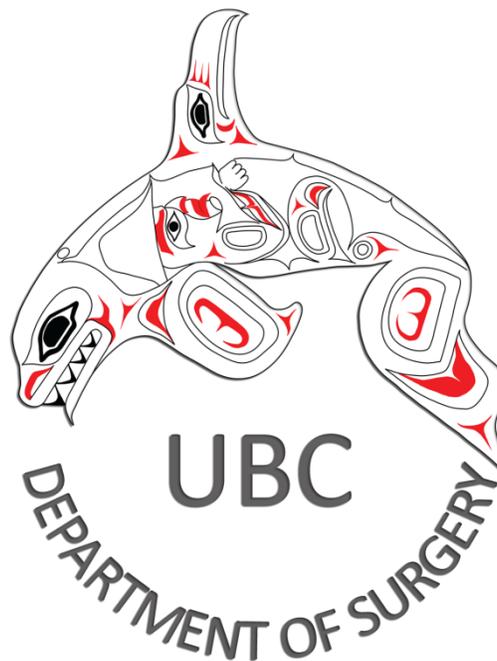




THE SURGICAL TIMES

UBC Department of Surgery

November 5, 2018



The 24th 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 2018 Chung Lecturer, Dr. Richard Reznick, is the Dean of the Faculty of Medicine at Queen's University, the first medical school in Canada to transition fully to a competency-based education model. As we are just starting down that path, his experience and insights will be extremely valuable.

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 Bethany Saunders, our 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 2018

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.

Accredited by UBC CPD



CONTINUING PROFESSIONAL DEVELOPMENT
FACULTY OF MEDICINE

Research Day Schedule

Plenary sessions

0800 **Dr. Gary Redekop, Head, Department of Surgery**
Chung Research Day Welcome

0805 **CHUNG LECTURE - Dr. Richard Reznick**
Large scale educational change: difficult, but doable.

MORNING SESSION – Chair 1: Dr. Gary Redekop/Chair 2: Dr. Alice Mui

**8 minute paper with 2 minute discussion*

- 0900 **Dr. Jessica Luc, Cardiac Surgery**
Graduate Subspecialty and Perceptions of Cardiothoracic Surgery Training: A 60-Year Retrospective Study
- 0910 **Dr. Karan D'Souza, General Surgery**
Residents' Perspectives on Acute Care Surgery in Canada
- 0920 **Dr. Adrienne Melck, General Surgery**
A Canadian Experience with Posterior Retroperitoneoscopic Adrenalectomy
- 0930 **Dr. Jen Li, General Surgery**
Efficacy and Safety of Patient Controlled Analgesia Compared to Epidural Analgesia after Open Hepatic Resection: Systematic Review and Meta-analysis
- 0940 **Dr. Serge Makarenko, Neurosurgery**
Reliability and Correlation with Quality of Life Outcomes of Unified Visual Function Scale
- 0950 **Dr. Peter Mankowki, Plastic Surgery**
Implementation of provincial adult burn clinical practice guidelines and their impact on patient outcomes
- 1000 **Dr. Harman Parhar, Otolaryngology**
A Low-Cost Pharyngeal Vibration Device for Voice Rehabilitation following Laryngectomy in the Low-Resource Setting
- 1010 **Dr. Jordan Wong, Radiation Oncology**
Validation of Deep Learning Based Auto-segmentation Methods for Organs at Risk and Clinical Target Volumes in Radiotherapy Planning
- 1020 **Dr. Caroline Huynh, General Surgery**
Processes and complications in emergency general surgery: A prospective surveillance study
- 1030 **REFRESHMENT BREAK**
- 1050 **Dr. Hannah Piper, Pediatric Surgery**
Gut Microbial Dysbiosis Characterized by Decreased Bile Acid Transforming Bacteria in Infants with Short Bowel Syndrome and Hepatic Cholestasis
- 1100 **Dr. Emily Young, Otolaryngology**
The neuroprotective potential of mesenchymal stem cells for hearing loss
- 1110 **Dr. James Jabalee, Otolaryngology**
The nuclear phenotype of histologically normal surface epithelial cells indicates the presence of HPV-positive oropharyngeal tumors
- 1120 **Dr. Jen Li, General Surgery**
Barriers to Adjuvant Chemotherapy after Resection for Pancreatic Cancer
- 1130 **Dr. Jacques Zhang, Plastic Surgery**
Do Microsurgical Outcomes Differ Based on Which Specialty Does the Operation? An Analysis of 6,617 Cases from the National Surgical Quality Improvement Program
- 1140 **Dr. Arthur Vieira, Thoracic Surgery**
Incidence and Histopathological Features of Thymomatous Myasthenia Gravis Following Total Thymectomy at a Tertiary-level Thoracic Surgery Centre
- 1150 **Dr. Elaine McKeivitt, General Surgery**
Impact of omitting sentinel lymph node biopsy in elderly patients with clinically node negative, ER positive breast cancer
- 1200 **Dr. Joel Howlett, Otolaryngology**
Are we meeting the American Academy of Otolaryngology-Head and Neck Surgery Clinical Practice Guidelines on Hoarseness?
- 1210 **Dr. Diana Forbes, Plastic Surgery**
Imaging-Based 3D Printing for Improved Presurgical Planning: A Single Center Case Series.
- 1220 **Dr. Graeme Hintz, General Surgery/Pediatric Surgery**
Sclerotherapy for Rectal Prolapse in Children: A Systematic Review and Meta-Analysis

1230 SIMULTANEOUS SESSIONS & LUNCH

AFTERNOON SESSION – Chair: Dr. Erik Skarsgard

**8 minute paper with 2 minute discussion*

1400	Dr. Mo Sadr, Neurosurgery <i>Timing of mobilisation post-burr hole drainage of chronic subdural haematomas: a prospective randomised clinical trial</i>
1410	Dr. Harpreet Pangli, Plastic Surgery <i>Application of Silver Nanoparticles as a Potent and Safe Antimicrobial Agent for Liquid Skin Substitute</i>

Highest
ranked
submissions!

1420	Dr. James Choi, Thoracic Surgery <i>CT-guided platinum microcoil lung surgery: updated experience at a high-volume tertiary thoracic surgical center</i>
1430	Dr. Nicole Mak, General Surgery <i>Increased Risk For Dangerous Driving and Motor Vehicle Collisions After Extended-Duration Work Shifts By Residents: A Systematic Review</i>
1440	Dr. Vanessa Samuel, Radiation Oncology <i>Evaluating the discussion of late effects and screening recommendations in survivors of adolescent and young adult (AYA) lymphoma at BC Cancer</i>
1450	Dr. Jessica Dawson, Radiation Oncology <i>Assessing the Quality of Online Information for Cervical Cancer Patients</i>
1500	Dr. Elizabeta Vasilyeva, General Surgery <i>Impact of surgical wait times on postoperative and oncological outcomes in resectable pancreas adenocarcinoma</i>
1510	Dr. Adrian Fung, Vascular Surgery <i>Delay in Discharge in Patients Undergoing percutaneous EVAR</i>
1520	Dr. Rami Al-Salman, Otolaryngology <i>Sinuses bone thickness changes in adult Chronic Rhinosinusitis (CRS) patients</i>
1530	Dr. Cyrus Bhiladvala, Pediatric Surgery <i>The Evaluation of the Nutritional Status of Pediatric Patients in Soroti, Uganda</i>
1540	Ms. Tisha Dasgupta, Pediatric Surgery <i>Evaluation of Postnatal Care for Mothers and Newborns in a Rural Uganda: A Quality Improvement Study</i>
1550	Dr. David Kim, General Surgery <i>Establishing a Canadian Global Surgery Community: A National Survey</i>

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 – Chair Dr. Andrew Thamboo

Paetzold Multipurpose Room, 12:30 – 2:00 pm

**2.5 minute paper with 0.5 minute discussion*

#	Division	Submitting Author	Abstract Title
A01	Thoracic Surgery	Greive-Price, Timothy	The variable presentation of esophageal perforation and implications for clinical management: 10-year experience at tertiary regional thoracic surgical centre.
A02	Pediatric Surgery	Greive-Price, Timothy	North-South surgical training partnerships – a systematic review.
A03	General Surgery	Wu, Dan	Characteristics of regulatory T cells in obese omental tissue in humans
A04	Pediatric Surgery	Liu, Iris Yin Ling	Examining the Factors Affecting Immunization for Ugandan Children
A05	Plastic Surgery	Miller, Rebecca Rohini	Citation Analysis in Breast Reconstruction Publications between 2000 and 2010
A06	Radiation Oncology	Yeo, Sarah	Testicular Cancer Patient Information: An evaluation of the quality of information resources available for testicular cancer patients
A07	Radiation Oncology	Murchison, Sonja Catherine	Breast cancer patients' perceptions of adjuvant radiotherapy: an assessment of pre-treatment knowledge and informational needs
A08	Otolaryngology	Liu, Alice	Laryngeal electromyography-guided vocal fold injections with Hyaluronic acid
A09	Otolaryngology	Liu, Alice	Facial morphology in pediatric patients: The relationship between 3-dimensional facial morphology and risk of sleep disordered breathing in children.
A10	Radiation Oncology	Kiani, Ghazal	Late Effects in Adult Survivors of Childhood Lymphoma: Overall Burden and Proportion Detected at Recall
A11	Vascular Surgery	Fung, Adrian	Review of Fenestrated Aortic Cuff Repair of Type 1a Endoleaks
A12	Otolaryngology	Long, Cai	Clinical Evidence Based and Systematic Scientific Reviews of Malignant Transformation of Inverted Papilloma
A13	Plastic Surgery	Van Slyke, Aaron	The KS-Pexy: a novel method to manage horizontal lower eyelid laxity
A14	Otolaryngology	Zhao, Kevin	A multicenter randomized controlled trial of physician influence on hearing aid user satisfaction
A15	Plastic Surgery	Zawadiuk, Luke RR	What do we know about treating recalcitrant auricular keloids?: a systematic review and meta-analysis
A16	Otolaryngology	Parhar, Harman Singh	Post-Acute Care use after Major Head and Neck Oncologic Surgery with Microvascular Reconstruction
A17	Plastic Surgery	Roller, Janine	A Retrospective Review of Breast Reconstruction Outcomes Comparing AlloDerm and DermACELL.
A18	Plastic Surgery	Cleversey, Chantell Nita Marie	Establishing a wound healing model by using an intradermal injection of botulinum toxin A prior to wounding in mice
A19	General Surgery	Webb, Mitchell	Incisional Negative Pressure Wound Therapy in Colorectal Surgery analysis of a 4-year experience at a single tertiary centre
A20	Pediatric Surgery	Zivkovic, Irena	Abdominal Trauma Outcomes At A Tertiary Hospital In Soroti, Uganda: A Retrospective Analysis
A21	General Surgery	Liu, Claire	Papillary Neoplasms Identified on Core Needle Biopsy Should be Excised Unless Atypia is Excluded
A22	Plastic Surgery	Rokui, Soroush	The scalp donor site for split-thickness skin grafting: a systematic review.
A23	Otolaryngology	Wijesinghe, Printha	Investigation of circulating microRNA expression profiles in patients with sudden sensorineural hearing loss

Simultaneous Session B – Chair Dr. Alexander Lee

Paetzold Lecture Theatre, 12:30 – 2:00 pm

**2.5 minute paper with 0.5 minute discussion*

#	Division	Submitting Author	Abstract Title
B01	Otolaryngology	Webb, Devon	A Comparison of Chronic Rhinosinusitis Recurrence Rates after Unilateral versus Bilateral Computer-Assisted Sinus Surgery
B02	Plastic Surgery	Carr, Michael	The natural history of breast implant pain with aggressively textured Biocell implants: a retrospective review and patient outcomes study
B03	General Surgery	Pasula, Daniel	Anti-apoptotic Bcl-xL Limits Mitochondrial Dysregulation in β -Cells during Prolonged Exposure to High Glucose
B04	General Surgery	Li, Jen	Limited Utility of Intraoperative Frozen Section During Parathyroidectomy for Primary Hyperparathyroidism
B05	Otolaryngology	Panchmatia, Rikesh	The Efficacy of Topical Povidone-Iodine Rinses in the Management of Recalcitrant Chronic Rhinosinusitis
B06	Otolaryngology, Radiation Oncology	Howlett, Joel	Management of Recurrent Nasopharyngeal Carcinoma in British Columbia: A Comprehensive Review
B07	Otolaryngology	Kakande, Emily	Vitamin D Supplementation and Reduction of Severity and Frequency of Epistaxis in Hereditary Haemorrhagic Telangiectasia
B08	General Surgery	Duncan, Katrina	A Statewide Analysis of Firearm Injuries
B09	General Surgery	Duncan, Katrina	Management of Firearm Injuries in the Emergency Department in Maryland, 2013-2016
B10	Otolaryngology	Valenzuela, Dianne	The Impact of Socioeconomic Status on Voice Outcomes in Patients with Spasmodic Dysphonia Treated with Botulinum Toxin Injections
B11	Cardiac Surgery	Lichtenstein, Kevin	A simpler approach for assessing left ventricular function using ultrafast ultrasound based wave intensity analysis
B12	Radiation Oncology	Oh, Justin	Primary Organ Preservation versus Total Laryngectomy for T4a Larynx Cancer
B13	Neurosurgery	Fatehi Hassanabad, Mostafa	To cut or watch: treatment paradigms in low-grade gliomas
B14	Plastic Surgery	Motamedi, Ali	Glucotoxicity Prevention in The Beta Cell: Role of A Novel Antagonist of NMDA Receptor
B15	Otolaryngology	Hashmi, Aneela	The anatomical variation, Retrosphenoid air cell, in CT tomography and their contributions in Sinus diseases. Identification to avoid therapeutic failure and iatrogenic surgical complications
B16	Otolaryngology	Howlett, Joel	Mandible defect classifications: A reconstructive based analysis
B17	Radiation Oncology	Chen, Ben (Tse)	Late Effects of Radiation Therapy for Lymphoma in the Adolescent and Young Adult Population
B18	Otolaryngology	Xu, Rebecca Zhang	The Audiological Patterns and Outcomes in Sudden Sensorineural Hearing Loss Patients (APOST Study)
B19	Cardiac Surgery	Luc, Jessica	Transcatheter Valve Implantation Versus Sutureless Replacement Versus Conventional Aortic Valve Replacement In Aortic Valve Stenosis: A Bayesian Network Meta-Analysis
B20	Cardiac Surgery	Luc, Jessica	Total Artificial Heart As Compared to Biventricular Assist Device for Biventricular Heart Failure: A Systemic Review and Meta-Analysis
B21	Thoracic Surgery	Finley, Richard	The Impact of Pathology, Staging and Operative Resection on Survival and CT Evidence of Recurrence of Early Non Small Cell Lung Cancer Excised with VATS wedge resection guided by preoperative CT-guided microcoil localization (CTML)
B22	General Surgery	Zou, Yuanjie	Failure of Autophagy and Lysosomes Exacerbates β -Cell Dysfunction and Death under Hypoxic Stress
B23	Neurosurgery	Zwimpfer, Thomas	Improvement Of Gait And Cognitive Function 3 Months After Endoscopic Third Ventriculostomy (ETV) In Adult Obstructive Hydrocephalus.

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.

Chung Keynote Speaker 2018



Dr. Richard Reznick

*Dean, Faculty of Health Sciences Queen's University
CEO, Southeastern Ontario Academic Medical Association*

Born in Montreal, Richard Reznick received his undergraduate university education and medical degree from McGill University, followed by a general surgical residency at the University of Toronto. He spent two years in fellowship training, first obtaining a Masters' degree in medical education from Southern Illinois University, followed by a fellowship in colorectal surgery at the University of Texas in Houston, Texas.

Since his first faculty appointment at the University of Toronto in 1987, Dr. Reznick has been active in both colorectal surgery and research in medical education. He was instrumental in developing a performance-based examination, which is now used for medical licensure in Canada.

At the University of Toronto Faculty of Medicine, he was the inaugural Director of the Faculty's Centre for Research in Education at University Health Network (The Wilson Centre) from 1997 to 2002. In 1999 he was appointed Vice President of Education at University Health Network. He served eight years as the R. S. McLaughlin Professor and Chairman of the Department of Surgery at the University of Toronto from 2002-2010.

In July 2010, Dr. Reznick assumed the position of Dean, Faculty of Health Sciences at Queen's University and Chief Executive Officer of the Southeastern Ontario Academic Medical Organization (SEAMO). He has received numerous awards for his work in education, including the Royal College of Physicians and Surgeons of Canada Medal in Surgery and the James H. Graham Award of Merit, the Association for Surgical Education Distinguished Educator Award, the National Board of Medical Examiners John P. Hubbard Award, the Daniel C. Tosteson Award for Leadership in Medical Education, the 2006 Inaugural University of Toronto President's Teaching Award and the Karolinska Institutet Prize for Research in Medical Education. In 2015, he was the recipient of McGill University's Medicine Alumni Global Award for Lifetime Achievement. Dr. Reznick is a honorary fellow of the Royal College of Surgeons of Edinburgh and the Royal College of Surgeons of Ireland.

Abstracts

Plenary Presentations

0900 Dr. Jessica Luc, Cardiac Surgery

Title: Graduate Subspecialty and Perceptions of Cardiothoracic Surgery Training: A 60-Year Retrospective Study

Jessica G.Y. Luc, MD1, G. Alexander Patterson, MD2, Bryan F. Meyers, MD, MPH2, Ralph J. Damiano Jr, MD2, Marc R. Moon, MD2, Mara B. Antonoff, MD3 2. Division of General Surgery, The University of Calgary; ¹Division of Cardiovascular Surgery, Department of Surgery, University of British Columbia, Vancouver, British Columbia, Canada ²Division of Cardiothoracic Surgery, Department of Surgery, Washington University School of Medicine at Barnes-Jewish Hospital, St. Louis, MO, USA. ³Department of Thoracic and Cardiovascular Surgery, University of Texas MD Anderson Cancer Center, Houston, Texas, USA

Background: Recent initiatives in cardiothoracic (CT) surgery education have been aimed at early tracking, emphasizing specialization earlier in residency. This study was performed to examine the impact of subspecialization on graduate assessment of quality of training and to identify educational gaps.

Methods: Surveys were sent to 119 surgeons who completed cardiothoracic surgery residency at a single institution in the United States between 1958-2017. Surveys evaluated transition-to-practice preparedness in patient care, technical skills, qualifying and certifying examinations. 78 surveys were returned complete, 14 were returned deceased or address unknown. Clinical practices include combined cardiothoracic [CT, n=22(28%)] and subspecialty cardiac [n=28(36%)] or thoracic surgery [n=28(36%)]. Responses were quantified on 5-point Likert scales. Statistical analyses compared excellent (5) to less than excellent (1-4).

Results: Graduates who practiced combined CT surgery were more likely to report excellent preparation for qualifying (Cardiac 60.7% vs. Thoracic 35.7% vs. CT 86.4%, p=0.001) and certifying examinations (Cardiac 71.4% vs. Thoracic 53.6% vs. CT 86.4%, p=0.042). Compared to thoracic surgery and combined CT surgery graduates, graduates who practiced cardiac surgery were more likely to indicate excellent preparation for performing adult cardiac surgery (Cardiac 85.2% vs. Thoracic 34.8% vs. CT 81.8%, p<0.001) though felt least prepared to perform general thoracic surgery (Cardiac 85.7% vs. Thoracic 100.0% vs. CT 100.0%, p=0.023). Among the graduates, those with a combined CT surgery clinical focus felt significantly more prepared for transition to independent practice compared to those with exclusively cardiac or thoracic surgery clinical focuses (Cardiac 59.3% vs. Thoracic 74.1% vs. CT 86.4%, p=0.040)

Conclusions: Graduates with combined CT practices self-reported greater examination preparation and technical training compared to graduates who subspecialized in cardiac or thoracic surgery. Subspecialization led to perceived deficiencies among graduates in non-specialty areas, which should be considered when developing new residency training paradigms.

0910 Dr. Karan D'Souza, General Surgery

Title: Residents' Perspectives on Acute Care Surgery in Canada

Karan D'Souza MD¹, Kristin DeGirolo MD¹, Morad Hameed MD, MPH¹
¹ Division of General Surgery, Department of Surgery, University of British Columbia, Vancouver, Canada

Background: Emergency general surgery, which accounts for half of general surgery practice, and which requires rapid, multidisciplinary and often multimodal responses to a broad spectrum acute surgical illness, offers urgent and unique challenges and opportunities in surgical training.

Objective: An updated national environmental scan of the educational experiences of residents on acute care surgery (ACS) services is required to advance surgical training, particularly in the context of new movements in competency-based medical education.

Methods: A cross-sectional online survey was disseminated to general surgical residents across 16 Canadian academic institutions. The survey consisted of multiple choice and open-text questions. 74 residents (16.3% response rate) participated between August and December 2016.

Results: 71.4% of residents report that current service experience and program curricula adequately prepare them to care for emergency general surgery patients. 62.1% report spending more than 50% of their time on service conducting non-operative duties. Additionally, the majority report lacking opportunities to attend ACS clinics (81.1%) or gain endoscopy experience (75.7%). Learners felt that despite the existence of learning goals and objectives, these were not consistently reviewed (56.2%) at the start of rotations. Lastly, outside of academic half or full days, 42.9% of residents' report having no formalized teaching on the ACS service. Furthermore, when probed on improvements that could be made to the service, 30 of 44 respondents suggested formal didactic sessions and bedside teaching opportunities. Other suggestions included integrating clinic experiences, additional allied health professional staffing support, and guidelines on resident expectations.

Conclusions: Despite the poor response rate, this survey provides some insight into the educational benefits and potential of ACS reaching services. However, in the future, surgical educators can enhance their ACS curricula by formalizing teaching opportunities in a team environment and expanding learning into clinics.

0920 Dr. Adrienne Melck, General Surgery

Title: A Canadian Experience with Posterior Retroperitoneoscopic Adrenalectomy

Kathleen Garber, MD and Adrienne Melck, MD, MPH, FRCSC, St. Paul's Hospital Department of Surgery, Division of General Surgery

Background: Minimally invasive adrenalectomy has become the standard of care for surgical management of benign adrenal disease. The transperitoneal approach is the most commonly performed approach worldwide, however many centres have adopted a prone retroperitoneal approach over the past decade. To our knowledge, we were the first center in Canada to perform the posterior retroperitoneoscopic adrenalectomy (PRA) and feel it offers several advantages over the transperitoneal laparoscopic approach (TLA).

Objectives: To describe the first Canadian experience with PRA and compare these patients to TLA patients in terms of preoperative characteristics and surgical outcomes.

Methods: A retrospective chart review was performed of all patients who underwent a minimally invasive adrenalectomy by a single surgeon between March 2011 to June 2018 at St. Paul's Hospital. Patient characteristics, tumor characteristics, operative times and postoperative outcomes were compared between PRA and TLA patients. Student T-test was used to compare continuous variables between groups. A p-value of <.05 was considered statistically significant.

Results: 38 patients underwent a PRA and 34 patients underwent a TLA during the study period. 56 patients had a functional tumor (35 primary aldosteronism, 15 pheochromocytomas, and 7 Cushing's syndrome) and 15 had a non-functional tumor. The TLA group had a significantly higher mean ASA class compared to the PRA group (3 vs. 2.6, p=.002) and a trend toward a higher BMI (28.4 vs. 27 kg/m², p=0.21). TLA glands were significantly larger and heavier compared to PRA glands (6.1cm vs 5cm, p=0.02 and 62.2 vs. 18.9 grams, p=.001 respectively). Anesthesia preparation time and operative times were significantly shorter in the PRA group compared to the TLA group (51.5 vs. 64.9 minutes, p <.001 and 79 vs. 124 minutes, p<.001 respectively). Finally, the PRA group was found to have less use of prn narcotics and a shorter hospital length of stay (2.8 vs. 13.7 doses, p<.001 and 2.7 vs. 4.6 days, p<.001, respectively).

Conclusions: Patients chosen for the TLA approach tended to have a higher ASA class, BMI, and tended to have bigger glands. The PRA approach affords quicker operative times, less postoperative pain and a shorter hospital length of stay and is our preferred approach to adrenalectomy in patients without significant obesity, respiratory comorbidities and whose tumors are <6 cm.

0930 Dr. Jen Li, *General Surgery*

Title: Efficacy and Safety of Patient Controlled Analgesia Compared to Epidural Analgesia after Open Hepatic Resection: Systematic Review and Meta-analysis

Jennifer Li¹; Masoud Pourrahmat²; Elizaveta Vasilyeva³; Peter TW Kim³; Sam M. Wiseman¹

1. Department of Surgery, St. Paul's Hospital & UBC; 2. Faculty of Medicine, UBC; 3. Department of Surgery, Vancouver General Hospital & UBC

Background: Effective pain management in patients undergoing open hepatic resection is often achieved with epidural analgesia. However, it also has associated risks. Alternative analgesic methods are often compared to epidural analgesia in this patient population.

Objective: This study aimed to systematically review and analyze randomized controlled trials (RCTs) comparing the efficacy and safety of patient controlled analgesia (PCA) to epidural analgesia in adults undergoing open hepatic resection.

Methods: A systematic search for RCTs comparing PCA to epidural analgesia in adult patients undergoing open hepatic resection was performed in Embase, MEDLINE, and the Cochrane Central Register of Controlled Trials. Pooled odds ratios (OR), mean differences (MD) and 95% confidence intervals (CI) were calculated using RevMan 5.3.

Results: Four RCTs that included 278 patients were identified. All studies compared the use of PCA to epidural, with differing regimens. Pooled MD for pain score was higher for PCA at 0.59 (95% CI 0.30-0.88) at rest 24 hours postoperatively, and 0.95 (95% CI 0.31-1.60) with movement at 48 hours postoperatively. Pooled MD for hospital length of stay (LOS) was 1.23 days (95% CI -2.72, 5.19). Pooled OR was 0.68 (95% CI 0.36, 1.3) and 0.24 (95% CI 0.04, 1.36) for overall and analgesia related complications, respectively. Need for blood transfusion had a pooled OR of 1.14 (95% CI 0.31, 4.18). No cases of epidural hematoma were reported.

Conclusions: Epidural analgesia is superior to PCA for pain control in patients undergoing open hepatic resection, with no significant difference in hospital LOS, complications or transfusion requirements. This suggests that epidural analgesia should be the preferred method for the management of postoperative pain in this patient population.

0940 Dr. Serge Makarenko, *Neurosurgery*

Title: Reliability and Correlation with Quality of Life Outcomes of Unified Visual Function Scale

Serge Makarenko, Peter A. Goederham, Ryojo Akagami, Division of Neurosurgery, UBC

Background: Historically, descriptions of visual acuity and visual field change following intracranial procedures has been very rudimentary. Clinicians and researchers have often used basic descriptions such as “improved”, “worsened”, and “unchanged” to describe outcomes following resections of tumours affecting the optic apparatus. These descriptors are vague, difficult to quantify, and are challenging to apply in a clinical perspective. We present a novel way to describe a patient’s visual function as a combination of visual acuity and visual field assessment – Unified Visual Function Scale (UVFS).

Objective: We have previously described and demonstrated its use to evaluate patients pre- and post-operatively following resection of lesions affecting the optic apparatus, a scale that uses combined visual acuity and visual fields evaluations to characterize patients into three categories designed around the definition of legal blindness and fitness to drive in Canada. To strengthen the applicability of the UVFS, we tested for inter- and intra-observer reliability of the UVFS and assessed whether UVFS scores reflect visual quality of life outcomes.

Methods: Eight independent observers (two medical students, two nurse practitioners, two neurosurgical trainees, and two neurosurgical staff members) were asked to assess visual acuity and visual fields and assign appropriate UVFS scores. These were then tested for inter- and intra-observer reliability. Additionally, Visual Function Questionnaire (VFQ-25) and Activities of Daily Vision Scale (AVDS) surveys were mailed out to 50 patients with previously-treated perisellar meningiomas. Pearson’s coefficient was calculated and analyzed for correlation against UVFS scores.

Results: We were able to demonstrate strong correlation between UVFS and general vision (0.77), near activities (0.73), peripheral vision (0.67) and driving (0.66) subdomains of VFQ-25. There was a strong correlation with AVDS overall score (0.59). We were able to compare UVFS grading to normative data and also demonstrate a strong link.

Conclusion: The Unified Visual Function Scale is a robust way to assess a patient’s vision combining visual fields and acuity. We believe it is reliable when used by clinicians, and its implementation in a clinical setting is strengthened by reflection of patient visual quality of life.

950 Dr. Peter Mankowki, *Plastic Surgery*

Title: Implementation of provincial adult burn clinical practice guidelines and their impact on patient outcomes

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Background: The severe inflammatory responsive and insatiable fluid losses associated with major burns require aggressive fluid administration to maintain organ perfusion. In the province of British Columbia, Canada clinical practice guidelines were implemented in 2011 to standardize resuscitation practices and optimize consistency in management practices prior to patient transport to a designated quaternary level burn center.

Objective: To evaluate the impact in current practices of the BC clinical guidelines for major burn fluid resuscitation guidelines since their implementation in 2011.

Methods: A retrospective review of TBSA estimation, resuscitation records and clinical outcomes following implementation of provincial major burn clinical practice guidelines was conducted from 2011-2016. Study inclusion required patients older than 18 years of age with a TBSA burn injury greater than 15%. Patients were categorized into groups based on treatment adherence to the 2011 guidelines and if they were treated initially peripherally or directly at our quaternary burn center. Results were compared to previously published BC burn outcome data prior to guideline implementation and to reviewed patients that were not managed in accordance with the guidelines.

Results: Ninety-five patients met the study inclusion criteria. In the 24h after burn injury, patients that were initially managed peripherally and then transferred received an average of 5.8 cc/kg/%TBSA of fluids when there was no evidence of guideline adherence. If the guidelines were implemented only after transferred to our center, they received an average of 5.0 cc/kg/%TBSA. For burns patients where guidelines were utilized both peripherally and after transfer, an average 4.0 cc/kg/%TBSA was used for resuscitation. Complications such as respiratory failure (17% vs. 11%), abdominal compartment syndrome (4% vs. 0%) and acute kidney injury (50% vs. 33%) developed more frequently when the guidelines were only implemented after transfer to our center compared to implementation at their center of initial presentation.

Conclusion: The implementation of new clinical practice guidelines to aid in fluid resuscitation following major burns has decreased IV fluid administration for patients initially assessed in peripheral low volume centers. Early guideline implementation additionally decreases burn associated systemic morbidities.

1000 Dr. Harman Parhar, *Otolaryngology*

Title: A Low-Cost Pharyngeal Vibration Device for Voice Rehabilitation following Laryngectomy in the Low-Resource Setting

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Introduction: Laryngeal cancer disproportionately affects socioeconomically disadvantaged individuals and its incidence is increasing dramatically in low-resource nations. Surgical ablation with laryngectomy results in loss of voice necessitating rehabilitation. Current strategies include tracheoesophageal puncture (TEP), using a surgically implanted prosthesis between the tracheal and esophagus, or the use of an electrical vibratory device externally. TEP requires additional procedures and ongoing maintenance which is often inaccessible in the low-resource setting. The current commercially available electrical devices

are cost-prohibitive. The purpose of this study was to develop and test an open-source and low-cost electrical device for voice rehabilitation in the low-resource setting.

Methods: Material and vibration wave properties were chosen after modelling a modified longitudinal wave equation. A pharyngeal mucosa vibratory device was then produced using a 3D-printed polylactic acid (PLA) plastic cylinder with a solenoid mounted at the tip, capped by a flexible PLA sheet. The device used a timer circuit to oscillate the solenoid at a frequency controlled by a potentiometer knob that adjusted the trigger/discharge impedance of the timer. The solenoid vibrated the PLA sheet, propagating longitudinal waves to neck, pharyngeal mucosa, and oral cavity at a user-adjusted frequency. The device was tested on 20 subjects who used the device to read 25 random words without exhalation to prevent interference from conventional speech. Intelligibility was assessed by an observer stationed 2 meters away. This was repeated with a SolaTone EL (GriffinLabs, Temecula, CA) for comparison. Durability testing was performed using an Arduino microcontroller programmed to activate the device for 10s every minute for 24 hours.

Results: The mean echo accuracies after durability testing was 95.6% with an audible frequency of from 57Hz to 138Hz. The commercial device recorded an echo accuracy of 96.4%. The device components cost \$26.80 USD (versus \$700 USD for the commercial device). The device's performance was similar to the commercial device over the range of common speech frequencies.

Conclusions: A low-cost vibration was developed for speech rehabilitation following laryngectomy. Testing demonstrated high levels of echo accuracy and acceptable levels of durability. This device has the potential to improve the quality of life of laryngectomy patients by addressing problems of ease of use, affordability, and maintainability.

1010 Dr. Jordan Wong, Radiation Oncology

Title: Validation of Deep Learning Based Auto-segmentation Methods for Organs at Risk and Clinical Target Volumes in Radiotherapy Planning

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Background: The goal of radiotherapy (RT) involves maximal irradiation of specific target structures defined by clinical target volumes (CTV), while minimizing dose to organs at risk (OAR). Manual contouring of target structures on computed tomography (CT) images is a labour intensive and time consuming process necessary for RT planning. Deep learning (DL) based auto-segmentation models can improve RT planning, but validation in clinical settings is limited.

Objectives: The aim of this study was to compare the performance of a DL based autosegmentation software against expert manual contours for common OARs and CTVs used in RT planning.

Methods: Three experienced Radiation Oncologists (RO) contoured the OARs and CTV for 43 patients who received RT for a central nervous system (CNS), head and neck (H&N), or prostate malignancy. Automated deep-learning based contours were generated using the DL software Limbus Contour on a consumer grade CPU. Dice similarity coefficient (DSC) and 2mm Hausdorff distances (HU) were used to compare contours. Automated and manual contouring times were recorded and statistical analysis was performed using Wilcoxon Signed Ranks test. **Results:** The mean DSC from comparing RO to RO contours and Limbus to RO contours were 0.82 (standard deviation [SD] 0.06) and 0.84 (SD 0.04) for brainstem, 0.39 (SD 0.12) and 0.43 (SD 0.06) for optic chiasm, 0.51 (SD 0.07) and 0.54 (SD 0.10) for optic nerve, 0.81 (SD 0.05) and 0.79 (SD 0.10) for parotid gland, 0.82 (SD 0.05) and 0.83 (SD 0.04) for submandibular gland, 0.79 (SD 0.02) and 0.70 (SD 0.02) for neck lymph node CTV, 0.85 (SD 0.06) and 0.81 (SD 0.05) for prostate CTV, 0.67 (SD 0.11) and 0.73 (SD 0.08) for seminal vesicle CTV, 0.80 (SD 0.09) and 0.84 (SD 0.08) for rectum, and 0.97 (SD 0.01) and 0.97 (SD 0.01) for bladder. The average 2mm HU from comparing RO to RO contours and Limbus to RO contours were 32.7 (SD 8.2) and 31.5mm (SD 7.0) for brainstem, 55.4 (SD 10.9) and 56.3mm (SD 6.8) for optic chiasm, 36.7 (SD 7.1) and 35.4mm (SD 11.3) for optic nerve, 34.2 (SD 7.3) and 39.9mm (SD 9.3) for parotid gland, 28.5 (SD 10.7) and 27.9mm (SD 8.2) for submandibular gland, 39.9 (SD 3.1) and 56.9mm (SD 3.4) for neck lymph node CTV, 36.1 (SD 14.2) and 49.7mm (SD 19.2) for prostate CTV, 44.4 (SD 7.7) and 41.1mm (SD 6.2) for seminal vesicle CTV, 27.7 (SD 9.4) and 24.5mm (SD 10.0) for rectum, and 19.3 (SD 5.1) and 17.3mm (SD 8.9) for bladder. Average time for ROs to contour compared to Limbus was 8.0 vs 1.1 minutes ($Z = -3.9$, $p < 0.001$) for CNS radiotherapy plans, 27.8 vs 2.7 minutes ($Z = -3.2$, $p = 0.001$) for H&N plans, and 21.8 vs 1.4 minutes ($Z = -2.8$, $p = 0.005$) for prostate plans.

Conclusions: DL based OAR contours are within RO interobserver variability and require significantly less time to produce. DL based CTV contours also closely match RO interobserver variability, but may require subsequent manual edits. Implementation of DL based autosegmentation software into clinical workflow can improve RT contouring time and reduce RT planning bottleneck. Further evaluation of DL in this setting is necessary to determine prospective workflow benefits and the impact on dosimetric consistency.

1020 Dr. Caroline Huynh, General Surgery

Title: Processes and complications in emergency general surgery: A prospective surveillance study

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Background: Emergency General Surgery (EGS) has increasingly been recognized as a distinct surgical subspecialty in North America since 2003. Although the EGS population has been notoriously difficult to define and study, a recent review of EGS systems described this subset of patients as a unique and severely ill group at high risk of postoperative morbidity and mortality, making it an important quality improvement target. This study proposes a model to identify ACS patients' processes and outcomes, with the ultimate goal of improving quality of care.

Methods: In July 2017, the EGS and Trauma services at the Vancouver General Hospital implemented a new prospective, cloud based database, populated and maintained by the surgical teams at the point of care. REDCap (Research Electronic Data Capture) was incorporated into clinical and handover work flow, and used to identify all new consults and operative cases. We prospectively extracted a 32-day consecutive sample of operative patients with their demographics, diagnoses, operative interventions and disposition plans from December 11th to January 11th, 2018. A small number of missing patients was retrieved through attendings' billing codes. Charts were reviewed to identify patients' comorbidities and post-operative complications. Finally, three representative patients were selected for detailed process mapping.

Results: The implementation of REDCap was successful in improving morning handover, enhancing residents teaching and providing context for detailed case discussions. We collected demographic, operative and outcome data on 94 EGS patients over a period of 32 days. The most common comorbidities were a history of previous abdominal surgeries (52.1%), hypertension (31.9%) and thyroid disease (17.0%). Only 13.8% of patients were previously healthy, with no apparent comorbidities. 35.1% of patients had postoperative complications which were most commonly identified as prolonged ileus (11.7%), reoperation (8.5%) and surgical site infections (6.4%). Based on the latter results, process mapping for three specific patients was performed and revealed potential areas of improvement within the EGS model.

Conclusion: Prospective collection of patient data improves service handover and creates an important data registry for EGS and Trauma services. The registry is useful for a better understanding of perioperative processes and outcomes, identifying patients and defining operative cases, and furthermore, it provides a foundation for quality improvement and research initiatives.

1050 Dr. Hannah Piper, Pediatric Surgery

Title: Gut Microbial Dysbiosis Characterized by Decreased Bile Acid Transforming Bacteria in Infants with Short Bowel Syndrome and Hepatic Cholestasis

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Purpose: Infants with short bowel syndrome (SBS) who are dependent on parenteral nutrition (PN) are at risk for hepatic cholestasis. Risk factors include prematurity, lack of enteral nutrition and episodes of sepsis. Additionally, after significant small bowel resection there are disturbances to the gut microbiota, including bacteria involved in bile acid metabolism. This study compares the intestinal microbiota between healthy infants and those with SBS, with and without hepatic cholestasis, to identify possible contributors to hepatic inflammation.

Methods: Stool samples were collected over 3 months from infants with SBS including those with cholestasis (conjugated bilirubin > 34 $\mu\text{mol/L}$ for > 2 weeks), those without and healthy controls (2016-2017). Fecal microbiota was characterized using 16S rRNA sequencing and the abundance of anaerobes known to transform bile acids was compared among groups. Kruskal-Wallis test was used for analysis with P values <0.05 considered significant.

Results: Fecal samples (n=48) were collected from 3 healthy infants, 7 with cholestasis (CHOL) and 8 without (noCHOL). Demographics and intestinal anatomy did not differ between CHOL and noCHOL groups. CHOL infants had increased conjugated bilirubin (142 $\mu\text{mol/L}$ vs. 3.4 $\mu\text{mol/L}$) and poorer growth compared to noCHOL (Z score for weight -2.29 vs -0.52 and for length -2.49 vs. -0.98). Both CHOL and noCHOL groups had significant deficiencies in four bacterial genera known to transform bile acids, with Bifidobacterium being lowest in CHOL infants (Figure 1).

Conclusion: Infants with SBS have reduced levels of anaerobic bacteria involved in bile acid transformation, with the lowest levels in those with hepatic cholestasis. Bacterial changes within the gut may contribute to altered bile acid metabolism and subsequent hepatic cholestasis.

1100 Dr. Emily Young, Otolaryngology

Title: The neuroprotective potential of mesenchymal stem cells for hearing loss

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Background: Sensorineural hearing loss is most frequently caused by loss of auditory hair cells followed by degeneration of auditory neurons. Although cochlear implantation is a relative successful treatment for severe hearing loss, it is dependent on sufficient numbers of healthy auditory neurons to transduce the electric current from the implant to the auditory nerve. Animal studies demonstrated that treatment with adipose mesenchymal stem cells, can delay degeneration of these neurons and improve the implant-neuron interface [Le et al. 2017]. However, stem cell survival rates within the cochlea are low, and their neuroprotective effects only temporary. We hypothesize that olfactory derived stem cells might be more effective, since they share more similarities with neural progenitor cells than adipose derived stem cells.

Objectives: To determine the expression of specific stem cell markers on different cell lines derived from olfactory mucosa and to compare their neurotrophic factor production to that of adipose derived mesenchymal stem cells.

Methods: Olfactory stem cells (OSCs) were derived from the turbinate mucosa of the rat and human and cultured in specific growth media. Human and rat OSCs were characterised using functional differentiation assays to demonstrate their ability to differentiate into bone, cartilage and fat. Flow cytometric analysis was used to demonstrate specific cell surface antibodies. Functional Stress induction experiments, using different concentrations TNF- α and hydrogen peroxide (H₂O₂) were performed to stimulate the production of Brain Derived Neurotrophic Factor (BDNF) and Glia Derived Neurotrophic Factor (GDNF).

Results: Flow cytometry demonstrated specific stem cell surface markers on the adipose and olfactory stem cells obtained from both humans and rats. Stress induction with TNF- α and H₂O₂ did not result in an increased neurotrophic factor secretion. Olfactory stem cells secrete comparable or slightly higher levels of neurotrophic factors than adipose derived stem cells.

Conclusion: Olfactory derived stem cells might be a valuable and easy to reach source of stem cells for neurogenerative purposes since they share more similarities with neuroprogenitor cells than stem cells derived from other sources, e.g. adipose tissue and bone marrow. In the next phase of this project we will test this hypothesis in an *in vitro* model.

1110 Dr. James Jabalee, Otolaryngology

Title: The nuclear phenotype of histologically normal surface epithelial cells indicates the presence of HPV-positive oropharyngeal tumors

Jabalee, J., Carraro, A., Ng, T., Prisman, E., Garnis, C., Guillaud, M.

Background: Transoral robotic surgery (TORS) is an emerging treatment option for patients with early-stage HPV-positive oropharyngeal tumors. TORS allows for non-invasive tumor resection through the mouth and is associated with fewer adverse effects and improved quality of life compared to the current standard of care, chemoradiation. However, early tumor detection is required for this strategy to be most effective. Previous studies attempted to develop a brush biopsy-based screening protocol for detection of HPV-positive tumors in the throat but were unsuccessful. This is likely because such tumors initiate at the base of large invaginations whereas brush biopsies collect only the histologically normal surface epithelial cells, which lack HPV. We demonstrate that histologically normal surface epithelial cells, which are easily accessible via brush biopsy, contain subtle but reproducible changes in nuclear phenotype when in close proximity to an underlying tumor. Such changes could be utilized as biomarkers for the detection of early-stage HPV-positive oropharyngeal tumors.

Objectives: Nuclear phenotypic changes have been identified as promising biomarkers for the diagnosis of difficult-to-detect tumors. This study aims to determine if such changes are present in the histologically normal surface epithelial cells adjacent to HPV-positive oropharyngeal tumors.

Methods: Biopsies of paired tumor and contralateral normal tissues were collected from each of nine HPV+ OPC patients as part of an ongoing clinical trial at VGH. Each biopsy was fixed, sectioned, and three areas of interest corresponding to the tumor (T), tumor-adjacent normal epithelium (AN), and contralateral normal epithelium (CLN), were outlined by the study pathologist. Slides were stained with Feulgen-thionin and a semi-automated quantitative imaging system was used to measure >100 nuclear features per cell. Features of T and CLN were used to build a Random Forest-based classifier capable of discriminating between these tissue types. Voting scores were generated which classify nuclei on a continuous scale from zero ("normal-like") to one ("tumor-like"). The distribution of voting scores for all cells of a tissue was used as a quantitative measure of the degree of abnormality of the tissue.

Results: Our model showed an area under the ROC curve of 0.90 and classified 84.7% of 1207 tumor nuclei and 80.8% of 837 CLN nuclei correctly when applied to the test set. If AN nuclei do not contain nuclear phenotypic changes, then the distribution of features in AN tissues should be nearly identical to that of CLN, since they are derived from the same anatomical structure (surface epithelium of the oropharynx). However, of the top 10 most important features identified by our model (based on the mean decrease in accuracy), we identified four in which the AN was intermediate between the CLN and the tumor, and three in which the AN was statistically significantly different from the CLN but not the tumor. Furthermore, the distribution of voting scores of AN nuclei was intermediate between that of tumor and CLN for all nine patients. These results indicate that AN epithelial cells display a nuclear phenotype that is distinct from that of CLN and tumor cells.

Conclusions: Our results suggest that histologically normal epithelial cells adjacent to HPV-positive oropharyngeal tumors contain reproducible changes in nuclear phenotype that could be used as biomarkers for the detection of early-stage HPV+ OPC.

1120 Dr. Jen Li, General Surgery

Title: Barriers to Adjuvant Chemotherapy after Resection for Pancreatic Cancer

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Introduction: Surgical resection with adjuvant chemotherapy provides optimal survival for patients with resectable pancreatic adenocarcinoma. However, significant perioperative morbidity precludes many patients from receiving adjuvant chemotherapy. There lacks robust data on barriers to adjuvant therapy in these patients.

Objectives: The objectives of this study were to identify rate of successful initiation and completion of adjuvant therapy after resection for pancreatic adenocarcinoma and to identify factors associated with failure to do so, as well as factors predictive of whether a patient will initiate adjuvant therapy.

Methods: A retrospective cohort study was performed on adult patients who underwent resection for pancreatic adenocarcinoma at Vancouver General Hospital between 2008 and 2015. Patient characteristics, perioperative variables and oncological outcomes were compared between patients who received adjuvant therapy and those who did not.

Results: Cancer agency referral rate was 96.9%. Of 151 patients seen by an oncologist, 58.9% initiated adjuvant chemotherapy and 39.4% completed the full course. Patients who did not initiate adjuvant chemotherapy were older (72 vs. 65, $P<0.001$), had a higher comorbidity index (5.4 vs. 4.7, $P=0.004$), lower hemoglobin at discharge (99 vs. 107, $P=0.002$), longer hospital length of stay (20d vs. 13d, $P=0.004$), higher rate of ICU stay (8.6% vs. 2.7%, $P=0.002$), higher rate of TPN use (13.2% vs. 6.6%, $P=0.001$), were more likely to be discharged to a rehabilitation facility (4.6% vs. 0.7%, $P=0.08$), and took longer to see an oncologist (85d vs. 49d, $P<0.001$). Major postoperative complications were more common in patients who did not initiate adjuvant therapy (19.1% vs. 13.9%, $P=0.055$). Distance to the closest cancer center was not associated with initiation or completion of adjuvant therapy. Median overall survival was 14.5, 13.9, and 31.4 months for patients who received no adjuvant, partial adjuvant, and full course of adjuvant therapy, respectively. Median recurrence free survival was 8.7, 7.4, and 17.7 months for patients who received no adjuvant, partial adjuvant, and full course of adjuvant, respectively. Multivariate logistic regression model identified age, pre-operative bilirubin, estimated blood loss, hemoglobin at discharge, ICU admission, and time between surgery and initial BCCA consult as important factors in predicting whether a patient will receive adjuvant chemotherapy (AIC 119).

Conclusion: Most patients who underwent resection were seen by a medical oncologist, but only 58.9% initiated and 39.4% completed the full course of adjuvant chemotherapy. Median overall and recurrence free survivals were higher for patients who completed adjuvant therapy, but were similar between those who received no adjuvant therapy at all and those who received only partial therapy. Older age and factors associated with a complicated postoperative course were identified as barriers to initiate adjuvant chemotherapy.

1130 Dr. Jacque Zhang, Plastic Surgery

Title: Do Microsurgical Outcomes Differ Based on Which Specialty Does the Operation? An Analysis of 6,617 Cases from the National Surgical Quality Improvement Program

Jacques X. Zhang, MD Melissa Wan, BSc Yichuan Ding, PhD Mahesh Nagarajan, MSc, MA, PhD Douglas Courtemanche, MD, MS, FRCSC Jugpal S. Arneja, MD, MBA, FAAP, FACS, FRCSC

Purpose: Since plastic surgeons don't "own" a specific anatomical region, other surgical specialties have increasingly assumed procedures historically performed by plastic surgery. Decreased case volume is postulated to be associated with higher complication rates. Herein, we investigate if volume and surgical specialty has an impact on microsurgical complications, specifically surgical site infection (SSI) and reoperation rate.

Methods: The 2005-2015 NSQIP participant use file was queried by CPT code and stratified by surgical specialty. A multivariate logistic regression model was performed to compare SSIs between surgical specialties for breast and head/neck reconstruction. To investigate the effect of case volume on complication rates, the cumulative frequency based on CPT code and surgical specialty was modeled.

Results: NSQIP captured a total of 6,617 microsurgical cases. Multivariate logistic regression revealed that although the rates of SSIs were lower in plastic surgery compared to otolaryngology for head and neck reconstructions (13.3% vs. 10.5%), and compared to general surgery for breast reconstructions (5.4% vs. 4.7%), they failed to reach a statistical significant difference ($p = 0.96$, $p = 0.28$). The rate of reoperation was lower in the surgical specialty performing a greater number of cases, but again there was no significant difference between specialties. Increased case volume is negatively correlated with complications.

Conclusions: Plastic surgery is a specialty at risk, as increasingly the same procedures are being performed by other specialties. From our systems-reported outcomes study, we conclude that surgical specialty does not affect the rate of SSIs and reoperations. We also demonstrate a correlation between lower volumes and increased complications. Once a specialty has amassed critical case experience, complication rates may decrease, and outcomes can be equivalent or superior. Case breadth and volumes should be maintained to preserve skills and optimize outcomes.

1140 Dr. Arthur Vieira, Thoracic Surgery

Title: Incidence and Histopathological Features of Thymomatous Myasthenia Gravis Following Total Thymectomy at a Tertiary-level Thoracic Surgical Centre

Arthur Vieira, Dorsa Mousadoust, John Yee, Anna McGuire

Background: Since the landmark Randomized Trial of Thymectomy in

Myasthenia Gravis (MGTX),¹ total thymectomy is considered standard of care in conjunction with medical management for myasthenia gravis (MG).

Objectives: We aim to report the incidence of thymomatous MG in our population, tumor histopathological characteristics, and background thymus tissue histopathological characteristics in comparison to those without MG. We also compared MG remission rate for thymomatous versus non-thymomatous MG. We hypothesize that the background thymus tissue in thymomatous MG differs than non-thymomatous MG with respect to volume of germinal centers, and that histology of thymoma in those with MG differs from those without MG.

Methods: A cross-sectional retrospective review of a prospectively maintained surgical database was queried for consecutive thymectomy cases from April 2001 to 2017. Vancouver General Hospital (VGH) is the largest tertiary-level thoracic surgical referral center for Western Canada, and was a MGTX trial collaborating site. Thymic tumors were stratified by presence of myasthenia gravis, and compared via univariate and multivariate regression analysis adjusted for patient and tumor characteristics (age, sex, histopathology, and stage).

Results: Baseline histopathological characteristics are summarized in Table 1. A total of 297 thymectomies were conducted in a population of mean (SD) age 53 (16), and 42% male. MG involved 115 (38.7%) cases, for an incidence of 45.2% thymomatous MG. A younger mean age (48.7 vs. 56.1 years, $p=0.0001$), and smaller tumor size (4.9 vs. 6.2cm, $p=0.008$), and female sex ($p=0.009$) were associated with thymomatous MG compared to non-thymomatous. Germinal hyperplasia in background thymic tissue was more often found with MG (OR, 95% CI: 2.94, 1.58-5.49; $p=0.0004$); as was WHO B1 histopathology (2.23, 1.02-4.90; $p=0.03$). In contrast, WHO AB was less likely associated with MG (0.25, 0.10-0.65; $p=0.001$). There was no observed difference in complete MG remission rate post thymectomy for thymomatous vs non-thymomatous MG; 8 (29.6%) vs 19 (70.4%), $p=0.552$. in thymomatous MG.

Conclusions: Epithelial predominant WHO B1 thymoma, as well as germinal cell hyperplasia were more likely to be associated with myasthenia gravis in our population. This has implications for a potential difference in pathophysiology in thymoma development in those with and without MG. Future research direction may focus on the role of T-lymphocyte immune response in pathophysiology of Thymomatous MG.

1150 Dr. Elaine McKevitt, General Surgery

Title: Impact of omitting sentinel lymph node biopsy in elderly patients with clinically node negative, ER positive breast cancer

Alison Laws, Rona Cheifetz, Colleen McGahan, Rebecca Warburton, Jin-Si Pao, Urve Kuusk, Carol Dingee, May-Lynn Quan, Elaine McKevitt.
Division of General Surgery

Background: Based on randomized control trials demonstrating no survival benefit of axillary surgery in elderly breast cancer patients, the SSO/Choosing Wisely campaign recommends against the routine use of sentinel lymph node biopsy (SNB) in clinically node negative (cN0) patients age ≥ 70 with hormone receptor positive breast cancer. However, axillary staging may influence adjuvant therapy decisions, and therefore some advocate a role for SNB in this population. We sought to evaluate current patterns of axillary surgery in elderly breast cancer patients and identify predictors of sentinel node positivity and the impact of sentinel node positivity on adjuvant systemic and radiotherapy.

Methods: Using our institution's prospective surgical database, we identified all patients age ≥ 70 who underwent breast surgery for stage I-III breast cancer from 2012-2016. In the cNO, ER+/HER2- subset of patients not treated with neoadjuvant therapy (NAT), we compared those with axillary surgery versus none. Univariate and multivariate analysis was used to identify factors associated with a positive sentinel lymph node. The BC Cancer Breast Cancer outcomes database was used to identify adjuvant treatment to assess the impact of positive sentinel nodes.

Results: We identified 367 patients who met study criteria. The median age was 75 years. Most patients had unifocal tumours ($n=325$, 88.6%) that were < 2 cm in size ($n=230$, 62.7%), and of low/intermediate grade ($n=313$, 85.3%). No axillary surgery was performed in 33 (9.0%) patients; these patients tended to be older (median age 80 vs. 75, $p<0.001$), treated with BCS compared to mastectomy (81.8% vs. 57.5%, $p=0.007$), and were more likely to have been upstaged to invasive cancer from a benign diagnosis ($p<0.001$). In the 331 (90.2%) patients with SNB performed, 75 (22.7%) were histologically node-positive, and 11 (3.3%) underwent completion ALND. On univariate and multivariate analysis, only larger pre-operative T-stage ($p=0.002$) was significantly associated with a positive sentinel node, with a trend seen on univariate analysis for multifocal disease ($p=0.07$). Absolute rates of sentinel node positivity were as follows: T1a 0/20 (0%), T1b 11/84 (13.1%), T1c 24/102 (23.5%), T2 37/110 (33.6%) and T3 3/11 (27.3%). Patients with positive sentinel nodes were more likely to receive radiation ($p<0.001$) and systemic therapy ($p=0.001$)

Conclusions: Sentinel node biopsy was performed in $>90\%$ of elderly patients in our cohort with clinically node negative, ER+ HER2- breast cancer with 23% of patients having positive nodes. The finding of a positive node affected adjuvant systemic and radiation therapy but the impact of these treatments on survival requires further study.

1200 Dr. Joel Howlett, *Otolaryngology*

Title: Are we meeting the American Academy of Otolaryngology-Head and Neck Surgery Clinical Practice Guidelines on Hoarseness?

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Background: The American Academy of Otolaryngology (AAO) recently released the updated Clinical Practice Guideline for the assessment and management of Hoarseness (Dysphonia).

Objectives: To determine if our institution's Voice Clinic is meeting the Clinical Practice Guidelines on hoarseness.

Subjects and Methods: Three hundred and thirty adult patients presenting with hoarseness from August 1, 2017 to January 31, 2018 were included. Main outcome measures were whether the thirteen recommendations of the guidelines were met. Statistical analysis was performed to determine what factors were associated with meeting the guidelines.

Results: Twelve of the thirteen recommendations were met, except for the recommended time to laryngoscopy (3 months for the original guidelines; 4 weeks for the updated guidelines). Patients were evaluated by the laryngologist after 23.0 ± 37.3 months. A quarter (25.5%) of patients were seen within 3 months; 7.9% were seen within 4 weeks. Logistic regression showed that patients referred from another specialist (OR 2.59 (1.37-4.89 [95% CI]) ($p=0.003$)) and who had recent surgery (OR 4.01 (2.02-7.95 [95% CI]) ($p<0.001$)) were associated with being seen within 3 months. Patients referred from another specialist (OR 3.43 (1.40-8.45 [95% CI]) ($p=0.007$)) and who had recent intubation (OR 6.37 (2.67-15.20 [95% CI]) ($p<0.001$)) were associated with being seen within 4 weeks.

Conclusion: Majority of AAO-HNS guidelines are being met at our institution, with improvement in time to laryngoscopy an ongoing challenge. A better triaging system should be developed to identify urgent referrals. It is also debatable whether the AAO-HNS time recommendation is generalizable to a socialized health care system.

1210 Dr. Diana Forbes, *Plastic Surgery*

Title: Imaging-Based 3D Printing for Improved Presurgical Planning: A Single Center Case Series.

Will Guest¹, Diana Forbes², Colin Schlosser³, Stephen Yip⁴, Robin Coope³, Jason Chew¹

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3 Canada's Michael Smith Genome Sciences Centre, BC Cancer Agency 4 Department of Pathology & Laboratory Medicine, University of British Columbia

Introduction: 3D printing is an increasingly widespread technology that allows physical models to be constructed based on cross sectional medical imaging data. We sought to develop a pipeline for production of 3D models for presurgical planning, and assess the value of these models for surgeons and patients.

Hypothesis: An image-based personalized 3D model is a useful tool for surgeons in preoperative planning and for patients in having a better understanding of their proposed surgical procedure.

Methods: In this institutional review board-approved, single center case series, participating surgeons identified cases for 3D model printing, and after obtaining patient consent a total of seven 3D models were produced based on pre-operative cross-sectional imaging. Each model was given to the surgeon to use during the surgical consent discussion and preoperative planning. Patients and surgeons completed questionnaires evaluating the quality and usefulness of the models.

Results: The 3D models improved surgeon confidence in their operative approach, in fact influencing the choice of operative approach in the majority of cases. Patients and surgeons reported that the model improved patient comprehension of the surgery during the consent discussion, including risks and benefits of the surgery. Model production time was a little as four days, and the average per-model cost was \$350 CAD.

Conclusions: Development of local hospital-based 3D printing capabilities enables model production in a cost-effective manner with rapid turnaround time. This represents a value-added service for radiologists to offer their surgical colleagues. 3D printed models are useful presurgical tools from both the surgeon and patient perspectives.

1220 Dr. Graeme Hintz, *General Surgery/Pediatric Surgery*

Title: Sclerotherapy for Rectal Prolapse in Children: A Systematic Review and Meta-Analysis

Graeme Charles Hintz^{2,5}, Vito Zhaoxin Zou², Robert Baird⁶

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Introduction: While rectal prolapse in children is often treated conservatively, resistant cases frequently proceed to intervention. Sclerotherapy is a commonly utilized option in this regard, yet standardization and outcomes of its use are lacking.

Objectives: This study sought to systematically evaluate the effectiveness and complications of various sclerosing agents in the treatment of pediatric rectal prolapse.

Methods: After protocol registration (CRD-42018088980), multiple databases were searched. Studies describing injection sclerotherapy for treatment of pediatric rectal prolapse were included, with screening and data abstraction duplicated. The methodological quality of included papers was assessed using the Methodological Index for Non-Randomized Studies (MINORS) score.

Results: Nineteen studies were identified, published between 1970 and 2017. Most studies were single institution case series, with median "N" 57+/-88.9 and mean MINORS score of 0.51+/-0.17 (perfect score = 1). 1510 patients with a mean age of 4.5 years were accounted for: 36.2% female, most without comorbidities. Mean follow up length was 30 months. The most common sclerosing agent described was ethanol (45%), followed by phenol (33%). The mean number of treatments per patient was 1.1+/-0.34. The overall success rate after a single sclerotherapy treatment was 76.9+/-8.8%. The overall complication rate was 14.4+/-2%.

Conclusions: Injection sclerotherapy appears effective and low-risk in the treatment of pediatric rectal prolapse and should be considered before more invasive surgical options. The available evidence is of relatively poor quality; prospective comparative investigations are warranted.

1400 Dr. Mo Sadr, *Neurosurgery*

Title: Timing of mobilisation post-burr hole drainage of chronic subdural haematomas: a prospective randomised clinical trial

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Background: The timing of patient mobilisation post-burr hole drainage of chronic subdural haematomas (CSDH) remains controversial and highly variable across institutions. Delayed mobilisation is traditionally favoured and hypothesised to allow re-expansion of the brain and decrease recurrence.

Objectives: This study aimed to determine the optimal timing of post-operative mobilisation of CSDH patients.

Research design: This is a prospective randomised clinical trial (RCT), evaluating early (EM) versus late mobilisation (LM) of CSDH patients. The primary outcome was recurrence rate at 30 and 90 days post-operation, and secondary outcomes included causes of morbidity and mortality, and length of hospitalisation (LOH).

Results: Eighty six patients were randomised in EM and LM arms, with comparable demographics. Upon admission, 68.3% and 75.6% of patients scored below 4 in a modified Rankin scale, for EM and LM, respectively. The recurrence rate necessitating a repeat surgery was 4.9% and 4.4% at 30 days, and 4.9% and 2.2% at 90 days, for EM and LM, respectively. The mean post-operative LOH was 20.3 and 13.9 days, and the median was 3 and 4 days, for EM and LM, respectively. The mortality rate was 2.4% and 2.2%, for EM and LM, respectively.

Conclusion: This is the first prospective RCT to evaluate post-operative CSDH patients' mobilisation timing. EM and LM patients displayed comparable recurrence, post-operative median LOH, and mortality rates. Our data challenge the current dogma of delayed post-operative mobilisation of CSDH, and suggest that an early mobilisation is at least equal to late mobilisation.

1410 Dr. Harpreet Pangli, *Plastic Surgery*

Title: Application of Silver Nanoparticles as a Potent and Safe Antimicrobial Agent for Liquid Skin Substitute

Harpreet Pangli, Chantell Cleversey, Reza Jalili, and Aziz Ghahary

Burn and Wound Healing Research Group, Division of Plastic Surgery, Department of Surgery, International Collaboration on Repair Discoveries (ICORD), University of British Columbia

Background: Wound repair and healing are often implicated by pathological microorganisms and biofilm. Treatment of chronic wounds, such as burn, pressure, 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: a liquid bioengineered collagen-glycosaminoglycan based scaffold cross-linked with polyvinyl alcohol borate. MeshFill exhibits a higher tensile strength, faster fibril formation, and less contraction than other gels. The optimal management of chronic wounds must also include a therapeutic approach that conveys antibacterial properties. Silver nanoparticles (AgNPs) are an antibacterial agent that can effectively combat colonization and infection in wounds. Silver containing dressings are widely used for controlling infection, however, conventional dressings reveal varying concentrations of silver and degrees of tissue injury after prolonged use.

Objective: The objective of this study was to optimize MeshFill with antibacterial properties by confirming the optimal therapeutic concentration of AgNPs to embed into the MeshFill. To this end, we tested different forms and concentrations of AgNPs to achieve optimal antimicrobial activity while maintaining the highest biocompatibility of MeshFill in terms of cell viability.

Methods: Human dermal fibroblasts were embedded within MeshFill with the density of 50,000 cell/mL and treated with varying concentrations of AgNPs ranging from 0 to 500 PPM. AgNPs were generated in our lab using silver nitrate reduction method. 3D cell-matrix-AgNP composites were cultured for 7 days and then were subjected to live-dead staining and MTT assay. Antibacterial activity of composites was tested for both gram negative (*Pseudomonas aeruginosa*) and gram positive (*Staphylococcus aureus*) bacterial species using absorptiometry and colony counting methods.

Results: Preliminary results of this study showed that concentrations of AgNP up to 100 PPM were safe for fibroblasts embedded within MeshFill. Live-Dead staining and MTT assay confirmed normal cell viability and metabolic activity at this concentration of AgNPs, respectively. Microbiological experiments showed a direct positive relationship between AgNP concentration and antimicrobial activity. Higher dose of AgNPs was required for killing *S. aureus* compared to *P. aeruginosa*.

Conclusion: These results provide support for the usage of silver AgNPs embedded in MeshFill as the optimal management and therapeutic approach to prevent and combat colonization and infections in wounds. AgNP concentration of approximately 100 PPM is optimal in terms of biocompatibility as well as antimicrobial effects.

1420 Dr. James Choi, *Thoracic Surgery*

Title: CT-guided platinum microcoil lung surgery: updated experience at a high-volume tertiary thoracic surgical center

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Introduction: Many lung nodules at high risk for malignancy are not amenable to transthoracic needle biopsy for diagnosis. Excisional biopsy by thoroscopic wedge resection remains important for diagnosis and definitive treatment. The difficulty with wedge resection in the setting of a small or non-solid nodule is that there are no visual or tactile clues available to localize the nodule.

Objective: To provide a 5-year update on our tertiary-level institutional experience with CT-guided platinum microcoil lung surgery.

Methods: A single-institution retrospective cross-sectional study was conducted for the period July 2012 to June 2017. All cases admitted to the Thoracic Service at Vancouver General Hospital to undergo CT-guided microcoil lung surgery were included. Primary outcomes were proportion of successful nodule localization and severity of adverse events with microcoil placement. Secondary outcomes included nodule characteristics on pre-operative CT-chest and nodule surgical pathology.

Results: A total of 97 lung nodules were resected with CT-guided microcoils in 92 subjects during the study period. Mean age was 65.3 (±10.6), and 59 (61%) female. All 97 (100%) nodules were successfully localized using VATS wedge resection. There were 59 (60.8%) cases of placement related events noted on CT-chest. All were minor, self-limited in nature, and did not require treatment: pneumothorax 45 (46.4%), lung hematoma 18 (18.6%), dislodgement into pleural space 4 (4.1%), hemoptysis 2 (2.1%). CT-chest mean nodule diameter was 13.2mm (±6.7). Nodule density was non-solid in 27 (27.8%), semi-solid in 27 (27.8%), and purely solid in 43 (44.3%). There was a single case of positive surgical margin, and 4 (4.1%) went on to completion lobectomy for invasive NSCLC under a 2nd anaesthetic. NSCLC was identified in 66 nodules, with staging as follows: pTis (20), pTmi (14), pT1a (13), pT1b (14), pT1c (3), pT2a (2) [microscopic visceral pleura invasion]. Of the invasive NSCLC, 26 were adenocarcinoma, and 2 were squamous cell carcinoma. Metastatic neoplasms were identified in 13 nodules: colon adenocarcinoma 9, thyroid carcinoma 2, soft tissue sarcoma 1, and metastatic melanoma 1. The remaining 14 nodules revealed benign histopathology.

Conclusion: CT-guided platinum microcoil lung surgery is safe and is suitable for poor risk patients. The method is effective and efficient, yielding 100% diagnostic localization. It essentially eliminates need for palpation to localize subpleural tiny nodules. It is additionally ideal for management of changing nodules, for diagnosis of small indeterminate lung nodules, or metastases.

1430 Dr. Nicole Mak, General Surgery**Title: Increased Risk For Dangerous Driving and Motor Vehicle Collisions After Extended-Duration Work Shifts By Residents: A Systematic Review**¹Clinician Investigator Program, University of British Columbia, Vancouver, BC, Canada;²Department of Surgery, University of British Columbia; ³Department of Surgery, St. Paul's Hospital & University of British Columbia, Vancouver, BC, Canada

Introduction: Resident physicians often work longer than 24 consecutive hours with little or no sleep. A systematic review of the literature was conducted to investigate the risk of resident physician motor vehicle collisions (MVC), and dangerous driving, after extended-duration work shifts (EDWS).

Objectives: The objective of this review is to systematically evaluate the current literature to determine whether resident physicians demonstrate an increased risk for dangerous driving after extended-duration work shifts.

Methods: A keyword search was performed for original research articles evaluating any aspect of driving safety following EDWS for the resident physician population. Two authors independently reviewed articles for inclusion. Subsequent independent data abstraction and quality appraisal was carried out.

Results: Five articles met study inclusion criteria. The quality of the evidence ranged from very low to low, and results were not pooled due to study heterogeneity. Residents reported 2.3 to 3.8 hours of sleep during EDWS. Three survey-based studies identified an increased risk of falling asleep at the wheel when driving after EDWS. One study found an association between weekly cumulative sleep hours lost and risk of falling asleep while driving after EDWS. Furthermore, another study reported risk of being in a MVC when driving post-EDWS increased by 16.2% per shift worked in a month. Similarly, a driving simulation study performed on 23 trainees found a significant increase in crash frequency in males post-EDWS.

Conclusion: The period following EDWS is associated with an increased risk of potentially life threatening driving safety risks for resident physicians. These observations warrant careful consideration. They suggest that there is a need for greater awareness and action in order to avoid the occupational and public health risks of the post-call commute.

1440 Dr. Vanessa Samuel, Radiation Oncology**Title: Evaluating the discussion of late effects and screening recommendations in survivors of adolescent and young adult (AYA) lymphoma at BC Cancer**Vanessa Samuel¹, Karen Goddard^{2,3}, Ben Chen¹, Kerry J. Savage^{1,2}, Ciara Freeman^{1,2}, and Andrea Lo^{2,3}.¹Faculty of Medicine, University of British Columbia, Vancouver, Canada ²BC Cancer Vancouver Centre, Vancouver, Canada ³Department of Surgery, University of British Columbia, Vancouver, Canada

Background: Survivors of AYA lymphoma are at high risk of developing late effects of radiotherapy (RT) and chemotherapy, including second malignancies, cardiomyopathy, and infertility. This population requires ongoing follow up, but may be discharged into the community without adequate documentation of late effects' risks and screening recommendations (SRs). Understanding the current nature of documented late effects' risks and SRs is the first step to improving communication between oncologists, patients, and their primary care professionals (PCPs), thus maximizing long-term health of survivors.

Objective: The study objective was to assess the quality and quantity of late effects discussion and SRs provided to AYA lymphoma patients and their PCPs prior to discharge from BC Cancer.

Methods: This study involved a retrospective chart review of AYA lymphoma survivors aged 15-29 at diagnosis who received RT +/- chemotherapy between 1974-2014 at BC Cancer. Susceptibility to specific late effects was determined by reviewing details of patients' RT and chemotherapy exposure. Descriptive statistics were used to report the percentage of susceptible patients who received appropriate late effects discussion and SRs. Chi-squared testing examined the relationship between year of diagnosis and quantity of SRs and late effects discussion.

Results: The study cohort consisted of 378 patients, including 226 survivors of Hodgkin lymphoma and 152 survivors of non-Hodgkin lymphoma. The total percentage of patient charts with any late effects discussed was 70.9%, while the total percentage of patients receiving any documented SRs was 38.9%. The most commonly discussed late effects risks were radiation-induced (RI) infertility (discussed in 48.7% of susceptible patients), RI lung damage (33.0% of susceptible patients), and RI thyroid disease (30.3% of susceptible patients). The least commonly discussed late effects risks were RI bowel cancer (discussed in 3.05% of susceptible patients), RI brain neoplasms (1.92% of susceptible patients), and RI carotid artery stenosis (0.36% of susceptible patients). The most common SRs were for RI breast cancer (mammography recommended for 43.2% of susceptible patients) and RI thyroid disease (regular TSH/T4 recommended for 23.3% of susceptible patients). Late effects were discussed for 88.2% of patients diagnosed between 1996-2009 vs. 51.9% of patients diagnosed between 1959-1996 ($P < 0.0005$). SRs were discussed for 47.7% of patients diagnosed between 1996-2009 compared to 34.4% of those diagnosed between 1959-1996 ($P = 0.009$).

Conclusion: Most survivors of AYA lymphoma received some discussion of late effects, but each relevant late effect risk was discussed in only a minority of susceptible patients; the discussion of SRs was even less common. Written documentation to PCPs, therefore, lacked adequate late effects education and SRs. The frequency of late effects discussion and SRs has increased significantly over the last few decades at BC Cancer, but there is room for further improvement. Recall of this cohort of AYA lymphoma survivors should be considered to assess the presence of late effects and long-term follow up needs.

1450 Dr. Jessica Dawson, Radiation Oncology**Title: Assessing the Quality of Online Information for Cervical Cancer Patients**Jessica Dawson¹, Paris-Ann Ingledew²¹MD Undergraduate Program, ²Department of Surgery (Radiation Oncology) University of British Columbia, Vancouver BC, Canada

Introduction: The Internet acts as an important source of information for many cervical cancer patients, but the quality of the resources that patients access can vary widely. Organizations that publish information for cancer patients are also moving beyond traditional websites, and are increasingly engaging with patients on social media platforms such as Twitter, Instagram and YouTube.

Objectives: We sought to systematically evaluate the quality of cervical cancer information resources available against a range of metrics, including content breadth and accuracy, readability, and accountability. As our current methodology for evaluating quality is limited to webpages, as part of this work we also began to explore the extent to which websites also maintain a social media presence.

Methods: We performed an internet search using the term "cervical cancer" using Google and two meta-search engines, Dogpile and Yippy and evaluated the 100 websites returned across all three engines using a validated structured rating tool. We recorded the number social media platforms to which each website linked and maintained a presence, and the number of websites hosting YouTube videos targeted to cancer patients.

Results: Websites provide the most coverage for etiology and risk factors (93% of websites) and prevention strategies such as pap smears and vaccines (92%). Coverage was high for the definition of cervical cancer (82%), incidence and prevalence (74%), symptoms (89%), detection and workup (80%), and treatment (84%), and worst for prognosis (49%), staging (52%), side effects and post-treatment effects (47%), and follow up (25%). The content provided was largely completely or mostly accurate for most topics; few websites had inaccurate information. There was no listed author on 68% of websites and no references on 62%. Only 64% had been updated in the last two years. Readability was at university-level or higher for 19% of websites, and high-school level for 78%. For social media, 79% of the websites linked to at least one platform, with an average of 4.1 different platforms per website; 32% of websites hosted information videos for cancer patients on YouTube.

Conclusions: While some topics such as cervical cancer screening and prevention are well covered, many other important topics like prognosis and staging are underrepresented. Most websites are accurate, but many lack accountability or recent updates. High reading levels may impact accessibility for patients. Many websites that provide information to cancer patients also maintain a social media presence; updating our methodology to evaluate the quality and types of information shared on these platforms may represent an important avenue for future work.

1500 Dr. Elizabeta Vasilyeva, General Surgery**Title: Impact of surgical wait times on postoperative and oncological outcomes in resectable pancreas adenocarcinoma**

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Introduction: Upfront resection with adjuvant chemotherapy is the mainstay treatment for resectable pancreas adenocarcinoma. There is limited data on the impact of surgical wait times on postoperative and oncologic outcomes in this patient population. This study was conducted to evaluate the effect of surgical wait times on postoperative complications, short-term and long-term oncologic outcomes.

Hypothesis: A significant delay of surgery is associated with higher rate of palliative bypass, postoperative complications, and worse oncologic outcomes.

Methods: A retrospective cohort study of 144 (2008-2015) of patients with proven or suspected resectable adenocarcinoma of the head of the pancreas who were scheduled for surgery was performed. The cohort was divided into 4 subgroups of surgical wait times as defined by the time elapsed between diagnosis to surgery (<4 weeks, 4-8 weeks, 8-12 weeks and >12 weeks). Intraoperative parameters, postoperative complications, pathologic stage and survival were analysed.

Results: Patients in the shortest wait time group (<4 weeks) were less likely to receive preoperative biliary drainage ($p<0.001$), had lower Charlson comorbidity index ($p=0.01$), and had their last preoperative imaging done within one week of the operation compared to other groups ($p<0.001$). 89.7% of the patients who waited less than 4 weeks underwent resection, compared to 75%, 68.8% and 70.2% of patients in the other wait groups, however statistical significance has not been reached ($p=0.207$). There was no difference in length of stay ($p=0.906$) or postoperative complications ($p=0.984$). There was no difference in tumour size ($p=0.672$), and lymph node involvement between the groups ($p=0.396$). Shortest wait time was associated with the highest rate of microscopic positive margins of 73.1%, although statistical significance has not been reached ($p=0.204$). Of the patients who underwent resection, there was no difference in the proportion of patients who initiated adjuvant chemotherapy, and disease free survival. Median survival for patients who underwent pancreaticoduodenectomy was 22.8 months, and 5-year survival was 18.3%. Median and 5-year survival (24.5 months and 22.6%) was highest in the longest wait time (> 12 weeks) group. Cox regression analysis adjusting for potential confounders, found that the longest wait group had a significant reduction in the risk of death during the study period.

Conclusions: Shorter wait times were associated with a lower biliary drainage, and lower rate of conversion to palliative bypass. Of the patients who underwent resection, surgical wait time >12 weeks was associated with better long-term survival. Longer wait times did not appear to have an impact on intraoperative or postoperative complications.

1510 Dr. Adrian Fung, Vascular Surgery**Title: Delay in Discharge in Patients Undergoing percutaneous EVAR**

Adrian Fung, Gary Yang, Joel Gagnon, UBC Division of Vascular Surgery

Background: The advent of endovascular aneurysm repair (EVAR) significantly reduced the post operative stay for patients undergoing aneurysm repair compared to open repair. Ever since, vascular surgeons have strived to reduce post operative length of stay and even completely avoid intensive care unit stay by employing techniques such as percutaneous EVAR (pEVAR) over cutdown EVAR. There is heavy interest in selecting the appropriate patients for pEVAR to facilitate timely discharges. The literature has reported on inability of void as a cause for delay of discharge post pEVAR, which could potentially be exacerbated by catheterization during surgery. Thus, we seek to identify complications that lead to delay in discharges in patients undergoing pEVAR at our centre.

Methods: A retrospective analysis was performed on all pEVAR repairs at a single centre from January 2013 to December 2017. Cutdowns on one side or conversions for closure device failure were excluded. The primary outcomes of interest were days to discharge, reason for delay of discharge greater than 2 days, foley catheter reinsertion. Other variables collected included incidence of urinary tract infection and hematuria, referral to urology, 30 day survival, post operative opioid or epidural usage, renal function and length of surgery.

Results: 365 pEVAR cases were identified through vascular surgery QI files and 186 were exclusively pEVARs without any cutdown procedures or conversions. 60 (32%) were discharged greater than 2 days after procedure. The average age (78.3 vs 75.9, $p=0.059$) and percentage of males (83% vs 90%, $p=0.23$) were not different between the groups. The delayed group had greater proportion of patients experiencing urinary retention (11.7% vs 2.4%, $p=0.0019$), but there is no significant difference for patients requiring reinsertion of catheter (8.9% vs 2.5%, $p=0.058$). However, the average day of foley removal is different between the two groups (1.4 days vs 0.86 days, $p=0.0001$). There was only one mortality within 30 days, which is in the delayed group for ruptured AAA, and one lost to follow up in the non-delayed group.

Conclusion: The data suggests that urinary retention is a significant cause of delay in discharge for patients undergoing pEVAR. Future studies could explore the need for prophylactic medical treatment to prevent retention.

1520 Dr. Rami Al-Salman, Otolaryngology**Title: Sinuses bone thickness changes in adult Chronic Rhinosinusitis (CRS) patients**

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Introduction: Chronic Rhinosinusitis (CRS) is a common inflammatory condition involving the nasal cavities and one or more of the paranasal sinuses. The treatment of CRS often involves multidrug therapy with corticosteroids, antibiotics, saline irrigation mucolytics, and decongestants. For those who fail medical therapy, Functional Endoscopic sinus surgery (FESS) is the best method of surgically treating patients who suffer from CRS, and has been shown to ameliorate quality of life in 85% of patients. Long term CRS can result in the development of osteoneogenesis secondary to low grade chronic inflammation and infection of the sinuses.

Objectives: To examine the changes in the bone thickness of the maxillary and sphenoid sinuses in long-standing CRS adult patients at St. Paul Sinus Centre and compare them with normal controls.

Methods: For this retrospective study, 64 charts of the adult CRS patients has been reviewed; of these 32 patients are older than 50 years old with equal gender distribution, and the rest are 50 years old or younger with equal male to female ratio. The thickness of the bony wall in the patients is then compared with controls of the same number, gender, and age distribution.

The bony thickness of paranasal sinus is assessed based on the CT scan images at the bone window setting in both groups. The evaluation of the bone thickness includes:

1. The maxillary sinus, bilaterally, at the mid-point of the posteromedial wall, in the axial section.
2. The sphenoid sinus, bilaterally, at the anterior sinus wall, in the axial section.

Results: The mean thickness of the bony walls were 0.87mm (Maxillary sinus) and 0.80mm (Sphenoid sinus) in the normal group vs 0.91mm (Maxillary sinus) and 0.84mm (sphenoid sinus) in the CRS group respectively. These differences were found to be statistically insignificant.

Conclusions: The bony thickness of the maxillary and sphenoid sinuses walls is not affected with long-standing CRS.

1530 Dr. Cyrus Bhiladvala, Pediatric Surgery**Title: The Evaluation of the Nutritional Status of Pediatric Patients in Soroti, Uganda**

Cyrus Bhiladvala^{1,2,3}, Damian Duffy^{2,3}, Mary Margaret Ajiko^{1,4}, Kishore Mulpur^{2,3}, Eleanor Reimer^{2,3}, Phyllis Kisa^{1,2}, Robert Baird^{1,2,3}
 Office of Pediatric Surgical Evaluation and Innovation (OPSEI)¹, BC Children's Hospital (BCCH)², University of British Columbia (UBC)³, Soroti Regional Referral Hospital (SRRH)⁴

Introduction: This project was implemented in order to assess the nutritional status of pediatric patients at Soroti

Regional Referral Hospital. According to the Uganda Health and Demographic Survey of 2016 (UHDS 2016), the frequency of severe malnutrition (-3 SD or less) in the sub-region surrounding Soroti is 3.3% stunting, 0.4% underweight, and 0.3% wasting.

Objectives: The aim of this research is to quantify the magnitude of discrepancy between the nutritional Zscores of pediatric patients (ages 6 months to 5 years) at SRRH, and those recorded in UHDS 2016. We assessed demographic factors, food and water security, and the patient's reason for admission.

Methods: Anthropometrics assessed were height, weight, sex, age, mid upper-arm circumference (MUAC), and bipedal edema. A survey of patient pathology, demographics, and food security was conducted at SRRH in July 2018.

Results: Data was gathered for 99 patients. Severe stunting was seen in 25.6% of patients, severe weight deficiency was seen in 24.7% of patients, and severe wasting was seen in 19.1% of patients. 74% of guardians said their children were missing key foods, the most common of which were milk, eggs, and meat. 50% of patients were concerned that their drinking water was unclean, and 34% reported a history of typhoid. The median family income was 41,000 UGX (14.15 CAD) per month, and the median family size was 8 (4 adults, 4 children).

Conclusions: Severe malnutrition is a significant concern at SRRH, and is in need of systemic addressing. Patients from families earning less than 41,000 UGX per month are more often stunted and underweight.

1540 Ms. Tisha Dasgupta, Pediatric Surgery

Title: Evaluation of Postnatal Care for Mothers and Newborns in a Rural Uganda: A Quality Improvement Study

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Background: The days immediately following childbirth is a crucial time for both mothers and newborns, as most complications and mortality occur in this period. Although high neonatal and infant mortality rates have been recorded in Uganda, improving postnatal care (PNC) has been neglected especially in rural areas. Additionally, Uganda also failed to meet the Millennium Development Goals targets on child mortality and maternal health in 2015.

Objectives: The purpose of this study is to analyze the quality of PNC, challenges associated, frequency of complications, and determine compliance rate to World Health Organization (WHO) guidelines at Soroti Regional Referral Hospital (SRRH).

Methods: The 'WHO recommendations on Postnatal care for the mother and newborn' guide was adapted into separate questionnaires for new mothers and maternity ward staff. As per the WHO guide, timing of discharge, number of postnatal contacts, and breastfeeding practices were elucidated. The staff survey was used to illustrate hospital protocol in regard to assessment of the mother and baby, cord care, bathing, immunization, and counselling for mothers. Total number of births, complications and mortalities during the study period were also recorded. Compliance rate of WHO guidelines and thematic analysis of barriers to care and overall experience was performed.

Results: From July 15- August 4, 100 mothers were recruited for the Patient Arm and 17 staff members for the Staff Arm. There were 54 deliveries each week, 20% of which needed emergency surgical intervention and 5% resulted in infant mortality. 100% mothers breastfeed their babies, are asked to return for 3 postnatal visits, spend at least 24 hours in the hospital after birth, and are counselled on the importance of immunization and post-partum care, all of which are in accordance with the WHO guidelines. However, 17% staff reported that not all newborn assessment criteria are routinely checked, while 15% reported the same for mothers. Newborns are bathed before 24 hours, according to 18% staff. Umbilical cord stumps of 70% babies are not cleaned with chlorhexidine gel, which is available to only those who can afford to buy it out-of-pocket. 50% of the staff members, including those involved in education, were not aware of the guidelines and their implementation. The primary barrier to accessing health center services is transport, while most mothers were concerned with inadequate preparation at SRRH.

Conclusion: Although there are programmatic strengths in the postnatal care system at SRRH, half of the WHO guidelines are not being followed. Lack of education and awareness appeared to be the biggest challenges in staff participation. Transport is the biggest barrier to accessing PNC services while inadequate preparation seems to be the biggest patient concern. The rate of complicated deliveries and infant death at SRRH is extremely high, even compared to national average. Future directions include education seminars for physicians, nurses, midwives and students, and improved resource allocation to be able to provide medications and reduce overcrowding for new mothers.

1550 Dr. David Kim, General Surgery

Title: Establishing a Canadian Global Surgery Community: A National Survey

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Background: Surgery has recently gained a prime position on the global health agenda. However, the global surgery community remains fragmented.

Objectives: To map the Global Surgery Offices (GSOs) in Canada and evaluate the scope of their initiatives.

Methods: This is a scoping review of all Canadian GSOs. They were identified through the Canadian Association of General Surgeons and by word of mouth. Surveys were conducted electronically and by phone interviews.

Results: Seven academic institutions have known GSOs. Six out of seven responded: Dalhousie, McGill, McMaster, University of Calgary, University of Alberta and University of British Columbia. Low and middle income countries (LMICs) with involvement included Africa (5/6), Americas (4/6), Eastern Europe (1/6) and Asia (3/6). All offer training in international surgery to Canadian residents and most to Canadian medical students (5/6). Only Half (3/6) offer training to LMIC trainees. Whereas one GSO provides surgical support only, others provide data collection (3/6) and quality improvement initiatives (5/6). All benefit from financial support from their Department of Surgery/Anesthesia, two from private funding and only one from grants and fundraising activities.

Conclusion: Despite a unifying commitment to improve surgical care in LMICs, GSO in Canada mostly operate independently of one another. We propose to build an epistemic community of Canadian surgeons involved in global health. This community could function as a flexible governance structure by providing a platform for networking, sharing of ideas, coordinating initiatives, building research-capacity and obtaining political support and sustainable funding. To ensure a more effective collective action, an additional effort should be made to include all surgical specialties.

Simultaneous Session A

A01 Greive-Price, Timothy, Thoracic Surgery

Title: The variable presentation of esophageal perforation and implications for clinical management: 10-year experience at tertiary regional thoracic surgical centre

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Background: Esophageal perforation is a rare but potentially lethal condition if diagnosis delayed. Essential to recognizing spontaneous perforation is clinical suspicion.

Objective: Our aim was to identify presentation variables associated with spontaneous perforation. By clarifying these, we can potentially avoid delay in diagnosis, definitive management, & decrease patient morbidity and mortality.

Methods: A retrospective cohort study was conducted from 2006 to 2016 for all cases of esophageal perforation. Variables assessed included basic patient demographics, comorbid characteristics, clinical presentation, initial imaging & management outcome features. Descriptive & comparative analysis was conducted to identify features unique to spontaneous esophageal perforation.

Results: A total of 49 cases esophageal perforation were identified. Median age was 62 years (range 33-86), & 22 (44.9%) female. Etiology was spontaneous in 15 (30.6%), iatrogenic 28 (57.1%), traumatic 2 (4.1%) & foreign body impaction in 4 (8.2%). 16 (32.7%) had no underlying esophageal pathology. Initial management included: 17 (34.7%) non-operative, 21 (42.9%) primary repair, 5 (10.2%) esophagectomy, & 6 (12.2%) stent. Spontaneous perforation was associated with no history of esophageal disease ($p=0.053$), recent emesis ($p<0.0001$) & pleural effusion ($p=0.022$) or pneumothorax ($p=0.025$) on chest X-ray. Post operatively they were more likely to suffer from serious pulmonary complications such as respiratory failure ($p=0.047$).

Conclusion: Spontaneous perforation was associated with history of emesis, chest X-ray findings of pleural effusion or pneumothorax at presentation, & serious respiratory complications. An otherwise healthy individual with a history of emesis & new pleural effusion or pneumothorax on Chest X-ray warrants consideration for the diagnosis of spontaneous esophageal perforation to avoid diagnostic delay.

A02 Greive-Price, Timothy, Pediatric Surgery

Title: North-South surgical training partnerships – a systematic review.

Tim Greive-Price¹, Hardee Mistry¹, Robert Baird¹¹ Division of Pediatric Surgery, the University of British Columbia, Vancouver, BC, Canada

Background: Fostering the success of surgical trainees from Low/Middle-Income Countries (LMICs) plausibly addresses the existing workforce deficit in a sustainable manner. However, it is currently unclear whether and how these trainees are targeted as strategic learners for educational exchanges.

Objectives: The purpose of this review is to assess the quality and outcomes of existing literature on exchanges of surgical trainees between High Income Countries (HICs) and LMICs.

Methods: We conducted a systematic review of reported instances of surgical training exchanges between HICs and LMICs in accordance with PRISMA. After databases searching, two independent reviewers evaluated titles, abstracts and manuscripts; the senior author adjudicated discrepancies. Selected studies were critically appraised using the CASP Qualitative Checklist, and analyzed for trainee level institutions, countries and subspecialties as well as reported outcomes of the exchange.

Results: After study screening, 28 reports met inclusion criteria and were analyzed. Most publications detailed North-South exchanges ($n=18$); one exchange was bi-directional. General Surgery was the most common discipline identified, with 9 other subspecialties described involving learners at all phases of training. Reports were generally of good quality although most fail to acknowledge the ethical implications of their study.

Conclusions: A variety of surgical exchanges have been published across disciplines, learner-types and host/home countries. There is an increasing need to formalize these exchanges via clear goals and objectives as well as prioritizing the proper matching of educational goals with local clinical needs.

A03 Wu, Dan, General Surgery

Title: Characteristics of regulatory T cells in obese omental tissue in humans

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Introduction: Obesity-associated visceral adipose tissue (AT) inflammation promotes insulin resistance and type 2 diabetes (T2D). In mice, lean visceral AT is populated with anti-inflammatory cells, notably regulatory T cells (Tregs) expressing ST2 (IL-33R). Conversely, obese AT contains fewer Tregs and more pro-inflammatory cells. In humans however, there is limited evidence for a similar pattern of obesity-associated immunomodulation.

Objective: Characterize the regulatory T cells in obese human omental tissue, and compare their phenotypes to those of human thymic Tregs and mouse epididymal adipose tissue Tregs.

Methods: We used flow cytometry and mRNA quantification to characterize human omental AT in 29 obese individuals, 18 of which had T2D.

Results: Patients with T2D had increased proportions of inflammatory cells, including M1 macrophages, with positive correlations to body mass index. In contrast, Treg frequencies negatively correlated to BMI but were comparable between T2D and non-T2D individuals. Compared to human thymic Tregs, omental AT Tregs expressed similar levels of FOXP3, CD25, IKZF2, and CTLA4, but higher levels of PPARG, CCR4, PRDM1 and CXCL2. However, neither IL1RL1 (ST2) nor IL10 expression were detectable in human omental AT Tregs.

Conclusion: This is the first comprehensive investigation into how omental AT immunity changes with obesity and T2D in humans, revealing important similarities and differences to paradigms in mice. These data increase our understanding of how pathways of immune regulation could be targeted to ameliorate AT inflammation in humans.

A04 Liu, Iris Yin Ling, Neurosurgery

Title: Examining the Factors Affecting Immunization for Ugandan Children

Iris Y. L. Liu^{1,2}, Damian J. Duffly¹, Mary Margaret Ajiko⁴, Anthony Cooper^{2,3}, Nazmudin Bhanji², Eleanor Reimer^{2,3}
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Introduction: Vaccine preventable deaths (VPDs) account for 1.5 million deaths among children under the age of five and developing countries are most affected. The Uganda National Expanded Program on Immunization (UNEPI) has increased immunization coverage since 2003, but their performance has subsequently stagnated. While the immunization schedule proposed by UNEPI requires a child to be fully immunized by 9 months of age, studies have shown that Ugandan children aged 12 to 23 months are not fully vaccinated.

Objectives: While reported immunization coverage has been increased, this is not necessarily correlated to an increase in completion of immunization schedules. Therefore, the purpose of this study is to understand, from the perspectives of caregivers and local health care professionals, what factors affect immunization for Ugandan children.

Methods: Questionnaires were administered from July 16th to August 4th, 2018, in the form of interviews, to caregivers and local health care professionals at Soroti Regional Referral Hospital, in Soroti, Uganda. The caregivers invited to participate in the study are those who care for children aged 9 to 23 months. The health care professionals invited to participate in the study are employees of Soroti Regional Referral Hospital who are involved in pediatric care and/or administration of vaccines to children. The collected data was analyzed with SPSS statistical analysis software and thematic analyses were done.

Results: The main factors that affect immunization for Ugandan children were identified to be miscommunication between caregivers and the health care professionals administering the vaccines and variability in the immunization schedules found on the child health card. Inaccuracy in recording the dates of immunizations and miscommunication of the vaccines given or not given are all categorized under “miscommunication”. This study also found that while most caregivers had a positive attitude towards immunization, many did not fully understand the benefits of vaccines or the child immunization schedule. As suggested by the participating caregivers, the emerging themes for why other caregivers do not vaccinate their children are lack of information and misconceptions rooted in fear and mistrust of vaccines.

Conclusion: This study has identified a need for immunization education outreach, especially for caregivers who live in remote villages far from health facilities. Most caregivers had a positive attitude towards child immunization, but lacked information about the benefits of vaccines. Furthermore, this study identified two factors that affect immunization for Ugandan children: miscommunication between caregivers and health care professionals and inconsistency in the immunization schedule found on the child health cards.

A05 Miller, Rebecca Louise Rohini, Plastic Surgery

Title: Citation Analysis in Breast Reconstruction Publications between 2000 and 2010

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Introduction and Purpose: Breast reconstruction is an active area of plastic surgery research. Citation analysis allows for quantitative analysis of publications, with more citations presumed to indicate greater influence. We performed citation analysis to evaluate the most cited papers on breast reconstruction between 2000-2010 to identify contemporary research trends.

Methods: The SCI-EXPANDED database was used to identify the 50 most cited papers. Data points included authorship, publication year, publication journal, study design, level of evidence, number of surgeons/institutions, center of surgery, primary outcome assessed, implant/flap/acellular dermal matrix/fat graft, acellular dermal matrix brand and use with implants/flaps, fat graft use with implants/flaps, unilateral/bilateral, one-/two-stage, immediate/delayed, number of patients/procedures, complications. Descriptive analysis of trends was performed based on results.

Results: 20% of papers were published in 2006, 16% in 2007 and 12% in both 2004/2009. 66% were published in *Plastic and Reconstructive Surgery*. The majority were retrospective or case series, and of Level III or IV evidence. The one Level I study was a prospective multicenter trial. 21 and 7 papers discussed procedures by single/multiple surgeons, respectively. Results from single/multiple centers were discussed in 18 and 6 papers, respectively. 30 papers discussed implant-based reconstruction, 22 papers flap-based (19 microsurgical), 15 papers acellular dermal matrix, and five papers fat grafting. The primary focus in the majority was complications or outcomes.

Conclusion: Our analysis demonstrates continually evolving techniques in breast reconstruction. However, there is notable lack of high-quality evidence to guide surgical decision-making in the face of increasing surgical options.

A06 Yeo, Sarah, Radiation Oncology

Title: Testicular Cancer Patient Information: An evaluation of the usage of information resources by testicular cancer patients and the quality of available information

Sarah Yeo, Paris Ann Ingledew, UBC, BC Cancer Agency Vancouver Radiation Oncology

Background: The continuous growth of the internet has allowed increasing amounts of information to be available and accessible to the public, including medical information. Testicular cancer is the most common solid malignancy diagnosed in young men aged 15-29. This patient population is also the age group that searches most actively for health information online, thus there is a high likelihood that the internet is a powerful tool for this younger population. Despite patients increasingly using the internet as an important source of information, little is known about the quality of online information about testicular cancer. This study looks to systematically evaluate the quality of websites available to patients with testicular cancer.

Hypothesis: We hypothesize the quality of testicular cancer information on the internet is variable and there are significant deficits in the information that is available.

Methods: The search term “testicular cancer” was inputted into the search engine Google and metasearch engine Dogpile and Yippy. The top 100 websites intended for the purpose patient education were compiled. A previously validated structural rating tool was used to evaluate the 100 websites with respect to attribution, currency, disclosure, interactivity, readability and content.

Results: The majority of the websites were affiliated with commercial businesses (49) and non-profit organization (39). Of the top 100 websites, less than half (44) disclosed authorship and even fewer states author credentials (26) and affiliation (21). 61 websites provided a last modified date, and of those websites, 46 were updated in the last 2 years. The average readability level was 11.01 using the Flesh Kincaid grade level system. The most accurately covered topics were etiology/risk factors and treatment, with 82 websites being completely accurate and containing all required information. The least accurate topics were prognosis and prevention, mainly due to the fact that a large majority of websites simply did not cover these topics or were missing essential information.

Conclusion: These results show that authorship and currency are lacking in many online testicular resources. Missing information such as this can make it difficult for patients to validate the reliability of testicular cancer information they find online. Readability is an important component of health literacy, and the average target readability grade level is 6 as recommended by the American Medical Association and the National Institutes of Health. However out of the 100 websites evaluated, only 1 was written at an FK grade level of 6 or below. The high average readability of testicular cancer websites can make it difficult for patients to comprehend the information available. This study found that the majority of online information about testicular cancer is accurate, but incomplete. The results of this study can be used to counsel patients on the strength and weaknesses of online testicular cancer resources.

A07 Murchison, Sonja Catherine, Radiation Oncology

Title: Breast cancer patients’ perceptions of adjuvant radiotherapy: an assessment of pre-treatment knowledge and informational needs

Sonja Murchison¹, Jenny Soo², Aneeta Kassam², Paris-Ann Ingledew¹, and Sarah Hamilton¹

1. Radiation Oncology, BC Cancer; 2. Radiation Therapy, BC Cancer

Background: Through media, Internet, and supportive community programs, patients are able to share cancer-related experiences. It can be difficult for patients to assess if the information about radiation that they encounter is accurate and relevant to one’s own situation. In order for physicians to recognize patients’ concerns and help them make decisions about breast radiotherapy (BRT), a better understanding of how patients are educating themselves and the types of information they have encountered is valuable.

Objective: The purpose of this study is to assess breast cancer patients’ information-seeking behaviours, needs and perceptions of BRT prior to radiation oncology consultation.

Methods: Breast cancer patients referred for adjuvant BRT at BC Cancer, > 18 years, without a history of prior BRT, were asked to complete an anonymous survey prior to their radiation oncology consultation. Likert scale, multiple choice and open-ended questions were used to assess information sources, knowledge, and perceptions of BRT.

Results: The response rate was 86%; 118/137 patients approached agreed to participate in the study. Most patients were >50 years old (66%) and 60% had a post-secondary degree or diploma. The most commonly reported sources of information about BRT were healthcare providers (HCP, 55%), family or friends treated with BRT (53%), and the Internet (45%). Patients indicated that these sources were also most trustworthy or reliable. Few received information about BRT from traditional media (13%), scientific articles (12%), social media (5%), and support groups (3%). Most patients reported having little or no knowledge about BRT (79%). Most (67%) were a little or moderately concerned about the side effects of BRT, while 29% were very concerned. Half were unsure about the benefit of BRT and 46% thought BRT would provide a moderate to significant benefit. While educating themselves about BRT, a wide range of topics were encountered, and the most common ones were fatigue (68%), skin care (57%) skin problems (54%), effects on healthy body tissues (43%), effects on the immune system (37%), and pain (34%). Several other topics were encountered, including BRT and bone health (32%), second cancers (32%), problems with heart (31%), lungs (30%), arm swelling (27%), recommended activity during BRT (27%), GI side effects (26%), dietary recommendations (24%), radioactivity (19%), and hair loss (19%). Of these topics encountered, those patients considered the most important for the radiation oncologist to address were BRT effects on the heart (74%), second cancers (74%), immune system (66%), and pain (64%). Although commonly encountered topics, relatively fewer patients indicated fatigue (56%) and skin care (49%) as important issues to be addressed at their consultation.

Conclusion: Breast cancer patients encounter a broad range of information about BRT from a variety of sources prior to their radiation oncology consultation and many are concerned about the potential side effects. Patients surveyed felt that rare and serious side effects were the most important for radiation oncologists to address during consultation.

A08 Liu, Alice, *Otolaryngology*

Title: Laryngeal electromyography-guided vocal fold injections with Hyaluronic acid

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Background: Glottal insufficiency from vocal fold paralysis or presbyphonia can cause hoarseness and dysphagia/aspiration. Vocal fold (VF) injections of absorbable materials, like hyaluronic acid, are performed to treat these symptoms. We have developed a novel technique using laryngeal electromyography (LEMG) to perform VF injections in the office.

Objectives: To assess the voice outcomes of LEMG-guided VF injections. Secondary objectives were to study the complication and completion rates, and to determine if any factors were associated with improved voice outcomes.

Methods: Retrospective case cohort study. Inclusion criteria were patients who received LEMG-guided VF injection from August 2017 to May 2018. Three-month voice outcomes post injection were assessed with voice handicap index-10 (VHI-10), maximum phonation time (MPT), perceptual analysis of voice (GRBAS), fundamental frequency, and stroboscopy. Data were analyzed by paired t-tests and multivariate analysis.

Results: Of the 77 eligible patients, 61 (79%) had 3 month data. VHI-10 was significantly improved from 24.9±7.3 to 20.9±1.3 (p=0.026). GRBAS was improved in 75.4% ([62.7, 85.5] 95% CI) of patients. Stroboscopy results were improved in 75.4% of patients. MPT improved from 6.6±6.3 seconds to 8.9±6.6 (p=0.021). Fundamental frequency did not significantly change, as expected (p=0.221). Multivariate analysis reported that male gender (p=0.005), older patients (p=0.004), right sided injections (p=0.009), and longer duration of hoarseness (p=0.009) were associated with better voice outcomes. Overall 108 of 112 (96.4%) LEMG-guided VF procedures were completed with no complications.

Conclusions: LEMG guided VF injection is an effective technique to treat glottis insufficiency with improved voice outcomes, a high completion rate, and no complications.

A09 Liu, Alice, *Otolaryngology*

Title: Facial morphology in pediatric patients: The relationship between 3-dimensional facial morphology and risk of sleep disordered breathing in children

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Background: Sleep related breathing disorders (SRBD), such as obstructive sleep apnea, are commonly found in the pediatric population. Facial shape has been associated with these disorders in both children and adults. The aim of this study was to use three-dimensional stereophotogrammetry to explore whether a correlation exists between the 3D facial morphometric parameters of children aged 2-17 years, and their reported sleep disturbances as measured by the validated Pediatric Sleep Questionnaire (PSQ).

Objectives: We hypothesized children with a more convex profile and longer, narrower facial shape will be at higher risk of sleep disordered breathing. The objective of this study were: 1) to assess the feasibility of using the 3dMD stereophotogrammetry for pediatric research in a clinical setting; (2) to explore potential associations between three-dimensional facial morphometric parameters of children and reported sleep disturbances.

Methods: This was a cross-sectional observational study, with patients recruited from the pediatric otolaryngology clinic at BC Children's Hospital. Stereophotogrammetric images were acquired using the 3dMD face camera system, after which participants' parents completed the PSQ. Patient images were analyzed and 3D coordinates derived from the identified soft tissue landmarks. Stepwise forward linear regression, forward selection, and LASSO were used to analyze the association between 3D landmarks and PSQ scores.

Results: A total of 101 patients, with a median age of 7 years, were recruited and 31.7% scored at high risk for SRBD. Several facial morphometric variables were found to have statistically significant correlations with PSQ score, including lower face height to face width ratio (r = 1.283, p = 0.019) and morphological nose width (r = -0.013, p = 0.029). No association was found with ethnicity and gender.

Conclusions: This study is the first to explore the relationship between craniofacial morphology and risk of sleep disturbances in children using three-dimensional stereophotogrammetry. We found a statistically significant correlation between longer, narrower faces and narrow noses, with symptoms of SRBD.

A10 Kiani, Ghazal, *Radiation Oncology*

Title: Late Effects in Adult Survivors of Childhood Lymphoma: Overall Burden and Proportion Detected at Recall

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Background: New therapeutic advances have increased the likelihood of patient survival in childhood Hodgkin (HL) and Non-Hodgkin Lymphoma (NHL); however, a significant proportion of childhood lymphoma survivors are likely to suffer from at least one chronic and/or life-threatening health issue in their lifetime.

Objectives: The aim of this project is to identify and determine the prevalence of late-effects (long-term health issues that are persistent at least 5 years post-treatment) in a population of adult childhood cancer survivors (ACCS) treated for HL and NHL using radiation therapy who are lost to follow-up.

Methods: The Late Effects, Assessment and Follow-up (LEAF) clinic was established in August 2016 as part of an effort to provide better care for ACCS by implementation of a dedicated clinical follow-up program. 41 ACCS previously treated for HL and NHL were recalled for assessment at the LEAF clinic. These survivors were treated with radiation therapy for childhood HL and NHL between 1969 and 2010, were aged 17 years or less at the time of therapy and had been lost to follow-up by BC Cancer. Data was abstracted retrospectively from the BC Cancer Information System (CAIS) and Oncology Reporting System (ORS) and was entered into a LEAF program Access database.

Results: To date, a total of 41 survivors were recalled and assessed at the LEAF clinic, consisting of 15 males and 26 females. Median age was 16 years (SD=3.61) at diagnosis and 47 years (SD=9.42) at initial reassessment at LEAF. 23 (56%) had nodular sclerosis subtype of Hodgkin lymphoma. 28 (68.3%) received chemotherapy in addition to radiation therapy. Of the 41 recalled survivors, 23 (56.0%) had at least one cardiovascular condition (74% heart valve disorder, 56.5% dyslipidemia, 22% hypertension, 17.4% coronary artery disease, 13.0% ischemic heart disease, and 21.7% other), 23 (56.0%) had at least one endocrinopathy (69.6% hypothyroidism, 17.4% diabetes mellitus, 17.4% multinodular goiter), 13 (31.7%) had at least one treatment-related secondary malignancy (54.0% breast cancer, 38.5% thyroid cancer, 38.5% basal cell carcinoma of skin), 9 (22.0%) had gastrointestinal complications (55.6% GERD, 55.6% esophageal diseases, 22.2% other GI issues), and 9 (22.0%) had neurological or cerebrovascular disorders (88.9% carotid artery disease, 22.2% cerebral infarction, 22.2% hearing impairment). One patient was found to have recurrent Hodgkin lymphoma (lymphocyte predominant) 34 years after last treatment and follow-up by BC Cancer.

Conclusion: Recalled survivors of pediatric lymphoma treated with radiation therapy are at very high risk for late-effects, with multiple health issues identified in many of them. The new LEAF clinic is an important new program to address the needs of ACCS.

A11 Fung, Adrian, Vascular Surgery

Title: Review of Fenestrated Aortic Cuff Repair of Type 1a Endoleaks

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Objectives: Since the advent of endovascular aneurysm repair (EVAR), managing endoleaks has remained a significant challenge. Type 1a endoleaks are traditionally repaired by balloon angioplasty, deployment of bare metal stent or covered aortic cuffs, or embolization. About a decade ago, custom fenestrated aortic cuffs were introduced to treat type 1a endoleaks. We report on our experience with this type of device as previous publications have been outside of North America.

Methods: A retrospective analysis of fenestrated aortic cuff repair of type 1a endoleaks performed at a single centre within Jan 2016 to Dec 2017 was performed. The evaluated outcomes included initial technical success, operative morbidity, 30 day mortality, fenestrated vessel patency, presence of endoleak, aneurysm size, renal function and reintervention.

Results: 6 patients with previously repaired AAA returned with type 1a endoleaks. The average length of time to fenestrated aortic cuff repair was long (38 to 145 months). 3 of the cuffs were 3 fenestrations, 1 had 4 fenestrations and the rest were 2 fenestrations. Technical success was achieved in all cases, but one patient sustained a renal injury requiring embolization by interventional radiology. There were no noted endoleaks on completion angiograms. The time to discharge was longer than the average EVAR stay (4.5 +/- 7.4) days, and 30 day mortality was 0%. Only one of the patients experienced deterioration of renal function. The mean follow up period was 7.2 +/- 6.2 months, and all fenestrations remained patent (17/17). There was no re-intervention for any of the cases, but one patient developed a retrograde type B dissection and was treated medically. There was minimal change in size of the AAA from pre-operative to post-operative CT angiogram (-0.85 +/- 2.97mm).

Conclusion: Fenestrated aortic cuff is a safe and feasible option for the repair of type 1a endoleaks. The outcomes at our centre align with previously published data from European centres.

A12 Long, Cai, Otolaryngology

Title: Clinical Evidence Based and Systematic Scientific Reviews of Malignant Transformation of Inverted Papilloma

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Background: Inverted papilloma (IP) is an unusual type of benign tumor that arises from the Schneiderian epithelium. IPs are found to have high recurrence rates and have the potential to transform into malignant tumors, particularly squamous cell carcinomas (SCC).

Objective: The mechanism of the transformation process from IP to SCC is uncertain and there is no consensus regarding the best practice to surveillance the transition process. The goal of this study is to identify up-to-date biological markers, suggested mechanisms, and clinical surveillance methods of the tumor transformation process in order support clinical practice.

Methods: A systematic review of the literature on the transformation of IPs to malignant tumours was performed using Medline, Ovid up to June 30, 2018. All manuscripts that discuss: 1) scientific pathophysiology or biomarkers of the transition process or 2) clinical studies of IP and malignancy surveillance approaches were included. Clinical results were assessed for strength of evidence where possible.

Results: While the role of HPV in IP progression and oncogenesis remains unclear, HPV 11 and 16/18 infections have been associated with IP and SCC respectively. Furthermore, several studies have linked HPV infection with levels cell cycle-related proteins, including P53 and P21, that have been shown to be tied to malignant transformation. Biomarkers such as P27, desmoglein-3, PDCD4, E-cadherin, and β -catenin have also been identified as potential predictors of the transformation to SCC and thus could be helpful in monitoring IP. Based on clinical research studies, increased SUVmax of IP on PET/CT is associated with higher probability of malignancy. Neither CT nor MRI are found to be reliable to predict malignancy, but they provide a good assessment of tumor staging and origin. The most common locations for SCC in IP patients are the maxillary sinus, ethmoid sinus and nasal wall, suggesting closer follow up of lesions in these areas.

Conclusion: PET/CT is the preferred modality to recognize malignant transformation, and P53 and P21 are very important biomarkers that could predict malignant transformation. However, further clinical trials are required to reinforce these prognostic biomarkers and PET/CT as the gold standard for IP surveillance.

A13 Van Slyke, Aaron, Plastic Surgery

Title: The KS-Pexy: a novel method to manage horizontal lower eyelid laxity

Aaron C. Van Slyke, Lauren Carr, Nicholas J. Carr

Background: Patients with horizontal lower lid laxity undergoing lower lid blepharoplasty are at a high risk for lid malposition. Prophylactic correction of horizontal lower lid laxity during blepharoplasty may alleviate this risk. Here, we describe a novel lower lid blepharoplasty technique, the KS-pexy, for correcting horizontal lower lid laxity.

Objectives:

1. Determine the effectiveness of the KS-Pexy

2. Determine the safety profile of the KS-Pexy

Methods: All cases of KS-pexy between September 2009 – June 2018 from the senior author's practice were reviewed retrospectively. All patients were diagnosed with horizontal lower lid laxity and requested lower lid blepharoplasty for aesthetic concerns. Patient demographics, clinical presentation, procedure details, and intraoperative findings were analyzed.

Results: 62 patients underwent KS-pexy by the senior author. The average follow-up was 41.1 months, ranging from 2-107 months. Thirteen patients had a negative vector, 53 patients received a KS-pexy in combination with another facial procedure, and 14 patients had their KS-pexy as a secondary procedure. The overall success rate was 98.4%. The complication profile was: dry eyes (30.6%), chemosis (27.4%), lower eyelid malposition (8.1%), poor scar quality (1.6%), lower lid abscess (1.6%), blepharitis (1.6%), conjunctivitis (1.6%), fat under resection (1.6%), canthopexy dehiscence (1.6%), and temporary V2 parasthesia (1.6%).

Conclusions: The KS-pexy is an effective means to treat horizontal eyelid laxity prophylactically in patients requesting lower eyelid blepharoplasty for aesthetic reasons.

A14 Zhao, Kevin, *Otolaryngology*

Title: A multicenter randomized controlled trial of physician influence on hearing aid user satisfaction

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2. NexGen Hearing

Background: Hearing loss is one of the most common chronic disabilities in the population aged 60 years and older and this segment of the population is growing rapidly. It is controversial if physician participation in the patient's hearing aid fitting process improves the retention, use and benefit of hearing aids.

Aim: This study therefore seeks to discover if physician patient interaction in the subjective verification of hearing aid induced change in hearing ability alters patient perceived hearing aid benefit.

Method: Patients pursuing hearing aid fitting at multiple independent hearing aid dispensers were prospectively randomized to undergo a follow-up visit with their physician or the dispensing audiologist. Hearing aid benefit 90 days post fitting was measured with the Satisfaction with Amplification in Daily Life (SADL) questionnaire.

Results: SADL scores on 37 of 74 recruited subjects have been completed to date. 29 and 8 randomized to audiologist and physician follow-up respectively. Age (72.2 and 74.9 years old), Gender (52% and 63% male) and hearing loss (44.5 and dBHL with pure tone audiometry) were not significantly different between audiologist and physician groups respectively. There was no significant inter-group difference in global SADL scores, 5.16 and 4.73 in the audiologist and physician groups respectively.

Conclusion: There is no evidence that physician involvement alters patient's hearing aid benefit. Further patient enrollment is recommended to improve the power of this finding.

A15 Zawadiuk, Luke, *Plastic Surgery*

Title: What do we know about treating recalcitrant auricular keloids?: a systematic review and meta-analysis

Luke R.R. Zawadiuk, Aaron C. Van Slyke, Jeffrey Bone, Baillie Redfern, Nicholas J. Carr, Jugpal S. Arneja

Affiliation: Division of Plastic Surgery, Department of Surgery, University of British Columbia, Vancouver, BC, Canada

Background: Keloids are benign neoplasms characterized by dysregulated deposition of connective tissue extending beyond the boundaries of the original wound. Many methods for treating auricular keloids have been reported. Recalcitrant keloids are keloids that have recurred after having any previous treatment. Previous treatment history, as opposed to no previous treatment history has been shown to increase likelihood of keloid recurrence. Currently, there is no consensus on how best to treat recalcitrant auricular keloids.

Objective: (1) To perform a systematic review of the literature and meta-analysis to evaluate the efficacy of various treatment modalities for recalcitrant auricular keloids. (2) To assess the current level of evidence for treatment of recalcitrant auricular keloids.

Methods: We searched MEDLINE, EMBASE, CINAHL and EBM Reviews using specific keywords. Pre-specified inclusion and exclusion criteria were used to assess article eligibility. Data was extracted for number of recalcitrant keloids, treatment modality, recurrence and minimum follow-up time. Included articles were stratified by treatment and assigned a level of evidence (LOE) based on the Oxford Centre for Evidence-Based Medicine guidelines. A meta-analysis was performed to estimate recurrence rates with 95% confidence intervals for each treatment modality.

Results: 887 unique articles were identified and 13 included. 11 were LOE III and two were LOE IV. Recurrence rates were found to be 9% (95% CI 3%-25%) for excision with adjuvant brachytherapy, 14% (95% CI 12%-17%) for excision with adjuvant compression therapy, 17% (95% CI 3%-56%) for excision with adjuvant external beam radiation and 18% (95% CI 4%-53%) for excision with adjuvant steroid injections. No statistical significant difference was found.

Conclusions: Data for treatment of auricular keloids is heterogeneous with few high quality studies. Excision with adjuvant brachytherapy has the lowest recurrence rate in our analysis. Narrow confidence intervals reported here for brachytherapy and compression therapy may help surgeons more confidently recommend either of these treatment modalities to patients.

A16 Parhar, Harman Singh, *Otolaryngology*

Title: Post-Acute Care use after Major Head and Neck Oncologic Surgery with Microvascular Reconstruction

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Objectives: Post-acute care (PAC) centers, such as skilled nursing facilities, unskilled nursing facilities, lower acuity hospitals, and rehabilitation centers, serve to optimize recovery after acute care hospitalization. We aimed to identify factors associated with PAC utilization among patients undergoing head and neck cancer surgery with microvascular reconstruction because it may be helpful for patient decision making, discharge planning, and resource allocation.

Methods: Retrospective linked analysis of the 2011 to 2015 National Surgical Quality Improvement Program. Eligible patients were identified and stratified by discharge disposition (home or PAC) after their postoperative acute-care hospitalization. After an initial univariate screen of demographic and clinical variables, a multivariable logistic regression analysis was performed modelling discharge to PAC.

Results: Of the 1,652 identified patients, 261 (15.8%) were discharged to PAC. Those admitted to PAC were older, had a higher burden of comorbidity, and were more likely to be functionally dependent. They also had longer surgeries, longer hospitalizations, higher rates of reoperation, and higher rates of postoperative complications. After multivariate analysis, factors independently associated with PAC discharge included increasing age (odds ratio [OR] 2.12 per 10-year increase; 95% confidence interval [CI], 1.81–2.48), active smoking status (odds ratio (OR) 1.61; 95% confidence interval (CI), 1.13–2.29), prolonged hospitalization (OR 1.04; 95% CI, 1.02–1.07), and postoperative pulmonary complications (OR 2.02; 95% CI, 1.36–2.99).

Conclusion: Of the patients undergoing surgery for head and neck cancers with microvascular reconstruction, 15.8% are discharged to PAC. Age, active smoking status, prolonged hospitalization, and postoperative pulmonary complications (vs. comorbidity, functional status, or primary tumor site) are independently associated with discharge to PAC.

A17 Roller, Janine, *Plastic Surgery***Title:** A Retrospective Review of Breast Reconstruction Outcomes Comparing AlloDerm and DermACELL.

Janine Roller, MD. Heather Greig MBChB, FRACS (plast), Nancy Y. Van Laeken, MD FRCSC
 Division of Plastic and Reconstructive Surgery, Department of Surgery, University of British Columbia

Background: Acellular dermal matrices are being more frequently utilized in alloplastic breast reconstruction to provide support to the inferior pole of the breast. This demand has led to an expanding choice of products available; both human and animal derived. There are few comparative studies and it is unclear if there are any differences in safety, outcomes or complication rates.

Objectives: Our primary objective is to determine if there is a difference in outcomes between AlloDerm and DermACELL in alloplastic breast reconstruction.

Methods: A retrospective chart review was performed on 68 consecutive patients (86 breasts) who underwent alloplastic breast reconstruction using AlloDerm (n=31) or DermACELL (n=37) with either tissue expanders or an implant from January to December 2016. All reconstructions were performed by the senior author after mastectomy by the general surgeons. Particulars of the surgery, additional treatments and complications were all recorded. Difference in seroma, hematoma and infection rates as well as more serious complications including implant replacement and capsular contracture were reviewed.

Results: There was no statistical difference in demographics of those treated with AlloDerm and DermACELL, however the DermACELL group had more bilateral mastectomies with ADM reconstructions ($p=0.0003$), wise pattern mastectomies ($p=0.02$) and nipple sparing mastectomies ($p=0.013$). There was no significant differences in complications among the patient groups with similar rates of seroma and hematoma, mastectomy flap necrosis, infection, capsular contraction and implant replacement. Conversely, in those that developed capsular contracture in the DermACELL group, there was a higher rate of no history of radiation ($p=0.004$). There was no recordable difference in time to drain removal or higher rates of return to theatre.

Conclusions: The particulars of breast surgery indicated that DermACELL cohort was higher risk, however there was no significant difference in complications with similar rates of seroma, hematoma, mastectomy flap necrosis, infection and capsular contraction and implant replacement. With trends towards significant, a larger sample size is required to show significance. This pilot study suggests similar outcomes between AlloDerm and DermACELL, providing a basis for a larger future prospective study examining long term complications, aesthetic outcomes and ultimately cost

A18 Cleversey, Chantell Nita Marie, *Plastic Surgery***Title:** Establishing a wound healing model by using an intradermal injection of botulinum toxin A prior to wounding in mice

Chantell Cleversey, Diana Forbes, Reza Jalili and Aziz Ghahary
 BC Professional Firefighters' Burn and Wound Healing Research Group, Department of Surgery/Plastic Surgery, University of British Columbia

Chronic wounds are devastating for patients worldwide and the associated heavy costs pose a financial strain on both the patient and the healthcare system. The treatment cost for chronic wounds amongst spinal cord injury patients in BC, Canada alone is estimated to be \$50 million / year. Moreover, the cost of treatment for all chronic wounds in the US is \$25 billion / year. Lack of an optimal preclinical model is a predominant obstacle in the study of delayed wound healing. Because a mouse model is economical and easily allows for genetic manipulations, it is often the model of choice. However, mouse wound healing occurs largely due to skin contraction, which is contrary to that of humans. Although the splinting method is the current standard to prevent wound contraction, suturing the splint onto the skin is time consuming and requires ongoing maintenance. Intradermal injection of botulinum toxin A (Botox) can efficiently prevent wound contraction and serve as a delayed wound healing mouse model. C57BL/6 mice were intradermally injected with either 0.32 U of Botox / animal (experimental, N=4) or saline (control, N=3) three days prior to wounding. Two 6mm diameter full-thickness cutaneous wounds were generated on the dorsum of each mouse. In addition to the Botox and saline groups, an additional group of wounds were generated and splinted with silicon rings for a comparative purpose. Wounds were covered with a semi occlusive dressing and photographed at multiple time points until wound closure in the control mice. Average open wound area percent consistently remained greater in Botox wounds in comparison to saline wounds with a statistically significant difference on day 7 (p -values <0.0001). Histological analysis shows similar proportions of inflammatory cells and myofibroblasts in the Botox and control groups. The splinted group illustrated elevated levels of both cell types in comparison. The use of intradermal Botox in mice resulted in larger wounds compared to the control. The use of Botox did not affect time to complete wound closure supporting the notion that it does not disrupt the normal healing pathways. This technique shows promise as a model for acute but not delayed wound healing.

A19 Webb, Mitchell, *General Surgery***Title:** Incisional Negative Pressure Wound Therapy in Colorectal Surgery: analysis of a 4-year experience at a single tertiary centre

Mitchell Webb, Michael Bleszynski, Leo Chen, Jack Chiu, Adam Meneghetti, Ormand NM Pantan
 Department of General Surgery, Division of General Surgery, UBC

Background: Superficial surgical site infection (sSSI) is a preventable postoperative complication that impacts length of stay, health care spending, and patient morbidity/mortality. However, in the field of colorectal surgery, with clean/contaminated wounds, this complication is not uncommon and occurs in 10–30% of cases, depending on the presence of risk factors. Incisional negative pressure wound dressings (iVACs) have demonstrated benefit in helping to reduce sSSI occurrences. However, there remains limited high-quality evidence to support their use as much of the supporting literature comes from fields outside of colorectal surgery. But, many surgeons have extrapolated these findings and frequently use iVACs for SSI prophylaxis. We sought to establish whether or not iVACs have conferred a wound healing benefit compared to standard adhesive dressings through a review of four years of institutional data.

Objective: To evaluate 30-day wound healing outcomes of incisional negative pressure wound therapy (iVAC) after colorectal surgery.

Methods: An institutional NSQIP database of colorectal surgical patients between the dates of Jan 1st, 2014 and Dec 31st, 2017 was analyzed. The primary outcome of superficial surgical site infection (sSSI) was compared between patients who received iVAC, and those who did not. Secondary outcomes such as wound complication, mortality, and morbidity were also compared. Risk-adjusted analysis was performed using the ACS NSQIP surgical risk calculator tool.

Results: 689 colorectal cases were included over the study period. In total, there were 71 (10%) occurrences of superficial SSI. Of the 689 cases, 145 received iVAC while 334 received standard dressings. The type of wound dressing was not recorded for 218 cases. The rate of sSSI with and without iVAC was 16.2% and 8.3% respectively ($p=0.015$). There were no differences observed with respect to morbidity, mortality, length of stay, or disposition. Elevated BMI, dyspnea, surgical duration and use of iVAC were independently associated with sSSI. Demographics and risk factors for SSI were similar between groups. Additionally, there was no difference in NSQIP SSI risk between groups (8.2% vs 8.4%, $p=0.49$). After adjusting for NSQIP risk, the odds of sSSI in iVAC group was 2.2 [CI, 1.3 - 3.8].

Conclusion: Although limited by the observational nature of this study, iVAC use was found to be independently associated with increased incidence of sSSI after colorectal surgery. This conflicts with current guidelines and literature that suggest iVAC use confers a reduction in wound complication rates by 50%. A randomized trial is necessary to obviate the effect of potentially confounding variables.

A20 Zivkovic, Irena, *Pediatric Surgery***Title:** Abdominal Trauma Outcomes At A Tertiary Hospital In Soroti, Uganda: A Retrospective Analysis

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3. Department of Surgery, Soroti Regional Referral Hospital, Soroti, Uganda
4. Division of Paediatric Surgery

Background: The high incidence of abdominal trauma in Uganda as well as lack of access to key diagnostic imaging, such as CT, in rural centres raises the need for further evaluation of the treatment and outcomes associated with this injury.

Objectives: To determine the rate of negative laparotomy in trauma cases at Soroti Regional Referral Hospital (SRRH), and to determine the severity of injuries associated with abdominal trauma.

Methods: With BC Children's Hospital REB and Soroti Hospital Ethics Board approval, a retrospective review of the SRRH trauma registry, OR registry, and patient charts for the period of April 1, 2017- June 1, 2018 was undertaken on all patients admitted for treatment of abdominal trauma. The collected data included variables required for the Injury Severity Score (ISS), mechanism of injury, imaging, whether laparotomy was positive or negative, and outcome.

Results: There were 42 patients admitted to SRRH for treatment of abdominal trauma during the study period, with complete data available for 39. Of this group, 18 were treated non-surgically, while 21 were treated surgically. The most common intra-operative repairs were of the spleen (57%; 12/21) and bowel (19%, 4/21). 76% of the surgical group had blunt trauma, and 24% had penetrating trauma; mechanisms of blunt injury included falls (69%) and road traffic accidents (RTA) (31%) while mechanisms of penetrating injury included stabbing (60%), GSW (20%), and RTA (20%). Overall, falls were the most prevalent cause of injury in the surgical group (52%), with 90% of these being falls from mango trees. There were 17 positive laparotomies and 4 negative laparotomies (19%), a significantly higher rate than reported in North America of 3.9% ($p=0.0090$). There was no significant difference in negative laparotomy rate between adult and paediatric patients. Patients treated surgically had significantly lower rates of imaging upon presentation compared to the non-surgical group ($p=0.0489$). There was no significant difference in use of imaging pre-operatively between the negative and positive laparotomy groups. There was no significant difference in ISS between the positive and negative laparotomy groups, between the blunt and penetrating trauma surgical groups, or between paediatric and adult surgical groups; however, the mean ISS was higher in the negative laparotomy (14.5) and penetrating trauma (15.8) groups, compared to the positive laparotomy (9.82) and blunt trauma (9.13) groups. ISS was similar in the paediatric (10.5) and adult (10.91) surgical groups.

Conclusions: The negative laparotomy rate in abdominal trauma at this LMIC center is significantly higher than the reported HIC rate. Patients treated surgically had significantly lower rates of imaging as compared to the non-surgical group. The significant proportion of injuries in the surgical group due to falls from mango trees indicates an avenue for education-based intervention, with the longitudinal goal of reducing incidence of abdominal injury.

A21 Liu, Claire, *General Surgery*

Title: Papillary Neoplasms Identified on Core Needle Biopsy Should be Excised Unless Atypia is Excluded

Claire Liu, Ravi Sidhu, Rebecca Warburton, Jin-Si Pao, Carol Dinglee, Urve Kuusk, Elaine McKeivitt.

Division of General Surgery, UBC

Background: Management of breast lesions has changed significantly over the past 20 years with image guided core biopsy replacing surgical biopsy for diagnosis. However, it is recognized that core needle biopsy (CNB) may under sample an area of abnormality. Upstage rates to malignancy following excision of Papillary Neoplasm (PN) on CNB have been reported in literature between 5-38% and not all centers routinely excise PNs. The purpose of this study was to evaluate the upstage rates of CNB diagnosed PN from diagnostic centers across Metro Vancouver, to identify factors predictive of malignancy, and to identify a group of patients at low risk of malignancy.

Methods: Patients having excision of high-risk breast lesions at Mount St. Joseph Breast Centre were identified from OR lists and chart review was performed to identify patients with PN identified on CNB between 2013 and 2017. The primary endpoint was rate of upstage to malignancy. The association of age, center where CNB was performed, palpability, discharge, clinical exam size, imaging size, family history of breast cancer, and presence of atypia with upstage to cancer was also evaluated.

Results: Of the 1941 patients having surgery for CNB diagnosis of high-risk lesions, 311 were identified as having CNB diagnosis of PN (77 APN, 22 PN with ADH). Seventy seven patients were upstaged to malignancy (24.8%), with 21 of these diagnosed with invasive ductal cancer, 14 encapsulated papillary carcinoma, 41 ductal carcinoma in situ (DCIS), and 1 invasive lobular cancer. Upstage rate for patients diagnosed with APN on CNB was 75.3%, 54.5% if CNB diagnosed PN with ADH, and 0% if CNB diagnosed PN with ALH or FEA. When all APNs and other atypias were excluded from analysis, the upstage rate was 3.30%, of which only one of the seven upstages specifically reported the absence of any atypia. Therefore, the upstage rate for no atypia on CNB was 0.47%. Upstage to malignancy was associated with atypia, the presence of a palpable mass, larger lesion size and older age but not family history of cancer or presence of discharge. The upstage rates for diagnostic centers varied from 0 to 73% ($p=0.017$).

Conclusion: PNs without atypia have a very low upstage to malignancy and APNs a high risk of upstaging. The presence or absence of atypia is not always reported on CNB pathology reports and thus clarification of the absence of atypia must be confirmed prior to considering conservative management. We now recommend that image detected PNs without atypia less than 1 cm in size can be followed with serial imaging.

A22 Rokui, Soroush, *Plastic Surgery*

Title: The scalp donor site for split-thickness skin grafting: a systematic review

Soroush Rokui BSc^{1,2}, Colleen Pawliuk MLIS², Sally L. Hynes MD FRCS^{1,2,4} *Division of Plastic Surgery, University of British Columbia* ²*British Columbia Children's Hospital Research Institute*

Background: The scalp is an appealing donor site for split thickness skin graft coverage of acute burns due to its hidden nature upon hair regrowth and excellent healing potential, but it is often reserved for massive burns with limited donor site availability.

Objective: This systematic review aims to evaluate outcomes of scalp donor sites for STSG coverage of acute burns to elucidate its viability as a first-line option for coverage of smaller burns.

Methods: A systematic review across MEDLINE, Embase, CENTRAL, CINAHL and LILACS databases and grey literature was conducted. Original research assessing outcomes of STSG coverage of acute burns using a scalp donor site was included. Outcome measures included donor site healing time, complications (alopecia, folliculitis) and quality of healed skin (pigmentation changes, hypertrophic scars).

Results: Of 1201 citations identified for review, 15 met the inclusion criteria. Combining retrospective and prospective cohort studies, 1761 patients (mean age = 15.36 yrs, mean TBSA=36.93%) underwent split thickness skin grafting with scalp donor sites. Of these, 29 (2.78%) developed folliculitis and 72 (4.60%) developed alopecia, with higher rates in De La Mettrie hair types VI-VIII. Other rare complications, including 'concrete scalp deformity' and hair transfer, were noted. Further, rapid donor site healing times (mean = 7.84 days) and capacity for re-harvest (mean = 2.32 harvests/patient) were noted amongst included studies.

Conclusion: Published data support the scalp as a viable first-line option for split-thickness skin grafting, with low complication rates, but caution should be exercised in patients with specific hair types.

A23 Wijesinghe, Printha, *Otolaryngology*

Title: Investigation of circulating microRNA expression profiles in patients with sudden sensorineural hearing loss.

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Background: Sudden sensorineural hearing loss (SSNHL) is an acute unexplained hearing loss that occurs over less than a 72-hour period. MicroRNAs (miRNAs) are small, non-coding RNAs and their altered expression has been identified in aging and pathological states of other organs. Recent studies have determined that miRNAs play a crucial role in inner ear development and neurosensory processes that create the functional auditory organ. Therefore, identifying changes in miRNA expression in SSNHL patients may offer new, and exciting insights into disease pathogenesis.

Objective: To compare altered microRNA expression profiles between SSNHL patients and age-matched normal hearing controls (NHCs), targeting the identification of circulating novel biomarkers associated with SSNHL.

Materials and Methods: Prospective SSNHL patients presenting within 28 days of onset of hearing loss were recruited as were age-matched controls. Pooled sera of SSNHL patients and age-matched NHCs were used for miRNAs investigations using TaqMan Low Density Array (TaqMan™ Array Human MicroRNA A+B Cards Set v3.0) real time PCR. The level of miRNAs expressions between the groups were measured using threshold cycle values normalized to a global mean ($2^{-\Delta\Delta C_q}$) at cut off level <32 and the fold changes >2.0 or <0.5 .

Results: A total of 37 SSNHL patients (mean age =52.9 years; male: female = 22:15) and 12 NHCs (mean age =50.9 years; male: female = 3:9) were screened. Of the 754 miRNAs screened, excluding the haemolysis susceptible miRNAs, 12 miRNAs were most commonly upregulated in SSNHL patients. Similarly, 25 miRNAs were identified as most frequently downregulated miRNAs in SSNHL patients compared to NHCs.

Conclusions: There is strong evidence of altered circulating microRNAs in SSNHL patients compared to NHCs.

Simultaneous Session B

B01 Webb, Devon, *Otolaryngology*

Title: A Comparison of Chronic Rhinosinusitis Recurrence Rates after Unilateral versus Bilateral Computer-Assisted Sinus Surgery

Devon Webb, William Mak, Anali Dadgostar, Sara Derikvand, Amin Javer, Division of Otolaryngology, University of British Columbia, St. Paul's Sinus Centre, Vancouver, British Columbia, Canada

Introduction: Chronic rhinosinusitis (CRS) is the inflammation of the respiratory epithelium of the sinonasal cavity lasting over 12 weeks. Endoscopic sinus surgery is a treatment mainstay for cases resistant to pharmacological management. It is currently undetermined if unilateral disease is a less severe form of CRS requiring a less invasive approach, or rather an earlier stage of CRS that will ultimately progress to bilateral disease, thus requiring preemptive bilateral management.

Objectives: To report and compare recurrence rates of chronic rhinosinusitis between patients treated with unilateral computer assisted sinus surgery (UNICASS), and those treated with bilateral computer assisted sinus surgery (BICASS). Additionally, it evaluates the influence of patient factors on recurrence after surgical management of CRS.

Methods: This retrospective chart review focused on primary CRS patients who received UNICASS or BICASS from January 2009 to December 2015 at St. Paul's Sinus Centre, a tertiary level sinus centre. Information on patient demographics, relevant medical history (asthma, sinonasal polypoid disease, smoking status), follow-up duration, and recurrences were recorded. Secondary cases, defined as CRS patients who had previously been treated surgically, were excluded from this study.

Results: There were a total of 481 primary CRS patients treated surgically, of whom 51 were UNICASS and 430 were BICASS. The mean age of the patients was 54.0 years (SD:13.5 years). 46.4% of the patients were male. In total, 35 patients had recurrences (7.3%) during the mean follow-up period of 29.9 months (range: 0 - 97 months). The mean time to recurrence was 33.0 months (range: 1 - 75 months). The recurrence rates for UNICASS and BICASS patients were 5.9% and 8.6% respectively. A two-way chi-squared analysis comparing the incidence of recurrence between UNICASS and BICASS cases yielded a value of 0.16 (p -value >0.05). Odds ratios for the following patient factors and recurrence were the following: smoking 0.68 (95% CI: 0.23-1.99), asthma 2.34 (95% CI: 1.16-4.70), and polypoid disease 2.95 (95% CI: 1.40-6.21).

Conclusions: The reported post-surgical CRS management recurrence rates of this chart review were comparative to published literature. There was a non-statistically significant difference in recurrence rates of UNICASS compared to BICASS patients, indicating similar post-surgical outcomes. However, a statistically significant increase in recurrence was observed for patients who either had a history of asthma or sinus polypoid disease. Based on these results, the choice of appropriate surgical approach should be clinically based on case-specific factors.

B02 Carr, Michael, *Plastic Surgery*

Title: The natural history of breast implant pain with aggressively textured Biocell implants: a retrospective review and patient outcomes study

Michael J. Carr, Aaron C. Van Slyke, Nicholas J. Carr, Division of Plastic Surgery

Background: The differential diagnosis of breast pain is extensive. Recent data suggests that Allergan's aggressively textured Biocell implants are associated with breast pain arising from the implant itself, which otherwise has not been previously described.

Objectives: To develop a clinical description of aggressively textured Biocell implant-related breast pain, its natural history, and response to various surgical treatments.

Methods: This is a retrospective, cross-sectional cohort study of patients who presented to a single surgeon's aesthetic practice between January 2005 – June 2018 for explantation of any painful Biocell implant. Patient demographics, implant characteristics, clinical presentation and intraoperative findings at explantation were analyzed. Patients were asked to complete a take-home questionnaire comprised of multiple choice and free text questions relating to their breast pain and its course following implant removal. Quantitative data was analyzed using descriptive statistics.

Results: 28 patients presented with painful Biocell implants for explantation. 15 patients completed the survey for a response rate of 53.6%. In total, 21 painful implants were removed from these 15 patients, with an average implant longevity of 6.19 years (range 1.6 – 10.5). 17, 3, and 1 patients were treated with exchange to smooth implants, explantation alone, and exchange to another aggressively textured implant, respectively. Intraoperative findings included double capsules, late seromas, partial adherence and malrotation with non-adherence. Referencing the Mankoski pain scale, patients rated their average pre-explantation breast pain as 4.9/10 (mean; range, 2 – 8), which improved to 1.5/10 (mean; range, 0 – 6) following explantation, at an average follow-up time of 31.8 months (range, 1.7 – 96.9). 11 of 15 patients reported complete resolution of their pain at follow-up, 9 of whom stated their pain had resolved immediately following explantation. Of the remaining four patients, 2 reported significant improvement in the quality of their pain and 1 reported a different type of pain. The final patient, who underwent an implant exchange for another Biocell implant, reported continued pain.

Conclusions: Here we characterize a novel clinical presentation of breast pain related to Biocell implants, and show that these patients can effectively be treated with explantation or implant exchange to a smooth implant. The natural history of breast implant pain with aggressively textured Biocell implants: a retrospective review and patient outcomes study

B03 Pasula, Daniel, *General Surgery*

Title: Anti-apoptotic Bcl-xL Limits Mitochondrial Dysregulation in β -Cells during Prolonged Exposure to High Glucose

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Introduction: The canonical role of Bcl-xL is to halt the activity of the pro-apoptotic Bcl-2 family members. However, recently Bcl-xL has been found to have non-canonical roles in mitochondrial metabolism. In pancreatic β -cells we have previously reported that it dampens glucose signaling. Other reports in non- β -cell types suggest that the metabolic roles may extend to the control of mitochondrial networking.

Objectives: Here we examined if non-canonical mitochondrial functions of Bcl-xL affects the ability of β -cells to handle the metabolic workload of prolonged exposure to high glucose.

Methods: We cultured islets and islet-cells, from Bclx^{fl/fl} (Bclx β WT) and Bclx^{fl/fl}:Pdx1CreTM (Bclx β KO) mice in 11 mmol/l glucose (NG) or 25 mmol/l glucose (HG) for 6 days and compared mitochondrial morphology and function.

Results: 2D confocal analysis showed that basal mitochondrial membrane potential ($\Delta\Psi_m$) was elevated in Bclx β KO cells under NG culture. HG culture increased basal $\Delta\Psi_m$ of Bclx β WT cells, but no additional elevation was seen in Bclx β KO cells. Total and average mitochondrial area increased in both genotypes after HG culture, but detailed 3D imaging revealed that only Bclx β KO cells had a significant expansion of mitochondrial volume along with increased mitochondrial fusion. These HG-induced morphological alterations were associated with blunted Bclx β KO $\Delta\Psi_m$ responses to acute glucose stimulation. Measurements of *Pdx1* and *Ins1* mRNA, superoxide levels, and cell death did not show evidence of bona-fide glucotoxicity. Fura-2 imaging demonstrated that HG culture increased basal islet Ca²⁺ and delayed the return of Ca²⁺ to baseline after acute glucose stimulation. The HG-induced Ca²⁺ dysregulation was exacerbated in Bclx β KO islets, and was associated with insulin hyper-secretion during recovery to baseline.

Conclusion: Together, our results demonstrate that anti-apoptotic Bcl-x_L is important for mitochondrial homeostasis and β -cell function during the metabolic challenge of chronic increases in glucose.

B04 Li, Jen, *General Surgery*

Title: Limited Utility of Intraoperative Frozen Section During Parathyroidectomy for Primary Hyperparathyroidism

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Introduction: Intraoperative frozen section (IFS) is commonly performed during parathyroid operations despite improvements in preoperative localization imaging, and utilization of intraoperative PTH measurement.

Objectives: This study aims to evaluate the utility of IFS during parathyroidectomy for treatment of primary hyperparathyroidism (PHP), and to identify patients who may benefit from IFS.

Methods: Retrospective chart review was carried out for all patients who underwent parathyroidectomy for treatment of PHP, by a single surgeon, at a single Canadian tertiary care centre, between January 2013 and June 2018. Two-tailed statistical test with alpha level 5% was used in our analysis.

Results: 262 patients made up the final study population. Overall, IFS provided information that impacted the operative plan in 46 patients (17.6%). The study population was further separated into 3 subgroups based on preoperative laboratory testing: 191 cases with elevated calcium and PTH (HCAHPTH), 52 cases with normal calcium and elevated PTH (NCAHPTH) and 19 cases with elevated calcium and normal PTH (HCANPTH). IFS influenced the operative plan in 13.6%, 28.9% and 26.3% of cases for the HCAHPTH, NCAHPTH and HCANPTH groups, respectively. In the entire study population, IFS altered the operative plan in 10.2% of cases that were correctly localized preoperatively, and in 41.5% of cases that were not or incorrectly localized (p=1.07231E-08).

Discussion: IFS is not required during parathyroidectomy for treatment of PHP for most patients. Patients with multiple adenomas, four-gland hyperplasia, normocalcemic disease, normal range PTH disease, and those that did not localize preoperatively, are most likely to benefit from IFS.

B05 Panchmatia, Rikesh, *Otolaryngology*

Title: The Efficacy of Topical Povidone-Iodine Rinses in the Management of Recalcitrant Chronic Rhinosinusitis

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Introduction: Recalcitrant chronic rhinosinusitis (CRS) is a persistent inflammatory condition of the sinonasal mucosa despite adequate medical therapy and sinus surgery. With limited alternatives, patients continue to experience a reduced quality of life.

Objectives: To demonstrate the effectiveness of Povidone-Iodine (PVP-I) sinonasal rinses on endoscopic modified Lund-Kennedy (MLK) scores, while additionally determining its safety profile objectively and subjectively.

Methods: This is an ongoing prospective cohort study of 20 patients diagnosed with CRS with or without nasal polyposis (CRSw/sNP) or with allergic fungal rhinosinusitis (AFRS). Included patients were enrolled to start PVP-I saline rinses (0.08%) in addition to standard Budesonide therapy between August 2017 and July 2018 due to recalcitrant symptoms as well as endoscopic or positive sinus culture evidence of infection. Patients were evaluated at baseline and approximately 6 weeks later in terms of their endoscopic appearance, thyroid function, saccharin test scores as well as the subjective 22-item Sino-Nasal Outcome Test (SNOT-22) scores.

Results: The median MLK-discharge score decreased by 1.50 points between baseline and follow-up (95% CI =1.00, 1.50; p < 0.05) and then mean total MLK score also decreased by 1.50 points (95% CI = 0.36, 2.64; p < 0.05). SNOT-22 scores decreased from baseline (median = 31; IQR = 17, 46; n = 17) to follow-up (median = 16; IQR = 14, 22; n = 17), while saccharine scores increased from baseline (median = 589 seconds; IQR = 529, 810; n = 12) to follow-up (median = 785; IQR = 525, 1155; n = 12). Of 11 patients with complete thyroid function tests, no change to euthyroid or subclinical thyroid dysfunction status occurred during PVP-I use.

Conclusion: PVP-I sinonasal rinses, as an alternative therapy to recalcitrant CRS management, is associated with significant reduction in endoscopic signs of infection and edema, along side a notable subjective improvement in symptom reduction. Thyroid function does not appear to be impacted by PVP-I rinses at this concentration.

B06 Howlett, Joel, *Otolaryngology, Radiation Oncology*

Title: Management of Recurrent Nasopharyngeal Carcinoma in British Columbia: A Comprehensive Review

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Background: Nasopharyngeal carcinoma (NPC) is a common cancer in Southeast Asian. Due to the influx of immigrants from this region, the incidence in British Columbia (BC) has been increasing over the last 30 years. Disease recurrence is common, with locoregional recurrence commonly treated by re-irradiation +/- chemotherapy or surgery. The literature lacks a large case series of outcomes for the management of recurrent NPC (rNPC) in North America.

Objectives: To examine the current management of locoregional recurrent NPC in BC and outline the factors associated with improved survival outcomes. The aim would be to develop better treatment and surveillance protocols.

Methods: A retrospective analysis of patients treated for locoregional rNPC between 2000 and 2015 in BC with the absence of distant metastatic disease were reviewed. The time to locoregional recurrence and the overall survival, locoregional control and disease-free survival over 5 years following re-irradiation, chemotherapy and/or salvage surgery are reported.

Results: Two hundred patients were included. 34(17%) of patients experienced recurrence within 2.54±2.56 years of initial treatment. Two-thirds(63.6%) of patients recurred within two years and 76.4% of patients recurred within the first three years of treatment. The majority of patients were treated with radiation(10), followed by brachytherapy(5), chemotherapy(3) and salvage surgery(5). Ten (2%) experienced a second recurrence. 5-year overall survival was 60.6% and 5-year disease-free survival was 30.3%.

Conclusion: NPC has a relatively high recurrence rate. To improve overall survival and disease-free survival, the data suggest we implement surveillance MRI scans 2 years after their initial therapy.

B07 Kakande, Emily, *Otolaryngology*

Title: Vitamin D Supplementation and Reduction of Severity and Frequency of Epistaxis in Hereditary Haemorrhagic Telangiectasia

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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. Supplementation of vitamin D to 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 positive effect of Vitamin D on HHT, no prospective study has been done.

Objectives: To investigate whether introducing vitamin D supplementation of 1000 or 4000 IU daily will decrease the frequency and/or the severity of epistaxis among 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 will be randomized into one of three groups: one group taking 1000 IU vitamin D, another taking 4000 IU, and the final group acting as the control group will be taking a placebo. Upon enrolment in the study, demographic data and clinical data will be obtained. The patient will be asked to fill out an ESS questionnaire; endoscopic images will be taken and they will be sent for baseline blood work at the baseline and every follow up visit (3 months and 6 months).

Results: Eight patients have been recruited for this study and we are still recruiting until we have the proper sample size.

Conclusion: The results of this study are pending until the follow up visits are completed.

B08 Duncan, Katrina, *General Surgery*

Title: A Statewide Analysis of Firearm Injuries

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Background: The nationwide epidemic of firearm injuries disproportionately affects the state of Maryland, which holds a greater than average rate of firearm injuries per capita.

Objectives: To investigate recent trends and inform potential interventions, we sought to describe the patterns of firearm injuries and mortality in the state of Maryland.

Methods: Through the Johns Hopkins Surgery Center for Outcomes Research, anonymized patient data from a statewide database for the years 2013-2016 were accessed. ICD 9 and 10 codes to identify all patients who suffered an index firearm injury and were treated as either an inpatient or in the ED from 2013 to 2016. A non-parametric test for trend was used to assess if rates of firearm injury mortality had varied significantly with time. Univariate logistic regression was used to delineate the relationships between variables and the odds suffering a fatal firearm injury. Backward stepwise selection was used to identify significant predictors of mortality.

Results: A total of 4,194 patients with index firearm injuries presented to hospitals in Maryland from 2013 to 2016. A non-parametric test of trend found that injuries per capita fluctuated significantly by year, ranging from 14.1 to 20.5 per 100,000 persons ($p < 0.001$). Of all firearm injuries, 576 (13.7%) were fatal. In univariate logistic regression, the odds of having a fatal injury were significantly lower in all subsequent years compared with 2013. In multivariate modelling, odds of mortality remained significantly lower in all years compared with 2013, after controlling for gender, type of hospital visit, median income, injury severity score, hospital trauma center designation, age, injury intent and patient ethnicity.

Conclusion: While the firearm injury rate per capita has increased from 2013 to 2016, the rate of mortality has decreased. Our findings both underscore the firearm injury epidemic in Maryland while suggesting that in-hospital care of such patients has improved.

B09 Duncan, Katrina, *General Surgery*

Title: Management of Firearm Injuries in the Emergency Department in Maryland, 2013-2016

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Background: As the epidemic of firearm injuries in the United States continues, hospitals continue to manage a high volume of injuries. Anecdotally, firearm injuries are increasingly being treated in the emergency department (ED) and not requiring hospital admission. Yet little evidence exists regarding how often patients are being treated in the ED and which patients are being managed in this manner.

Objectives: We sought to assess if the rates of ED-only treatment have been changing over time and to identify predictors of ED-only treatment.

Methods: Through the Johns Hopkins Surgery Center for Outcomes Research, anonymized patient data from a statewide database for the years 2013-2016 were accessed. We used ICD 9 and 10 codes to identify all patients who suffered a non-fatal index firearm injury and were treated as either an inpatient or in the ED from 2013 to 2016. A non-parametric test for trend was used to assess if rates of ED-only treatment had varied significantly with time. Univariate logistic regression was used to delineate the relationships between variables and the odds of being treated in the ED only. Backward stepwise selection was used to identify significant predictors of receiving ED-only treatment.

Results: A total of 3,618 patients with non-fatal firearm injuries presented to hospital in Maryland from 2013 to 2016. A non-parametric test of trend found that rates of ED-only treatment changed significantly over time, ranging from 44.6% in 2013 to a peak of 55.1% in 2015 ($p < 0.001$). In univariate logistic regression, the odds of receiving ED-only treatment were significantly increased in each year compared to 2013, in male patients, and in those who came from higher median income neighbourhoods (all $p < 0.05$). In contrast, patients with increasing injury severity scores, patients who were treated in a level 1 or 2 trauma centre, and those whose injuries were either self-inflicted or due to assault were significantly less likely to be discharged from the ED (all $p < 0.05$). In multivariate modelling, the odds of being treated in the ED-only did significantly increase in all years relative to 2013 ($p < 0.01$). When controlling for gender, median income, age, hospital trauma center designation, injury intent, and injury severity score, African American patients were significantly more likely to receive ED-only treatment (OR 1.27, $p = 0.02$).

Conclusion: As the firearm injury epidemic in the United States continues, healthcare providers in Maryland are increasingly managing non-fatal firearm injuries in the ED only and currently use this approach for more than half of all injuries. This approach is disproportionately being used for African American patients. Further research is required to delineate which patients can be appropriately managed in this manner and to investigate their outcomes.

B10 Valenzuela, Dianne, *Otolaryngology*

Title: The Impact of Socioeconomic Status on Voice Outcomes in Patients with Spasmodic Dysphonia Treated with Botulinum Toxin Injections

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Background: Spasmodic dysphonia (SD) is a type of voice disorder where laryngeal intrinsic muscles involuntarily contract. While it is known that this disorder significantly influence patients' quality of life, it is not known whether there are certain socioeconomic factors that may influence voice outcomes for patients undergoing treatment.

Objective: To determine the impact of socioeconomic status (SES) on voice outcomes for spasmodic dysphonia (SD) patients treated with botulinum toxin injections

Methods: Adult SD patients returning to the voice clinic for their botulinum toxin injections were recruited from October 2017 to April 2018. Patients completed a questionnaire on demographic data, the Hollingshead Four-Factor Index for socioeconomic, and the Voice-Handicap Index 10 (VHI-10). Primary

outcome was the association between VHI-10 and Hollingshead Index. Secondary variables were median household income by postal code, duration of disease, gender, age, and professional voice user. Descriptive statistics and multiple linear regression was conducted.

Results: One hundred and one patients were recruited with VHI-10 of 22.1 ± 8.1 (out of 40) and Hollingshead Index of 46.3 ± 11.7 (range 8 to 66). Median household income was \$75,875, which was above the Canadian average of \$70,336. About 91.1% were Caucasian, 54.4% had university degree, 86.1% spoke English, and 43.5% were employed. There was a mild to moderate negative correlation ($r=-0.292$, $p=0.004$) between VHI-10 and Hollingshead Index when controlling for disease duration, age, gender, and professional voice use.

Conclusion: SD patients treated with botulinum toxin were mostly affluent, Caucasian, well educated, and English speakers. Lower self-perceived vocal handicap was associated with higher socioeconomic status.

B11 Lichtenstein, Kevin, *Cardiac Surgery*

Title: A simpler approach for assessing left ventricular function using ultrafast ultrasound based wave intensity analysis

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Changes in pressure and flow travel throughout the arterial system in the form of forward and backward waves. Wave intensity analysis (WIA) can examine these waves and their relation to left ventricular (LV) function. Clinically, WIA can be performed at any site in the arterial system.

Initially, WIA was performed invasively using pressure and flow catheters introduced into the arterial system. The two WIA indices crucial to analyzing LV function are two positive peaks, W_1 and W_2 . W_1 a forward going compression wave correlates with the maximum rate of pressure rise, and LV systolic function. W_2 is the second positive peak and represents a forward travelling decompression wave that decelerates blood flow, and reflects LV diastolic function. The literature supports W_1 and W_2 as useful clinical indicators for LV systolic and diastolic function in patients with heart failure with preserved (HFpEF) and reduced ejection fraction (HFrEF). Previous studies demonstrated an effective non-invasive method of WIA using one point echoDoppler based ultrasound of the carotid artery combined with sphygmomanometer blood pressure measurements, used to examine how WIA indices change in heart failure. Though noninvasive, the synchronization of echo-Doppler with blood pressure measurements, make this method technically challenging, prone to timing errors, inaccuracies, time consuming, and overly complex. We propose a novel approach to WIA using ultrafast ultrasound to simultaneously measure changes in velocity and diameter. Velocity is normally determined by tracking scatterers (microbubbles) within the blood; called ultrasound imaging velocimetry. However, the injection of microbubbles is invasive. Instead, we propose to non-invasively track the native blood speckle alone utilizing a method of ultrasound image decomposition called singular value decomposition (SVD) which is well suited for the simultaneous calculation of blood velocity and vessel diameter change using a non-invasive ultrafast ultrasound of the carotid artery. The measurement of diameter and velocity through the proposed means is a simpler, and truly non-invasive method of WIA which could enable clinicians of varying specialties to evaluate systolic and diastolic LV function non-invasively and allow for more ubiquitous monitoring, and therefore treatment, of symptomatic and asymptomatic heart failure patients in the community, and in hospital.

B12 Oh, Justin, *Radiation Oncology*

Title: Primary Organ Preservation versus Total Laryngectomy for T4a Larynx Cancer

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Background: There is a lack of consensus regarding the optimal management of T4a larynx cancer. Possible management options include organ preservation therapy (radiation +/- chemotherapy) or upfront laryngectomy. Previous studies show conflicting oncologic outcomes between treatment cohorts.

Objective: To evaluate the outcomes of primary organ preservation therapy versus total laryngectomy for T4a laryngeal cancer.

Methods: A retrospective population-based analysis of patients treated for T4a larynx cancer referred to British Columbia Cancer from 1984-2014 was performed (N=329). Outcomes in patients treated with surgery alone (Sx), surgery with adjuvant radiotherapy (Sx/RT), radiation alone (RT), and radiation with concurrent cisplatin chemotherapy (chemoRT) were compared. Primary end points were overall survival (OS) and locoregional recurrence free survival (LRRFS). Cox and competing risk regression analyses were performed.

Results: The 5-year OS was 43% for RT, 23% for Sx, 40% for ChemoRT, and 45% for Sx/RT. On MVA, Sx/RT (HR 0.66, 95% CI 0.48-0.91) and ChemoRT (HR 0.44, 95% CI 0.26-0.72) were associated with better OS than RT alone ($p=0.0012$). The 5 year LRRFS was 28% for RT, 18% for Sx, 25% for ChemoRT, and 40% for Sx/RT. On MVA, ChemoRT was associated with better LRRFS (HR 0.43, 95% CI 0.26-0.71), and there was a trend towards better LRRFS with Sx/RT (HR 0.74, 95% CI 0.54-1.02) relative to RT alone ($p=0.001$). In the ChemoRT group 36% were G-tube dependent and 38% were tracheostomy dependent at one-year post treatment.

Conclusion: ChemoRT was not associated with worse outcomes relative to Sx/RT and may be considered as a treatment option for patients with T4a larynx cancer after a careful discussion of the risks and benefits of this approach. However, patients treated with RT alone had worse outcomes relative to chemoRT and Sx/RT.

B13 Fatehi Hassanabad, Mostafa, *Neurosurgery*

Title: To cut or watch: treatment paradigms in low-grade gliomas

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Low grade gliomas (LGGs) are tumors derived from glial cells in the central nervous system (CNS). Under the 2016 WHO Classification of Tumors of the CNS, LGGs include WHO grade II astrocytomas and grade II oligodendrogliomas. While some tumors are discovered incidentally, other patients may present with headaches, seizures or weakness. The clinical course and prognosis of patients with LGGs is quite variable; some tumors remain stable for many years without treatment whereas others grow despite aggressive treatment.

Given the heterogeneity in presentation and progression, there is no clear consensus regarding the management of newly detected tumors which are radiologically thought to represent low grade gliomas. Various studies have advocated early aggressive surgical resection and adjuvant therapies in a bid to increase overall survival. However, in light of the potential consequences of such treatments and the stability of some untreated patients, there is interest in determining the subset of patients who may be managed conservatively.

We retrospectively studied outcomes in patients who were radiologically found to have lesions consistent with LGG between 1987 and 2016. Overall survival and progression free survival were the outcomes of interest. These results were analyzed "as-treated".

In the study period, 167 patients were followed by the senior author, BDT. The median age was 38.2y and there was a slight predilection for males (55% of patients). After a median follow up time of 8 years, 102 patients (62%) had undergone surgical resection with 40 patients proceeding to adjuvant chemotherapy. We found that while tumor size and laterality did not predict need for resection, the development of symptoms did.

Contrary to many previous studies, this study of patients suspected of having LGG suggests there is a significant subset of patients who may be managed conservatively. Surprisingly, tumor volume or laterality do not seem to determine the need for surgery. Ongoing work in this project is focused on discovering radiologic features which may accurately predict the need for early surgery.

B14 Andrew Amenyogbe, *Otolaryngology*

Title: Glucotoxicity Prevention in The Beta Cell: Role of A Novel Antagonist of NMDA Receptor

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Background: Recently, N-methyl-D-aspartate receptor (NMDAR) located on pancreatic beta cells was found to have a regulatory effect on beta cell function and survival under chronically elevated glucose levels.

Objectives: To investigate the effect of a novel NMDAR antagonist, IV-1, on beta cell viability and survival.

Methods: INS-1 beta cell line and rat, mouse, and human pancreatic islets were cultured in high glucose concentrations (after confirming the optimum glucotoxic concentration for each respective set) without or with different concentrations of IV-1 (1, 2, 5, 10, 15, or 50 μ M). Islets were incubated in these experimental conditions for up to 8 days. Culture media was changed every two days. Islet cell viability and function were then assessed using a) Calcein AM (Live)/ Ethidium Homodimer-1 (Dead) staining, b) Methylthiazolyl-diphenyl-tetrazolium bromide (MTT) assay, c) immunofluorescence (IF) staining for insulin and glucagon (with calculation of alpha to beta count ratios), and d) key transcription factors' gene expression using qPCR.

Results: Live-Dead staining showed that viability of INS-1 cells in high glucose cultures was preserved to a level comparable to normal glucose culture when IV-1 was added to the medium at concentrations of 5 μ M or higher. Rat and mouse islets demonstrated preserved survival at both 10 and 50 μ M IV-1 concentrations while human islets showed a dose-response viability rate, comparable to that of normal glucose cultures at 5 and 10 μ M IV-1 concentrations. MTT assay showed INS-1 cells' metabolism was reduced after exposure to high glucose compared with control group, but treatment with IV-1 at 5, 10, and 15 μ M resulted in rescuing cell metabolic rate to an even higher rate than that of control normal glucose treatments. Rat islets showed rescued activity compared to the high glucose group at 10 μ M IV-1. Insulin/glucagon IF staining in human islets showed that high glucose resulted in an increased alpha to beta cell ratio of 4.07 \pm 1.34 (P<0.001 vs. control), while IV-1 treatment groups showed decreased ratios, 0.30, 0.34, 0.61, and 0.51 for 1, 2, 5, and 10 μ M IV-1, respectively (P<0.001, all compared to high glucose group). qPCR gene analysis showed that while expression of PDX1 mRNA, a key transcription factor in beta cells, was decreased in the human islets exposed to high glucose, its expression gradually increased back to the normal level and even higher than the control group after IV-1 treatment in a dose-dependent manner. Expression of XBP1 and ATF6, two genes involved in enhancing biosynthetic capacity of beta cells under endoplasmic reticulum stress, also showed a dose-response relationship with increasing IV-1 concentrations.

Conclusions: These preliminary results suggest a protective role against glucotoxicity for a novel NMDAR antagonist as a survival factor that can prevent beta cell death and maintain beta cell mass.

B15 Hashmi, Aneela, Otolaryngology

Title: The anatomical variation, Retrosphenoid air cell, in CT tomography and their contributions in Sinus diseases. Identification to avoid therapeutic failure and iatrogenic surgical complications

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Introduction: Sphenoid sinuses are asymmetrical paired, about 2.2 cm in height, breadth and AP diameter with 3% incidence of inflammation rate. Preoperative radiological scanning, is routinely done nowadays for computer assisted surgical procedure, to evaluate the anatomy and variation to facilitate the surgical procedure. Retrosphenoid air cells, is an anatomical variant of the paranasal sinuses, that lie posterior to the sphenoid sinus, identified accidentally on scanning. The sphenoidal air cells, or the posterior most ethmoid air cells, commonly known as the onodi air cells, lie superolateral to the sphenoid sinus. If it lies superior to the sphenoid sinus, it's called the central onodi air cell. Variation in septation of the sphenoid sinus along with different pneumatization can affect the approach to sphenoid sinus diagnosis and management.

Objectives: To determine the incidence of retrosphenoid air cell, atypical anatomical variation of sphenoid sinus, as seen by computer tomography scan

Methods: A study of 300 scans of patients operated for chronic sinus or recurrent sinus disease with atypical presentation and radiological findings. All CT Scan done without contrast. Each slice was 0.5- 1 mm thick. Images done in both axial and coronal and reviewed in bone and soft tissue window. The site of retrosphenoid cell measured and noted along with other anatomical variants of sphenoid sinus

Results: Of the 300 scans that were selected randomly, 6 cases of sphenoid sinus hypoplasia were detected of which 2 were due to congenital non pneumatization, 1 was due to Alpert syndrome and 3 were due to cystic fibrosis. One case of retrosphenoid air cell was seen. Protrusion of internal carotid artery and optic nerve was more prevalent than the dehiscence of either one. Superolateral sphenoidal air cell are present more than the central variant. One case of sphenoid was identified without any septation. Most septation started with central location at sphenoid face and deviating posteriorly to right or left. Pneumatization of anterior clinoid process is also not a common variant.

Conclusion: If unrecognized, imaging features may at times create difficulties in interpretation and diagnosis and intervention. The unique position and the ability to identify it and provide successful intervention will lead to better outcomes. This study supports the initiative to identify retrosphenoid air cell and plan treatment strategy, and especially for patients with recalcitrant sinus disease.

B16 Howlett, Joel, Otolaryngology

Title: Mandible defect classifications: A reconstructive based analysis

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Background: Oral cavity cancer is the most common mucosal head and neck cancer, often treated with surgical resection including segmental mandibular resection. Several classification systems have been proposed to report mandibular defects following resection, in an attempt to guide the reconstructive surgeon. There is limited data examining the relationship between defect type and reconstruction complexity in terms of the number of bony segments required.

Objectives: This study compares commonly referenced mandibular defect classifications and determines the optimal number of segments required for reconstruction of each type of defect.

Methods: An in house Virtual Preoperative Reconstruction (ViPre) platform was developed using the Ramer-Douglas-Peucker mathematical algorithm. Computed tomography (CT) scans of 48 mandibles were analysed with various defects created based on three commonly referenced classification systems (Brown, HCL, CRBS). The number of bony segments required to reconstruct each defect was generated by ViPre. Classifications were compared to determine the most consistent predictor of the number of segments needed for reconstruction of a given defect.

Results: 720 mandibular defects were analyzed. A wide variance in the number of segments needed for optimal reconstruction was observed between classifications. The CRBS classification proved most predictive with 7 of 8 defects accurately predicted, while the Brown model failed to reliably predict any defect.

Conclusions: The CRBS classification is superior to other classification systems in predicting the number of bony segments required for mandible reconstruction. Additionally, we present a pre-operative and intraoperative guide, suggesting the number of segments required for each type of defect and helping to predict reconstruction complexity.

B17 Chen, Ben (Tse), Radiation Oncology

Title: Late Effects of Radiation Therapy for Lymphoma in the Adolescent and Young Adult Population

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Background: Late effects of radiation therapy (RT) are highly relevant for survivors of adolescent and young adult (AYA) malignancies. These health complications often represent irreversible or progressive conditions that can have a significant negative impact on quality of life. There is a relative lack of literature documenting complications from RT in patients treated as AYA compared to as pediatric patients.

Objectives: The objective of this study is to describe and quantify the incidence of radiation-induced late effects in AYA patients treated for lymphoma.

Methods: Patients diagnosed with Hodgkin lymphoma (HL) at 15-24 years of age or non-Hodgkin lymphoma (NHL) at 15-29 were identified in the Lymphoid Cancer Database. All patients who received RT as part of their management of lymphoma at BC Cancer from 1980-2010 with a minimum 5-year survival post-RT were included. Late effects were defined as documented health complications persistent or developing beyond 5 years post-RT or at last follow-up. For the analysis of cardiac disease, patients who received mediastinal RT and/or anthracycline chemotherapy were included. For infertility, patients who received inguinal RT and/or chemotherapy agents with the risk of infertility were included. Analyses of all other late effects included only survivors who were deemed susceptible to the respective toxicity based on the anatomical site(s) of RT received. Late effects were analyzed using Kaplan-Meier method and reported as cumulative incidence (CI) \pm standard error.

Results: Of the 378 patients studied, 226 patients were diagnosed with HL (60%) and 152 patients with NHL (40%). Median follow-up was 7.2 years (range, 0.2-37). 34 patients were treated with RT only (9%) and 344 patients were treated with RT and chemotherapy (91%). 316 patients received one course of RT (84%) and 62 patients received ≥ 2 courses (16%). 85 patients (22%) had at least 1 relapse of lymphoma and 59 patients were deceased by last follow-up (15.6%). Of the late effects studied, Radiation-Induced (RI) hypothyroidism was the most prevalent, with a CI of $19.9 \pm 2.5\%$ at 5 years and $30.4 \pm 3.3\%$ at 10 years. The CI of in-field second malignancy was $0.7 \pm 0.5\%$ at 5 years and $2.1 \pm 1.1\%$ at 10 years, of which the most common types were skin cancer (N=5) and sarcoma (N=3). The 5-year CI of symptomatic RI lung damage was $4.8 \pm 1.4\%$ and 10-year CI was $6.8 \pm 1.8\%$. RI esophageal complications occurred at a CI of $1.3 \pm 0.7\%$ at 5 years and $1.9 \pm 1\%$ at 10 years. CI of RI xerostomia or dental decay was $4.7 \pm 1.6\%$ at 5 years and $6.6 \pm 2.1\%$ at 10 years. Treatment-induced cardiac disease occurred at a CI of $2 \pm 0.8\%$ at 5 years and $3.7 \pm 1.3\%$ at 10 years. CI of reported infertility was $6.9 \pm 1.5\%$ at 5 years and $11.1 \pm 2.1\%$ at 10 years.

Conclusions: Even with relatively limited follow-up, this study demonstrates that survivors of lymphoma treated as AYA are significantly burdened by late effects of radiation therapy. The diverse clinical presentation and high incidence of late effects in a young population necessitate focused follow-up and screening when appropriate. Patients and primary care providers need to be informed to ensure proper management.

B18 Xu, Rebecca Zhang, *Otolaryngology*

Title: The Audiological Patterns and Outcomes in Sudden Sensorineural Hearing Loss Patients (APOST Study)

Rebecca Xu BSc¹, Ameen Amanian MD^{1,2}, Desmond A. Nunez MBBS MD FRCSC^{1,2}

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Background: Sudden sensorineural hearing loss (SSNHL) is a usually unexplained acute sensorineural hearing loss of greater than 30 dB averaged over a minimum of three pure-tone audiogram test frequencies, occurring over 72. Only 10-15% of cases have an identifiable cause of hearing loss.

Objective & Hypothesis: This study will investigate whether there is a correlation between hearing recovery and the presenting audiological pattern of hearing loss in patients with Sudden Sensorineural Hearing Loss (SSNHL) at Vancouver General Hospital (VGH).

Methods: This study will review the charts of patients presenting with hearing loss over a 7 year period to VGH. Audiogram shape will be classified into upward-sloping, downward-sloping, mid-frequency loss, flat type, or profound type. The Pure Tone Audiogram (PTA), Speech Recognition Threshold (SRT) and Word Recognition Scores Score (WRS) will be recorded. The PTA average will be calculated over four standard frequencies: 0.5, 1, 2, 3 kHz. The SRT is minimum hearing level for speech at which an individual can recognize 50% of the speech material. The WRS measures the discrimination of a standard list of monosyllables, measured as a percentage of correctly recognized words.

Results & Conclusions: Results will hopefully identify the prognostic effect of audiological patterns in SSNHL such that low-frequency hearing losses (upward sloping audiograms), or mid-frequency hearing losses (cookie bite type audiograms) have better prognosis and that total hearing losses (profound type audiograms) have worse prognosis.

B19 Luc, Jessica, *Cardiac Surgery*

Title: Transcatheter Valve Implantation Versus Sutureless Replacement Versus Conventional Aortic Valve Replacement In Aortic Valve Stenosis: A Bayesian Network Meta-Analysis

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Background: Minimally invasive surgical techniques pose alternatives to conventional surgery for the treatment of aortic valve stenosis. We present a Bayesian network analysis comparing Valve Academic Research Consortium-2 clinical outcomes between transcatheter aortic valve implantation (TAVI), sutureless (SL-AVR) and conventional aortic valve replacement (CAVR). Findings from this study are of particular importance given the drive towards use of TAVI and SL-AVR in place of CAVR amongst all-comers in the treatment of aortic stenosis.

Methods: Electronic searches of databases were conducted and six two-arm randomized-controlled trials and 24 propensity-score-matched studies comparing clinical outcomes of TAVI, SL-AVR and CAVR for treatment of aortic stenosis were identified. Bayesian Markov chain Monte Carlo modeling was used to analyze clinical outcomes.

Results: The analysis included 14,672 patients who underwent TAVI (6,142), SL-AVR (1,238) or CAVR (7,292). Compared to CAVR, TAVI and SL-AVR were associated with reduced postoperative major bleeding of 65% (OR 0.35, 95%CI 0.26-0.50) and 45% (OR 0.55, 95%CI 0.32-0.90) respectively. TAVI had a 44% reduction in postoperative myocardial infarction (OR 0.56, 95%CI 0.37-0.82) and SL-AVR had a 38% reduction in postoperative acute kidney injury (OR 0.62, 95%CI 0.42-0.92). Compared to TAVI, CAVR and SL-AVR had a reduction in moderate/severe paravalvular regurgitation of 89% (OR 0.11, 95%CI 0.06-0.16) and 92% (OR 0.08, 95%CI 0.03-0.17). CAVR had a

63% decreased postoperative permanent pacemaker implantation compared to TAVI (OR 0.37, 95%CI 0.26-0.50) and a 61% reduction compared to SL-AVR (OR 0.39, 95%CI 0.24-0.63). There were no differences in 30-day mortality or postoperative stroke between the groups.

Conclusion: In selected patients, minimally invasive surgical interventions for severe aortic stenosis are viable alternatives to conventional surgery but are associated with increased paravalvular regurgitation and conduction disturbances.

B20 Luc, Jessica, *Cardiac Surgery*

Title: Total Artificial Heart As Compared to Biventricular Assist Device for Biventricular Heart Failure: A Systemic Review and Meta-Analysis

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Background: Mechanical circulatory support has been increasingly used as a bridge to heart transplantation or destination therapy in patients with end stage heart failure refractory to medical management. Options for patients with biventricular heart failure are total artificial heart (TAH) or biventricular assist

devices (BiVAD). However, comparative studies between the two approaches are lacking. The aim of this systematic review and meta-analysis was to examine the outcomes of patients undergoing TAH as compared to BiVAD implantation for biventricular heart failure.

Methods: Electronic search was performed to identify all studies in the English literature examining outcomes of patients who underwent TAH or BiVAD implantation for biventricular heart failure. All identified articles were systematically assessed for inclusion and exclusion criteria. Random effects meta-analysis was performed.

Results: Of the 4200 studies identified, 15 studies were included. Of 528 patients, 494 (93%) underwent TAH implantation and 34 (6%) underwent BiVAD implantation. There were no significant differences in baseline demographics in terms of age and etiology of heart failure. In terms of postoperative outcomes, patients with TAH were more likely to develop an infection (TAH 73% vs. BiVAD 18%, $p=0.01$), though there were no differences in rates of severe bleeding (TAH 45% vs. BiVAD 23%, $p=0.17$), stroke (TAH 11% vs. BiVAD 29%, $p=0.27$) and acute kidney injury (TAH 48% vs. BiVAD 27%, $p=0.39$). Patients with TAH were supported for a shorter duration of time (TAH 81 days [30-132] vs. BiVAD 163 days [114-211], $p=0.02$) with a trend to more likely receive a heart transplant (TAH 67% vs. BiVAD 46%, $p=0.06$). Furthermore, patients with a TAH had superior survival at 180 days of follow-up post implantation (TAH 74% vs. BiVAD 45%, $p=0.02$).

Conclusions: Total artificial heart implantation is superior to BiVAD therapy in terms of bridge to heart transplantation rates and 180-day post-implant survival in patients with biventricular heart failure. Further studies are needed to delineate evidence-based guidelines to tailor the appropriate device support therapy, TAH vs. BiVAD, to the appropriate patient.

B21 Finley, Richard, *Thoracic Surgery*

Title: The Impact of Pathology, Staging and Operative Resection on Survival and CT Evidence of Recurrence of Early Non Small Cell Lung Cancer Excised with VATS wedge resection guided by preoperative CT-guided microcoil localization (CTML)

Finley, Richard J., Carol Donagh, MB, Joyce Leo, MD3, Mayo, John R., MD2, Grant, Kyle, MD1, Clifton, Joanne C., MSc1, English, John, MD3, Lam, Stephen, MD4. 1Thoracic Surgery, 2Radiology, 3Anatomical Pathology, 4Respiratory Medicine, University of British Columbia

Background: The purpose of this study is to determine the impact of histopathology, staging and extent of operative resection on survival and CT evidence of recurrence of early NSCLC excised with VATS wedge resection guided by preoperative CT-guided microcoil localization (CTML) and intra-operative fluoroscopic guidance.

Methods: Between April 2003, to June 2012, 106 of 154 patients who underwent CTML and VATS resection of suspicious pulmonary nodules were found to have NSCLC. Serial chest CTs of the 106 patients with confirmed NSCLC were reviewed by 2 chest radiologists for development of recurrence of the original cancer at the resection margin, lung or mediastinum and the development of new primary lung cancer. An experienced chest pathologist determined pathologic resection margins, histological subtype and staging.

Results: The male/female ratio was 47/59. Median age was 63 (34-81) years. Smoking history obtained in 91/106. Median follow-up was 82 (32-136) months. Histology consisted of 99 adenocarcinomas and 7 squamous carcinomas. Staging (AJCC 8th edition) was Stage 0 (11), IA1 (77), IA2 (2), IA3 (3) IB (8), IIB (4) & IV (1). 53 patients underwent CTML and VATS resection alone and 53 had CTML, VATS resection and therapeutic lobectomy. Both surgical groups were similar for demographics, tumor characteristics, histopathology and stage at surgery. There was no 90-day mortality.

Multivariate analysis showed adverse effects on: 1) Local recurrence of cancer ($n=3$) by positive resection margin ($n=2$) ***. 2) Any recurrence of original cancer ($n=10$) by lymph node stage ***, positive resection margin ***, visceral pleural invasion (VPI) *** but not age, gender, smoking history, nodule shape on CT, histopathology, tumor invasive size, STAS, lymphovascular invasion or extent of resection. 3) Development of a new primary NSCLC ($n=19$) by wedge resection alone* (12/19). The new primary was resected in 13/19 patients. 4) Disease free survival at 3 (89%), 5 (74%) & 9 years (61%) by a positive resection margin ***, VPI **, lymph node stage*, or wedge resection alone *. Overall 5-year survival was 85%. ($p<.05$ *, $p<.01$ **, $p<.001$ ***)

Conclusions: In patients with early NSCLC, CTML accurately identifies the cancer margins resulting in a low radiologic local recurrence rate of 3%. Ten patients had recurrence of their original cancer associated with lymph node involvement, positive resection margin, and VPI. Second primary lung cancers are prevalent in long-term survivors, particularly if treated with wedge resection. Completion therapeutic lobectomy following diagnostic wedge resection of NSCLC improves disease-free survival

B22 Zou, Yuanjie, *General Surgery*

Title: Failure of Autophagy and Lysosomes Exacerbates β -Cell Dysfunction and Death under Hypoxic Stress

Peter Yuanjie Zou, Benny Tang, Mei Tang and Dan S Luciano
UBC Division of General Surgery, BC Children's Hospital Research Institute

Background: Autophagy helps protect β -cells from lipotoxicity and inflammation, but the importance of autophagy under other diabetes- and islet transplantation-relevant stress is not known. Here, we investigated if autophagy and lysosomal homeostasis are important for β -cell function and survival under hypoxia.

Objective: To determine the importance of autophagy and lysosomal homeostasis for β -cell function and survival under hypoxia.

Methods: We deleted the essential component of autophagosome formation, Autophagy-related 5 (Atg5), in β -cell-specific knockout animals (Atg5 β KO) and by adenovirus-mediated Cre expression in Atg5^{fllox/fllox} mouse islet cells. Confocal microscopy was used to image LC3-GFP-RFP autophagy reporter islet cells under hypoxia (1% O₂), and LysoTracker staining following chemical hypoxia induced by CoCl₂. Lysosomal inhibition (alkalization) was induced by chloroquine or Bafilomycin A1. Mitochondrial metabolism was quantified by recording cellular oxygen consumption rates. Gene expression was examined by quantitative real-time PCR. Islet cell death under hypoxia was tracked using fluorescence imaging of propidium iodide uptake.

Results: In mouse islets, hypoxia induced time-dependent changes in the expression of autophagy-related genes that correlated with changes in adaptive, but not pro-apoptotic, ER stress genes. Mice with β -cell-specific knockout of Atg5 developed diabetes, with impaired glucose tolerance as early as 5 weeks. In vitro deletion of Atg5 did not induce basal islet-cell death but amplified hypoxia-induced death, demonstrating an important protective function for autophagy under hypoxia. Imaging islet-cells from LC3-GFP-RFP autophagy reporter mice revealed that 24-hr hypoxic culture caused accumulation of enlarged autophagosomes, which indicates failure of autophagic flux. Moreover, CoCl₂-induced hypoxic stress reduced LysoTracker staining in mouse β -cells, suggesting hypoxia may compromise autophagosome clearance by disrupting lysosomal function. Using chloroquine and Bafilomycin A1 we found that prolonged lysosomal dysfunction (alkalization) had detrimental effects on both basal and acute glucose-stimulated mitochondrial oxygen consumption in MIN6 cells.

Conclusions: Our data confirm that β -cell autophagy is absolutely essential for maintenance of normal glucose tolerance. Further, we reveal 1) that autophagy is protective in β cells under hypoxic stress, and 2) that prolonged/severe hypoxia impairs lysosomal homeostasis and autophagic flux, which may further exacerbate metabolic failure and death of the β -cells.

B23 Zwimpfer, Thomas, *Neurosurgery*

Title: Improvement of Gait and Cognitive Function 3 Months After Endoscopic Third Ventriculostomy (ETV) in Adult Obstructive Hydrocephalus

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Introduction: In addition to symptoms of raised ICP, adults with obstructive hydrocephalus often present with gait, bladder and/or cognitive dysfunction. This report presents preliminary results of gait and cognitive function, both Pre and 3 months Post ETV in adults.

Methods: Adult patients with obstructive hydrocephalus were identified based on tri-ventricular hydrocephalus on CT and MRI. This report focuses on 1) Gait velocity (10m timed gait) and; 2) Cognitive function (Montreal Cognitive Assessment [MOCA]) Pre and Post ETV.

Results 85 adults underwent ETV, with a mean age of 55 yrs and 49 (58%) males. Distribution of hydrocephalus: 41 (48%) Congenital, never previously treated; 33 (39%) Acquired, shunted or not; 11 (13%) Transitional patients, any etiology and treated before age 18. ETV was primary in 73 (86%), while 12 (14%) with a blocked shunt, underwent a secondary ETV. Due to drowsiness, confusion, severe gait disturbance, only 49 (58%) of the 85 patients completed a MOCA and Gait test prior to the ETV. To date, 33 (67%) of these 49 have a Post ETV MOCA, with improvement from 24/30 (2 mo Pre ETV) to 26/30 (3 mo Post ETV). Post ETV Gait tests were completed by 32 of the 49 (65%) with improvement of gait velocity from 0.9 m/s (1 mo Pre ETV) to 1.2 m/s (3 mo Post ETV).

Conclusions: ETV in adults with obstructive hydrocephalus results in improvement of cognition and gait, 3 months Post ETV. Longer follow-up will determine the degree and durability of this improvement. Supported by the Hydrocephalus Association.

2018 Department of Surgery Faculty Achievement Awards

Hjalmar Johnson New Investigator Award – Dr. Andrea MacNeill



Dr MacNeill is a surgical oncologist at Vancouver General Hospital and the BC Cancer Agency, and a clinical assistant professor at the University of British Columbia. She is also the provincial education coordinator for the BCCA Sarcoma Tumour Group and a founding member of the BCCA Sarcoma Outcomes Unit and the Canadian Abdominal Sarcoma Collaborative.

She completed General Surgery residency at the University of British Columbia followed by a fellowship in Surgical Oncology at the University of Toronto. She pursued additional fellowship training in sarcoma surgery at the Istituto Nazionale dei Tumori in Milan, Italy and the Royal Marsden Hospital in London, UK, and subspecialty fellowship training in peritoneal malignancies in Basingstoke, UK. She completed a Master's of Environmental Change and Management at the University of Oxford and has research interests in sustainable health care as well as clinical outcomes of soft tissue sarcoma and peritoneal malignancies.

Richard J Finley Senior Investigator Award – Dr. Bruce Verchere



Bruce Verchere is a Professor in the UBC Depts of Surgery and Pathology & Laboratory Medicine, head of the Canucks for Kids Fund Childhood Diabetes Laboratories at BC Children's Hospital, holds the Irving K Barber Chair in Diabetes Research, and leads the recently created BC Diabetes Research Network. His research focuses on understanding pancreatic islet function with the goal of developing therapeutic approaches for enhancing beta cell survival and function in diabetes and following transplantation. He has published over 120 manuscripts in diabetes research and made significant contributions to our understanding of the triggers of beta cell dysfunction in diabetes and in the identification of disease biomarkers. He was awarded the Diabetes Canada

Young Scientist Award in 2006, a Queen Elizabeth II Diamond Jubilee medal for diabetes research and service in 2012, the Geoffrey L Hammond Lectureship in 2017, and awards from the UBC Faculty of Medicine for Excellence in Mentoring Early Career Faculty (2015) and Distinguished Achievement in Service to the University and Community (2018). In recent years he has served on a number of advisory and editorial boards, including the Diabetes Canada Board of Directors and National Research Council; the Institute Advisory Board for the Canadian Institutes of Health Research (CIHR) Institute of Nutrition, Metabolism and Diabetes; on editorial boards of the journals Diabetes, Endocrinology, Diabetologia, and Islets; and on grant review panels for Diabetes Canada, CIHR, JDRF, and NIH.

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: *"Multisystem organ 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 Charles H. Tator, Professor and Chair, Division of Neurosurgery, The Toronto Hospital: *"The breadth of surgical research in the 1990's"*
- 1999 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"
- 2000 Paul Walker, Vice President, Toronto General Hospital
Professor of Surgery and Laboratory Medicine, Pathobiology, University of Toronto
"The continuing challenge of sepsis"
- 2001 James C. Thompson, Ashbel Smith Professor of Surgery, University of Texas Medical Branch
"Endocrine tumors of the pancreas"
- 2002 Richard J. Finley, Professor, Department of Surgery
Head, Division of Thoracic Surgery, University of British Columbia
"Future of image guided minimally invasive thoracic surgery"
- 2003 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"
- 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 Thomas M. Krummel, Emile Holman Professor and Chair, Stanford University School of Medicine, Department of Surgery
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 Yvan Douville, 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 communication 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 Médecins Sans Frontières (Doctors Without Borders) Canada