change scores from baseline to 1 year did not reach statistical significance (p=0.07).

Conclusion: In this large prospective study, preventive aneurysm treatment was not associated with a significant change in QoL score compared to observation measured by SF36 and EQ5D5L. Further studies are needed to explore the lower QoL scores in patients undergoing treatment and its impact on management decision making.

326 Dr. Peter Mankowski Plastic Surgery
Title: Outcome assessment of facial orthopedics with tapping for cleft lip deformities using 3D stereophotogrammetry.

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3 Plastic and Reconstructive Surgery, Kyoto University, Kyoto, Japan

Background: Prior to surgical correction of a cleft lip deformity, facial tapping is a type of presurgical orthopedics (PSO) that is used to improve soft tissue alignment and facilitate surgical repair. Dynacleft and 3MTM tapping are two commercially available tapping systems that can be utilized with or without nonalveolar molding. Determining how these tapes differ in their ability to manipulate soft tissue is useful in optimizing the care of cleft lip and/or palate patients.

Objective: The purpose of this study was to evaluate two cleft lip tapping devices, 3M and Dynacleft, for their ability to impact nasolabial shape and symmetry during the treatment of the cleft lip deformity.

Methods: A retrospective cohort study of 70 CLP patients was conducted including patients that have received either Dynacleft or 3M facial tapping as a component of their PSO treatments. 3D stereophotogrammetry images were obtained at three time-points: prior to treatment, after receiving tapping
and after surgical repair. 3D images were annotated with 31 landmarks on the nasal and upper lip region using 3DMD Vultus software (Atlanta, GA). The landmarks were then used in conventional morphometric analysis with previously validated facial measurements (linear distances, ratios and angles) to describe and compare the two cohorts at each stage. Geometric morphometrics using Procrustes ANOVA analysis was also conducted to compare the nasolabial asymmetry between the two taping groups.

**Results:** Both taping devices demonstrated progressive improvement in multiple facial metrics after taping and after surgery. Although variability in the degree of improvement was noted in the evaluated facial metrics after PSO between the two taping groups, no differences were found between these metrics after surgery. ANOVA comparison of the nasolabial region after Procrustes ANOVA also found no significant difference in facial shape between the two taping cohorts after surgical cleft lip repair ($p$-value = 0.80). However, nasolabial shape after PSO ($p$-value = 0.02) was found to differ depending if patients received formal PNAM treatment with their taping or taping alone.

**Conclusions:** PSO with facial taping reduces the severity of facial deformity prior to surgical correction across multiple facial measurements. Both 3M and Dynaclaim taping devices result in similar facial alignment post-operatively suggesting either can be successfully utilized. Given the significant cost differences between the two systems, our data may provide support for greater uptake of 3M taping for PSO.

**327 Dr. Peter Mankowski**  
**Plastic Surgery**  
**Title:** Reporting Outcome and Outcome Measures in Male-to-Female Transgender Chest Surgery: A Systematic Review  
**Keywords:** Gender affirming surgery, chest feminization, reporting standards, outcomes

**Methods:** This systematic literature review was conducted utilizing three electronic publication databases (PubMed, Ovid MEDLINE, Embase) to identify studies detailing male to female transgender breast construction procedures. Articles were reviewed for their case number, patient demographics, surgical techniques, follow up, reported complications and additional metrics of post-operative appraisal including psychosocial wellbeing.

**Results:** A total of 7 studies met our inclusion criteria representing 439 patients who received breast construction procedures. Inframammary placed implant construction was the most commonly documented procedure represented in the literature. Unplanned revisions (8.4%) was the most frequently reported undesirable outcome and was linked to a reduction in patient wellbeing. Various metrics for psychosocial evaluation were utilized to quantify the impact of chest feminization and supported its ability to improve wellbeing and self-esteem post-surgery.

**Conclusions:** The results of this review summarize the procedures of breast construction being utilized and profiles their expected post-operative outcomes. Consistently in psychosocial well-being of transgender patients who solely received chest procedures has yet to be fully demonstrated.

**328 Dr. Evie Landry**  
**Otolaryngology**  
**Title:** Early Health Economic Modelling of Novel Therapies in Hearing Loss: Accelerating Access and Implementation

**Objective:** To evaluate the efficacy of cognitive and/or behavioral therapies in improving health-related quality of life (HRQOL), depression and anxiety associated with tinnitus.

**Methods:** A systematic review and network meta-analysis of randomized controlled trials (RCTs) comparing cognitive and/or behavioral therapies to one another or to waitlist controls for the treatment of tinnitus were included.

**Conclusions:** To our knowledge, this is the first network meta-analysis and NMA comparing psychological interventions for tinnitus. The results of this analysis will provide health technology assessment groups and decision makers with a comprehensive evidence base from which to choose.
greater at restoring hearing to the normal range (pure tone average of &lt;25dB to remain cost-effective. Finally, the most important uncertainties identified were the estimates of efficacy, uptake and cost of the novel hearing therapeutics used in the model.

**Conclusions:** Early health economic modelling shows that with novel regenerative hearing therapeutics for ARHL, QALYs can be gained in a cost-effective fashion under current willingness to pay thresholds.

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**330 Dr. Aaron Van Slyke**
**Plastic Surgery**

**Title:** Something Stinks! Finding Ways to Manage Noxious Odours in the Operating Room: A Randomized Controlled Trial

**Authors:** Aaron C. Van Slyke 1, Lindsay Bjornson 1*, Marija Bucevala1,4, Rebecca Courtmanche1,4, Jeffrey Bone3, Aaron Knox4, Cynthia Vercher3,4, James C. Boyle2,7

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**Background:** The operating room can be saturated with noxious smells. Anecdotally, medical staff apply products to surgical masks to lessen the impact of these smells.

**Objective:** This study aimed to identify an odour-masking product that is pleasant, inexpensive, and accessible.

**Methods:** This is a randomized, single-blinded crossover study. Participants were exposed to an experimental odour in lieu of a noxious surgical odour.

**Inclusion criterion:** age 19-30 years. Exclusion criteria: active allergies, upper respiratory tract infection, alteration to sense of smell, or failure of olfactory screen. Eighty-one individuals were recruited; one was excluded following a failed olfactory function test. After smelling the experimental odour without barriers, participants were re-exposed to the odour using five surgical masks in randomized order. Each mask was lined with a test product (cherry lip balm, tincture of benzoin, Mastisol®, mint toothpaste, and control (plain mask)). Participants rated the effectiveness of products at masking the experimental odour from 0-100 (0 = completely ineffective, 100 = completely effective). Participants also rated the pleasantness of the products, recorded if the products made them feel unwell, and identified their preferred product overall.

**Results:** Eighty participants were included in the study (33 male, 47 female), averaging 24.2 years of age. Cherry lip balm was the most preferred odour-masking product (29 participants), followed by mint toothpaste (22), Mastisol® (14), tincture of benzoin (10), and control (5). Mean odour-masking effectiveness for cherry lip balm was 66.5 (±24.6), tincture of benzoin: 62.6 (±25.0), Mastisol®: 61.3 (±23.9), mint toothpaste: 57.5 (±27.4), and control: 21.9 (±21.8). All tested products demonstrated odour-masking abilities. We recommend that healthcare professionals find the odour-masking product that works best for them, starting with cherry lip balm.

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**331 Dr. Laura Allen**
**Otolaryngology**

**Title:** A systematic review of the Harmonic Scalpel in parotidectomy

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**Introduction:** The Harmonic Scalpel® (HS) is commonly used in head and neck surgery. Parotidectomy is a complex and intricate surgery that requires careful dissection of the facial nerve. Our objective was to compare surgical outcomes in parotidectomy using the HS with traditional scalpel and cautery (SC). We performed a systematic review with meta-analysis of 7 studies that compared the use of HS to SC in parotidectomy.

**Methods:** A systematic review of the literature was performed with subsequent meta-analysis of 7 studies that compared the use of HS to SC in parotidectomy. Outcome measures included: temporary facial paresis, operating time, intraoperative blood loss, post-operative drain output, and length of hospital stay.

**Results:** A total of 7 studies representing 675 patients were identified: 372 were treated with HS and 303 with SC. Statistically significant outcomes favoring the use of HS over SC included operating time, intra-operative blood loss, and post-operative drain output. Outcome measures that did not favor either treatment included facial nerve paresis and length of hospital stay.

**Conclusions:** Overall, the HS was found to reduce operating time, intra-operative blood loss, and post-operative drain output.

**Key Words:** Harmonic scalpel, salivary gland, facial nerve, parotidectomy.

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**332 Dr. Gaurav Medikeri**
**Otolaryngology**

**Title:** Frontal Ostium Grade (FOG): A Novel CT Grading System for a Safe Endoscopic Approach to the Frontal Sinus

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**Introduction:** The location and size of the internal frontal sinus ostium is critical in endoscopic sinus surgery. The frontal ostium, defined as the narrowest point between the anterior buttress and upturn of the skull base, can be variable in its location and size based on the position of these 2 anatomical points. This variability is evident on a sagittal CT scan cut placed at the most medial aspect of the lacrimal bone just inferior to the frontal plane. We propose a novel CT grading system (FOG) that is easy and specific to the anatomical position of the frontal sinus ostium on the sagittal plane.

**Objective:** To create a novel frontal ostium grading (FOG) system based on pre-operative Computerized Tomography (CT) imaging studies. The FOG system will allow for another layer of pre-surgical planning and preparation for frontal sinus surgery.

**Method:** FOG is based on marking two vertical lines parallel to each other on the defined sagittal CT cut. The first line (Reference/R-line) is standardized and drawn at the level of the anterior buttress. The Second line (S-line) is variably and drawn at the point of upturn of the anterior skull base. If the R-line is anterior to the S-line, we term this frontal ostium grade as positive. If the R and S-lines overlap, we classify it as FOG Neutral (0-grade). If the R-line is posterior to the S-line, we classify it as a FOG –ve. A FOG +ve grade is predicted to be a surgically easier dissection than a FOG neutral, which is predicted to be an easier dissection than a FOG -ve grade.

**Results:** Using this grading method, 90 frontal sinuses underwent primary endoscopic frontal sinusotomies. Of these 48 were FOG +ve, 21 were FOG neutral and 21 were FOG 0-ve. A statistically significant difference in mean surgical time was found between the FOG +ve (9.96 min.), FOG neutral (11.42 min.) and FOG –ve (16.05 min.) groups (p<0.05).

**Conclusion:** This novel FOG system indicates applicability in predicting difficulty during frontal ostium dissection.

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**333 Dr. Navid Karimi**
**Plastic Surgery**

**Title:** In Vivo Application of The First Generation of MeshFill-Plus; A Liquid Wound Healing Scaffold with Inherent Antimicrobial Properties

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Background: Wound repair and healing is often complicated by pathological microorganisms and biofilms. Treatment of chronic wounds, such as burn, pressure ulcers, and diabetic wounds, is challenging. The presence of cavities and void spaces in these wounds makes them difficult to treat with conventional skin grafts, sheets of skin substitutes, or scaffolds. Our group has recently developed MeshFill (MF): a liquid bioengineered collagen-based scaffold, which exhibits a higher tensile strength, faster fibril formation, and less contraction than other formulations and gels. In a clinical pilot study, we realized that recurrent wound infection is a limitation for application of MF in complex wounds. Indeed, the optimal management of complex wounds must also include a therapeutic approach that conveys antimicrobial properties. Silver nanoparticle (AgNP) have shown to serve as antimicrobial agents that can effectively control (prevent) colonization of bacteria and infections in wounds. Silver containing dressings are widely used for controlling infections, however, conventional dressings are not appropriate for deep wounds and also reveal varying concentrations of silver and degrees of tissue injury after prolonged use. Our group has developed the idea that the incorporation of silver nanoparticles (AgNPs) into MF and its application to wounds would prevent/treat infections which in turn can decrease healing time. In our previous set of in vitro experiments, by incorporating AgNPs into MF, hence introducing antimicrobial properties to MF, we developed and optimized a new generation of MF known as MeshFill-Plus. This was done via testing different forms and concentrations of AgNPs to achieve optimal antimicrobial activity while maintaining optimal biocompatibility.

Objective: The objective of this study was to test in vivo efficacy and safety of the first generation of MeshFill-Plus in an infected rat wound model.

Methods: Monodisperse spherical silver nanoparticles were synthesized in the lab using a kinetically controlled seeded-growth approach via the reduction of silver nitrate. MeshFill-Plus was then prepared by loading different concentrations of AgNPs into liquid matrix in a controlled manner. Rat infected closed wound model was generated by inserting a titanium implant into a small subcutaneous pocket in the dorsal skin in the presence of bacteria (either Pseudomonas aeruginosa or Staphylococcus aureus). The pockets were filled with either MeshFill alone or MeshFill-Plus before being closed with sutures. After 5 days, rats were euthanized, titanium implants were retrieved and analyzed for presence of bacterial biofilm on their surface. In another set of experiments, MeshFill-Plus was applied on mice with splinted full thickness open wounds to investigate the safety of MeshFill-Plus during the wound healing process.

Results: Preliminary results of this study showed that MeshFill-Plus with 600 PPM AgNP was very effective to clear wound infections induced by 10^6 P. aeruginosa. AgNPs were also effective on S. aureus. The project is ongoing to confirm these promising findings and to fine tune the composition of MeshFill-Plus. Mouse open Wound healing experiments showed that MeshFill-Plus is safe to use and AgNPs would interfere with the healing process.

Conclusion: These results provide support for the application of MeshFill-Plus (MeshFill equipped with AgNPs) as a promising method to promote wound healing as well as preventing/treating wound infections.

334 Dr. India Dhillon  Otolaryngology

Title: A Phase I Tolerance Evaluation of Topical Nitric Oxide Sinus Irrigation (NOSi) Dose Escalation in Individuals with Recalcitrant Chronic Rhinosinusitis (CRS)

Background: Recalcitrant chronic rhinosinusitis (CRS) is a persistent inflammatory condition despite surgery and aggressive medical therapies. Nitric Oxide (NO) is an endogenously produced molecule that exhibits antimicrobial & anti-inflammatory properties.

Objectives: This prospective, pilot study aims to determine the tolerance and safety of escalating dose treatments of NO sinus irrigation (NOSi) in CRS adults.

Methods: 5 adult subjects with CRS rinsed their sinuses twice daily for 12 days with NOSi with dose escalation every 2 days. Safety monitoring on days 3, 5, 7, 9 and 11 included tolerability as reported by Visual Analogue Scale (VAS), adverse events (AE), methemoglobin (MetHb), O2 saturation (SaO2) and ambient NO2. Changes to Modified Lund-Kennedy (MLK) endoscopic score, sinonasal mucosal culture, olacon, mucociliary function, and quality of life as measured by Sino-Nasal Outcome Test (SNOT-22) were recorded at baseline and day 13.

Results: 4/5 subjects tolerated the highest dose of NOSi twice daily. No AE or changes to ambient NO2, MetHb, or SaO2 outside of normal range were reported. 3/5 subjects exhibited improvements in total MLK score (baseline median=13, mean=9.25; day 13 median=10, mean=9.2). Reduced growth of bacterial & fungal organisms was reported in 3/5 subjects. SNOT-22 score improved in all subjects (baseline median=49, mean=49.4; day 13 median=26, mean=26.6). Increases in mucociliary clearance time within normal ranges were noted in 3/5 subjects. No significant changes to olacon or mucosal tissue were reported.

Conclusion: Preliminary results suggest NO is a tolerable and safe sinus irrigation and could provide an efficacious treatment for CRS.

335 Dr. Stephen O Adehola  Otolaryngology

Title: Use of confocal microscopy and clinical data to understand Chronic Rhinosinusitis (CRS)

Background: Chronic rhinosinusitis with nasal polyps (CRS) is a common condition in North America with a significant impact on patients' quality of life. The current diagnostic criteria are based on clinical symptoms and imaging studies, but do not provide insights into the pathophysiological mechanisms underlying the disease.

Objective: To examine the bacterial and fungal load in recalcitrant CRS using confocal microscopy.

Methods: Sinus mucous aspirates and mucosal biopsy were obtained from patients with recalcitrant CRS. Bacterial and fungal load were examined using confocal microscopy. Comparative clinical microbiology studies and Modified Lund and Kennedy (MLK) scores were also conducted.

Results: Nineteen patients were recruited (mean age 51.6 years ± 9.8). Confocal imaging revealed bacterial and fungal organisms in 8/19 and 5/9 patients’ aspirates, respectively, within a few hours after fixing for a 24-hour period. Sinus culture yielded bacterial and fungal organisms for 7/19 and 4/19 patients’ aspirates, respectively. MLK scores were significantly associated with the presence of bacteria and fungi.

Conclusions: The study methods described could potentially become a more prompt and accurate diagnostic tool, when compared to conventional microbiology methods, for determining bacterial and fungal load in CRS patients.

336 Dr. Irena Zivkovic  Otolaryngology

Title: Surgical Capacity and Trauma System Functionality in Rural Uganda

Background: Soroti Regional Referral Hospital (SRRH) in Soroti, Uganda is the partner institution of a long-standing collaboration with the BC Children’s Hospital Department of Surgery, Office of Pediatric Surgical Evaluation and Innovation. Surgical capacity assessment in combination with an evaluation of the trauma system and services at SRRH are key factors in identifying priorities in care and partnership growth.

Objective: To assess surgical capacity at SRRH and to evaluate the functionality of the Soroti trauma system and services, delineating a trauma-informed approach to capacity evaluation.
Methods: The Global Assessment in Pediatric Surgery (GAPS) checklist, a novel capacity assessment tool, was implemented at SRRH, administered via interview with a senior surgical faculty member. To evaluate the trauma system, a 26-item environmental scan was implemented via three structured interviews with a general surgeon, medical officer, and intern, in addition to a focus group with four interns. This project was conducted in July 2019.

Results: GAPS highlights strengths in surgical capacity at SRRH including ability to perform surgery 24 hr/day; consistent access to 2 operating rooms with sterile equipment, a blood bank, and oxygen; and availability of a surgical and anesthesia team with experience in pediatric care. Over 50% of health care practitioners involved in pediatric care attend 1-2 CME sessions annually. Areas for growth in capacity include improving timely access to surgical care (currently, ≤50% of patients reach definitive care in ≤2 hrs), formalized tracking of patient outcomes, access to pediatric-sized OR equipment, and the establishment of surgical and anesthesia residency training programs at SRRH. Key identifiers of the environment scan include the need for establishment of EMS in the community, and significant trainee interest (consensus amongst 2/2 interviewees at training levels of medical officer and intern, and 4/4 interns in focus group to structure and support interview) in the development of trauma care provider education during internship, such as ATLS and simulation training.

Conclusions: This study demonstrates insight into the current scope of surgical capacity and trauma services at SRRH. Potential partnership priorities include a focus on integrated pre-hospital care and educational resources for trainees at the institution.

337 Dr. Sally Hye Ji Choi Vascular Surgery

Title: Evaluation of aortic zone 2 landing accuracy during TEVAR following carotid-subclavian revascularization

Sally Hj Choi, Gary K Yang, Keith Baxter, Joel Gagnon
Division of Vascular Surgery, University of British Columbia, Vancouver, BC

Background: The thoracic aorta distal to the left subclavian artery (LSA) is prone to dissection, a neursmal degeneration and traumatic injury. Therefore, zone 2 landing during thoracic endovascular aortic repair (TEVAR) is commonly required, but can prove to be challenging due to the often tortuous and angulated anatomy of the region.

Objectives: Our objective was to determine the landing accuracy of zone 2-targeted endografts following carotid-subclavian revascularization (CSR), which is routinely performed at our institution.

Methods: Retrospective review of patients that underwent CSR for zone 2 endograft delivery at our institution between Jan 1st 2007-Oct 1st 2018 was done. Patient demographics, comorbidities, treatment indication, urgency, and intraoperative imaging modality were documented. Accuracy of zone 2 delivery was evaluated by two independent reviewers using postoperative CT scans.

Results: CSR was performed in 54 patients with 52 patients (96%) in zone 2, 3 patients (5%) in zone 3, and 1 patient (2%) in zone 4. Mean age was 60 ± 13 years, with 22% of patients having chronic kidney disease. Mean zone 2 distance from the LCCA was 8 mm. Cases performed using higher resolution built-in fluoroscopy machine compared to mobile C-arm were associated with higher chance of intervention with proximal cuff extension (OR 7.7; 95%CI 1.1-53.7). The need for immediate rescue procedures was not associated with pathology, urgency of surgery or post-operative mortality.

Conclusions: Using current endografts and imaging modalities, zone 2-targeted TEVARs have suboptimal technical accuracy with high rates of immediate revision and inadequate seal of the LSA.

338 Dr. Jordan Wong Radiation Oncology

Title: Validation of Deep Learning-based Auto-Segmentation for Organs at Risk in Lung Stereotactic Body Radiotherapy Using Retrospective Radiotherapy Plans

Jordan Wong, Vicky Huang, Jashhua Gamsbatizita, Tonye Teke, Slawan Arshad

Background: Accurate segmentation of organs at risk (OARs) is particularly important in stereotactic body radiotherapy (SBRT) where high dose per fraction and smaller margins are used. Automatic segmentation can decrease workflow and improve treatment consistency, but this requires high quality training data and robust validation before implementation into clinical practice.

Objectives: We evaluate the performance of deep learning-based auto-segmentation models trained using a less resource intensive approach of leveraging retrospective manually drawn segmentations.

Methods: Auto-segmentation models were trained using a deep convolutional neural network based on a U-net architecture. Training data consisted of 210 structure sets, which included 160 publicly available CT scans, with ground truth segmentations reviewed and edited by a single radiation oncologist, and 50 SBRT planning CT scans from previously treated patients from center A that were not re-reviewed. Deep learning-based auto-segmentations (DSs) were then generated for 100 planning CT scans; 50 were additional planning CT scans from center A and 50 were obtained from center B. The original clinical segmentations (CSs) were compared with DSs using the Dice Similarity Coefficient (DSC) and 95% Hausdorff distance transform (DT).

Results: Comparing DSs to CSs for all 100 validation planning CT scans, the mean DSC and 95% DT were 0.93 and 2.85mm for aorta (n=81), 0.81 and 3.32mm for esophagus (n=99), 0.95 and 5.15mm for heart (n=100), 0.98 and 3.09mm for lung (n=188), 0.55 and 6.59mm for brachial plexus (n=101), 0.82 and 4.23mm for proximal bronchial tree (n=100), 0.90 and 1.50mm for spinal cord (n=87), and 0.91 and 2.27mm for trachea (n=100). The mean DSC and 95% DT were similar for center A and center B for all structures.

Conclusions: Lung SBRT DSs trained using un-reviewed retrospective clinical data closely approximated manual segmentations from two centers, with comparable results to other auto-segmentation studies. Previous radiotherapy courses used for treatment represent a valuable data source for DS training and validation. An approach leveraging this data can more quickly lead to the implementation of useful auto-segmentation into clinical workflow.

339 Dr. Sumaiya Muathen Otolaryngology

Title: Subcutaneous Nucala Injection: An adjunctive Treatment for Recalcitrant Allergic Fungal Rhinosinusitis

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Background: Recalcitrant Allergic Fungal Rhinosinusitis (AFRS), a complex subtype of Chronic Rhinosinusitis, is a non-invasive fungal sinus disease that results from chronic allergic inflammation of the sinonasal mucosa. Failure to respond to mainstay therapies and sinus surgery leaves AFRS patients with limited alternatives and a decreased quality of life. Mepolizumab (Nucala) is an anti-IL5 medication currently designed to treat patients with severe eosinophilic asthma. This study aimed to identify the efficacy of mepolizumab on improving Modified Lund-Kennedy (MLK) endoscopic scores in recalcitrant AFRS patients.

Objective: The primary objective was to determine if the addition of mepolizumab lead to improvement in Modified Lund-Kennedy (MLK) sinonasal endoscopic scores in recalcitrant AFRS patients. Additionally, we examined the rate of patients requiring a prednisone rescue compared to a retrospective control arm.

Methods: Retrospective chart review of 27 recalcitrant AFRS patients who added one Nucala injection per month to their treatment between December 2016 and June 2019. Patients were evaluated endoscopically at baseline and at each subsequent follow-up every 6-8 weeks. A retrospective control arm was randomly generated to compare the rate of patients requiring a prednisone rescue to patients receiving mepolizumab. Sinonasal Outcome Test 22 (SNOT-22) score and median eosinophil count were collected when retrospective data was available.
**Introduction**

Alopecia Areata (AA) is an autoimmune disease with the clinical features of hair loss and skin inflammation. The mechanism by which inflammation in AA affected skin is unknown. Currently, there is no satisfactory treatment for AA. Recent works from our research group have identified macrophage colony-stimulating factor (M-CSF)-mediated myeloid cells to be involved in initiation and progression of this disease in an AA mouse model. Furthermore, our previous findings have demonstrated that a lack of keratinocytes in hair follicles is involved in the hair loss mechanism in AA.

**Objectives**

The aim of this study is to find new treatment options for AA by targeting M-CSF-mediated myeloid cells via local depletion of this cell population, inhibition of M-CSF receptor signalling pathways or increasing the differentiation of hair follicle epithelial cells.

**Methods**

AA mouse model was induced by dermal injection of skin mixture cells, isolated from AA affected skin. In vivo depletion of macrophages in AA affected skin was obtained using clodronate liposome, a medication previously used as an anti-osteoporotic drug. Several in vitro experiments were conducted to test the effects of kynurenine, an IDO induced tryptophan metabolites, on M-CSF-mediated myeloid cells, skin cell proliferation and keratinocyte differentiation. Hair regeneration was evaluated by photography.

**Results**

Our pilot study showed that local depletion of myeloid cells in AA-affected skin by dermal injection of clodronate liposome effectively restore the hair growth in AA mice (3 of 5 mice). Kynurenine at concentration of 5-50 µg/ml significantly reduced M-CSF-mediated myeloid cell proliferation and skin mixture cell proliferation. RT-PCR result revealed that kynurenine down-regulated M-CSF receptor expression in mouse splenocytes. Finally, our result demonstrated that kynurenine induced undifferentiated hair follicles epithelial cells to undergo differentiation, a condition to improve hair growth. These findings collectively suggest that the use of either clodronate, kynurenine or combination can be an alternative treatment for this inflammatory disease.

**Conclusions**

The routine use of Bifidobacterium and Lactobacillus probiotics in VLBW infants did not significantly impact the incidence or severity of NEC. However, it may result in fewer overall infections and less antibiotic use.
343 Dr. Najah Adreak  
**Title:** Short- and long-term survival rate of mini-sternotomy vs full sternotomy in aortic valve replacement: The St. Paul’s Hospital experience  

**Background:** Advantages of mini-sternotomy aortic valve replacement (MSAVR) include improved cosmetics, reduction in postoperative pain, blood loss, and length of stay (LOS), and better wound healing. However, MSAVR is not widely adopted by surgeons, and the clinical outcomes of MSAVR have not been reported in Canada. We studied the outcomes of MSAVR in our institutions in British Columbia comparing such to the full sternotomy aortic valve replacement (FSAVR).

**Methods:** We conducted retrospective analysis of the Cardiac Service BC database of all isolated aortic valve replacements (AVR) performed in our institution from Jan 2007 to Dec 2016. Nine hundred ten patients were identified (776 conventional AVR and 134 MSAVR) with a median follow-up period of 6.2 yrs. (95% CL: 3.8 to 8.5). Descriptive statistical analysis was carried out.

**Results:** Baseline variables between the two surgery groups were similar with a mean age of 70.7 ± 11.8 yrs in MSAVR vs 69.7 ± 12.2 in the FSAVR group (p=0.38). 40% were females. Those who had MSAVR group had higher NYHA III/IV Class 76.8% vs 49.3% (p=0.001) and had a trend towards greater incidence of renal failure (12.7% vs 8.8%, p=0.15). Bioprosthetic valves were implanted in 93.3% (MSAVR) and 93.8% (FSAVR). The mean cardiopulmonary bypass (CPB) and aortic cross-clamp (XC) times were shorter in MSAVR group (74 vs 80 min (p=0.014) and 56 vs 62min (p=0.08), respectively. There were no significant differences in the incidence of atrial fibrillation (p=0.89) or renal dysfunction (p=0.49) between the two groups. There was no significant difference in 30-day mortality (p=0.79) and long-term mortality between groups (p=0.70). LOS was shorter in the MSAVR group (mean 7.8 ± 6.3 vs 8.6 ± 7.2 days, p=0.006).

**Conclusion:** MSAVR can be performed safely with similar short and long-term survival rates. CPB and XC times and LOS were shorter in MSAVR. MSAVR should be performed when feasible.

344 Dr. Jessica Luc  
**Title:** Valvectomy Versus Replacement for the Surgical Treatment of Infective Tricuspid Valve Endocarditis: A Systematic Review and Meta-Analysis

**Background:** Optimal surgical treatment of infective tricuspid valve endocarditis in patients with intravenous drug use (IVDU) remains controversial.

**Objectives:** The aim of this systematic review and meta-analysis was to compare outcomes of valvectomy versus replacement for the surgical treatment of isolated infective tricuspid valve endocarditis.

**Methods:** An electronic search was performed to identify all relevant studies published. After assessment for inclusion and exclusion criteria, 16 original studies were pooled for systematic review and meta-analysis.

**Results:** There were a total of 752 patients with infective tricuspid valve endocarditis, of which 14% underwent valvectomy and 86% underwent replacement (mean follow-up 4.2 years). There were no differences in rates of stroke [valvectomy 4% vs. replacement 3%, p=0.85] but a higher likelihood of prolonged ventilation in those who underwent valvectomy [valvectomy 40% vs. replacement 26%, p<0.01]. There were no differences in 30-day post-operative mortality [valvectomy 13% vs. replacement 7%, p=0.21], post-operative right heart failure [valvectomy 7% vs. replacement 11%, p<0.01] and recurrent endocarditis [valvectomy 7% vs. replacement 19%, p=0.81]. Valvectomy had higher rate of reoperation for tricuspid valve replacement [valvectomy 50% vs. replacement 14%, p<0.006].

**Conclusions:** Tricuspid valvectomy is an acceptable initial therapy for infective tricuspid valve endocarditis in patients with IVDU as a bridge to identify those who will self-select themselves as candidates for staged valve replacement.

345 Dr. Jessica Luc  
**Title:** Effect of Operating Room Personnel Generation on Perceptions and Responses to Surgeon Behavior

**Background:** The effects of operating room (OR) personnel generation on perceptions and responses to surgeon behavior are not well characterized.

**Objectives:** To identify the behavior as either acceptable, unacceptable but would ignore, unacceptable and would confront the surgeon, or unacceptable and would report to management.

**Methods:** OR personnel were asked to assess surgeon behavior across a standardized set of five scenarios. For each scenario, respondents were asked to identify the behavior as either acceptable, unacceptable but would ignore, unacceptable and would confront the surgeon, or unacceptable and would report to management. Chi-squared analyses were used to compare responses to surgeon behavior with respondent generation.

**Results:** There were 3101 respondents, of which 41% were baby boomers (n=1280), 31% were Generation Gen X (n=955) and 28% were Gen Y (n=866). Overall, when compared to Generation Gen X or Gen Y, baby boomers were significantly more likely to find surgeon behaviors of impatience (p<0.001), being late for a case (p<0.001), swearing in the OR (p<0.001), and shouting with a bleeding patient (p=0.001) to be inappropriate and would talk to the surgeon. Alternatively, Gen Y respondents were more likely to find fault with surgeon behaviors that deviate from rules and regulations, such as forgetting a timeout (p=0.001), when compared to baby boomers and Gen X respondents.

**Conclusions:** Results of our study demonstrate that OR personnel generation affects their perceptions and response to surgeon behavior. By shedding light on generational differences, we hope that we can work towards improved awareness and development of leadership strategies to optimize surgical workplace morale and productivity.
Background: The Thoracic Surgery Social Media Network (TSSMN) represents a collaborative effort of leading journals in cardiothoracic surgery to highlight publications via social media, specifically Twitter.

Objective: We conducted a prospective randomized trial to determine the effect of scheduling tweeting on non-traditional bibliometrics of dissemination.

Methods: A total of 112 representative original articles (2017-2018) were selected and randomized 1:1 to an intervention group to be tweeted via TSSMN or a control (non-tweeted) group. Four articles per day were tweeted by TSSMN delegates for 14 days. Primary endpoints included change in Altmetric score pre and post-tweet compared to controls. Secondary endpoints included change in Twitter analytics daily one post-tweet and day seven post-tweet for each article compared to baseline.

Results: Tweeting via TSSMN significantly improved article Altmetric scores (Pre-tweet 1 vs. Post-tweet 8, p<0.001). Mendeley reads (Pre-tweet 1 vs. Post-tweet 3, p<0.001), and Twitter impressions (Day 1 post-tweet 1599 vs. Day 7 post-tweet 2296, p<0.001). Subgroup analysis demonstrates that incorporating photos into the tweets trended towards increased link clicks to the full-text article (p=0.08) whereas tweeting at 1pm EST and 9pm EST generated the highest and lowest audience reach (p=0.022), respectively. Articles published in adult cardiac surgery achieved the highest change in Altmetric score (p=0.028), Mendeley reads (p=0.028) and were more likely to be retweeted (p=0.042) than those published on education, general thoracic surgery, and congenital surgery.

Conclusions: Social media highlights of scholarly literature via TSSMN Twitter activity improves article Altmetric scores, Mendeley reads, and Twitter analytics, with dissemination to a greater audience.

347 Dr. Matthew Boroditsky Plastic Surgery

Title: “How good is the Mustarde Otoplasty?”

Matthew L. Boroditsky, MD, Brian C. Van Spyk, MD, MSC, Jygapal V. Arneja, MD, MBA, FACS, FRCSC, 1.

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Background: The Mustarde otoplasty is a commonly used procedure for the correction of prominent ear. Complication rates following Mustarde otoplasty, related to suture extrusion and long-term outcomes, are variable in the literature.

Objectives: Examine the efficacy and safety of the Mustarde otoplasty

Methods: Retrospective data was collected on patients under 18 years-old who underwent primary otoplasty by the senior author between May 2009 – August 2018. Patient demographics, clinical presentation, intraoperative details, complications, follow-up, and patient/family satisfaction scores were collected and analyzed. Mustarde efficacy was measured via patient and surgeon satisfaction, whereas safety was measured by complication and reoperation rates.

Results: There were 119 Mustarde otoplasties performed on 68 patients, with a median follow-up of 72 weeks (range: 24-476 weeks). Fifty-one of the 68 patients underwent bilateral procedures. Of the 119 otoplasties, 110 (92%) were performed for prominent ear and 9 (8%) for cup/constricted ear. The median operative time was 95 minutes (31-133 minutes). A total of 24 complications were reported in 17 patients. Complications included: Suture extrusion (n=20), hematoma (n=1), suture abscess (n=1) and reoperation (n=2). The study had a revision rate of 1.7% (n=2). No additional procedures were documented at other hospitals in the province. The majority (97%) of reported ear outcomes demonstrated both patient and surgeon satisfaction.

Conclusions: The Mustarde otoplasty demonstrated a high efficacy in the correction of prominent ear, with low reoperation rates and high patient and surgeon satisfaction. Suture extrusion, the most frequent complication, was managed successfully by suture removal one year post-operatively.

348 Dr. Daniel Ben Lustig General Surgery

Title: Preoperative Calcium and Parathyroid Hormone Levels Affect Dual Energy Computed Tomography (DECT) and Conventional Preoperative Localization Studies in Patients with Primary Hyperparathyroidism

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Background: Fibroepithelial lesions (FEL) range from the benign fibroadenoma (FA) to malignant phyllodes tumor (PT). While FAs do not require surgery, PTs require excision. Both lesions can be preoperatively localized using different technologies: dual energy computed tomography (DECT), sestamibi single positron emission computed tomography (CT-MIBI) and ultrasound (US).

Methods: A retrospective study was conducted at a tertiary endocrine referral center examining all patients with PHP who underwent DECT, CT-MIBI, US, and parathyroidectomy at our center between 2012 and 2019. Preoperative calcium and parathyroid hormone (PTH) levels were used to stratify patients into three cohorts: normal calcium high PTH, high calcium normal PTH and high calcium high PTH for which sensitivity and accuracy of dual energy computed tomography (DECT), sestamibi single positron emission computed tomography (CT-MIBI) and ultrasound (US) were evaluated. DECT should be considered first-line for preoperative localization and can also be used to identify parathyroid tumours that are not successfully localized by combined US and CT-MIBI.

Conclusions: Preoperative calcium and PTH levels influence the sensitivity and accuracy of preoperative localization in PHP for all imaging studies evaluated. DECT should be considered first-line for preoperative localization and can also be used to identify parathyroid tumours that are not successfully localized by combined US and CT-MIBI.

349 Dr. Dorsa Mousa-Doust General Surgery

Title: Excision of breast Fibroepithelial lesions: when is it still necessary?

Authors: Dorsa Mousadoust 1, Carol Dingee 2, Leo Chen 1, Amy Bazzarelli 2, Urve Kuusk 2, Jin-Si Pao 2, Rebecca Warburton 2, Elaine McKevitt 2

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Objective: To assess whether the policy to excise FA 3cm in size or greater is justified, and identify a low risk group that can be spared surgery.

Methods: Patients having surgery with FEL on CNB at Mt St Joseph hospital from 2009-2018 were identified from a prospective database. The association of clinical, radiology, and pathological features with upstage to PT was evaluated. Univariable and multivariable logistic regression analysis of variables was conducted to identify the risk factors of upstage to PT and trend analysis was performed to assess tumor size cut offs.

Results: Of the 627 patients included in this study, 405 were identified as having FA on CNB and 222 were identified as having FEL where PT could not be ruled out. A total of 113 cases of PT were identified upon surgical excision, 27 had CNB of FA (6.7%), while 82 were upstaged from FEL (36.9%). For FEL the NPV for tumor size of 10-100mm ranged from 57% to 65%, highlighting the need for surgical excision of these lesions. However, the NPV among FA cases was consistently high, 88% to 99%, for all tumor sizes and for tumors <37mm it is 95.6%. Using the size cut off of 37mm, 86.2% of FA patients in our study could have avoided surgical excision of these lesions. All cases of PT with CNB of FA were noted to be enlarging. Upstage to PT among FEL cases was not associated with age while it was associated with older age among FEL cases (p<0.001) as the likelihood of upstage increased by 1.1% per year. Family history was not associated with upstage to PT for both FA and FEL groups.

Conclusion: Patients with FEL on CNB should continue to have excision to rule out PT. We now recommend that patients identified with FA lesions that are 37mm or less in size can be considered for non-operative management.
RESULTS
Employment, psychiatric comorbidity, breathiness, and dysphagia were investigated. Outcomes included failure as defined by the patient and dosage of injections, disease duration, unilateral/bilateral injection, right/left injection, dose quantity, body mass index (BMI), professional voice user, and shorter duration of good effect.

Dosage change occurred in 29.08% of injections and was associated with injection side effects, bilateral injections, BTX dose, professional voice user, and lack of breathiness (p=0.00). Failure rate was not associated with age, gender, VHI-10, CAPE-V, disease duration, left/right injection, dose quantity, BMI, professional voice user (p=0.02). Failure was associated with first injection with a new physician (p=0.00), professional voice user (p=0.00) and lack of breathiness.

Conclusion: Implementation of a preoperative carbohydrate loading pathway was not associated with increased cardiopulmonary complications in thoracic patients. The magnitude of thoracic sprocedure, including minimally invasive approaches & post-operative care pathways, are likely more important determinants of clinical outcomes.

350 Dr. Anna McGuire Thoracic Surgery


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Background: Enhanced recovery after surgery (ERAS) protocols, including carbohydrate loading pre-operatively, is associated with improved postoperative outcomes in colorectal surgery. These results have been extrapolated to thoracic patient populations, despite notable differences in underlying patient factors, & procedure related complications.

Objective: To describe the impact of an ERAS carbohydrate loading pathway implemented on adverse cardiopulmonary events in a thoracic surgery population.

Methods: A retrospective cohort study was conducted to identify patients undergoing elective thoracic surgery prior & following the implementation of a standardized carbohydrate loading pre-operative pathway. Primary diagnosis, type of surgery, complications, & patient comorbidities were evaluated. Univariable and multivariable analyses were conducted with appropriate statistical tests of comparison.

Results: There were 1774 cases included: 852 had carbohydrate loading, & 924 did not. Overall there were 883 (49.7%) female participants. The median age was 65 years (range 20-85). Overall, & on stratification by operation. There was no significant difference in frequency of pneumonia & atrial arrhythmia between groups. For all pulmonary, mediastinal, & chest wall surgery, there was also no significant difference in frequency of pneumonia & atrial arrhythmia between groups. The median length of stay was significantly shorter in lobectomy patients with carbohydrate loading group (5 vs. 6 days; p=0.03). There was also significantly more Thoracoscopic lobectomy conducted in the carbohydrate loading group (p<0.001).

Conclusion: Implementation of a preoperative carbohydrate loading pathway was not associated with increased cardiopulmonary complications in thoracic patients. The magnitude of thoracic sprocedure, including minimally invasive approaches & post-operative care pathways, are likely more important determinants of clinical outcomes.

351 Dr. Mira Keyes Radiation Oncology

Title: Patterns of prostate cancer recurrence after brachytherapy imaged with PSMA-targeting 18F-DCPyL PET/CT

Introduction: Brachytherapy is a highly effective treatment in localized prostate cancer. A previous study from our institution indicated a low rate of local failure after prostate brachytherapy (Lo, IJROBP 2015). However the study was limited by the absence of post-implant prostate biopsy and by utilization of conventional imaging to document local, regional and distant recurrence. In this study, we evaluate patterns of recurrence after brachytherapy utilizing positron emission tomography (PET) tracers that target the prostate specific membrane antigen (PSMA).

Methods: The study included patients enrolled in our ongoing institutional prospective trial, “PSMA PET/CT for Assessment of Recurrent Prostate Cancer” (NCT02899312). Patients with recurrent prostate cancer were eligible if they were candidates for salvage local therapy and there was no recurrent disease visualized on conventional cross-sectional imaging and bone scans. Biochemical and PSMA PET/CT recurrence were defined according to PHOENIX (Roach, IJROBP 2006) and PROMISE (Eiber, JNM 2018) criteria respectively.

Results: Between July 20, 1990 and August 2018, 6380 patients have been treated with brachytherapy at our institution. Between March 2017 and August 2018, 208 patients were enrolled in the PSMA PET/CT trial, open for 13 months during this time. During the same time period, 1349 brachytherapy patients had follow up PSA recorded and 81 (1.6%) experienced biochemical recurrence. In these patients with biochemical recurrence, median follow-up was approximately 7 years and median time to biochemical recurrence was 50 months. 35 out of 208 study patients were identified as receiving brachytherapy as part of initial curative treatment. In these brachytherapy patients, 68.6% had local recurrence in the prostate, 37.1% had seminal vesicle involvement, 34.3% had nodal recurrence and 28.6% had distant metastases. The basal segments of prostate were involved in 80.0% of local recurrences, which was significantly different than involvement of the mid (31.4%) and apical (11.4%) segments; p < 0.001.

Conclusion: Contrary to previous evidence, our study showed that local failure is a common pattern of recurrence in patients who experience biochemical relapse after prostate brachytherapy. Further study is underway to correlate implant dosimetry with the location of intra-prostatic recurrence.

352 Dr. Kevin Zhao Otolaryngology

Title: Factors Associated with Failure of Botulinum Toxin Injection in Adductor Spasmodic Dysphonia

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Background: Spasmodic dysphonia (SD) is a neurological voice disorder where the laryngeal intrinsic muscles involuntarily contract. Electromyography (EMG) Guided botulinum toxin (BTX) injection is considered first-line treatment for adductor SD. Failure rate can range between 6-30%.

Objective: Study objective was to determine which factors were associated with failure of botulinum toxin injection in adductor SD.

Methods: This was a retrospective review conducted at a tertiary, academic center. Adductor SD patients presenting for BTX injections from August 2017 to October 2018 were eligible. Age, gender, Voice Handicap Index (VHI-10), Consensus Auditory-Perceptual Evaluation of Voice (CAPE-V), number of injections, disease duration, unilateral/bilateral injection, right/left injection, dose quantity, body mass index (BMI), professional voice user, employment, psychiatric comorbidity, breathiness, and dysphagia were investigated. Outcomes included failure as defined by the patient and dosage change. Univariate and multivariate statistical analysis was conducted.

Results: Sixty seven out of 564 injections (11.88%) were categorized as failure by 131 patients. In multivariate analysis, dosage change was associated with shorter duration of good effect (p=0.00), BTX dose (p=0.02), breathiness (p=0.00), bilateral injection (p=0.02), dysphagia (p=0.01) and professional voice user (p=0.02) were failure with injection with a new physician (p=0.00), professional voice user (p=0.00) and lack of breathiness (p=0.00). Failure rate was not associated with age, gender, VHI-10, CAPE-V, disease duration, left/right injection, dose quantity, BMI, psychiatric comorbidity, and dysphagia.

Conclusion: Failure rate was 11.88% and associated with patients’ first injection with a physician, professional voice user, and lack of breathiness. Dosage change occurred in 29.08% of injections and was associated with injection side effects, bilateral injections, BTX dose, professional voice user, and shorter duration of good effect.

353 Dr. Navneet Singh Otolaryngology

Title: The Efficacy of Topical 0.3% Hydrogen Peroxide Solution Rinse in the Management of Biofilm-Associated Chronic Rhinosinusitis

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Introduction: Chronic Rhinosinusitis (CRS) is an inflammatory condition of the paranasal sinuses. Biofilm has been implicated in CRS recalcitrant to both medical and surgical sinus therapy. The presence of biofilm results in patients having worse postoperative symptoms, recurrent infections, and persistent inflammation. Hydrogen peroxide (H2O2) is known for its antiseptic, antibacterial, antiviral and antifungal effects. It is also thought to have the ability to dissolve, destroy and release adherent biofilm from the underlying mucosal membrane. The efficacy of H2O2 sinus irrigation in patients with CRS has never been studied.

Objectives: To study the efficacy and safety of a 0.3% H2O2 solution compared to saline irrigation in recalcitrant CRS associated with biofilm.
Methods: Thirty patients were enrolled in a prospective, randomized controlled trial at St. Paul’s Sinus Centre in Vancouver, B.C. Patients were included if they were diagnosed with recalcitrant CRS and present with biofilm. Participants were blinded and randomized to irrigate with either a 0.3% Hydrogen Peroxide solution or saline (control) every other day in conjunction with the standard-of-care budesonide rinse. Following six weeks of treatment, participants were asked to continue with standard of care for an additional 6 weeks and return for follow up on week 12. The primary endpoint was the Modified Lund Kennedy endoscopic grading system and SNOT-22 quality of life questionnaire. Safety was monitored by evaluating UPSIT olfactory test and mucosal biopsies.

Results: Nine patients have completed their 6 week follow up thus far, six in the experimental arm, and three in the control arm. 83% of the experimental group, exhibited a clinically significant improvement of minimum 1 point in total MLKs score between baseline and 6 weeks compared to 33% in the control group (experimental group: baseline median= 20, mean=19, n=6; 6 week median= 13, mean=15, n=6). Of those that completed SNOT-22, scores clinically improved with a minimum of 9 points was noted in 3/9 subjects, remained the same in 2/9 subjects and worsened in 1/9 subjects. 1/9 patients experienced a clinically significant decrease in UPSIT scores. No serious adverse events were reported by any participants including no changes to mucociliary time or mucosal changes (biopsy). Recruitment is ongoing for this study.

Conclusion: Preliminary results suggest Hydrogen Peroxide may potentially provide efficacious and tolerable treatment for recalcitrant CRS.

354 Dr. Sita Oza Ollek General Surgery
Title: Location of the Primary Tumor within the Breast: A Unique Predictor for Local Recurrence After Skin Sparing Mastectomy with Immediate Reconstruction

Methods: We retrospectively identified patients who underwent SSM for breast cancer from September 1997 – December 2010. A logistic regression analysis was performed to identify predictive factors for local recurrence.

Results: 697 patients were included. The median age at diagnosis was 46 [41-52] years. Tumors were grade III, T3/T4 and node positive in 37%, 13% and 40% of cases respectively. With a median follow up of 9.4 [5.3-13.9] years, local recurrence was the first relapse event in 14.7% of patients. Patients with a primary tumor in the medial breast were at increased risk of local recurrence (OR 2.42, 95% CI 1.34-4.37, p=0.003). Those who required radiotherapy were also at increased risk for local recurrence (OR 1.93, 95% CI 1.11-3.41, p=0.021) while those who received chemotherapy had a lower risk of local recurrence (OR 0.53, 95% CI 0.30-0.94, p=0.029). Biomarker profile, LVI, margins, T stage and nodal status were not significantly associated with local recurrence.

Conclusion: With long term follow up, patients remain at risk for local recurrence after SSM. Location of the primary tumor within the breast may represent a unique predictor for local recurrence.

355 Dr. Gautam Sarwal Vascular Surgery
Title: The physical toll of working in operating rooms: A survey of the Canadian Society of Vascular Surgery

Methods: An online survey was distributed to members of the Canadian Society of Vascular Surgery including residents, fellows and staff vascular surgeons. The survey collected data on surgeon demographics, operative volume, technical preferences and work-related MSK symptoms.

Results: An online survey was distributed to 188 surgeons and trainees. After three e-mailings, 112 surveys were returned for a 60% response rate. Among the respondents, 87% were male, 50% were 45 years or older, and 55% had been in practice for ten or more years. 35% of surgeons reported symptoms of MSK pain or numbness in their hands, 35% reported symptoms in their neck, shoulder and arm, with 33% reporting symptoms in their lower body. 23% of respondents reported a work-related injury within the past year.

Conclusion: Occupational injuries and disability is increasingly being recognized as a source of surgeon burnout. The purpose of this study was to assess the physical toll of working in operating rooms.

356 Dr. Kadhim Taqi General Surgery
Title: Trends for acute surgical consultations for oncology patients in British Columbia.

Introduction: Cancer is the leading cause of death in Canada with significant number of patients presenting to the emergency department with acute symptoms. Limited data is available about short and long term outcomes of this specific population.

Objective: The aim of this study was to identify modifiable factors that could help improve prognosis of acute cancer patients.

Methods: Retrospective review of prospectively collected data of all patients referred to the Acute Care Surgery services (ACS) at Vancouver General Hospital (VGH) for the management of oncology related surgical problems from July 2017 till August 2018.

Results: A total of 191 patients were identified of whom (55%) were females. The mean age was 65.8 ± 14.5 years. The most common cancers were Gastrointestinal, Breast and Sarcomas. The most common presentations were Small Bowel obstruction and post-operative complications. Cancer was newly diagnosed in 37 patients, and 96 patients presented with Stage IV disease. The mean length of stay was 12.8 ± 15.6 days. A total of 90 patients required surgery of which 31% was for palliative reasons. Disposition to hospital was 31% discharge planning (81.2%).

Conclusion: The diversity of cancer types and their care requires multidisciplinary team involvement. This would require special attention to their inpatient care and disposition planning, which would effect their short and long term outcomes.

2 British Columbia Cancer Agency, Vancouver, BC
Objective: Identify and analyze gender differences in BC general surgery medical services plan (MSP) compensation.

Methods: MSP payments to practitioners were collected for all BC general surgeons from 2010/11 to 2017/18 fiscal years. Surgery and consult volumes were obtained from general surgeons of BC. Surgeon data was gathered from public databases. Subspecialists and years general surgeons billed <$200,000 were excluded. Data was analyzed by T-tests for continuous variables and χ² tests for categorical variables. Multivariable regression was performed to adjust for confounding variables.

Results: Of 223 general surgeons, women (N=51) billed $119,332 lower mean MSP compensation than men (N=172) ($388,984 vs. $508,316, p<.001). Compensation was similar for men and women general surgeons with <5 years in practice. After ≥5 years in practice compensation of women surgeons ($402,815) was less than men ($519,137, p=.001). Compensation differences persisted at large ($372,242 vs. $486,345, p<.001) and medium population centers ($403,175 vs. $508,371, p=.008). After adjusting for years in practice, surgeries performed, and consult volumes, men surgeons earned $61,877 more than women surgeons ($496,698 vs. $434,821, p<.001).

Conclusion: Women general surgeons earned less than men. The gender difference in compensation is not wholly accounted for by differences in the number of surgeries and consultations performed. Improved understanding of labour division and expert discussion on contributing factors will be necessary to reduce compensation discrepancy and improve equity among general surgeons in BC.

Objective: Evaluate attrition and completion of advanced degrees and fellowship training for the University of British Columbia (UBC) general surgery residency program. Analyze alumni leadership appointment attainment and satisfaction.

Methods: UBC general surgery residency trainees and alumni from 1988 to 2013 were studied using routinely collected residency data and data gathered from public databases. Alumni were sent surveys evaluating leadership positions and satisfaction. Comparisons were made across gender and between 1988-2002 and 2003-2013 cohorts. Statistics were performed using JMP V14.1.0.

Results: Over the quarter century, the demographics, recruitment, and training of incoming residents in general surgery programs have changed. Leadership is an important CanMEDS competency and valued as a surgeon. It will be meaningful to evaluate both the immediate and long-term indicators of surgical, academic, and administrative leadership of residency training alumni.

Conclusion: Our institution met American but not European QI standards for BC rates. We identified a high number of medically necessary mastectomies. Our results support the understanding that BC rates are influenced by multiple factors and are challenging to compare across jurisdictions. CPM rates may offer a more actionable opportunity to de-escalate surgery for breast cancer than BC rates.


Methods: A rapid growing field of interest in healthcare during recent decades. Patients who are more involved in their care in hospital and who are actively provided with more treatment-related information during the post-operative period may experience improvements in their overall satisfaction.

Background: Head and neck cancer is a disease that has a particular propensity for treatment-related morbidity. Patient-centred care has been a rapidly growing field of interest in healthcare during recent decades. Patients who are more involved in their care in hospital and who are actively provided with more treatment-related information during the post-operative period may experience improvements in their overall satisfaction.
Objectives: To determine whether patients’ self-involvement and patient-centred education delivered via electronic tablet modules has an impact on overall satisfaction and perceived quality of medical care.

Methods: Patients undergoing reconstructive head and neck surgeries for a confirmed oral or oropharyngeal cancer diagnosis were recruited. They were randomized to receive scheduled education through electronic surveys during their post-operative admission as opposed to no education. A survey collected on discharge day was used to assess patient-centred outcomes.

Results: 21 patients were recruited into the study (N = 13 Education; N = 9 Non-Education). In the education group, 92% of patients found the educational platform extremely useful or quite useful. 85% of this cohort would recommend the educational platform for patients undergoing similar procedures. Perceived satisfaction with the surgeon and medical team was 92% in the education group vs. 78% in the non-education group. 44% of patients in the non-education group would have liked additional education during their in-patient admission.

Conclusions: Head and neck cancer patients perceived satisfaction may enhance with the utilization of patient-centred post-operative educational platform. Further prospective studies are warranted to assess the significance of this.

361 Dr. Emily Deane Otolaryngology
Title: Voice Outcomes following Secondary Tracheoesophageal Puncture in Gastric Pull-up Reconstruction following Total Laryngopharyngectomy

Objectives: To determine whether patients’ self-involvement and patient-centred education delivered via electronic tablet modules has an impact on overall satisfaction and perceived quality of medical care.

Methods: Prospective cohort study of patients with advanced laryngopharyngeal malignancies who have undergone GP and TEP by a single surgeon between 2008 and 2017 at UBC. Objective acoustic measures of fundamental frequency, vocal range, and vocal intensity, were performed using dedicated software. Voice recordings of the “Rainbow Passage” were made and were randomly presented in a blinded fashion to four trained clinicians for perceptual analysis using the previously validated GBRAS scale. Intelligibility was assessed in a blinded fashion by non-otolaryngology clinicians using a previously validated 7-point scale. The previously validated, self-reported, quality of life scale, Voice Handicap Index-10, was also administered to patients.

Results: Ten patients (70% male) had abnormal fundamental frequency and limited vocal range and intensity. A moderate degree of vocal impairment was judged on GBRAS perceptual analysis [grade 2.4 (0.5), roughness 2.1 (0.9), breathiness 2.2 (0.8), asthenia 1.7 (0.6), strain 1.7 (0.3)] and moderate unintelligibility [4.7 (1.4)]. Patients reported moderate voice handicap [25.3 (8.7)].

Conclusions: Although voice outcomes are suboptimal, TEP placement in GP patients is feasible and provides a means of giving useable verbal communication back to these patients.

362 Dr. Peter Skarsgard Cardiac Surgery
Title: Percutaneous Mitral Valve Repair: Proof of concept for a novel medical device

Objectives: To determine whether patients’ self-involvement and patient-centred education delivered via electronic tablet modules has an impact on overall satisfaction and perceived quality of medical care.

Methods: Adult sheep were anaesthetized and placed on cardiopulmonary bypass. Under cardioplegic arrest, the mitral valve was exposed through a left atriotomy. A model of degenerative MR was created by division of marginal chordae tendineae supporting the anterior leaflet. After separation from bypass, anterior leaflet prolapse and posteriorly directed severe MR was confirmed by epicardial doppler echocardiography. During a second cardioplegic arrest, a medical device was surgically implanted on the mitral valve, to evaluate correction of prolapse and MR, as well as the device adjustment mechanism.

Results: The model of prolapse and MR was confirmed. The device corrected prolapse and MR, and the adjustment mechanism permitted stepwise correction of prolapse and MR on the beating heart.

Conclusions: Proof of concept is confirmed. A medical device consisting of a net of ePTFE suture, attached proximally to the mitral annulus, and distally to the ventricular myocardium, can correct mitral valve prolapse and MR.

364 Dr. Saiedeh Maleki Otolaryngology
Title: Epigenetic silencing of SMPD3 in oral cancer alters cell migration, invasion, and drug response

Objectives: To determine whether patients’ self-involvement and patient-centred education delivered via electronic tablet modules has an impact on overall satisfaction and perceived quality of medical care.

Methods: Whole-genome methylation and expression profiling were performed on matched, patient-derived normal, pre-malignant, and carcinoma in situ (CIS)/OSCC samples using Illumina 27K microarray and Agilent 4x44K microarray, respectively. We also analyzed open-access, patient-derived data from The Cancer Genome Atlas (TCGA). SMPD3 methylation and expression status were assessed in commonly used oral dysplasia (DOK, POE9-nTERT) and OSCC (Ga127, SCC-3, SCC-9, SCC-25) cell lines using methylation-specific PCR and qPCR, respectively. To determine the effect of SMPD3 overexpression, we generated, doxycycline-inducible dysplasia (DOK) and OSCC (SCC-25) cell lines via lentiviral transduction. The effect of overexpression on cell proliferation was tested via manual counting (Trypan blue exclusion). Transwell assays without Matrigel were used to assess migration, whereas addition of 200 μg/ml Matrigel was used to test invasion. Finally, knockdown assays were used to determine the effect of SMPD3 on response to various stressors, including radiation and EGFR inhibition via the chemotherapy drug Erlotinib.

Results: SMPD3 promoter hypermethylation and gene silencing was observed in 4/6 pre-malignant and 6/10 CIS/OSCC samples. In agreement, analysis of TCGA data revealed a statistically significant increase in methylation and decrease in expression of SMPD3 in tumors compared to normal tissues. Furthermore, SMPD3 was methylated and silenced in all oral dysplasia and OSCC cell lines analyzed, with the exception of SCC-4. SMPD3 overexpressing
DOX and SCC-25 cells showed a significant decrease in migration and invasion compared to controls, whereas proliferation was unchanged. Furthermore, SMPD3-overexpressing cells showed improved clonogenic survival following treatment with the EGF inhibitor Erlotinib.

**Conclusions:** Our results suggest that hypermethylation and silencing of SMPD3 are early and common events in OSCC progression. SMPD3 appears to play an important role in migration and invasion of dysplastic and malignant oral cells, and overexpression improves clonogenic survival following treatment with Erlotinib.

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**365 Dr. Victor Mocanu  Otologyngology**  
**Title:** "Pilot Study for Development of a Descriptive and Clinically Relevant Endoscopic Sinus Scoring System"  
**Victor Mocanu, Saud Alasheh, Rami Al-Salman, Sumaya Muchoon, Rishi Bhatta, Amii Javer**  
University of British Columbia, Department of Surgery, Division of Otologyngology (V.M., S.M., R.B., A.J.); Clemenceau Medical Group, Abdali Medical Center, ENT Department (R.A.); King Saud University, Head and Neck Surgery Department (S.A.)  
**Background:** Chronic rhinosinusitis (CRS) is a condition in which the nasal passages and surrounding sinuses become inflamed for 12 weeks or longer. Numerous endoscopic scoring systems exist to assess disease severity in CRS. The Modified Lund-Kennedy (MLK) scoring system is one commonly used instrument which yields a 0-6 score based on edema, polyposis and discharge in nasal passages. A more descriptive Alasheh-Javer Endoscopic Sinus Score (AJESS) system is currently being validated for CRS endoscopic scoring. The AJESS assesses all sinuses, olfactory clefts, and middle turbinates for numerical scores of edema/polyposis and letter scores for CRS features: crusting, synechiae, purulence, mucus, recirculating mucus, and ostial narrowing.  
**Objectives:** A pilot study was conducted to determine the test-retest and inter-rater reliability of the AJESS system.  
**Methods:** CRS patients visiting the St. Paul’s Sinus Centre for routine clinic follow-up were enrolled. Anonymized photos of all sinuses and olfactory clefts were collected and presented to five reviewers (three rhinology fellows and two practicing surgeons). The reviewers scored photos according to the AJESS rubric twice, two weeks apart. Statistical analysis was performed using IBM SPSS 24.  
**Results:** Nine CRS patients were enrolled and ninety photos were scored. The AJESS system showed good test-retest reliability (Cohen κ = 0.68; 95% CI = 0.61 – 0.75) and moderate inter-rater reliability (Fleiss κ = 0.41; 95% CI = 0.39 – 0.43).  
**Conclusions:** The descriptive AJESS system appears to be reliable and reproducible. An upscaled head-to-head study of the AJESS and MLK systems is examining reliability, relevance to validated patient-reported outcome measures, and correlation with olfactory ability on formal testing. Pending validation and head-to-head analysis, the AJESS system may be a more valid and reliable endoscopic sinus scoring system for clinical practice and outcomes research in CRS.

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**366 Dr. Laura Samson  Otologyngology**  
**Title:** Vitamin D Supplementation and Reduction of Severity and Frequency of Epistaxis in Hereditary Hemorrhagic Telangiectasia  
**Emily Kakonde, Claire Liu, Laura Samson, India Dhillon, Sara Derkxhoud, Amii Javer**  
Division of Otologyngology, University of British Columbia and St. Paul’s Sinus Centre, Vancouver, British Columbia, Canada  
**Introduction:** Hereditary haemorrhagic telangiectasia (HHT) also known as Osler-Weber-Rendu disease, is a rare systemic autosomal dominantly inherited disorder of the fibrovascular tissue with a wide variety of clinical manifestations. The supplementation of Vitamin D in order to reach normal levels has been suggested as a therapy for those with cardiovascular disease due to its impact on arterial stiffness. As well, observational retrospective studies have found an association between Vitamin D levels and epistaxis bleeding time and severity in HHT patients. Despite evidence of the positive effect Vitamin D has on HHT patients and epistaxis, no prospective study has been performed.  
**Objectives:** The primary objective of this study is to determine if Vitamin D supplementation of 1000 or 4000 IU daily will reduce the frequency and severity of epistaxis among HHT patients. Additionally, we aim to determine the adequate dosage of Vitamin D supplementation to reduce the frequency and severity of epistaxis in HHT patients.  
**Methods:** This is a prospective randomized control trial study of 60 patients diagnosed with HHT. Patients diagnosed with HHT who are not taking Vitamin D supplementation at the time of recruitment are randomized into one of three groups: 1) receiving 1000 IU vitamin D; 2) receiving 4000 IU and 3) the control group receiving a placebo. Patients are instructed to take daily supplementation for the 6-month duration of the study. Endpoints include Epistaxis Severity Score (ESS) questionnaire, count of nasal arteriovenous malformations (AVMs) and Serum Vitamin D levels. This data is collected at baseline, 3 and 6 months follow up visits.  
**Results:** There was no significant change in mean ESS between baseline and 3 months in either the placebo (n=4, baseline=4.82, 3-month=4.86, p=0.95), or 1000IU treatment group (n=10, baseline=5.57, 3-month=5.05, p=0.61) and a non-significant decrease in the 4000IU treatment group (n=9, baseline=5.10, 3-month=4.73, p=0.5). Additionally, a decrease was noted in placebo (n=5, baseline=5.49, 6-month=5.84, p=0.20) and 4000 IU (n=10, baseline=5.10, 6-month=4.65 p=0.40) but not in 1000 IU (n=11, baseline=5.89, 6-month=5.84 p=0.95), between baseline and six months however, none of these differences were found to be statistically significant. There was no statistically significant difference in ESS scores at baseline, 3 months, and 6 months based on receiving a different dosage of Vitamin D supplementation (F = 0.945, p = 0.982; Wilk’s Λ = 0.173).  
**Conclusion:** There was a non-significant decrease in ESS over a 6-month period for HHT patients on either dosage of 1000IU or 40000IU Vitamin D. However, these preliminary results suggest a trend in reduced Epistaxis Severity Score for patients on the highest dosage, 4000 IU, of Vitamin D supplementation. After the completion of 60 patients, there will be a large enough sample size to determine if there is a significant decrease in ESS when patients are on 4000IU Vitamin D supplementation for 6 months.

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**367 Dr. Daegan Sit  Radiation Oncology**  
**Title:** Treatment and Outcomes in pT4 Well-Differentiated Thyroid Carcinoma  
**Daegan SitB, Wansian KohC, Aria ShoookohC, Eric TranC, Eric BertheletB, Jonas WuN, Robert OlsonB, Sarah HamiltonB**  
Background: Locally advanced, pT4 well differentiated thyroid carcinoma is a relatively rare entity and the benefit of external beam radiotherapy is unclear.  
**Hypothesis:** The purpose of this study is to evaluate locoregional control (LRC) and cancer specific survival (CSS) of patients with pT4 well differentiated thyroid carcinoma in the largest, single-institution retrospective cohort to date.  
**Methods:** Electronic records of patients with pT4 well differentiated thyroid carcinoma treated at our institution from 2001 to 2013 were reviewed. Log-rank test and multivariable Cox regression were used to establish factors impacting locoregional control and cancer specific survival.  
**Results:** A total of 232 patients were treated during this time period. The most common histologies were papillary carcinoma (n=192) and follicular carcinoma (n=11). The median age was 58, 61% were female and 39% were male. Median follow up time was 11 years. The median tumour size was 3.1 cm (interquartile range: 2.0-5.0 cm). 60% had multifocal disease, 33% lymphovascular invasion, 9% perineural invasion and 64% had node positive disease. Local invasion into the strap muscles was seen in 51%, trachea 33%, larynx 4%, thyrax 3%, and recurrent laryngeal nerve 1%. 22% patients had an R0 resection, 56 R1 and 23% R2. 90% patients received adjuvant radioactive iodine therapy. A total of 88 patients received external beam radiotherapy with a median dose of 60 Gy. There were 7 acute grade 3 toxicities (3 dysphagia, 2 nausea, and 2 pain); there were 7 late grade 3 toxicities in the cohort (2 dysphagia, 3 esophageal stricture, 1 pain, 1 laryngeal stenosis). There were no grade 4 toxicities observed.  
Ten year LRC was 65%, CSS was 85% and OS was 75%. On multivariable analysis, older age (p=0.02, HR 1.02, 95% CI 1.01-1.04), larynx invasion (p=0.05, HR 3.32, 95% CI 1.0-11.0) and larger tumour size (p=0.01, HR 1.17, 95% CI 1.04-1.32) were associated with worse LRC. Older age (p<0.001, HR 1.10, 95% CI 1.06-1.15), lymphovascular invasion (p=0.002, HR 3.9, 95% CI 1.5-7.2), perineural invasion (p=0.02, HR 2.9, 95% CI 1.19-7.48), and tracheal invasion (p=0.00, HR 2.7, 95% CI 1.3-5.5) were associated with worse CSS. Adjuvant RT was not associated with improved LRC and CSS when the entire cohort
was assessed. However, for patients with microscopic or macroscopic residual disease (R1 and R2 resection), adjuvant radiotherapy was associated with improved LRC on multivariable analysis (p=0.02, HR 0.45, 95% CI 0.12-0.90).

**Conclusion:** Despite locally advanced disease; 10 year CSS was 85% in this cohort of patients with pT4 DTC. Adjuvant radiotherapy improved LRC for patients with R1 and R2 resections and was associated with a low rate of toxicity.

### 368 Amanien, Ameen Otolaryngology

**Title:** Bone Mineral Density in Recalcitrant Chronic Rhinosinusitis Patients on Long-Term Intranasal Budesonide via Mucosal Atomization Device: A Cross-Sectional Study

Jamil Manji, Gurkaran Singh, Luis Macias-Velte, Andres Finkenstein, Christopher Okpaleke, Anali Dudgostar, Fahad Al-Awaii, Ameen Amanien and Amin Javer.

**Background:** Chronic rhinosinusitis (CRS) is a common condition affecting millions of North Americans. Due to concerns with a absorption of systemic steroids, such as decreased bone density, otolaryngologists frequently prescribe intranasal corticosteroids (INCS). It is important to identify the risks of INCS on bone density given the public health impact of osteoporosis on the general population.

**Hypothesis:** To determine if the long-term use of topical nasal budesonide delivered via the mucosal atomization device (MAD) has an impact on bone density (BMD).

**Methods:** In a cross-sectional study of CRS patients (N=173, 89 females, average age= 55.7 years, SD 12.4) who had previous sinus surgery and were receiving intranasal budesonide via MAD (≥12 months, average duration=17.5 months, SD 4.3), BMD was measured. The WHO classification of T-scores for osteopenia and osteoporosis and Pearson correlation analysis (n=0.05) were performed.

**Results:** No significant correlation was found between BMD and comitant treatment. T-scores of the femur, spine and hip were significantly correlated with age and body mass index. Prevalence of osteoporosis among women (11%) and men (9.5%) aged ≥50 years was comparable to the national prevalence.

**Conclusion:** The prevalence of osteoporosis among recalcitrant CRS patients using long-term intranasal budesonide via MAD was comparable to that of the general population.

### 369 Dr. Printha Wijesinghe Otolaryngology

**Title:** Role of oxidative stress-related miRNAs in idiopathic sudden sensorineural hearing loss (SSNHL) etiopathogenesis

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**Background:** MicroRNAs (miRNAs) regulate gene expression. There is little known about the impact of oxidative stress on the expression of miRNAs and their targeted mRNAs in auditory cells. Ischemia one of the main proposed pathogenic mechanisms for idiopathic sudden sensorineural hearing loss (SSNHL) may exert its effect through oxidative stress.

**Objective:** To compare the miRNA expression profiles of, hypoxic versus normoxic House Ear Institute –Organ of Corti 1 (HEI-OC1) cells cultured under permissive conditions; SSNHL patients (treated and untreated) versus age-matched normal hearing controls (NHCs) serum samples; and to compare the differentially expressed miRNAs (DEMs) observed in hypoxic HEI-OC1 cells with that in SSNHL patients’ serum.

**Materials and Methods:** We induced oxidative stress by treating HEI-OC1 cells with 5 mM H2O2 for 1 hr exposure under permissive culture conditions. miRNAs extracted from hypoxic and control cell lysates were compared using a TaqMan Low Density Array (TLDA) (Rodent MicroRNA A+B Cards Set v3.0) PCR system. Prospective SSNHL patients presenting within 28 days of onset of hearing loss were recruited as were age-matched controls. Pooled sera of untreated (n=40, mean age= 57.1 years), treated (n=2, 52.6) SSNHL patients and age-matched NHCs (n=9, 51.2 and n=0, 50.0) were used for miRNAs investigations using TLDA (Human MicroRNA A+B Cards Set v3.0).

**Results:** There were 8 DEMs miR-133a-3p/-141-3p/-146b-5p/-190b-5p/-200b-3p/-200c-3p/-223-3p and -375-3p identified in common when comparing the hypoxic with normoxic HEI-OC1 cells findings and the untreated SSNHL patients’ with NHCs sera findings. 4 of these 8 DEMs (miR-146b-5p/-190b-5p/-200c-3p and -375-3p) were similarly found in common when comparing hypoxic with normoxic HEI-OC1 cells and treated SSNHL with NHCs sera. The putative target mRNAs of the DEMs were enriched predominantly in signaling pathways phosphatidylinositol 3 kinase / protein Kinase B (PI3K/Akt) followed by mitogen-activated protein kinase (MAPK) in untreated patients/hypoxic cells; whereas Rap1 and MAPK were the corresponding signaling pathways predominantly enriched in treated patients/hypoxic cells.

**Conclusions:** The PI3K/Akt signaling pathway is involved in response to oxidative stress in HEI-OC1 cells and in untreated SSNHL patients, whereas Rap1 signaling which is suggested to regulate vascular morphogenesis or suppress reactive oxygen species is enriched in treated SSNHL patients. These findings support oxidative stress as a pathogenetic mechanism in SSNHL.

### 370 Dr. Nawaf Al Muqaimi Plastic Surgery

**Title:** Hospital Length of Stay after Cleft Palate Surgery: An Analysis of 200 Consecutive Cases.

Nawaf Al Muqaimi, Tariq Hemelman

**Background:** There is a growing trend towards decreased post-operative in hospital length of stay. This is driven by the desire to decrease hospital costs, increase patient capacity, and improve the patient/family experience. While studies have shown that patients can safely have lip repair as a day or short stay surgery; optimal length of stay after palatoplasty is less clear. Patients undergoing cleft palate repair are at risk for airway complications and postoperative bleeding within 48 hours following surgery. Keeping patients in the hospital longer may provide faster response times to postoperative complications. Longer postoperative hospital stays for patients undergoing palatoplasty has previously been shown to be associated with: structural airway anomalies, longer operative and anesthesia duration, older age, female gender, and the presence of a syndrome.

**Objectives:** This study aims to (1) quantify the postoperative length of stay for patients undergoing palatoplasty at BC Children’s Hospital, and (2) analyze variables such as extent of the cleft, surgical technique, surgical time, geographical home, patient’s demographics, presence of a relevant comorbidity, ASA status and Pierre Robin Sequence (PRS) diagnosis.

**Methods:** A retrospective chart review was conducted on 200 consecutive patients undergoing primary repair of a cleft palate from June 2011 - May 2018. Demographic, perioperative data were collected from the BC Children’s Hospital Database and analyzed.

**Results:** The study cohort consisted of 108 males and 92 females who underwent palatoplasty at a median age of 11.0 months (IQR 9.5 – 12.4). Specific cleft diagnoses were: cleft lip and palate (91), cleft palate (101), and submucous cleft palate (8). 29 patients had a syndrome, 18 patients had a relevant comorbidity and 29 patients had Pierre Robin Sequence [PRS]. The most common surgical technique was two-flap palatoplasty (70), followed by Wardill palatoplasty (49), Fulkow palatoplasty (48), von Langenbeck (27), and hybrid palatoplasty (3). 179 patients had myringotomy tubes inserted at the time of cleft palate repair. Median surgical time was 2.1 hrs. (IQR 1.7 – 3.0 hours).

Median length of stay from exiting the operating room to discharge was 43.1 hrs (IQR 26.1 – 50.1) with 90 patients staying 1 night, 78 patients staying 2 nights and 32 patients staying more than 2 nights. Length of stay (# of nights) did not depend on surgical technique (p=0.438), cleft type (p=0.267), presence of a relevant comorbidity (p=0.08), age at surgery (p=0.136), myringotomy tubes insertion (p=0.147) or geographical home (p=0.451). Patient factors associated with a significantly longer length of stay included PRS (p<0.001) and an ASA status of 3 or 4 (p=0.009). A longer surgical time was also associated with a longer length of stay (p=0.016).
**Conclusion:** Patients with PRRS, an ASA status of 3 or 4, and those who have longer operations are more likely to stay for more nights post-operatively. Surgical technique and cleft type are not associated with a longer length of stay.

**371 Dr. Mostafa Fatehi** Neurosurgery

**Title:** Early and Delayed Functional Outcomes after the Treatment of Posterior Inferior Cerebellar Aneurysms

**Fatehi, Mostafa, MD, Prakasa, Sreedhar, Now, Charles S.E., Gooderham, Peter J., Redick, Gary L.**
1 UBC, Faculty of Medicine, Division of Neurosurgery, Vancouver, Canada

**Objective:** Aneurysms of the posterior inferior cerebellar artery (PICA) are a rare cause of subarachnoid hemorrhage. Treatment for this type of aneurysm may be microsurgical clipping or endovascular (coil embolization, flow diverting stent, and proximal occlusion). This decision is based on patient characteristics, aneurysm location and dimensions, along with surgeon and institutional experience. Understanding how patient outcomes are affected by the different treatments of PICA aneurysms would help physicians and patients in their decision regarding treatment options.

**Methods:** Retrospectively, we reviewed the charts of 52 patients who were admitted to Vancouver General Hospital for ruptured or symptomatic PICA aneurysms between 2005 and 2015. Modified Rankin Scores were assigned at the time of discharge and at two subsequent follow-up time points. The mean short-term follow-up period post-operatively was 11.1 months and the mean long-term follow-up period was 19.3 months. Clinical and radiological characteristics were also collected.

**Results:** Of the 52 patients, 2 died prior to obtaining treatment. Of the 50 patients who were treated for their PICA aneurysm, 39 (78%) presented with subarachnoid hemorrhage while 11 (22%) had asymptomatic unruptured PICA aneurysms. Overall, 11 (22%) patients had endovascular treatment (coil embolization) while 39 (78%) patients underwent microsurgical clipping/trapping of the aneurysm. At the time of hospital discharge, patients in the microsurgical group had a better mean score on the modified Rankin Scale (2.3) compared to the endovascular group (3.0). This disparity decreased as the mean long-term score in the endovascular group (1.6) was comparable to the microsurgical group (1.9).

**Conclusion:** While the early outcomes in patients treated endovascularly are better, there is no statistically significant outcome difference between the microsurgical and endovascular patient groups in long-term follow-up.

**372 Dr. Temitope Grace Joshua**

**Title:** A systematic review on treatments outcomes of patients with sudden sensorineural herring loss.

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**Background:** Sudden sensorineural hearing loss (SSNHL) is a rapidly usually idiopathic hearing decline greater than 30dB over at least three contiguous audiometric frequencies occurring within a 72-hr period. Treatment of SSNHL remains somewhat controversial. Corticosteroids are the mainstay of treatment, and high-dose oral corticosteroids are considered as the first line treatment though intra-tympanic (IT) steroid injections are also widely administered. Hyperbaric Oxygen therapy (HBOT) is mostly considered an adjuvant therapy for SSNHL.

**Objective:** The purpose of this study is to evaluate the current literature on the effectiveness of oral steroids, IT steroids and HBOT based treatments on hearing outcomes in patients with SSNHL.

**Methods:** A systematic review of primary studies published in the English language between January 2000 to June 2018 identified by searching Medline, PubMed, Web of Science, and Embase databases was performed. Inclusion criteria were SSNHL demonstrated on a pure-tone audiogram, no other neurological signs, and commencement of treatment within 14 days of the onset of the hearing loss. Patients with all other types of hearing loss were excluded. The quality of included studies was assessed using the National Institute of Health Assessment tool. The type of investigations, study methods, interventions, and outcomes were recorded on a standardized data collection form. The primary outcome measure was hearing recovery defined as hearing improvement >15dB post treatment. Additional outcome measures of interest included objective measures, such as the change in averaged pure-tone audiometric (PTA) scores, speech discrimination scores and subjective measures, such as patient reports of tinnitus, vertigo, and perceived hearing improvement.

**Results:** 223 articles were identified of which 24 articles meet the study inclusion criteria. The quality of evidence was good in 20 articles, and poor in the remaining 4 articles. Overall, 90% of 1857 patients in the 20 studies who received oral and IT steroids (combination therapy) demonstrated hearing recovery compared to a 75% recovery rate in 776 patients who received oral steroids alone. Combination therapy had statistically significant hearing improvement compared with oral steroids alone (Chi squared, p < 0.05). The results of studies that included patients who received triple therapy with HBOT were inconsistent.

**Conclusions:** There was a significant greater hearing improvement (>15db) noticed in patients who received combination therapy (p<0.05) compared to oral steroids alone or HBOT.

**373 Dr. York Hsiang**

**Title:** The Development of a Smart Stent to Detect In-Stent Restenosis

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**Background:** In order to prevent in-stent restenosis, stent research has focussed on stent coatings. The purpose of this study was to use microelectronics to develop a smart stent capable of providing continuous monitoring of restenosis through the implanted stent. Objectives: To develop an integrated stent coupled to a pressure transducer to provide intra-stent pressure information wirelessly.

**Methods:** An electrically active stent which served as its own antenna was constructed and tested in vitro and in vivo over a range of pressure measurements.

**Results:** Prototype stents were developed to withstand crimping forces >100N and balloon expansion pressures up to 16 atm. Using intravital models of tubes with flowing saline, the prototypes had a wireless sensing resolution of 12mmHg. Using a swine model, the prototypes were implanted in PTFE vascular grafts anastomosed to the femoral artery. Using intraluminal clot as a model of in-stent restenosis, the prototypes provided real-time tracking of blood pressure changes over a range of 108 mmHg.

**Conclusion:** We developed a prototype smart stent that could withstand the crimping forces similar to the production of balloon angioplasty catheters. These stents provided wireless information over a range of 100mmHg suggesting that they would be able to transmit clinically relevant information about the development of in-stent restenosis.

**374 Dr. Alice Liu**

**Title:** The effectiveness of motivational interviewing on hearing aid use

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**Background:** Motivational interviewing (MI) is a method of interacting with patients to enhance behavioral change; the technique works on the principle that behavior change is largely patient dependent. It is well known that many individuals with hearing loss are ambivalent in regards to seeking assistance for hearing loss and using hearing aids. To our knowledge, a systematic analysis of current literature has not been done to determine the efficacy of MI in increasing hearing aid use.

**Objectives:** To determine the impact of MI on hearing aid use compared to standard care. Secondary outcomes include determining if there are associated adverse effects with MI, analyzing the barriers to implementing MI, and to provide clinical recommendations on how MI can be best used.
Methods: A systematic review of the Cochrane ENT, Central, Medline, Web of Science, ICTR, and ClinicalTrials.gov databases was performed following PRISMA statement guidelines. Inclusion criteria were randomized controlled trials (RCT) published between 1988 and 2018 that compared MI to standard care. Abstracts were reviewed and data extracted by two independent reviewers. RevMan 5.3 and a random effect model were used for analysis.

Results: In total, 626 articles were identified across the databases mentioned above. Three articles and one clinical trial, examining 176 patients, were included in the final data extraction. Two articles showed a statistically significant increase in hours of hearing aid use in MI treated patients compared to standard care. Immediate improvements in hearing aid use were maintained over time. However, there were no reported associated adverse effects.

Conclusions: Motivational interviewing appears to achieve an immediate increase in hearing aid use compared to standard care. This technique needs to be further evaluated to determine if the immediate improvements in hearing aid use are maintained over time.

375 Dr. Aishwarya Roshan
Title: Back (Door) to the Future: Dorsal Lumbotomy for Pediatric Upper Pole Heminephrectomy
Aishwarya Roshan, Annie Lalande, Andrew E. MacNeil, 2
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Introduction: Dorsal lumbotomy is a safe technique for renal surgery. This paper examines the outcomes following dorsal lumbotomy in a pediatric patient population.

Methods: A retrospective review of 50 UHN performed in pediatric patients using the DL approach by a single surgeon at BC Children's Hospital between 2000–19. Clinical variables and indicators included age, sex, weight, skin to skin time, total operative time, duration of hospital stay, post-operative complications, analgesic requirements, and 3-month post-operative ultrasound results.

Results: Mean age at surgery was 2.45 months. Mean length of follow-up was 2.25 months. Mean (range) time between skin incision and closure was 90 (62 – 140) minutes, and the mean (range) total operating room time was 140 (70 – 180) minutes. There were neither intraoperative complications nor transfusions. The mean (range) post-operative opioid delivered was 4.73 (0.00 – 25.00) mg/kg/day. Median length of hospital stay was 2 days. No patients received postoperative prescriptions for narcotics at discharge. Two patients experienced minor wound complications. One patient had secondary atrophy of the lower pole. Secondary lower tract surgery, unrelated to surgical approach, was performed in six patients. Fifteen patients experienced a urinary tract infection at some point after surgery.

Conclusions: DL is an historical approach for UHN that should not be forgotten. It is safe, feasible, and produces operative outcomes and times comparable or superior to that of conventional open flank incision, laparoscopic, and robotic techniques. Variations in local peri-operative VTE prophylaxis (VTEp) administration were suspected to contribute to our increasing VTE rates.

376 Dr. Annie Lalande
General Surgery

Title: Standardizing peri-operative VTE prophylaxis in orthopedic trauma patients at VGH – is there room for improvement?

Methods: A survey was created in collaboration with orthopedic surgeons at VGH, with questions addressing demographics of the surgeons, long bone fracture, and pelvis fracture-specific peri-operative VTEp administration practices and barriers to optimal VTEp prescription. An electronic survey was distributed to practicing orthopedic trauma surgeons at Vancouver General Hospital (VGH) following the implementation of a diagnostic pathway in children with suspected appendicitis. The survey was performed on an online platform.

Results: 11 of 12 surveyed surgeons responded. Pre-operative VTEp administration and holding practices were highly variable for most fracture types (operative pelvis and acetabular fractures, femur fractures, hip fractures for patients over 65 years old, tibial plateau fractures), with the exception of tibial shaft fractures and upper extremity fractures. 81% of respondents recommended VTEp upon discharge following surgery for pelvis, acetabular fractures and tibial shaft fractures and upper extremity fractures. 81% of respondents recommended VTEp upon discharge following surgery for pelvis, acetabular fractures. 81% of respondents recommended VTEp upon discharge following surgery for pelvis, acetabular fractures.

Conclusions: Practices for peri-operative VTEp management were significantly variable, with key actionable issues identified. Future directions include surveying orthopedic trauma surgeons in level 1 trauma centers in Canada and the USA, surveying our local anesthesiologists in regards to optimal timing of VTEp for safe neuraxial anesthesia and clarifying current outpatient VTEp prescription patterns at VGH.
378 Dr. Annie Lalande  General Surgery
Title: Reflecting on 5 years of Primary Trauma Care course experiences in Gondar, Ethiopia.
Annie Lalande1, Kristin DeGrolamo1, Meby Berhan2, Dassie Yirdaw2, Shahraud Johari2, Vito Zoua1, Richard Simon3, Meklit Mengistu2, Menwar Yassin2, Nisan Garroway3.
1University of British Columbia, Vancouver
2Gondar University Hospital, Gondar
3Trauma Services, Vancouver General Hospital, Vancouver

Background: Trauma is a leading cause of morbidity and mortality around the world, with low- and middle-income countries (LMICs) bearing the majority of its burden. Through an ongoing partnership for over 5 years, the Branch for International Surgical Care, in collaboration with the Trauma Services at VGH, has been involved in expanding surgical capacity in Gondar, Ethiopia, featuring training as one of the main strategies. The Primary Trauma Care (PTC) course is an internationally-recognized course that has been developed to target low-resource countries as an alternative to less adapted courses and has been used in all of the team’s previous deployments.

Objectives: Evaluating the three iterations of the PTC course in Gondar, Ethiopia.

Methods: The PTC course was taught on three separate occasions during three deployments between 2015 and 2019. Initially offered to senior staff in the context of a training-the-trainer session, as well as to senior residents and rural staff, it was then provided to the senior general surgery residents and, based on feedback, taught to junior residents the following year. The course ran over two days, consisting of didactic sessions, practical skills sessions and group scenarios. A pre-course test was administered to evaluate baseline knowledge and re-administered after the course to evaluate short-term knowledge retention. Surveys included in the PTC course as well as one designed by UBC were provided to the participants after the course.

Results: The PTC course has now become independently run by local leadership with minimal support from the Canadian team. 8 junior general surgery residents and 6 anesthetists participated in the 2019 iteration, encouraging more interdisciplinary exchange than in the previous years. All students improved between the pre-course test and the post-course test, on average by 12.5%. 79% of the trainees felt definitely more confident in their management of trauma patients, while all the others felt somewhat more confident. For all iterations, the trainees have emphasized that these sessions were useful, practical, provided them with a systematic approach to the trauma patient and introduced or supported the vision of trauma as a team effort.

Conclusions: The PTC course is adapted to the local environment to provide essential knowledge for the care of the injured patient. It has served as a platform to engage residents in addressing local issues of access to care. The course has been offered to progressively younger trainees, though some further teaching for interns and first year residents is needed given their primary role in the initial resuscitation. Future directions include supporting the provision of the course to more rural general practitioners, as well as conducting an evaluation of long-term knowledge and skills retention 6-12 months after the course.

379 Dr. Martha I. Talbot General Surgery
Title: Population-based treatment, regional recurrence patterns and survival in Merkel cell carcinoma: a 15-year review
Martha Talbot, Heather Stuart, Trevor Hamilton
UBC General Surgery

Background: Merkel cell carcinoma (MCC) is a rare, neuroendocrine tumor of the skin that commonly metastasizes to lymph nodes. Current guidelines recommend sentinel lymph node biopsy (SLNB) for node negative patients.

Methods: A retrospective review of all Provincial Cancer Agency cases of MCC from 2000 to 2015. Demographics and therapeutic interventions were assessed focusing on SLNB in node negative patients. Kaplan-Meier curve estimates and log-rank testing were used to compare survival and regional recurrence rates. Cox proportional hazard modeling was used for multivariate analysis.

Results: 285 cases of MCC were identified, 200 (70.2%) were node negative at diagnosis. Of the node negative cohort 55.5% were male with median age of 77 years [IQR 69-83]. Sixteen different treatment pathways were identified within this cohort, and 17.4% had a SLNB. On univariate analysis the provision of the course to more rural general practitioners, as well as conducting an evaluation of long-term knowledge and skills retention 6-12 months after the course.

Conclusions: Despite current recommendations, the routine SLNB in node negative patients with MCC is lacking. Further study of the impact of SLNB on survival and regional recurrence is required with a larger cohort.

380 Dr. Paige Knight Plastic Surgery
Title: Pre-operative tranexamic acid reduces peri-operative blood loss: A meta-analysis
Mieke Heyns1, Paige Knight1, Anna Stove1, and Justin Young1
1 Division of Plastic Surgery, Department of Surgery, University of British Columbia, Canada

Purpose: Tranexamic acid (TXA) is a synthetic anti-fibrinolytic which has been used in various surgical disciplines to reduce blood loss. However, its utility in plastic surgery has not been well characterized. This study evaluates the current evidence for the efficacy and safety of TXA on surgical blood loss in all surgical disciplines.

Methods: Cochrane Central and Embase were searched in November 2018, and search terms included “Tranexamic Acid” AND “Intraoperative”, with studies limited to Randomized controlled trials (RCTs) in humans. Two independent reviewers and an arbitrator assessed articles for inclusion. Criteria included a single pre-operative bolus dose of intraoperative TXA, surgical patients, and intra-operative blood loss measurement.

Results: A total of 1098 articles were screened, 57 met inclusion criteria. RCTs were performed across a wide variety of surgical subspecialties: orthopedic surgery (27), obstetrics and gynecology (16), oral maxillofacial surgery/Otolaryngology (30), cardiac surgery (3), and plastic surgery (1). Sample sizes of the included trials ranged from 6-374, and mean age of participants ranged from 22.8-79.3 years. There were a total of 5698 patients included in the analysis.

Conclusion: A single pre-operative dose of intraoperative TXA reduces peri-operative blood loss compared to placebo (-153.33cc [95% CI = -187.79cc to -118.87cc]) in a variety of surgical disciplines without increasing the risk of thromboembolic events (OR 1.00). Therefore, a single pre-operative dose of TXA should be considered, particularly for elective day surgery procedures to minimize risks of peri-operative blood loss.

381 Dr. Annie Lalande General Surgery
Title: Stewardship of laboratory investigations and rational resource utilization in acute care surgery.
Annie Lalande1, Karina Spyra2, Leo Chen1, Janet Simon3, Philip Dawe4, Andrea MacNeill4.
1University of British Columbia, Vancouver
2St. Paul’s Hospital, Vancouver
3BC Cancer Agency, Vancouver
4Vancouver General Hospital, Vancouver

Background: Ancillary tests in hospitalized patients should be performed to support clinical judgment and identify actionable issues for ongoing care. Excessive laboratory investigations can lead to iatrogenic anemia, prolonged recovery and increased blood transfusion requirements. Currently, limited research exists characterizing the full impact of unnecessary phlebotomy, including factors such as hospital costs and environmental consequences.

Objectives: Characterizing unnecessary laboratory investigations ordering pattern at Vancouver General Hospital (VGH) on the Acute Care Surgery (ACS) service.
Methods: A retrospective chart review was performed for patients admitted to the ACS service at VGH between January 1 and December 31, 2018 investigating five disease entities: acute uncomplicated appendicitis, acute uncomplicated cholecystitis, cholelithiasis, gallstone pancreatitis and adhesive small bowel obstruction treated non-operatively. Up to 20 patients per disease entity with an uncomplicated course were randomly selected for further analysis. Bloodwork ordered during their admission was compared to a ideal pathway for laboratory investigations, established by a consensus amongst General Surgery division members. The associated pure carbon footprint was calculated using the Department for Environment, Food and Rural Affairs (DEFRA) PAS2050 methodology and publicly available raw materials origin data.

Results: 304 patients met the admissions criteria, of which 83 were randomly selected and further evaluated. On average, 76% of evaluated patients had excessive bloodwork drawn during their admission. Moreover, 100% of patients undergoing a same admission laparoscopic cholecystectomy for gallstone pancreatitis and cholelithiasis had excessive bloodwork drawn. This represents an estimated 1201 excessive tests and laboratory costs of 10,158$ for all the included patients. Carbon footprint calculations are underway.

Conclusions: Excessive bloodwork was prevalent in the population studied, suggesting that unnecessary investigations are a significant problem in the hospitalized general surgery patients, with far-reaching impacts. Next steps include calculating the associated carbon footprint on a more granular level, expanding the population studied to include various services and spearheading local policy changes at Vancouver General Hospital and in our Health Authority.

382 Wiseman, Sam General Surgery
Title: LIMITED CLINICAL UTILITY OF INTRAOPERATIVE FROZEN SECTION DURING PARATHYROIDECTOMY FOR TREATMENT OF PRIMARY HYPERPARATHYROIDISM

Methods: A retrospective chart review was carried out for all patients who underwent parathyroidectomy for treatment of primary hyperparathyroidism (PHP), and to identify patients for whom it is most helpful.

Results: IFS did not provide information that influenced the operative plan during parathyroidectomy for treatment of PHP for the majority of patients. Patients that present with normal PTH and hypercalcemia, or those who do not localize preoperatively, are most likely to benefit from IFS.

383 Brar, Shanjot General Surgery
Title: Discharge VTE Prophylaxis Prescribing Patterns of VGH Trauma and Orthopedic Surgeons Following Orthopedic Trauma Surgery at Vancouver General Hospital.

Methods: A retrospective chart review was conducted for orthopedic trauma patients admitted to Vancouver General Hospital from Nov 1, 2017 to Oct 31, 2018 with an Injury Severity Score of 12 and above. Data was collected from hospital charts as well as from the provincial trauma registry, with parameters evaluated including attending orthopaedic and trauma surgeon, surgery performed, discharging physician and VTE prophylaxis (duration and type) prescribed upon discharge.

Results: Data collection is currently underway for the 411 identified orthopaedic trauma patients meeting inclusion criteria. Preliminary results demonstrate that on average, 28% (27/97) of patients with an operative long bone fracture were prescribed VTEp upon discharge. 34% (11/32) of patients with pelvic fractures were discharged with VTEp medication, most commonly enoxaparin or dalteparin. Anecdotally, orthopaedic trauma patients admitted under the trauma service have been noted to receive post-discharge VTEp infrequently. This study aimed to better describe prescribing patterns of physicians at VGH following orthopedic trauma fractures.

Conclusions: Discharge VTEp prescribing patterns for orthopedic trauma patients at VGH require further characterization.

384 Lie, Jessica Jin General Surgery
Title: Emergency Use of Group A Plasma in Trauma Patients at a Level 1 Trauma Center

Methods: The use of group A plasma was initiated in July 2017 at our institution. A prospectively collected database of trauma patients who received emergency release plasma between July 2016 to July 2018 was reviewed to compare outcomes of patients who received A plasma to those who received AB plasma.

Results: Of the 55 patients, 37 patients received A plasma and 18 patients received AB Plasma. Patient demographics were comparable in terms of age, gender, blood type, injury type, mechanism of injury and Injury Severity Score. Between the A plasma and the AB plasma groups, there was no significant difference in length of stay (24 vs. 33 days), plasma transfused (5.7 vs. 9.4 units), or ICU admission (76% vs. 67%). There were no transfusion-related complications in both groups. Mortality (32% vs 39%) was similar between both groups.

Conclusion: This study supports the use of group A plasma in an emergency setting for trauma patients as a safe alternative to AB plasma.

385 Dr. Saman Fouladirad Neurosurgery
Title: Challenges Associated with Transitioning from Pediatric to Adult Care for Youths with Hydrocephalus
Introduction: Hydrocephalus is a chronic neurological condition that affects around 6 in 10,000 live births and is one of the most common indications for pediatric brain surgery. The condition is fatal if left untreated, however surgical procedures such as shunt placements has led to most pediatric patients surviving and transitioning to adulthood. Unlike other chronic conditions such as cystic fibrosis, congenital heart disease, type 1 diabetes, etc., the transition of adolescents with hydrocephalus from pediatric to adult care is often fragmented and disjointed given the lack of attention and research in establishing appropriate guidelines and models of transfer. This is particularly concerning not only due to the prevalence of hydrocephalus among the pediatric population, but the significant increase in morbidity and mortality associated post-transition with poorly handled transfers.

Objective: The purpose of the study was to quantify the various factors that challenge young adults with hydrocephalus as they go through this transitioning period by utilizing both a qualitative and quantitative approach.

Methods: The study consisted of two phases that used a series of interview and survey questions to collect qualitative and quantitative data to identify factors that challenge young adults with hydrocephalus who are transitioning/transferring into adult care.

Results: Emerging themes from the data highlighted the difficulty patients and family members have in forgoing familiar relationships, adapting to the new cultural environment in an adult clinic and becoming self-reliant.

Conclusion: Understanding the expectations, concerns and overall input of patients is one of the many important steps that must be taken in order to build a foundation for a transition model of care that can carefully attend to the needs of patients with hydrocephalus.

387 Dr. Abdalla Butt Plastic Surgery
Title: A Clinical and Histological Analysis of Double Capsules and Adherence in Augmentation Mammoplasty with Textured Implants
Abdalla Butt MD, Simran Parmar, Abhiram Cheruvupalli, Yuda Shih, Gary K Yang, York Hisiang, Division of Vascular Surgery, University of British Columbia, Vancouver, BC

Background: Biocell implants are heavily textured breast implants that were removed from the Canadian market in May 2019 for their associated risk of breast implant-associated anaplastic large cell lymphoma (BIA-ALCL). However, many patients still have these implants in-situ and have presented with failed adherence and double capsules and the clinical significance is unknown. There may be a link between these pathological findings and BIA-ALCL. Despite a generic definition, double capsules are lacking a comprehensive definition and classification system.

Objectives: This study aims to create a comprehensive definition and classification of double capsules in Biocell textured implants in relation to failed adherence.

Methods: This is a prospective cohort study. Patients presenting for explantation of Biocell breast implants to the senior author’s (NJC) practice were reviewed. Charts were reviewed for: original surgery and explantation dates, patient and implant characteristics, clinical presentation, and intraoperative findings. Representative cases of different degrees of adherence and double capsule formation were selected for histopathological analysis. Data was analyzed using descriptive statistics.

Results: Eleven women presented for explantation of their Biocell implants primarily for capsular contracture, pain, or size change. The average time to explantation was 8 years. Thirty samples were taken from 22 implants. Intra-operatively, three types of adherence was observed: adherent, partially non-adherent, and completely non-adherent. Ten samples taken from three adherent implants did not demonstrate evidence of a double capsule. Of the remaining 19 implants, 15 were partially adherent and four were completely non-adherent. All 20 samples taken from these 19 implants had evidence of a double capsule. Histopathological analysis showed that outer capsules were well developed and thicker. Inner capsules were thinner, had high levels of inflammatory cells, and ranged from areas of fibroplasia with synovial-like metaplasia to islands or areas of well-defined inner capsular layers in a discontinuous fashion. Completely non-adherent implants had a fully circumscribed double capsule.

Conclusions: Aggressively textured breast implants can result in a double capsule which exists in all cases of implants that are partial to completely non-adherent. Here, we present the first algorithm to define and classify double capsules. This definition and classification system will help form the basis of clinical and research related discussions regarding the problems associated with Biocell implants.
Conclusion: Examination of this sample population revealed correlations between surgical quality indicators. The serum TG level may represent the quality metric of with the most clinical utility since it correlates with both RAIU and MLNR, reflecting the residual volume of benign and malignant thyroid tissue.

389 Dr. Justin Oh General Surgery
Title: Intraoperative Parathyroid Hormone Measurement During Parathyroidectomy For Treatment of Primary Hyperparathyroidism: When Should You End The Operation?
Nicolle Mak, Jennifer Li, Elizabetha Vasileva, Jake Hubert, Michael Gao, Daniel Lustig, Dan Holmes, Sam M. Wiseman

Introduction: The study objective was to evaluate the intraoperative 50% decrease in PTH level, with or without PTH normalization, for its ability to predict cure during parathyroidectomy (PTx) for the treatment of primary hyperparathyroidism (PHP).

Methods: A retrospective review of patients undergoing PTx was conducted. The points at which the 50% PTH decrease, with or without PTH normalization, was reached were recorded. The accuracy of intraoperative PTH for predicting cure, defined as normocalcemia at 6 months postoperatively, was evaluated.

Results: The study population was composed of 248 PHP patients, with 247 patients achieving normocalcemia at 6 months postoperatively. If a 50% PTH decrease was used to indicate operation conclusion, a single case of contralateral parathyroid adenoma would be missed. Persistent PTH elevation at T10 had a PPV of 77%, NPV of 99.5%, sensitivity of 95.2%, and specificity of 97.3% for predicting the presence of a contralateral adenoma. For the entire study cohort, 24.5 hours of cumulative operating time (6 minutes/patient) would be saved if the 50% PTH decrease triggered operation conclusion. If PTH normalization was also required, 19.4 hours (4.7 minutes/patient) would be saved and a persistent PTH elevation at T10 would have a PPV of 38.2%, NPV of 100%, sensitivity of 100%, and specificity of 85% for identifying contralateral adenoma.

Discussion: A decrease in the higher of the baseline or pre-excision PTH levels by 50% at T5 or T10, regardless of whether PTH level normalizes, reliably predicts cure from PHP and should be used to guide the operation.

391 Dr. Zach Zhang Plastic Surgery
Title: Perioperative predictors of digital replantation success rate - A review of institutional experience
Zach Zhang MD1, Peter Credico BS2, Sean Bristol MD FFRS1C, Shaina Maccam MD BS MD FFRS1

Background: Digital replant is a challenging procedure with highly variable success rate between institutions. Institutional experience at the UBC Division of Plastics and Reconstructive Surgery is unknown.

Objectives: To investigate the success rate of digital replant at the UBC Division of Plastics Surgery and the factors associated with increased replant survival.

Methods: This was a retrospective cohort study of all patients who underwent digital replant at the Vancouver General Hospital (January 2000 to September 2018). Digital survival, patient demographics, comorbidities, injury pattern, operative data, and postoperative care were retrospectively reviewed. Univariable and binary logistic regression analysis were conducted to identify factors associated with increased replant survival rate.

Results: Of the 146 patients, 132 (90.4%) were male, the average age was 41-years-old, and 46 (31.5%) had multi-digit replants. Of the 220 replanted digits, 157 (71.4%) were successful. Binary logistic regression identified significant factors (<p<0.05) associated with increased digit survival were sharp or saw mechanism of injury (<0.01), incomplete amputation (<0.01), amputation proximal to zone I flexor level (<0.02), postoperative aspirin use (0.01), absence of leech use (0.05), and absence of re-exploration in OR (<0.01). Digital ischemia time, day vs. night surgery, number of Anastomosed vessels, postoperative infusional continuous regional analgesia were not found to be significant factors.

Conclusions: The UBC Plastic Surgery Division replant success rate is comparable to another national cohort. Sharper amputations, intact venous drainage, more proximal amputation, aspirin use, and the lack of requirement for keesh therapy and exploration are associated with increased digital replant survival.

392 Dr. Mitchell Allan Webb General Surgery
Title: Damage Control in Liver Transplantation: a strategy in managing hemorrhage
Authors: Subin Pannam, Mitchell Webb, Michael Bleszynski, Andrzej Buczkowski

Background: Damage control surgery (DCS) has gained acceptance in the management of the critically ill surgical patient. However, its use in liver transplantation is not yet well described and indications for its use remain to be elucidated.

Objectives: To determine predictors for use of DCS and, alternatively, failure of primary closure after the index liver transplantation (ILT).

Methods: This was a retrospective cohort study of all patients who underwent digital replant at the Vancouver General Hospital (January 2000 to September 2018). Digital survival, patient demographics, comorbidities, injury pattern, operative data, and postoperative care were retrospectively reviewed. Univariable and binary logistic regression analysis were conducted to identify factors associated with increased replant survival rate.

Results: Of the 146 patients, 132 (90.4%) were male, the average age was 41-years-old, and 46 (31.5%) had multi-digit replants. Of the 220 replanted digits, 157 (71.4%) were successful. Binary logistic regression identified significant factors (<p<0.05) associated with increased digit survival were sharp or saw mechanism of injury (<0.01), incomplete amputation (<0.01), amputation proximal to zone I flexor level (<0.02), postoperative aspirin use (0.01), absence of leech use (0.05), and absence of re-exploration in OR (<0.01). Digital ischemia time, day vs. night surgery, number of Anastomosed vessels, postoperative infusional continuous regional analgesia were not found to be significant factors.

Conclusions: The UBC Plastic Surgery Division replant success rate is comparable to another national cohort. Sharper amputations, intact venous drainage, more proximal amputation, aspirin use, and the lack of requirement for keesh therapy and exploration are associated with increased digital replant survival.

393 Dr. Justin Oh Radiation Oncology
Title: Association between Nutritional Risk Index and Outcomes for Head and Neck Cancer patients receiving Concurrent Chemoradiotherapy
Authors: Alvin Liu, Eric Tran, Eric Berthelet, Jonn Wu, Robert A. Olson, Nicole Chau, Angie Bowman, Sarah Hamilton

Background: Patients undergoing combined chemoradiotherapy (CRT) for Head and Neck Cancer (HNC) are often malnourished before, during, and after treatment. Contributing factors include odynophagia, dysphagia, dysgeusia, and mucositis. Poor nutritional status is associated with poor treatment outcomes and worse complications. A simple validated objective measure of malnutrition is the Nutritional Risk Index (NRI). NRI has been validated in surgical cohort, but it has not been assessed as a malnutrition screening tool for HNC patients undergoing radical radiotherapy.

Objectives: 1) To assess the difference between pre- and post-treatment nutritional status as measured by NRI 2) To evaluate whether NRI score predicts for treatment outcomes and complications.

Methods: A population-based review of British Columbia (BC) provincial database of HNC patients treated from 2013 to 2015 with curative intent CRT was performed. The provincial nutritional database prospectively collects basic anthropometric data, including initial weight, height, post-treatment weights and treatment complications. Basic demographic and oncologic staging and treatment information were collected retrospectively. Outcomes included overall survival (OS), early mortality, hospitalization, and G-tube dependence. Univariate (UVA) and multivariate (MVA) analysis were performed as appropriate.

Results: 292 patients were identified. 78% were male, and median age was 59. Average pretreatment NRI was 110 compared to post treatment NRI of 99 (p<0.01). In the median follow up of 3.5 years, 67 deaths were recorded. UVA showed worse OS associated with worse pretreatment NRI (p=0.02). On MVA, worse OS was still associated with pre-treatment NRI (p=0.04), as well as increasing age (<0.01), ECOG status (p=0.02), and oral cavity disease...
compared to oropharynx (p=0.02). 3% of patients passed away in the first 90 days, and higher ECOG score (p=0.01, Fisher’s Exact Test) and T-stage (p<0.01, Fisher’s Exact Test) were associated with early mortality. 3% were G-tube dependent at 1 year, and it was associate with increasing age (p=0.01) and worse NRI (p<0.01). 15% were hospitalized within 90 days, but there was no associated factor with early hospitalization. On MVA, worse NRI (p=0.02) and higher T-stage (p=0.01) predicted for a complication risk.

**Conclusion:** NRI is a simple tool that can quantify malnutrition. In HNC patients undergoing curative CRT, there is a significant difference between pre-and post-treatment NRI. Pre-treatment NRI predicts worse overall survival and treatment complications. NRI should be considered as one of the prognostic factors for HNC patients undergoing curative CRT.

394 Dr. Jonathan Lim Radiation Oncology

**Title:** Late effects assessment in survivors of pediatric brain tumors and rhabdomyosarcoma

**Background:** A “recall program” began at the recently established BC Cancer LEAF (Late Effects, Assessment and Follow-up) Clinic in July 2016. This clinic is specifically designed to address the needs of adult childhood cancer survivors (ACCS) who had been lost to regular follow-up. Patients who have had CNS tumors or rhabdomyosarcomas are at a high risk of experiencing late effects (LEs) or chronic health problems more than five years after their treatment. Their previous therapy generally included surgical resection, high dose radiation therapy (RT) and intensive combination chemotherapy. The majority of patients are still treated this way and it is critical to understand late morbidity associated with this intensive multimodal therapy.

**Objectives:** The objective of our project is to assess the burden of LEs in ACCS treated for CNS tumors and rhabdomyosarcoma and determine if previously unrecognized LEs are detected in these patients by recall assessment.

**Methods:** This study identified all CNS tumors and rhabdomyosarcoma ACCS treated in BC, diagnosed between 1969 to 2002 and not reviewed at any cancer clinic for a minimum of 5 years. 201 patients were identified by the ORS/CAIS database, 66 patients were already being followed, 16 were unable to be contacted, and 9 were deceased, therefore 110 patients were recalled for clinical assessment at the LEAF Clinic. A retrospective review of the ORS and CAIS database of patients attending recall assessment, from the start of the recall program is currently being performed. A variety of data is being collected, such as demographics, details of original therapy, any relapse, evidence of late effects or chronic health problems detected prior to and at recall assessment, patients’ history of screening programs, and treatments started. Data collection is underway and 71 of the 110 patients have been reviewed.

**Results:** Over half of the eligible patients have been retrospectively reviewed. This process is still underway.

**Conclusions:** Our data shows that ACCS experience a significant number of serious LEs, with some LEs being more prevalent than others. We will present data regarding the burden of LEs in pediatric brain tumor survivors.

395 Dr. Sorush Rokui Otolaryngology

**Title:** Adventures in Surgery: preliminary results and insights from interactive, case-based surgical education modules for medical students.

**Background:** The surgical patient is generally underrepresented in medical pre-clerkship curricula, resulting in a relative deficit of knowledge in surgical indications, methods and decision-making amongst third year medical students. This underscores the need for additional exposure to these scenarios in advance of beginning formal clinical training. The advent of interactive modules has shown promise in other fields of medical education; as such, our team has produced a number of case modules for various surgical specialties in an effort to improve medical student fluency with different surgical specialties prior to entering their Surgery and Perioperative Care (SPC) clerkship block.

**Objective:** To assess the utility of a series of interactive surgical case modules for medical students in their surgical clerkship block.

**Methods:** Five surgical specialties were included in this pilot project (general surgery, otolaryngology, plastic surgery, urology, and vascular surgery). From each of these disciplines, a senior resident or staff surgeon was recruited to write several high yield cases corresponding to the MD undergraduate program learning objectives of that surgical discipline. A total of 12 cases were written. Thereafter, cases were transformed into interactive modules using the Prezi presentation platform. Modules for each specialty included relevant anatomy, multiple-choice questions, and radiographic or intraoperative images where applicable. Modules were followed by optional, self-reported surveys. Survey outcomes included length of cases, affinity for the interactive format, difficulty of cases, and overall utility of the module.

**Results:** A focus group of 8 students has completed modules and surveys thus far. After completing the survey, students’ self-reported ‘confidence in managing surgical patients’ increased by 23.2% (3.750 to 5.375 out of 7, n=8). 8 students (100%) found the difficulty and length of the modules to be ‘just right’. 8 students (100%) believe the modules will ‘somewhat’ or ‘significantly’ contribute to their clinical approach. Overall utility of the modules was 5.375 out of 7 (n=8). 8 students (100%) were ‘likely’ (5.25 out of 7) to use another one of the modules in the future. 8 students (100%) prefer this interactive format, difficulty of cases, and overall utility of the module.

**Conclusion:** Preliminary results from a cohort of third year medical students shows that students benefit subjectively from the availability of interactive case modules for various surgical specialties and are likely to use these modules before and during their surgical rotations. Possible improvements include using a more sophisticated and intuitive delivery software.

396 Dr. Mostafa Fatehi Neurosurgery

**Title:** Low grade gliomas: to operate, or not to operate?

**Introduction:** Low grade gliomas (LGGs) are neuroepithelial tumors derived from glial cells in the central nervous system. Patients with LGGs may initially present with symptoms such as seizures and headaches, or may be completely asymptomatic. LGGs’ natural history is variable, ranging from asymptomatic patients with stable tumor burden to rapidly growing lesions progressing to higher grade gliomas, requiring prompt treatment.

**Rationale:** The current model of management of low grade gliomas is the aggressive treatment of the disease in its early stage with surgery and radiation and chemotherapy. However, the aforementioned treatments are far from benign, and a subset of patients may benefit from conservative management. In the current study, we have tested benefits and drawbacks of a conservative “watch-and-wait” versus opt for early surgery approach for LGGs.

**Design:** We have performed a retrospective study of patients diagnosed with low grade glioma. We have included all patients with imaging findings of LGG, from 1996-2015. Overall survival and progression free survival were the outcomes of interest. These results were analysed “as-treated”.

**Results:** A total of 167 patients (median age 38.2 years, 55% male) were included in the present study. The median follow up time was over 7 years. Approximately 1/3 of LGG patients did not require surgery. Of those who underwent surgery, 40 patients progressed to adjuvant chemo-radiation. Furthermore, the size or the location of the tumour did not predict the necessity of surgical intervention. Symptomatic patients, especially those having seizures, were most likely to undergo surgical resection.

**Conclusion:** Despite the current dogma suggesting that LGG patients undergo aggressive operative interventions, our study demonstrates that a large subset of LGG patients would benefit from conservative management.
Background: Intracranial aneurysms (IA) arise when arterial walls weaken and form sac-like bulges, which can rupture and lead to subarachnoid haemorrhage. Familial intracranial aneurysms are defined as two or more relatives being affected with IA. At this time, one gene, THSD1, has been associated with familial IA.

Objectives: Our objective was to use next-generation sequencing to identify rare, non-syndromic variants in multiplex IA families that have Mendelian inheritance patterns.

Methods: Informed consent was obtained from all participants. Detailed clinical histories were obtained via interview. Participants were annotated with relevant information (e.g. IA status, age of diagnosis, number of IA, smoking history). Our group conducted whole exome sequencing in members (n=19) of five different families.

Results: We found 116 rare variants in 32 genes that were common between at least three out of the five families. To determine the association of these variants with IA formation, the identified subset of genes were filtered down via manual annotation with disease-association and literature-search terms that were known to be relevant to vascular formation and maintenance (e.g. "angiogenesis"). Our preliminary results reveal the candidate genes: ASTN2, HSPG2, and ITGB4.

Conclusions: In spite of the potential candidate genes identified herein, a larger participant cohort is desirable in order to identify reproducible disease associations. We have expanded our cohort to an additional 119 individuals, including 32 families with two or more affected first-degree relatives. Confirmation of emerging candidates will require establishment of a causal relationship between rare variants and vascular pathology in animal models.

397 Dr. Ru Guo Neurosurgery
Title: Next-Generation Sequencing and Functional Studies for Rare, Highly-Penetrant Mutations in Familial Intracranial Aneurysms

398 Dr. Mitchell Allan Webb General Surgery
Title: Cava reconstruction in orthotopic liver transplantation: is one technique supreme?

399 Dr. Nicholas Salterio Neurosurgery
Title: Short- & Long-Term Gait and Cognitive Outcomes After Primary Endoscopic Third Ventricle Decompression in Adult Obstructive Hydrocephalus

400 Dr. Paul Steinbok Neurosurgery
Title: Upper Extremity Performance Changes in Children with Spastic Cerebral Palsy following Lumbo-sacral Selective Dorsal Rhizotomy

Objectives: To determine short- & long-term gait and cognitive outcomes.

Methods: Obstructive hydrocephalus was identified based on tri-ventriculomegaly on CT scan and/or MRI. This report focuses on gait velocity (10 m timed gait) and cognitive function (Montreal Cognitive Assessment [MoCA]).

Results: A total of 448 OLTx were performed: 134 classic, 173 SS, and 155 PG. Mean case duration was shorter with PB technique (classic 392, SS 363, PB 321 min, p < 0.005). Other than mean volume of crystalloid (classic 4077, SS 3248, PB: 3403, p < 0.05), techniques did not differ with respect to intra-operative resuscitation requirements (pRBC, FFP, PLts, Cryoprecipitate). PB, however, required less post-operative pRBCs (2 vs 3 and 3.5 units, PB 321 min, p < 0.005). Other than mean volume of crystalloid (classic 4077, SS 3248, PB: 3403, p < 0.05), techniques did not differ with respect to intra-operative resuscitation requirements (pRBC, FFP, PLts, Cryoprecipitate). PB, however, required less post-operative pRBCs (2 vs 3 and 3.5 units, PB 321 min, p < 0.005). Other than mean volume of crystalloid (classic 4077, SS 3248, PB: 3403, p < 0.05), techniques did not differ with respect to intra-operative resuscitation requirements (pRBC, FFP, PLts, Cryoprecipitate). PB, however, required less post-operative pRBCs (2 vs 3 and 3.5 units, PB 321 min, p < 0.005).
Purpose: The use of hyaluronic acid (HA) fillers have become a popular treatment to address changes in the aging face. National statistics report a 58% increase in the use of HA fillers since 2014. Second to only botulinum toxin, HA is the next most common non-surgical aesthetic procedure. Acute complications associated with HA fillers are usually short-lived and reversible. They include but are limited to pain, ecchymosis, and edema. Other early onset complications include vascular occlusion, Tyndall effect, and surface irregularities and nodules. Hyaluronidases are enzymes which depolymerise and subsequently degrade HA. There are many described indications for the use hyaluronidases in aesthetics surgery. To better understand the current practice patterns, we surveyed Canadian plastic surgeons on the use of hyaluronidase for managing complications related to HA fillers.

Methods: With the approval of the Canadian Society of Plastic Surgeons, an electronic survey was e-mailed to all members. The survey included twelve questions focusing on hyaluronidase usage. A total of 382 surveys were distributed and 98 surveys were completed for a response rate of 28%.

Results: Approximately half (49%) of the survey respondents use HA fillers in their practice. Of the respondents who did not perform HA injections, nearly two-thirds were not interested in performing the procedure and over 30% of respondents were not in a private practice setting. Skin testing for hypersensitivity reactions was only performed by less than 10% of HA users. Forty-eight percent of HA providers have used hyaluronidase to treat complications from the use of HA fillers. Nearly all respondents used hyaluronidase for filler over-correction (95.5%) as well as asymmetry (86.4%). Twenty-four percent of the respondents reported using a hyaluronidase formulation prepared by a compounding pharmacy. The vast majority (82.6%) of HA providers reported using hyaluronidase every several months or less than once a year. Over half of the respondents have used hyaluronidase for inflammatory or infectious nodules (59.1%) and the Tyndall effect (59.1%). Other reported applications included resolution of vascular compromise, and one respondent reported using hyaluronidase for haematoma resolution.

Conclusion: The use of hyaluronidase to manage hyaluronic acid filler complications is popular among Canadian plastic surgeons. While hyaluronidase is commonly used by plastic surgeons for over-correction and asymmetry, its use in aesthetic practice is rather diverse and heterogeneous.
Hjalmar Johnson New Investigator Award – Dr. Emilie Joos

Dr. Emilie Joos is a rising star in the UBC Department of Surgery. In a few short years, she has re-energized research activities in Trauma and Acute Care Surgery as Fellowship Director, and in the Division of General Surgery, as Research Director. Engagement with research and academic productivity has skyrocketed in the Division because of her energy and enthusiasm as a role model and mentor for our trainees.

This year, Dr. Joos published one of the world’s largest multicenter studies on the diagnosis and management of pancreatic trauma. Her work will not only affect the care of thousands of patients worldwide, but also was a proof of concept of the great potential of an emerging national research collective in Trauma and Acute Care Surgery.

As a global citizen, Dr. Joos has played a defining leadership role in the Branch for International Surgical Care, and Médecins Sans Frontières (MSF). Dr. Joos has already made substantial academic contributions at local, national and global levels, and is an inspiring role model for future generations of surgeons.

Richard J Finley Senior Investigator Award – Dr. Nadine Caron

Dr. Caron was born and raised in Kamloops, BC, and completed her Bachelor of Science in Kinesiology at Simon Fraser University (1993) and her Medical Degree (1997) at the University of British Columbia in Vancouver. During her surgical residency, Nadine completed her Masters of Public Health (2001) from Harvard University and after completion of residency training (2003), moved to San Francisco to complete her Postgraduate Fellowship Training in Endocrine Surgical Oncology at the University of California, San Francisco (2004). But her love for BC brought her home and since January 2005, Nadine has been working as a General and Endocrine Surgeon at the University Hospital of Northern BC. She is an Assistant Professor–Surgery at UBC’s the Northern Medical Program, as well as an Associate Faculty member at Johns Hopkins University’s School of Public Health, Adjunct Professor at University of Northern British Columbia, Associate Faculty at UBC’s School of Population and Public Health and BCCA Scientist, Genome Sciences Centre.

As the first female First Nations student to graduate from the University of British Columbia’s medical school, she won the Hamber Gold Medal as the top graduating student and was named one of Maclean’s “One Hundred Canadians to Watch.” Nadine’s main research focus involves access to equal health status, health care services and the research that leads to these for our marginalized populations – including Aboriginal, northern and rural. She is currently a member of the Michael Smith Foundation for Health Research Board of Directors, the Governing Council of the Canadian Institutes of Health Research, Regional Advisory Committee for the Terry Fox Research Institute (BC Node), the BCCA Surgical Oncology Network and member of the Northern Aboriginal Cancer Care Advisory Committee. As well, Nadine is the interim Director for UBC’s Centre for Excellence in Indigenous Health which aims to be a focal point for collaboration involving UBC students/faculty and community in partnerships to optimize health science curriculum, education, student supports and health research through an Indigenous lens. Nadine has also been a part of multiple presentations nationally and internationally on Indigenous health, cancer care in rural and northern populations, and addressing the inequities – both known and suspected – for Canada’s marginalized populations.
A History of the Chung Lectureship

In 1995, Madeline and Wally Chung made a generous donation to the Department of Surgery at the University of British Columbia. The purpose of the donation was to support an annual UBC Department of Surgery research day and invite the W.B. & M.H. Chung Lecturer to present new academic work as well as judge academic productivity, not only by the Residents but also by the Faculty. The format was directed toward the new work developed by the Residents, Fellows, Basic Scientists and Faculty. The visiting professor presented original research as part of the day as well as judged the clinical and basic science presentations. The Department is grateful for this wonderful legacy that Madeline and Wally Chung have left for the Department.

1995  Lloyd MacLean, Department Head, Surgery, McGill University and President of the American College of Surgeons
1996  John Duff, University of Western Ontario: “Multiorgan failure: manifestations and mediators”
1997  K. Wayne Johnston, University of Toronto
   “Issues in the management of abdominal aortic aneurysms in a rapidly changing health care environment”
1998  Garth Warnock, Chief General Surgery, University of Alberta Hospitals, Director, Division of Surgical Research, University of Alberta
   “Progress in transplantation of insulin-secreting tissues for diabetes mellitus”
1999  Paul Walker, Vice President, Toronto General Hospital
   Professor of Surgery and Laboratory Medicine, Pathobiology, University of Toronto
   “The continuing challenge of sepsis”
2000  James C. Thompson, Ashbel Smith Professor of Surgery, University of Texas Medical Branch
   “Endocrine tumors of the pancreas”
2001  Richard J. Finley, Professor, Department of Surgery
   Head, Division of Thoracic Surgery, University of British Columbia
   “Future of image guided minimally invasive thoracic surgery”
2002  Douglas W. Wilmore, Frank Sawyer Professor of Surgery, Department of Surgery
   Brigham and Women’s Hospital, Boston, Massachusetts
   “The pathophysiology and treatment of intestinal failure”
2003  John Duff, University of Western Ontario: “Multiorgan failure: manifestations and mediators”
2004  John Wong, Chair of Surgery & Head, Department of Surgery
   University of Hong Kong Medical Centre, Queen Mary Hospital, Hong Kong
   “Complications of esophagectomy: confess and remember”
2005  Richard K. Reznick, R.S. McLaughlin, Professor and Chair, University of Toronto
   Department of Surgery, Banting Institute, Toronto, Ontario
   “Surgical training in 35 hours per week: laudable or lunacy?”
2006  James T. Rutka, Janes Visiting Professor in Surgery, Dan Family Chair in Neurosurgery, Professor and Chairman,
   Division of Neurosurgery, University of Toronto
   “Astrocytoma invasiveness: molecular mechanisms form the leading edge”
2007  Markus W. Büchler, Professor of Surgery, Division of General Surgery
   Chairman Surgical Unit, University of Heidelberg
   “Evidence based pancreatic surgery”
2008  Susan B. Ford Surgeon in Chief, Lucile Packard Children’s Hospital, Stanford, CA
   “From Blood and Guts to Bits, Bytes and Beyond—Upgrading the Surgical Apprentice Model”
2009  Andrea L. Pusic, Assistant Attending Surgeon, Plastic and Reconstructive Surgery, Memorial Sloan-Kettering Cancer Center, New York
   “Measuring patient reported outcomes in surgery”
2010  Jane Winter, Chief, Department of Surgery, University of Laval
   “Evolution of Stentgraft for Treatment of Abdominal Aortic Aneurysms”
2011  Gerald Fried, Chair, Department of Surgery, McGill University
   “Teaching Billy how to operate: can we do better?”
2012  Haile Debas, Executive Director of UCSF Global Health Sciences (GHS); former Dean of the UCSF School of Medicine (1993-2003); former Chair,
   UCSF Department of Surgery.  “Precious Times”
2013  Lorelei Lingard, Professor and Director of the Centre for Education Research & Innovation, Schulich School of Medicine & Dentistry, Western
   University, London, ON
   “Beyond communicating skills: A rhetorical approach to communication for advancing the practice and teaching of teamwork”
2014  Thomas Waddell, Chair, Division of Thoracic Surgery, University of Toronto, Professor, Department of Surgery, University of Toronto
   Head, Division of Thoracic Surgery, UHN, Senior Scientist, Toronto General Research Institute, UHN
   “The role of research training in surgical education”
2015  Garnett Sutherland, Professor, Clinical Neurosciences, University of Calgary, Founder and Director, Seaman Family MR Research Centre, Alberta
   Health Services.  “Magnetic resonance imaging and robotic surgery.”
2016  Dr. Ivar Mendez, Fred H. Wigmore Professor and Unified Head of the Department of Surgery at the University of Saskatchewan – “Robotic and
   distance tele-mentoring surgery.”
2017  Dr. Michael Tymianski, Head of UHN’s Division of Neurosurgery and Senior Scientist at the Krembil Research Institute
   Dr. Wendy Lai, President of Medicos Sans Frontières (Doctors Without Borders) Canada
   “Large scale educational change: difficult, but doable.”