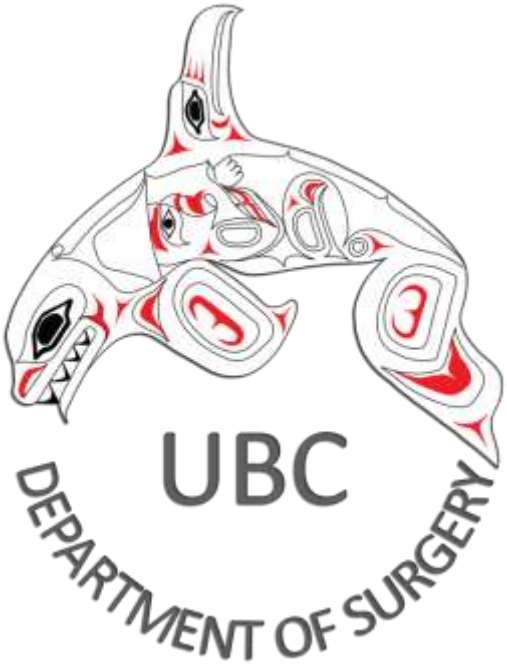
THE SURGICAL TIMES

UBC Department of Surgery November 2, 2015



The 21st Annual

WB & MH Chung
Lectureship and Research Day

Accreditation

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.

Learning Objectives

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:

Table of Contents

The Surgical Times was formerly the newsletter of the UBC Department of Surgery. The past editors were two distinguished emeriti professors: Dr. Phil Ashmore and Dr. John MacFarlane. With the advent of electronic communication the Surgical Times is now only printed in paper form once a year for Chung Research Day.

Research Day Schedule- Plenary sessions – November 2, 2015

MORNING SESSION - Chair: Dr. Gary Redekop

8 minute paper with 2 minute discussion

0800 **WELCOME - Dr. Gary Redekop**

0805 **Dr. Oleksandr Butskiy, Otolaryngology**
Revisiting the gastric pull up: A systematic review and meta-analysis of pharyngoesophageal reconstruction

0815 **Dr. Seo Young Kim, General Surgery**
"Stat" surgery in children: Expected vs. actual time to surgical intervention

0825 **Dr. Joshua Gurberg, Otolaryngology**
Is a multi-site vestibular lesion more disabling than a single-site lesion?

0835 **Dr. Gregory Bodie, General Surgery**
Impact of an enhanced recovery after surgery (ERAS) program on outcomes of patients undergoing colon resection

0845 **Dr. Amin Javer, Otolaryngology**
Antimicrobial photodynamic therapy for treatment of refractory chronic rhinosinusitis: A case series

0855 **Dr. Danny Mendelsohn, Neurosurgery**
Clinical and radiographic predictors of successful and unsuccessful medical management of vertebral osteomyelitis

0905 **Dr. Paris-Ann Ingledew, Radiation Oncology**
Closing the gap: The development of novel online oncology resources for undergraduate medical students.

0915 **Dr. Karan Jason D'Souza, Pediatric General Surgery**
Stepping out of the shadow: Investigating a teacher-learner contract for observerships in the clinical setting

0925 **REFRESHMENT BREAK**

0940 **Dr. Mohammadreza Pakyari, Plastic Surgery**
In situ gel scaffold improves healing outcome in a full-thickness splinted skin wound healing model

0950 **Dr. Louise Valerie Straatman, Otolaryngology**
Magnetic targeting of stem cell therapy to the ear

1000 **Dr. Laura Cook, General Surgery**
Functional heterogeneity of human memory CD4+ T cells specific for C. difficile toxins in patients with active disease

1010 **Thilo Speckmann, General surgery**
Regulation of Npas4 expression and its role in prevention of tacrolimus-induced cytotoxicity in pancreatic beta-cells

1020 **Dr. Alysah Rasool, Otolaryngology**
Efficacy of a novel self-propelling hemostatic agent in head and neck bleeding using a sheep in vivo model

1030 **SIMULTANEOUS SESSIONS**

1130 **LUNCH**

1230 **CHUNG LECTURE - Dr. Garnett Sutherland**

AFTERNOON SESSION - Chair: Dr. Erik Skarsgard

8 minute paper with 2 minute discussion

1330 **Dr. Gregory Bodie, General Surgery**
Fluorescent cholangiography in laparoscopic cholecystectomy: The initial Canadian experience

1340 **Dr. Jerry Chen, Vascular Surgery**
Venus stenting for lower extremity chronic venous occlusive disease: The Vancouver General Hospital experience

1350 **Dr. Cathevine Yang, Vascular Surgery**
A comparison of RUDI and DRIL for the management of severe access-related hand ischemia

1400 **Dr. Chi (Lisa) Jin, Otolaryngology**
Assessment and comparison of vaccination status in pediatric cochlear implant patients: A 10 year retrospective review

1410 **Dr. Karan Jason D'Souza, General Surgery**
The impact of the acute care surgery service model in comparison to the traditional model: A systematic review

1420 **Dr. Carla Rose Pajak, General Surgery**
Early operative management of acute cholecystitis: Clinical audit and algorithm

1430 **Dr. Benjamin Maas, Radiation Oncology**
Isolated axillary nodal breast cancer without breast primary: A BC cohort and matched controls

Simultaneous Session A

Paetzold Multipurpose Room, 10:30-11:30

#	First Author *Last Author*	Division	Abstract Title
A01	Aharoni-Simon, Michal *Luciani, Dan*	General surgery	Anti-Apoptotic Bcl-2 Regulates Redox-Balance and Autophagy in Pancreatic Beta-Cells
A02	Alasousi, Fahad *Javer, Amin*	Otolaryngology	Evaluation of sheep sinonasal endoscopic anatomy as a model for rhinologic research
A03	Butskiy, Oleksandr *Nunez, Desmond*	Otolaryngology	Rinne Test: Does the position of the tuning fork affect the sound amplitude?
A04	Cavaleri, Franco *Jia, William*	General surgery	Inhibition of NF-kB p65-p50 transactivation by Curcumin involves a novel complex comprehensive mechanism.
A05	Chang, Stephano *Akagami, Ryojo*	Neurosurgery	Timing of Incidence and Recovery of Delayed Facial Palsy after Vestibular Schwannoma Resection: Insight into mechanisms
A06	Culig, Jennifer *Munoz, A*	Vascular surgery	Vascular Surgery Globalized Education; The resident exchange program experience
A07	Delwar, Zahid *Jia, William*	Neurosurgery	Tumor specific triple regulated oncolytic herpes amplicon virus to specifically target glioma cells
A08	D'Souza, Karan *Blair, Geoffrey*	Pediatric general surgery	Students As Future Educational Leaders In The Development Of Learning Resources: An Undergraduate Surgical Curriculum Initiative
A09	Farrokhi, Ali *Ghahary, Aziz*	Plastic surgery	Comparison of three methods for decellularization of mouse skin and evaluating the outcome after transplantation in full thickness skin wound in mouse model
A10	Ghuman, Amandeep *Phang, Terry*	General surgery	Surgical Site Infection Rates Following Implementation Of A Colorectal Closure Bundle in Elective Colorectal Surgeries
A11	Giambattista, Joshua *Berthelet, Eric*	Radiation oncology	Magnitude and timing of GTV response to neoadjuvant chemotherapy and concurrent chemo-radiation in the treatment of locally advanced nasopharyngeal carcinoma
A12	Giambattista, Joshua *Loewen, Shaun*	Radiation oncology	A mixed methods survey on the impact of a difficult Canadian job market on radiation oncology residents and program directors
A13	Ho, Germain *Nunez, Desmond*	Otolaryngology	Development of an In-vitro Porcine Inner Ear Cell Model
A14	Krentz, Nicole *Lynn, Francis*	General surgery	Pancreatic progenitor cell G1 lengthening is required for efficient endocrine cell differentiation

Simultaneous Session B

Paetzold Lecture Theatre, 10:30-11:30

#	First Author *Last Author*	Division	Abstract Title
B01	Liang, Jennifer *Hengel, Ross*	Neurosurgery	Evaluating Student Achievement in the Summer Research Program at British Columbia Children's Hospital: A Quantitative and Qualitative Study
B02	Lu, Daphne *Chadha, Neil*	Otolaryngology	Detection of abnormally shaped ears in newborns
B03	Makarenko, Serge *Akagami, Ryojo*	Neurosurgery	Craniotomy for Perisellar Meningiomas, Comparison of Simple (Appropriate for Endoscopic) Versus Complex Anatomy and Surgical Outcomes
B04	Mick, Paul Thomas *Lin, Frank*	Otolaryngology	Hearing loss and Injury-Related Expenses in the United States
B05	Mo, David *Hengel, Ross*	Pediatric general surgery	Trauma Team Leadership Attributes: A Qualitative Analysis With Discrete Choice Experiments
B06	Mousavi, Seyed *Nunez, Desmond*	Otolaryngology	Determinants of Hearing Aid Uptake, and Satisfaction or Use: A Review
B07	Nabai, Layla *Ghahary, Aziz*	Plastic surgery	Reduced post-surgical fibrosis by implantation of kynurenic acid microspheres in vivo
B08	Okpaleke, Christopher *Javer, Amin*	Otolaryngology	The Efficacy Of A Thermosensitive Poloxamer 407-Based Topical Medication Regimen For Chronic Rhinosinusitis: A Retrospective Review
B09	Dosani, Maryam *Schellenberg, Devin*	Radiation oncology	Do pre-treatment PET parameters predict for outcome in early-stage lung cancer patients treated with stereotactic body radiotherapy?
B10	Turner, Simon *Bédard, Eric*	Thoracic surgery	Development and validation of competency assessment instruments in thoracic surgery
B11	Wong, Helen *Marzban, Lucy*	General surgery	Deletion of the pro-apoptotic function of cytochrome c protected beta-cells from amyloid toxicity: implications for clinical islet transplantation
B12	Wu, Dan *Levings, Megan*	General surgery	Regulatory T cells and adipose tissue inflammation in bariatric surgery patients
B13	Yang, Gary K *Alavi, Afsaneh*	Vascular surgery	Factors associated with the development and resolution of venous leg ulcers in a Canadian population
B14	Yong, Michael *Lea, Jane*	Otolaryngology	Endoscopic Ear Surgery in Canada: a cross-sectional study
B15	Zivkovic, Irena *Skarsgard, Erik*	Pediatric general surgery	Feasibility of Implementing Chlorhexidine Gluconate (CHG) for Pre-Operative Cleansing in Pediatrics

Message from the Department Head, Dr. Gary Redekop

The WB & MH Chung Research Day provides an 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 includes topics ranging from pure basic science to translational research, education, and clinical outcome studies.

We are honored to have Dr. Garnette Sutherland as our visiting Chung lecturer. Dr. Sutherland is a Professor in the Department of Clinical Neurosciences at the University of Calgary, where he is the Director of the Seaman Family MR Research Centre. Dr. Sutherland's contributions to science and medicine are reflected by 166 abstracts, 136 peer-reviewed publications, 16 monographs or book chapters, and five patents. His major research focus has been the application of MR techniques to the study of neurological diseases. He has attracted millions of dollars through local and national grant competitions and has received many awards over the years. Dr. Sutherland has made numerous presentations in Australia, Asia, Europe, Hawaii, New Zealand, and North America. In 2012, Dr. Sutherland was awarded The Order of Canada award for his outstanding contribution to neurosurgery.

I would like to recognize 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 many 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 2015

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 Dept 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 Dept 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 Deparment 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 was active in her church and community as well. She served on boards of the Chinese United Church, the Vancouver Academy of Music, and was the founding Executive Director of the True Light Chinese School in Vancouver. Well into her eighties, she was given an honorary graduation certificate from York House School in recognition of her contributions to the school.

Family

Despite her tireless devotion and dedication to her patients she was still able to balance a healthy family life providing endless support to her husband, Wally, while raising two children who felt inspired enough by their home life to pursue careers in medicine. Their daughter Dr. Maria Chung is in the Division of Geriatric Medicine at the University of British Columbia. Their son Dr. Stephen Chung is the past University of British Columbia Head of the Division of General Surgery and the current Vancouver General Hospital Head of Hepatobiliary & Pancreatic Surgery. Late in her career, she experienced a life-threatening illness but was able to return to full-time work. At the same time, she was the primary caregiver to her elderly mother whom she looked after in her home. Dr. Madeline Chung's is a busy grandmother of five grandchildren.

Chung Lecture 2015

Dr. Garnette Sutherland

Dr. Sutherland is a Professor in the Dept of Clinical Neurosciences at the University of Calgary, and founder and Director of the Seaman Family MR Research Centre, Alberta Heath Services.

His major research focus is the application of MR techniques to the study of neurological diseases. Among his innovations are the Intraoperative MR system and the NeuroArm robotic system that can do neurosurgery. He has been recognized by numerous awards including an Order of Canada (2012) and induction into the Space Foundation's Space Technology Hall of Fame (2014).

He will be speaking on his award-winning work in magnetic resonance imaging and robotic surgery.

Plenary Presentations

P01 **Oleksandr Butskiy,** Otolaryngology

Title: Revisiting the gastric pull up: A systematic review and meta-analysis of pharyngoesophageal reconstruction

Oleksandr Butskiy, Ronak Rahmanian, Richard A White, Eitan Prisman, nnnnUniversity of British Columbia

Background: Gastric pull up remains one of the oldest surgical techniques for re-stablishing alimentary tract continuity following pharyngoesophagectomy. It continues to be used for reconstruction of surgical defects extending below the thoracic inlet. However, due to the fears of high mortality and morbidity reported in early case series, gastric pull up reconstruction of defects above the thoracic inlet has largely been abandoned. However, a trend of morbidity and mortality as this technique has been popularized over the past fifty years has not been undertaken. A meta-analysis of morbidity and mortality associated with gastric pull up for pharyngoesophageal reconstruction from its first reported use in 1959 to present was performed. The primary objective was to assess the change over time in gastric pull up related post-operative mortality and morbidity.

Hypothesis: The mortality and morbidity of gastric pull up following pharyngoesophagectomy has decreased over the past five decades of its use.

Methods: *Search:* Medline®, Embase, and the Web of Science® databases were searched for publications on morbidity and mortality following gastric pull up pharyngoesophageal reconstruction. Further studies were identified from bibliographies of relevant studies and from the review of annual scientific assemblies. Two reviewers selected the studies, appraised them, and extracted the data. The data extracted included: (1) post-operative mortality, (2) the incidence of anastomotic complications, (3) the incidence of other complications, (4) the method of gastric pull up, and (5) the use of pre-operative radiation.

Statistical analysis: The incidence of mortality and anastomotic complications were modeled using a logistic regression, and the incidence of other complications were modeled using a negative binomial regression. In both analyses, the primary predictor was the time period of data collection for each study. A multivariable analysis was then performed to asses for potential cofounders: (1) the use of preoperative radiation and (2) the method of gastric pull up.

Results: *Search:* Out of 246 identified publications, 77 met the inclusion criteria: 1 prospective case series and 76 retrospective case series with a total of 2705 patients. *Statistical Results:* The time period of data collection for each study was significantly associated with mortality ($p < 0.0001$) and other complications ($p = 0.021$) but not with anastomotic complications ($p = 0.12$). The odds of mortality decreased by 37.2% per decade (95% CI = 28.0% to 45.3%), the relative risk of other complications decreased by 21.0% per decade (95% CI = 3.5% to 35.2%), and the odds of anastomotic complications decreases by 8.0% per decade (95% CI = -2.1% to 17.1%). Neither pre-operative radiation nor method of gastric pull up were significantly associated with mortality, anastomotic complications or other complications ($p > 0.05$ in all cases). The post-operative mortality for patients operated on 2000 (n=105) was 7.6%, and the rate of anastomotic complications was 27%.

Conclusions: The mortality and morbidity associated with gastric pull up reconstruction have declined significantly over the past 55 years. Nevertheless, the mortality and anastomotic complication rate for the past 15 years remain relatively high at 7.6% and 27% respectively.

P02 **Seo Young Kim,** Pediatric Surgery

Title: "Stat" surgery in children: expected vs. actual time to surgical intervention

Seo Young Kim, Sonia Butterworth, Division of Pediatric Surgery, Department of Surgery, University of British Columbia

Background: Emerging literature demonstrates that delays to operation for patients with acute surgical emergencies may contribute to potentially avoidable morbidity and mortality. There is a paucity of literature on delays to surgery for children requiring immediate surgical intervention. Stat, immediate, emergent, or Class 1 surgery terms are generally utilized to represent a patient requiring surgery within minutes (< 60 minutes) to avoid potential life, limb or organ loss. Our hypothesis was that delays due to operating room access and anaesthesia time would be common.

Objectives: To determine the performance of BCCH in meeting target OR times for Class 1 cases and analyse the effect of patient and service variables.

Methods: With REB approval, a retrospective review of the ORSOS (prospectively collected patient and operating room information) database was undertaken from June 15, 2011-June 15-2015 on all Class 1 surgeries at BCCH. Class 1indicates < 60 minutes. Data included patient demographics, diagnosis and procedure, as well as service, booking times, in-room times, incision times and case times. Patients were grouped by age: 0-28 days, >28 days-1year, 1-5 years, 5-12 years and >12 years. Descriptive statistics were used.

Results: There were 388 Class 1 cases during the study period. The majority of Class 1 cases were Neurosurgery and General Surgery, comprising 169 (48%) of total cases. Patients <1year of age represented 41% of all emergent cases. There were 154 cases (of 388) which had a recorded booking time, in room time, and incision time. Otolaryngology, Urology, and Cardiovascular services were most successful in having 81.0%, 68.1%, and 66.7% of cases meet the target in-room times

respectively. Median time from booking to OR was 55 minutes and median time to incision was 1 hour and 26 minutes. The longest wait times from booking to OR were for Ophthalmology cases and in patients aged 0-28 days. Mean anaesthesia time was 30 minutes, with the longest anaesthesia times in Neurosurgery (45 mins) and General Surgery (40 mins), as well as in the 0-28 days age group (42 mins).

Conclusions: In our institution, the majority of Class 1 cases were in infants and the minority of patients had complete recording of times. Neonates, General Surgical and Neurosurgical patients experienced the longest anaesthesia times. Ongoing assessment of Class 1 patients will be critical to ensure appropriate categorization of cases, as well as minimize delays to operative intervention for the most critically ill children.

P03 **Joshua Gurberg,** Otolaryngology

Title: Is a multi-site vestibular lesion more disabling than a single-site lesion?

Joshua Gurberg Warren Mullings, Gusta Van Zwieten, Neil Longridge, Art Mallinson, Juzer Kakal , and Desmond A. Nunez, Division of Otolaryngology, Department of Surgery, University of British Columbia

Background: Dizziness is a common complaint estimated to affect approximately 25% of adults. An oto-vestibular cause can be identified in 51% of cases presenting to a Neur-otology balance clinic.

Objective: To determine if patient reported and objectively measured balance disability correlates with the extent of the vestibular lesion.

Methods: Consecutive patients referred to our tertiary Neuro-otology clinic completed the dizziness handicap inventory (DHI) questionnaire and underwent Computed Dynamic Posturography (CDP), Videonystagmography (VNG), and Vestibular Evoked Myogenic Potential (VEMP) testing by a neurophysiologist blinded to the DHI score. Patients were stratified into those having unilateral single site or multi-site lesions. Intergroup differences in CDP and DHI scores were evaluated using the Student's T-test.

Results: 155 patients (49% female and 51% male with a mean age of 46) were analyzed. There were no statistically significant differences in mean composite CDP or DHI scores between patients with a single site lesion vs. a multi-site lesion with mean group CDP and DHI scores of 64 vs. 62 and 55 vs. 56, respectively.

Conclusion: Patients with single site or multi-site deficits do not differ in subjective (DHI) or objective (CDP) measures of vestibular dysfunction. This suggests that an isolated vestibular lesion is as incapacitating as a global one.

P04 **Greg Bodie,** General Surgery

Title: Impact of an enhanced recovery after surgery (ERAS) program on outcomes of patients undergoing colon resection

Greg Bodie, Garth Warnock, Adam Meneghetti, Kelly Mayson, Liam Stobart, Tracey Hong, Andrea Bisaillon, Neely Panton, Division of General Surgery, Department of Surgery, University of British Columbia

Background: The risk-adjusted reports from the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) demonstrated that patients undergoing colorectal surgery had a high odds ratio of postoperative morbidity. Evidence-based perioperative care pathways like ERAS offer the potential to reduce morbidity and hospital readmission. Our objective was to examine the impact of ERAS on postoperative occurrences and readmission rates in cohorts of general surgery patients who had colon resections at our hospital from 2011-2014.

Methods: Case-control study conducted by a team of nurses, anesthesiologists and surgeons in a tertiary academic center. Outcomes were compared for cohorts of 99 patients pre- (July 2011 to June 2013), and 270 patients post- (November 2013 to February 2015) implementation of ERAS. Patients in both cohorts were similar in age, sex, ASA class, comorbidity counts and laparoscopic versus open surgery. Data on postop occurrences was tracked using our institution's ACS NSQIP database of non-risk-adjusted outcomes. Results for each cohort were compared.

Results: Monthly audits of compliance with preop and intraop ERAS components showed rapid adoption with compliance more than 80% within 3 months but post-operative components were adopted more slowly over 18 months. Pre- versus post-implementation of ERAS had occurrence rates for overall morbidity of 27% vs 18%. Total surgical site infections 20% vs 14%; pneumonia 5% vs 4%; unplanned intubation 5% vs 3%; ventilator support over 48h 4% vs 1%; sepsis 6% vs 4%; venous thromboembolism 1.0% vs 0.7%; and ileus 0% vs 2.6%, respectively. Readmission within 30 days was 7% pre- and 11% post-implementation.

Conclusions: Implementation of an ERAS protocol in our hospital decreased the morbidity of surgery for patients who received colon resection, but readmission rates increased slightly.

P05 **Amin Javer,** Otolaryngology

Title: Antimicrobial photodynamic therapy for treatment of refractory chronic rhinosinusitis: A case series

Luis Macias-Valle, Andres Finkelstein-Kulka, Christopher Okpaleke , Jamil Manji, Fahad Alasousi, Amin Javer, Division of Otolaryngology, Department of Surgery, University of British Columbia

Background: Inflammation in refractory chronic rhinosinusitis (RCRS) is complicated by persistent microbial colonization resistant to medical treatment. Antimicrobial photodynamic therapy (aPDT) has been shown to be effective in eradicating in-vitro biofilms of CRS microbes and reducing mucosal inflammation. It is an emerging tool for treatment of recalcitrant CRS.

Objective: Our objective was to evaluate the safety and efficacy of aPDT in a cohort of our patients diagnosed with RCRS.

Methods: A retrospective case series was conducted at our centre. Patients with persistent inflammation and suspected chronic biofilm within the sinuses despite maximal medical and surgical treatment were treated with aPDT using a diode laser and methylene blue (as photosensitizer) on an outpatient basis. Patient outcomes were reviewed at 3 and 6 months post-aPDT. Endoscopic sinus scores and adverse events were recorded at each visit.

Results: Sixteen patients were recruited and treated with aPDT. Of these, 14 (13-females, 1-male) patients completed their follow-up visits. Forty-three sinuses were treated in the fourteen patients (Mean: 2.7 sinuses/patient/treatment). The average age of patients was 53.7 years. Nine of the fourteen patients treated showed improved endoscopic scores after 6 months. (Mean MLK Score difference ± SD: 1.81 ± 2.76). Three patients expressed minor and transient adverse events (slight bleeding, stinging sensation) immediately after the procedure and none at 3 and 6-months. The clinicians' experience with the procedure was satisfactory.

Conclusion: Patients with refractory CRS can be safely treated with aPDT on outpatient basis. These early results, while promising, will require validation in prospective clinical trials.

P06 **Daniel Mendelsohn,** Neurosurgery

Title: Clinical and radiographic predictors of successful and unsuccessful medical management of vertebral osteomyelitis

Daniel Mendelsohn, John Street, Michael Boyd, Scott Paquette, Brian Kwon, Charles Fisher, Marcel Dvorak, Division of Neurosurgery, Department of Surgery, University of British Columbia

Background: Spinal infections can lead to substantial morbidity including paralysis, spinal deformity, chronic pain and death from sepsis. In patients who are neurologically intact at the time of presentation, it is not clear which patients will go on to deteriorate neurologically and require surgery and who can be successfully managed medically alone. At present, the surgical management of vertebral osteomyelitis is based on the individual clinician's expertise and bedside assessment of the patient. High quality clinical studies on vertebral osteomyelitis are lacking, in part, due to the relatively low incidence of the disease.

Objectives: The purpose of this study was to review the Vancouver Spine Program's experience with vertebral osteomyelitis to identify clinical, laboratory and radiographic factors that predict the failure of medical management.

Methods: We identified patients admitted to the Vancouver General Hospital (VGH) with a diagnosis of vertebral osteomyelitis, epidural abscess or septic discitis between January 1, 2010 and March 31, 2013. Electronic medical records, paper charts and imaging investigations were retrospectively reviewed. Patients were classified into three groups: 1) initial surgical management, 2) successful medical management and, 3) failed medical management. Initial

surgical management was defined as the decision to perform an operative intervention occurred within 24 hours of clinical presentation to hospital. Patient demographics, comorbidities (Charlson Comorbidity Index), initial presenting symptoms, and select laboratory findings (C-Reactive Protein, leukocyte count) were reviewed. CT and MR imaging at the time of diagnosis and prior to surgical intervention were reviewed for infectious involvement of the vertebral body, disc space, pedicles, facets, and for spinal cord edema and spinal alignment parameters.
Results: We identified 150 patients with vertebral osteomyelitis admitted to VGH during the study period.

P07 **Paris-Ann Ingledew,** Radiation Oncology

Title: Closing the gap: the development of novel online oncology resources for undergraduate medical students

Paris-Ann Ingledew, Radiation Oncology, Department of Surgery, University of British Columbia

Purpose: The majority of practicing physicians will encounter cancer patients. However many physicians lack the proper training and confidence in basic cancer prevention and detection techniques. This is largely due to a deficit in oncology education in medical training programs. There is a recognized need to develop new teaching resources to support oncology undergraduate medical education. The purpose of this project is to develop online learning modules to enhance the basic oncology education for medical students.
Methods: Online learning resource development started in 2008 at UBC. The curriculum design framework of Kern and Tyler was utilized. This included a general literature review, targeted needs assessment and curriculum deliberation with the collaboration of an interdisciplinary team of experts. Website development and implementation followed. Implementation involved a team of medical students working alongside oncologists. Website development began in 2009 with scripting of tumor specific modules. In the following years, virtual patient experiences and additional modules were added. Kirkpatrick's evaluation framework has been used and the results have been used to modify the online materials.
Results: During the curricular design phase, a general and targeted needs assessment confirmed a deficit in oncology undergraduate education. The targeted needs assessment of 3rd and 4th year medical students, noted that 41% (76/186) of respondents had not interacted with cancer patients during their clerkship years and 62% (115/186) felt their knowledge of oncology was poor or fair in comparison to other subject areas. 80% (149/186) of students felt that online modules with case based learning would be helpful to supplement clinical experiences. A detailed analysis of the local medical school curriculum revealed that exposure to oncology was sporadic and discipline specific. The needs assessment provided critical information for the curriculum design work. 14 online learning modules, supplemented by 11 virtual patient cases were developed with repetitive cycles of implementation, evaluation and revision. In 2014, a mobile application was added to improve learner self-assessment. In 2015, 7 virtual whiteboard videos were added to enhance learning of basic oncology and common cancer types and PDF modules were produced to allow students to study the existing online modules in an offline format. These materials were designed to mirror the Canadian Oncology Goals and Objectives for Medical Students. Evaluation of the online tools and novel learning resources has been conducted throughout implementation. Evaluation data confirmed graduating learners have an improved knowledge of oncology and feel more prepared to interact with oncology patients. The online format allows students to study with flexibility and control.
Conclusion: This project has contributed to the systematic development of an online oncology curriculum. Evaluation data have demonstrated a positive impact on undergraduate medical education. By combining the resources developed by this project with others initiatives, there is the potential to enhance cancer delivery in the future. The next steps will include evaluation of the whiteboard videos and professional editing of the online resources. Greater integration of these resources into the medical school curriculum will generate more evaluation data which will be used to improve the resources.

P08 **Karan D'Souza,** Pediatric Surgery

Title: Stepping out of the shadow: investigating a teacher-learner contract for observerships in the clinical setting

Dan Cojocaru[1, 2], Karan D'Souza[1, 2], Vincent Ye[1, 2], Damian Duffy[2], Garth Warnock[1, 3], Geoffrey Blair[1, 2, 4]
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Background: Shadowing in the clinical setting is seen as an opportunity to expose students to the practice of surgery. These experiences are opportunities to observe the application of curricular concepts and motivate students to further explore prospective careers. However, negative experiences can thwart these goals and discourage students and surgeons. With vague objectives and unclear expectations in the current model, are we setting students and faculty up for unproductive shadowing experiences?
Objective: Our aim was to provide a structured objective-based framework for both faculty and students in the shadowing experience. We piloted a Teacher-Learner Contract (TLC) to test this concept and its utility in the shadowing context.
Methods: In this prospective pilot study 10 pre-clerkship medical students and 10 surgeons across three teaching hospitals were paired to test the framework within ward and OR settings. To ensure a genuine experience, participants were given autonomy to apply the TLC to their individual learning needs. Participants were then interviewed to collect qualitative feedback.
Results: Preliminary results indicate students perceived the TLC concept to provide a clearer structure, and the objectives to be applicable to their learning. Surgeons shared similar feedback but suggested the need for institutional support to accomplish broad-based adoption by staff.
Conclusions: The TLC is based on adult learning concepts wherein students and faculty are equally accountable in the learning process. This study indicates participants consider the TLC as a resource to structure and enhance experiential learning opportunities. Also, the concept is not confined to surgery and has broader applications in medical education.

P09 **Mohammadreza Pakyari,** Plastic Surgery

Title: In situ gel scaffold improves healing outcome in a full-thickness splinted skin wound healing model

Introduction: Burns and chronic wounds comprise nearly two-thirds of the advanced wound care sector, which amounts to nearly $20 billion worldwide. Rapid biological wound coverage can greatly benefit wound care, but as of yet, has failed to overcome key tissue engineering hurdles, such as preparation time, ease of use, and integration with the recipient tissue. Using previously approved polymers our goal was to establish a biomimetic network that could function with simple biochemistry in order to expedite the regulatory process, reduce treatment cost and easily gel within the wound. OUR HYPOTHESIS is that a hydrogel-containing scaffold will be able to rapidly integrate with the wound surface and provide a means in which transplanted cells can remodel the environment.
Methods: In-situ gelling scaffolds were fabricated by combining collagen with a pH-sensitive hydrogel. For most treatments, collagen scaffolds with and without hydrogels were compared against a solid support. Mice received a full thickness wound that was splinted to prevent contracture.
Results: In situ gelling scaffolds, containing hydrogels, were non-toxic, exhibited significantly faster fibril formation than controls ($p<0.05$). Hydrogel scaffolds demonstrated a greater mechanical strength, as well as resistance to contracture and degradation ($p<0.05$). Splinted wounds demonstrated a significantly faster time to wound closure over controls ($p<0.05$).
Conclusions: Collectively our data suggest that the hydrogel containing scaffolds showed to be a promising method to provide rapid, integrative wound coverage that may improve treatment outcome.

P10 **Louise Straatman**, Otolaryngology

Title: Magnetic targeting of stem cell therapy to the ear

Louise Straatman[1], Ronak Rahmanian[1], Cathie Garnis[1], Anat Yanai[2], Andrew Metcalf[2], Brian Westerberg[1], Kevin Gregory-Evans[2]
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Background: While cochlear implants (CI) can result in recovery of hearing in deaf patients, a key problem is limited sound quality and poor tonal perception. Cell-based therapies could be one approach to improving the quality of hearing obtained with CIs. Atraumatic cell delivery to the inner ear, however, remains a significant challenge. Magnetic targeting to neurological tissue, a novel technique pioneered by our group, could allow targeting of cells labeled with paramagnetic nanoparticles to the cochlea.

Objectives: The aims of this study were to develop a magnetized CI and to assess the *in vivo* efficacy of localization of magnetic stem cells to the device in a deafened rodent model.

Methods: Rodent mesenchymal stem cells were magnetized using paramagnetic nanoparticles. Migration of cells to the magnetized CI was first evaluated *in vitro*. *In vivo*, labeled cells were injected into the tail vein of a rodent with or without a unilaterally magnetized CI implanted in the inner ear. Histopathologic evaluation was utilized to assess localization of cells in the inner ear.

Results: In preliminary studies, we have developed a technique to magnetize CIs and demonstrated *in vitro* localization of cells to the device and *in vivo* improved cell localization to the magnetized CI implanted cochlea.

Conclusion: Preliminary results of this study demonstrate that magnetic targeting, using a magnetic CI, might enhance localization of stem cells to the inner ear.

P11 Laura Cook, General Surgery

Title: Functional heterogeneity of human memory CD4$^+$ T cells specific for C. Difficile toxins in patients with active disease

Laura Cook[1], May Q Wong[2], Megan K Levings[1] and Theodore S Steiner[2*]*equal contribution*
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Background: *Clostridium difficile* is a toxin-secreting bacteria that is the leading cause of nosocomial antibiotic-associated infectious diarrhea. Although *C. difficile* infection (CDI) can be readily treated with antibiotics, approximately 25% of patients relapse after treatment. The pathogenicity of CDI is known to require the activities of its toxins, TcdA and TcdB, but the T cell-mediated response to these toxins remains uncharacterized.

Methods: As a pilot study we collected blood from patients experiencing relapsing CDI, and from healthy volunteers with no history of CDI. CD4$^+$ T cell responses to the toxins were measured using a flow cytometry assay that identifies antigen-specific CD4$^+$ T cells by co-expression of CD25 and OX40 following 44h incubation with antigen. To define whether CDI infection polarized CD4$^+$ T cells into specific Th cell subsets, expression of CCR4, CXCR3, CCR6, and CD39 was measured on antigen-specific cells.

Results: T cell responses to TcdB were significantly higher in patients than controls (median 1.01% vs. 0.28%; $p = 0.041$) and were significantly higher than patient TcdA responses (median 1.01% vs. 0.10%; $p < 0.001$). Positive control (Pediacel) and TcdA T cell responses were not significantly different between patients and controls. TcdB-specific CD4$^+$ T cells were functionally heterogeneous, on average: 25% expressed the gut homing marker integrin β7; there was a 1:1 ratio of Tregs to T effectors; and T effectors contained Th1, Th2 and Th17 cells at a 1.5:1:3 ratio. Anti-TcdA/TcdB IgG antibody titres were not significantly different between patients and controls.

Conclusions: Our data indicate that anti-TcdB CD4$^+$ T cell responses are a more specific marker of disease than antibody titres. Tracking how toxin-specific CD4$^+$ T cell responses change following treatment and/or vaccination not only has the potential to predict relapse, it will also deliver insight into how human CD4$^+$ T cell memory develops in response to this prevalent bacterial pathogen.

P12 Thilo Speckmann, General Surgery

Title: Regulation of Npas4 expression and its role in prevention of tacrolimus-induced cytotoxicity in pancreatic beta-cells

Thilo Speckmann, Paul V. Sabatini, Cuilan Nian, and Francis C. Lynn, Diabetes Research Program, Child and Family Research Institute & the Department of Surgery and Department of Cellular and Physiological Sciences, University of British Columbia

Background: Pancreatic islets of Langerhans contain insulin-producing beta-cells. In patients with diabetes, the blood glucose lowering effects of insulin are lost due to relative or absolute deficiency in insulin. Replacement of lost beta-cells via islet transplantation is a promising therapeutic strategy, but limited by donor shortage and post-transplantation beta-cell death. Cytosolic calcium influx activates signalling pathways known to support beta-cell function and survival by modulating gene expression, and impaired calcium signalling leads to decreased beta-cell mass and diabetes. Npas4 is a calcium-dependent transcription factor whose expression is cytoprotective in beta-cells, but the signalling pathways coupling intracellular calcium to Npas4 induction are unknown.

Objective: Our goal was to understand the relevant calcium signalling pathways leading to Npas4 expression, and investigate the implications for beta-cell function and survival.

Results: Calcium-dependent Npas4 expression was examined using pharmacological inhibition of several calcium signalling pathways. These experiments implicated the calcineurin (CaN), protein kinase B (Akt) and calmodulin-dependent kinase II (CaMKII) signalling pathways in the regulation of Npas4 transcription and translation. We also observed high turnover rates of Npas4 mRNA and protein, and at the protein level degradation was mediated via the ubiquitin-proteasome pathway. Finally, Npas4 overexpression prevented beta-cell cytotoxicity of the CaN inhibitor tacrolimus.

Discussion: These results delineate the pathways regulating Npas4 expression and stability and demonstrate their importance for clinical areas such as islet transplantation. Particularly, they highlight Npas4 as a potential therapeutic modality to enhance post-transplant islet survival by overcoming the cytotoxic effects of tacrolimus, an immunosuppressant used for islet transplantation as described in the Edmonton protocol.

P13 Alysah Rasool, General Surgery

Title: Efficacy of a novel self-propelling hemostatic agent in head and neck bleeding using a sheep in vivo model

James Baylis MSc[1], Luis Macias-Valle MD[2], Andres Finkelstein-Kulka MD[2], Christopher Okpaleke MPH[2], Jamil Manji MSc[2], Salahaldin Al-Salihi MD[2], Amin Javer MD FRCSC FARS[2], Christian Kastrup PhD[1].1. Michael Smith Laboratories, University of British Columbia, Vancouver BC 2. St. Paul's Sinus Centre. Division of Otolaryngology Department of Surgery, University of British Columbia, Vancouver BC.

Introduction: Functional endoscopic sinus surgery (FESS) involves operating within a confined space bordered by vital structures such as the eyes and brain. One main obstacle in FESS is intraoperative bleeding which when magnified poses a potentially significant hindrance in the operating field. Propelled-thrombin, a self-propelling hemostatic agent, has been demonstrated to effectively halt arterial bleeding in mice.

Objective: This study aims to evaluate the efficacy and safety of propelled-thrombin in stopping bleeding in a sheep model of epistaxis and carotid injury.

Methods: Eleven sheep underwent minor endonasal and subsequent carotid surgery. The nasal mucosa of both sides was punched using a 45° Trucut forceps and the bleeding time measured after applying propelled-thrombin and plain gauze for 2 minutes. Propelled-thrombin, plain and Floseal gauzes were then applied to a carotid bleed under standardized pressure and assessed after 10 minutes for bleeding. Students' t-test was used to compare the means of bleeding time. The lungs, brain and heart were assessed for evidence of thromboembolism.

Results: There was a statistically significant difference in the mean bleeding times of propelled thrombin vs plain gauze (mean difference: 3.83-minutes, p-value=0.002). All of the carotid bleeds (100%) controlled with propelled-thrombin stopped after 10 minutes of application under pressure, compared to 33% of Floseal and 0% of plain gauze. There was a 1.5cm mean migration of propelled-thrombin from the carotid puncture site. There was no evidence of thromboembolism in the organs.

Conclusion: Propelling thrombin can potentially enhance its performance and efficacy in controlling hemorrhage in epistaxis and FESS.

P14 **Greg Bodie,** General Surgery

Title: Fluorescent cholangiography in laparoscopic cholecystectomy: the initial Canadian experience

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Background: Laparoscopic cholecystectomy is the most commonly performed general surgical procedure worldwide. Bile duct injury rates have not decreased despite increased rates and training with this procedure. Laparoscopic fluorescent cholangiography using Indocyanine Green (ICG) for real-time intraoperative near infrared (NIR) imaging of the extrahepatic biliary system has potential to help identify anatomy and may possibly decrease rates of inadvertent biliary injury. Here we present the initial Canadian experience with this technique.

Method: An objective analysis of NIR imaging during elective cholecystectomy in the Canada was performed. Patient demographics, intraoperative details, and subjective surgeon data were recorded. The primary endpoint was to identify real-time rates of cystic and common bile duct identification. Survey questions were obtained regarding the functionality, use, and perceived benefit of the technology.

Results: NIR imaging with ICG cholangiography was used in 12 initial cases. The average operative time was 80 +/- 31 minutes. The cystic duct, CBD, and CHD were visualized with NIR in 100%, 83%, and 50% of cases respectively. Use of fluorescent cholangiography incorporated smoothly into the operation in 83% of cases, and facilitated identification of anatomy in a majority of cases. There were no adverse reactions or complications related to the technology.

Conclusions: Fluorescent cholangiography allows for non-invasive real time visualization of the extra-hepatic biliary tree. This technology has not increased operative times and facilitates obtaining a critical view of safety. This technology has received positive feedback in this initial Canadian use and may be a durable adjunct for laparoscopic surgery.

P15 **Jerry Chen,** Vascular Surgery

Title: Venus stenting for lower extremity chronic venous occlusive disease: the Vancouver General Hospital experience

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Introduction: Endovenous stenting of proximal central veins (EndoVS) has become a viable and efficacious option for treatment of chronic venous occlusive disease of the lower extremity. We reviewed our initial experience with this procedure to assess results.

Methods: We undertook a retrospective chart review of all EndoVS performed by vascular surgeons at the Vancouver General Hospital between February 2013 and May 2015. Patient demographics, procedure details, complications, and follow-up data were collected from the patient's charts onto an Excel spreadsheet. Telephone interviews were conducted to assess symptom improvement and post-procedural pain.

Results: EndoVS was performed in 14 patients from February 2013 to May 2015. Twelve of the patients (85.7%) had a prior history of DVT. Two of these patients (14.3%) had recent DVT due to May-Thurner Syndrome. Preoperative CEAP classification was C3,4,5 or 6 in 3,5,3 and 3 patients, respectively. Thirteen patients (92.9%) had symptoms of venous claudication. All procedures were performed percutaneously in the operating room with mobile fluoroscopy, duplex ultrasound and IVUS guidance. Four patients had complete occlusion of the IVC requiring recanalization and IVC stenting. Post-procedure, twelve patients (85.7%) had clinical improvement in their symptoms. Four patients (28.6%) had significant pain attributable to the procedure. None of the patients had worsening of their symptoms. Complications include one case of proximal stent migration requiring piecemeal retrieval of the misplaced stent endovenously.

Conclusion: Our initial experience with EndoVS is favorable with clinical improvement in the majority of patients. Long-term follow up is required to properly assess the durability of these procedures.

P16 **Jonathan Misskey,** Vascular Surgery

Title: A comparison of RUDI and DRIL for the management of severe access-related hand ischemia

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† Principle Investigator

Background: Access-related hand ischemia (ARHI) is an uncommon but potentially limb threatening complication of arteriovenous access for dialysis. Both the distal revascularization-interval ligation (DRIL) and revision using distal inflow (RUDI) procedures allow treatment of ischemic symptoms while maintaining fistula patency. Although the DRIL has demonstrated excellent outcomes in the reported literature, experience with the RUDI for ARHI remains preliminary.

Objective: We compared outcomes in RUDI and DRIL with respect to cumulative patency, resolution of symptoms and patient survival.

Methods: All patients with severe (SVS grade 3) ARHI following autogenous arteriovenous fistula construction at two hospitals between 2005 and 2015 were identified using a large, prospectively maintained database.

Results: A total of 58 of 2035 autogenous accesses (2.8%) developed grade 3 ARHI. Of this cohort, 20 patients underwent RUDI and 21 had a DRIL. The indication for intervention was tissue loss (61%) or ischemic rest pain (39%). Most patients had diabetes (85.3%), symptomatic peripheral arterial disease (63.4%), and mean DBI was 0.25 +/-0.12. There were no preoperative differences in patient comorbidities between the RUDI and DRIL cohorts. 12-month primary patency (60% vs. 67.7%; p = 0.658) and secondary patency (85% vs. 90.5%; p = 0.592) were similar between groups. 3 year primary patency (55% vs. 52.4%; p = 0.867) and secondary patency (80% vs. 90.5%; p = 0.343) also showed no significant difference. Resolution of ischemic symptoms, including resolution or improvement in pain or healing of ischemic ulcers or amputations, occurred in 90% with RUDI and 81% with DRIL (p = 0.131). Survival for the RUDI and DRIL groups at 1 year was 85% vs. 85.7% (P=0.948) and 57.9% vs. 49.2% (p = 0.278) at 3 years.

Conclusions: The RUDI demonstrates equivalent patency, symptom resolution and survival compared to the standard DRIL procedure for the treatment of severe ARHI. Further investigation is necessary to define the long-term outcomes of these procedures.

P17 **Chi (Lisa) Jin,** Otolaryngology

Title: Assessment and comparison of vaccination status in pediatric cochlear implant patients: a 10 year retrospective review

Chi (Lisa) Jin, Paula Téllez, Daphne Lu, Neil K. Chadha, Julie Pauwels, Simon Dobson, Frederick K. Kozak, Division of Pediatric Otolaryngology, Head and Neck Surgery

Background: The reported incidence of infections, such as meningitis, in pediatric cochlear implant (CI) patients is up to 30 times higher than the general public. Ensuring age-appropriate vaccinations in these children is critical in harm-reduction. A previous review of the vaccination records of CI recipients at BC Children's Hospital (BCCH) from 2002-2007 revealed that 67% of children were not up-to-date at the time of their surgery, putting these children at unnecessary risk. In 2008, the Cochlear Implant Team at BCCH began working with an Infectious Diseases Specialist to address the poor rate of vaccinations in these patients. This study reviews the current rate of vaccinations in CI patients since this change was implemented and investigates further barriers that exist in ensuring CI patients are appropriately vaccinated post-surgery.

Objectives: The objectives of this study were to gather clinical data regarding the vaccination status in pediatric patients who received CIs over the last 5 years (2010-2014), compare these vaccination rates to those of the previous 5 years (2002-2007) and gain a better understanding of the current barriers to CI patient vaccination compliance.

Methods: This study consisted of a retrospective chart review and a telephone survey. Medical charts of 116 patients were reviewed including their vaccination history. Telephone surveys were administered to the parents of patients who required additional vaccines after their CI (n=48) to obtain current patient vaccination status and, if applicable, reasons for non-compliance.

Results: In 2010-2014, 88% of patients were up to date at the time of surgery, whereas 67% of patients were up to date at the time of surgery in the previous review (a 31% increase). 26 patients (54%) have completed the survey thus far and 38% of these patients did not receive the necessary vaccinations post-surgery. Pneumovax-23, a vaccine specifically for high-risk patients, was the most pertinent vaccine missed in 9 out of 10 cases. Because parents followed the childhood vaccination guidelines for the general public, they were unaware that their child was missing vaccination(s) to remain appropriately up to date.

Conclusion: Pre-operative vaccinations improved after administrative changes were made in 2008, however 12% of pediatric CI patients were still not appropriately vaccinated at the time of surgery. More alarmingly, a large proportion of patients requiring vaccinations after surgery did not receive them. A communication gap continues to exist between the CI team, patient families and public health. Parents and public health are unaware that their child falls under the high-risk vaccination schedule, leading to children missing critical vaccines. Possible solutions to bridge this communication gap include providing families with updated high risk vaccination schedules post-surgery, sending families reminder notifications, and notifying public health of the patient's high risk status.

P18 **Kristin DeGirolamo,** General Surgery

Title: **The impact of the acute care surgery service model in comparison to the traditional model: a systematic review**

Kristin DeGirolamo[1, 2], Karan D'Souza[2], Jacques Zhang[2], Syed Morad Hameed[1, 2] [1] Division of General Surgery, Department of Surgery, University of British Columbia, Vancouver, Canada, [2] Faculty of Medicine, University of British Columbia

Background: In recent years, the significant workload, high acuity and complexity of emergency general surgery conditions has led to hospitals around North America replacing the traditional on-call model in favour of a dedicated acute care surgery (ACS) model. The potential of an ACS model to improve the organization and efficiency of the service has led to rapid adoption.

Objective: Several studies have been completed to compare the two models and our objective was to perform a broad systematic review to determine the services' impact on patient outcomes and administrative decision-making factors.

Methods: A systematic, English-language search of Ovid, EMBASE and MEDLINE was conducted. From the 245 papers yielded from the search, 4 independent reviewers identified 22 studies that matched the purpose of the systematic review. An evidence-based practice for improving quality (EPIQ) method described by the International Liaison Committee on Resuscitation (ILCOR) was then used to score the quality, level of evidence, and relevance to the objectives.

Results: Studies evaluating patient outcomes demonstrated strong trends suggesting that the ACS model reduced length of stay (8 of 9 studies), reduced number of operations at night (5 of 6 studies) and improved timeliness of care. Additionally, of the 8 studies assessing on complications rates (e.g. surgical site infections and intraabdominal abscesses), all reported significant decreases or no change.

As the service model gains popularity, a few studies piloted educational models to see the impact of an ACS specific curriculum on trainees. The evidence suggests that with appropriate supervision and guidance, patient outcomes are not adversely affected. Lastly, as more hospital administrations weight the importance of the financial implications of the ACS model, it is worthy noting that several studies illustrate decreased hospital costs, and improved net revenues and cost-effectiveness.

Conclusions: The ACS model has been implemented in hospitals globally, and has been shown to provide a safer surgical experience by improving patient outcomes, administrative costs, and trainee learning. However, the type structure of the model and the case mix of each hospital have varying levels of impact from a patient quality, financial and educational perspective. Hence, hospitals need to access how best to implement an appropriate ACS model for their specific site.

P19 **Carla Pajak,** General Surgery

Title: **Early operative management of acute cholecystitis: clinical audit and algorithm**

Dr. Carla Pajak[1], Sharmen Lee[2] and Dr. Scott Cowie[3] 1. University of British Columbia, Department of General Surgery 2. Strategyst Healthcare Corporation 3. Head, Langely Memorial Hospital, Division of General Surgery

Introduction: Significant research has convincingly shown that early laparoscopic cholecystectomy (LC) within 24-72 hrs is safe, has similar rates of conversion to open and a reduced duration of hospital stay, when compared to delayed LC. Early LC's (within 2 days of presentation) also have the best outcomes and lowest costs. Furthermore delaying LCs may be associated with more complications, higher mortality and costs.

Methodology: An online voluntary survey was conducted of all Fraser Health Authority (FHA) general surgeons in order to assess current practice patterns and challenges. This data was then compared to a retrospective database audit of 1,329 patients within the FHA admitted with a diagnosis of acute cholecystitis.

Results: The survey and audit revealed that many patients within the FHA are not receiving early LC's despite most surgeons recognizing this as standard of care.

Conclusions: Based on this, an algorithm has been created to standardize the initial management of acute cholecystitis and aim to provide all patients with timely (<48hrs) access to surgery. This will be piloted at two sites with prospective auditing of outcomes.

P20 **Benjamin Maas,** Radiation Oncology

Title: **Isolated axillary node breast cancer without breast primary: BC cohort and matched controls**

Maas B, Davidson JA, Tyldesley S, Speers C, Woods R, Chia S

. **Background:** Patients presenting with isolated axillary metastatic breast carcinoma represent a potentially curable subset of patients. Management of axillary involvement in the absence of a detectable breast primary is guided by small retrospective reports. These vary widely with respect to the information collected, span a large time period during which diagnostic and therapeutic options have advanced considerably, and are largely without a contemporary control group.

Methods: The British Columbia Breast Cancer Outcomes Unit (BCOU) database was searched to identify patients referred to the British Columbia Cancer Agency with a new diagnosis of isolated axillary metastatic cancer diagnosed between 2000 and 2005. Eligible patients were female, had pathological evidence of lymph node (LN) involvement but no evidence of a primary tumor or distant metastases on clinical workup. A series of control patients, with pathological T1 tumors and N1 involvement at presentation were selected from the BCOU database matched 3:1 for age, diagnosis year, tumor characteristics (histology, estrogen receptor status, HER2 status, and number of affected lymph nodes), and systemic treatment characteristics (adjuvant chemotherapy and/or endocrine therapy).

Results: 36 patients were identified to form the primary axillary cohort. The controls consisted of 1,406 patients, of whom 106 were matched for the above characteristics. Patients in the primary axillary cohort were fairly well-distributed among all diagnosis years, and all tumors exhibited ductal histology. 26 (72%) were estrogen receptor-positive and 8 (22%) were known to be HER2-positive. 9 (25%) patients underwent mastectomy. 33 (92%) patients received radiation therapy and 19 (53%) did not undergo any breast surgery. With a median follow-up of 5.2 and 5.4 years for the primary axillary cohort and the matched controls, the BCSS was 93% and 88% respectively. There were no locoregional recurrences documented in the primary axillary cohort.

Conclusions: This study represents one of the larger contemporary case control series of isolated axillary nodal presentations, demonstrating a good prognosis for this cohort of patients despite approximately half of the patients not having primary breast surgery.

Simultaneous Session A

A01 **Michal Aharoni-Simon,** General Surgery

Title: Anti-apoptotic Bcl-2 regulates redox-balance and autophagy in pancreatic beta-cells

Michal Aharoni-Simon, Rose Shumiatcher, Anthony Yeung, Alexis Z.L Shih and Dan S. Luciani, University of British Columbia, Child & Family Research Institute, Vancouver, Canada

Background: Elevated levels of reactive oxygen species (ROS) induced by excess nutrients or after islet transplantation promote oxidative stress, failure and death of insulin-secreting pancreatic beta cells. However, ROS and redox-balance also regulate the physiological response of beta-cells to glucose, but the mechanisms are unclear. During cellular stress autophagy is often activated as an adaptive response to restore homeostasis, but little is known about how autophagy is regulated in beta-cells.

Hypothesis: We recently demonstrated that the anti-apoptotic proteins Bcl-2 and Bcl-xL suppress beta-cell glucose signaling and insulin secretion. We hypothesize that the roles of Bcl-2 extend to the control of beta-cell redox-balance and autophagy.

Methods: Mouse islet cells and MIN6 cells were exposed to Bcl-2/Bcl-xL antagonist Compound 6 and the Bcl-2-specific antagonist ABT-199. We used flow cytometry to measure ROS levels, western blot to evaluate induction of autophagy and apoptosis, Seahorse XFe96 analyzer to study mitochondrial respiration and live-cell imaging to monitor cytosolic Ca2+. The antioxidant N-Acetyl-L-Cysteine (NAC) was used to evaluate the contributions of ROS, and Cyclosporine A (CsA) to inhibit the mitochondrial permeability transition pore.

Results: Both acute glucose stimulation and inhibition of Bcl-2 transiently decreased superoxide levels and progressively increased peroxides in beta-cells. Further, Bcl inhibition rapidly stimulated islet SOD activity and induced a NAC- and CsA-sensitive mitochondrial proton leak, which likely contribute to Bcl-2-regulated ROS signaling. Acutely, inhibitor-induced increase in peroxides promoted Ca2+ influx, while under prolonged Bcl inhibition, it mediated beta cell apoptosis. We further found that Bcl inhibition induced autophagic flux in MIN6 cells, mouse islets and human islets. Of note, the inhibitor-induced induction of autophagy was also prevented by the NAC, revealing a striking requirement for ROS in the activation of these acute Bcl-2-regulated processes. Finally, we have established a line of beta-cell-specific Bcl-2 knockout mice. Initial results show that islets from these mice have increased expression of antioxidant genes relative to islets from wild-type littermates, implicating Bcl-2 in beta-cell redox control under chronic conditions as well.

Discussion: Our data reveal novel roles for anti-apoptotic Bcl-2 in the beta-cell, and indicate Bcl-2 is a molecular link between beta-cell mitochondrial physiology, redox state, autophagy and apoptosis. These findings suggest Bcl-2 may be important for the ability of beta-cells to adapt to stress in the pre-diabetic state or following islet transplantation.

A02 **Luis Macias-Valle,** Otolaryngology

Title: Evaluation of sheep sinonasal endoscopic anatomy as a model for rhinologic research

Luis Macias-Valle MD, Andres Finkelstein-Kulka MD, Christopher Okpaleke MPH, Jamil Manji MSc, Salahaldin Abdulrahman MD, Fahad Alasousi MD, Amin Javer MD FRCSC FARS
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Background: There is a constant search for adequate animal models in functional endoscopic sinus surgery (FESS) research. Despite many publications describing sheep models for FESS procedures, accurate endoscopic anatomical studies are lacking. Furthermore, there are no publications correlating computed tomography (CT) and 3D models with endoscopic anatomical descriptions.

Objective: This study aims to evaluate and accurately describe the endoscopic anatomy of a live sheep model.

Methods: 10 live adult sheep were included in the study for a total of 20 sides. Two Cadaveric specimens for 3D reconstruction correlation were included and imaged using thin slice (1mm) CT. Description and measurement of different anatomical structures was performed using endoscopic visualization. Measurement of the same structures was also carried out using the 3D imaging model.

Results: Numerous structures were observed and measured during the cadaveric and live model dissection. Three sets of turbinates were identified at 2.3, 5.1 and 8.5 cm (SD 0.4, 0.8, 1.1). Frontal recess and uncinate process were identified at 12.7 cm (SD 1.3). A natural septal perforation was encountered at 10.5cm (SD 1.8). The sphenopalatine foramen was measured at 12.1 cm. All anatomical measurements were correlated with the measurements on the CT scan 3D volume-rendering model, thereby allowing for an accurate description of the sheep sinonasal anatomy.

Conclusion: This study describes the endoscopic sinonasal anatomical measurements of the adult sheep. It is the first study to evaluate the sheep CT and endoscopic anatomy in order to determine its feasibility as an animal model for research in FESS.

A03 **Oleksandr Butskiy**, Otolaryngology

Title: Pharyngoesophageal reconstruction, revisiting the gastric pull up: systematic review and meta-analysis

Oleksandr Butskiy, BSc, MD, Ronak Rahmanian, BSc, MD, Richard A White, BSc, MSc, Eitan Prisman, MD, FRCSC, University of British Columbia

Background: The Rinne test is used to detect conductive hearing loss during an otologic assessment. The traditional teaching on performing the Rinne test stresses the importance of placing the tuning fork tines in parallel orientation to the ear canal during air conduction testing. In comparison to perpendicular orientation of the tines, placement of the tines parallel to the ear canal is thought to increase sound intensity at the level of the tympanic membrane. This claim has not been tested experimentally.

Hypothesis: We hypothesized that during the Rinne test, the amplitude of sound is the same when the tuning fork is placed parallel as when it is placed perpendicular to the ear canal.

Methods: Using a head and torso mannequin mounted with a sound meter, three testers simulated the Rinne test. Each of the three testers activated 512Hz and 256Hz tuning forks 100 times: 50 placements parallel and 50 placements perpendicular to the ear canal. The results were combined and amplitudes of fundamental and the dominant non-fundamental frequencies were compared statistically.

Results: The 512Hz tuning fork tests showed that placement of the tuning fork parallel to the ear canal as opposed to perpendicular was louder by 2.5dB (±0.59, $p<0.0001$) for the fundamental frequency (512Hz), and by 4.94dB (±0. 93dB, $p<0.0001$) and 3.70dB (±1.05dB, $p<0.0001$) for the two non-fundamental frequencies of the fork (1kHz and 3.15kHz respectively). The 256Hz fork tests showed a 0.05 dB difference in the amplitude of the fundamental frequency between the two positions of the fork. This difference was not statistically significant ($p=0.913$). The amplitude of the dominant non-fundamental frequency (500Hz) produced by the 256Hz fork was 3.2dB (±0.77dB, $p<0.0001$) louder with the placement of tuning fork parallel to the ear canal.

Conclusions: When testing air conduction of sound with the Rinne test, placement of the tuning fork tines parallel to the ear canal produces a louder sound at the level of the tympanic membrane than placement of the tuning fork perpendicular to the ear canal. The difference in amplitude is on the order of a few decibels and varies across the spectrum of fundamental and non-fundamental frequencies produced by different tuning forks. The findings of this study support the traditional teaching on placing the tines of the tuning fork parallel to the ear canal during the Rinne test.

A04 **Franco Cavaleri,** General Surgery

Title: Inhibition of NF-kB p65-p50 transactivation by Curcumin involves a novel complex comprehensive mechanism.

Franco Cavaleri1 and William Jia2, 1. Department of Experimental Medicine, 2. Division of Neurosurgery, Department of Surgery, University of British Columbia

Abstract: The NFkappaB (NFkB) family member p65-p50 complex, is a transcription factor that plays a central role in the mediation of inflammation and immune system activity. Activation of NFkB involves a cascade of reactions including dissociation of the p65-50 complex with its inhibitor IKappaB, phosphorylation of p65 at various sites, nuclear translocation of p65 and binding of the p65-p50 heterodimer to the NFkB response elements of a number of

genes to transcriptionally stimulate the expression of those target genes. Curcumin is a widely used natural extract of Turmeric that is known for its anti-inflammatory activity demonstrated by many previous studies. The curcumin extract is comprised of three naturally occurring curcuminoid analogues: curcumin I (diferuloylmethane), curcumin II (demethoxycurcumin) and curcumin III (bisdemthoxycurcumin). While curcumin has been shown to mildly inhibit p65-p50 nuclear translocation in LPS stimulated cells in previous studies as a mechanism of the anti-inflammatory pharmacology, the distinct functions of the individual curcuminoids comprising the curcumin extract have not been studied in the framework of this NFkB inhibition or other targets to elucidate how they may each be contributing to the pharmacology. In the present study, we showed that all three inherent curcuminoid analogues inhibited p65 phosphorylation of serine276 with similar potencies. This serine residue of the protein's Transactivation Domain is central to the transcription factor's transactivation. Furthermore, we have identified that individual curcuminoids may also differentially act on other subcellular proteins, in particular nuclear kinases, involved in p65-p50 transactivation and inflammation pathway regulation. Our results demonstrate a more selective targeting of regulatory proteins other than NFkB by some of the naturally occurring curcuminoid analogues and not all of them in the curcumin extract which as a group induce a complex synergistic polypharmacology on NFkB regulation not discovered before.

A05 **Stephano Chang,** Neurosurgery

Title: Timing of incidence and recovery of delayed facial palsy after vestibular schwannoma resection: insight into mechanisms

Dr. Stephano Chang, Dr. Ryojo Akagami, Division of Neurosurgery, Department of Surgery, University of British Columbia

Background: Preservation of facial nerve function during resection of vestibular schwannomas (VS) remains a primary goal of surgery, with a significant impact on patient quality of life. Delayed facial palsy (DFP) is described as noticeable worsening of facial nerve function after an initially normal post-operative result, though many different specific definitions are used in the literature. Several mechanisms have been postulated, including post-surgical edema, compression at the meatal foramen, vasospasm and ischemia, mechanical traction and heat or vibration injury, and viral reactivation, although none explains all of the major features.

Objective: The aim of this study was to retrospectively review our institution's series of VS resections to evaluate the timing of DFP onset and recovery, and to test our hypothesis that later onset DFP patients do better than patients who exhibit facial palsy immediately or in the early post-operative period.

Methods: 403 consecutive cases of VS resection taking place between Nov 2001 and Jun 2015 were identified and retrospectively reviewed. Patients with any pre-operative facial palsy were excluded from our study. Patients who developed significant facial palsy (House-Brackmann (HB) grade ≥ 3) post-operatively were categorized into three groups based on the timing of onset: immediate facial palsy (IFP), "early-onset" DFP (on post-operative day 2 or prior), and "late-onset" DFP (on post-operative day 3 or later). Furthermore, IFP patients were subdivided by the severity of their weakness into "minor" (HB grade 3) and "major" (HB grade ≥ 4) groups. These four facial palsy subgroups were compared with respect to patient age and sex, surgical approach, tumour size and laterality, intraoperative neurophysiological monitoring, hearing preservation, and time-course of recovery.

Results: Of the 385 cases of VS resection meeting inclusion criteria, 6.8% developed minor IFP, 4.9% major IFP, 2.6% early-onset DFP, and 5.7% late-onset DFP, with 80.0% not exhibiting any significant weakness post-operatively. The late-onset DFP group demonstrated the quickest recovery to HB grade 1 or 2 (3.0 weeks), followed by the minor IFP group (8.5 weeks), then the early-onset DFP group (40.8 weeks), and with the major IFP group exhibiting the poorest recovery with only 21% of patients recovering to HB grade 1 or 2 within one year of onset.

Conclusion: An examination of the time-course of recovery in the different facial palsy subgroups in this study suggests that early-onset and late-onset DFP likely involve different pathophysiological mechanisms. Based on the uniformly complete and extremely rapid recovery seen in late-onset DFP, we propose that apoptosis of facial nerve Schwann cells after surgery results in delayed demyelination and dysfunction of the facial nerve, and best explains the subsequent rapid recovery seen in these late onset DFP patients.

A06 **Jennifer Culig,** Vascular Surgery

Title: Vascular surgery globalized education: the resident exchange program experience

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Background: There has been increasing interest for interinstitutional and international cooperation in surgical training and practice. We highlight the feasibility and effectiveness of an international surgical training exchange program in enhancing resident practical skills, education and management of rare pathologies, involvement in international research and understanding of differing health care systems.

Methods: An international student exchange program was organized between the Department of Vascular Surgery of University of British Colombia and the Vascular Surgery program affiliated with Universidad Nacional de Colombia. This was the first international resident exchange for the UBC Vascular Surgery Department and first time establishing working connections with Bogota, Colombia. The individual participant experiences and feedback of the program are presented.

Results: The experiences of the first resident of UBC Vascular Surgery residency global exchange program are described. Residency exchange between Colombia and Canada presented a wide variety of cultural and clinical education. The exchange provided valuable experiences for both staff and residents involved. Common vascular clinical and surgical skills were honed as well as first hand clinical and surgical experience in rare pathologies such as carotid body tumors. Global exchange presented international research opportunity and opportunity to attend and present at Colombian Vascular academic meetings.

Conclusions: Academic surgical international resident exchange programs provide valuable cultural and clinical education. The exchange program forges a lasting relationship among countries and is an excellent forum for continuing contact and communication between programs.

A07 **Zahid Delwar,** Neurosurgery

Title: Tumor specific triple regulated oncolytic herpes amplicon virus to specifically target glioma cells

Zahid Delwar[1,2,3], Guoyu Liu[2,3], Yvonne Kuo[3,4], Cleo Lee[3], Luke Bu[2,3], William W. Jia[2,3]

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Background: Oncolytic herpes simplex virus type 1 (oHSV-1) therapy is an emerging treatment modality that selectively destroys cancers, including conventional therapy resistant tumors like glioblastoma multiforme (GBM).

Objective: The aim of the present study was to develop a highly glioma specific oHSV-1 (SU4-124) to selectively target tumor cells.

Methods: To achieve transcriptional regulation of the SU4-124 virus, the promoter for HSV-1 essential gene ICP4 was replaced with a tumor specific survivin promoter. Translational regulation was achieved by incorporating 5 copies of microRNA 124 target sequence in the 3'UTR of the ICP4 gene. Another translational regulation was imposed by adding a 5'UTR of rat fibroblast growth factor -2 in the viral ICP4 gene.

Results: Our results confirmed the significantly enhanced expression of survivin and eif4E in different glioma cells and upregulated micro-RNA 124 expressions in normal human and mouse brain tissue. Here, we observed increased ICP4 protein expression and virus replication in different glioma cells compared to normal neuronal cells. Furthermore, SU4-124 provides strong antitumor effect against a panel of glioma cell lines. Intracranial injection of 2.8X10^5 plaque forming unit (PFU) of SU4-124 did not show any sign of toxicity at day 15 post viral injection. Moreover, significantly enhanced antitumor effect of intratumorally injected SU4-124 virus was demonstrated in mice bearing human glioma U87 tumors, whereas viral DNA was almost undetectable in normal organs such as the brain, liver & stomach.

Conclusions: Our study indicates that incorporation of multiple cancer specific regulations in an oHSV-1 system significantly enhances cancer specificity & efficacy.

A08 Karan D'Souza, Pediatric Surgery

Title: Students as future educational leaders in the fevelopment of learning resources: an Undergraduate surgical curriculum initiative

Karan D'Souza[1, 2], Dan Cojocaru[1, 2], Damian Duffy[2], Geoffrey Blair[1, 2, 3]
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Background: Can the current didactic teaching model be improved through supportive educational tools beyond the lecture theatre? Instead of presenting material one-dimensionally, the 'Cutting Classes' project was initiated to investigate alternative teaching methodologies to provide content for 3rd-year surgical clerks.

Purpose: The purpose was to have students work with faculty, educational facilitators, and peers to develop foundational competency-based multimodal tools.

Methods: Two second year medical students focused on a set of core surgical competencies identified by the Director of Undergraduate Surgical Education that required additional emphasis and resources. The students conducted a focus group with 4 current clerks, and met with faculty and subject matter experts to determine the content and modalities that would lead to a high-value and engaging module.

Results: Feedback from third year clerks included the need for flexible learning through a variety of modalities, a focus on the approach to diagnosis and treatment rather than disease specific details, and priming clinical lectures with appropriate physiology and basic science. Faculty emphasized teaching concise concepts, clinical reasoning, and greater but effective use of visuals. The medical students used this qualitative data to develop practical and useable educational resources in the form of video podcasts and reference sheets for surgical objectives on Chest Trauma.

Conclusions: Engaging the key stakeholders in the learning process prior to developing curricular tools ensures high value and usability for clerks. Additionally, involving medical students as educational leaders in the development of such tools allows them to not only shape their own education, but to enhance the learning of their future colleagues.

A09 **Ali Farrokhi,** Plastic Surgery

Title: Comparison of three methods for decellularization of mouse skin and evaluating the outcome after transplantation in full thickness skin wound in mouse model

Ali Farrokhi, Mohammadreza Pakyari, Layla Nabai, Ryan Hartwell, Reza Jalili, Aziz Ghahary, Professional Firefighters' Burn & Wound Healing Research Laboratory, Department of Surgery, University of British Columbia

Introduction: Acute and chronic wounds affect millions of people around the world. Approximately 11 million people are affected by acute wounds with 300,000 yearly hospitalizations in the United States. The most common cause of acute wounds is thermal injury or burn. Additionally, 1-2% of the population in developed countries will experience non-healing chronic wounds such as diabetic, pressure, and venous ulcers in their l

Covering the skin defects is essential for wound healing regardless of wound types. Any delay in coverage can lead to hypothermia, electrolyte imbalance, fibrotic scarring and sepsis. As such, the main goals of wound treatment strategies are to achieve a rapid closure of the lesion and a functional and aesthetic scar. An ideal skin substitute should be non-immunogenic, permissive to migration of host cells for subsequent dermal remodeling and capable of neovascularization. Numerous strategies for skin coverage have been investigated. Among these, extracellular matrix-based biomaterials have many inherent advantages over synthetic polymer materials. These protein-based materials have significant mechanical strength and retained biological activity. Acellularized dermal matrix (ADM) has been used as a temporary wound covering for partial and full thickness burn wounds.

Objectives: The primary objective of this study was to characterize the ADM prepared by three methods of decellularization to determine the most effective method i.e., the treatment that removes all cellular components without significantly affecting the composition, mechanical integrity and biological activity of the remaining extracellular matrix (ECM) molecules. Although there are several methods published for decellularization of the skin, the literature lacks high quality in vivo evidences for comparing these methods. Thus, as secondary objective, we evaluated the outcome of using these ADM for transplantation in full thickness skin wound in a mouse model.

Methods: In this study, we used ionic and non-ionic detergent as well as detergent free methods for decellularization of mouse skin. In series of in vitro and in vivo studies, skin samples were evaluated for efficacy of removal of cellular content, biomechanical property and the effect on maintenance of several ECM components including basement membrane proteins. For each method, allogenic skin transplantation on full thickness wound mouse model was performed and immunogenic response to ADM, neovascularization and migration of host cells to scaffold were investigated at different time points.

Results: All three decellularization methods produced ADM scaffolds that were immunologically inert and could support fibroblast cell growth and migration upon recellularization. However, each ADM was distinct from both structural and biomechanical perspectives. Even though they had the same amount of collagen content based on hydroxyproline assay, other ECM components like Elastin and glycosaminoglycans were different. The results from the in vivo study showed accelerated wound healing with different rate of wound contraction after three weeks of transplantation.

Conclusion: Our results emphasize on the importance of the decellularization protocol for producing skin ECM scaffolds and suggest considering both *in vitro* and *in vivo* outcomes for evaluating the ADM quality.

A10 **Amandeep Ghuman,** General Surgery

Title: Surgical site infection rates following implementation of a colorectal closure bundle in elective colorectal surgeries

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**Colorectal Surgeon, Department of Surgery, Division of General Surgery, St. Paul's Hospital*

Background: Surgical site infections of up to 27% are reported for colorectal surgery. Care bundles were introduced to decrease surgical site infection rates, but are variable in composition.

Objective: To determine whether the addition of a "Colorectal Closure Bundle" in our Enhanced Recovery After Surgery pathway decreased surgical site infection rates.

Methods: Design - Retrospective study of elective colon resections pre and post addition of closure bundle at a single academic institution. Patients - Consecutive elective colon resections with primary anastomosis, December 2012 to July 31, 2014, enrolled in our Enhanced Recovery After Surgery pathway. Exclusion criteria were stoma creation and closure, and pre-operative chemoradiation. Intervention - Addition of "Colorectal Closure Bundle" which includes a change in gown and gloves, re-draping, wound lavage and new set of instruments for closure. Main Outcome Measure - Surgical site infections as defined by CDC criteria.

Results: 205 patients were reviewed, 111 pre-intervention and 94 post-intervention. Overall surgical site infection rates were 25.2% pre-intervention vs. 26.6% post-intervention (p=0.82). Surgical site infections were sub-divided into "superficial" and "deep and organ space" and were 14.4% and 10.8% pre-intervention vs. 14.9% and 11.7% post-intervention (p=NS). Smoking and diabetes were found to be independently associated with surgical site infections on multivariate analysis, with adjusted odds ratios of 4.32 [95% CI 1.70, 10.94], p=0.002, and 2.87 [95% CI 1.30, 6.34], p=0.009, respectively.

Conclusions: There was no change in surgical site infection rates after implementation of the "Colorectal Closure Bundle". Smoking and diabetes were the only significant risk factors associated with increased surgical site infections. Our infection rates remain high and further change in our perioperative protocol is needed.

A11 **Joshua Giambattista,** Radiation Oncology

Title: Magnitude and timing of GTV response to neoadjuvant chemotherapy and concurrent chemo-radiation in the treatment of locally advanced Nasopharyngeal Carcinoma

Joshua Giambattista, Eric Berthelet, Division of Radiation Oncology, Department of Surgery, University of British Columbia

Introduction: Curative radiotherapy for locally advanced nasopharyngeal carcinoma (NPC) is based on the gross tumor volume (GTV), but the magnitude and timing of GTV changes during combined modality therapy remain unclear.

Objectives: This study aimed to analyze GTV changes at phases of induction chemotherapy and sequential concurrent chemo-radiotherapy (CRT) in patients with locally advanced NPC.

Methods: Subjects included thirteen patients with newly diagnosed stage III-IV NPC who underwent treatment between 2011 and 2014. Criteria for eligibility included 2 cycles of neoadjuvant chemotherapy, at least 5 cycles of concurrent chemotherapy and 3 magnetic resonance imaging (MRI) scans at specific phases of treatment (T0: before treatment, T1: post induction and T3: three months after CRT). The induction phase consisted of two cycles of gemcitabine and cisplatin. The CRT phase consisted of weekly cisplatin and radiotherapy delivered using volumetric modulated arc therapy (VMAT). The total dose was 70 Gy over 35 daily fractions administered five days/week. A subset of three patients received an additional MRI 4 to 5 weeks into CRT (T2). Primary gross tumor volume (GTVp) was defined as the GTV and adjacent involved retropharyngeal lymph nodes. Tumour volumes were delineated on gadolinium-enhanced fat-saturation T1 weighted MRIs by two observers. Mean values are reported +/- one standard deviation.

Results: Preliminary analysis included six (out of 13) subjects. The mean initial GTVp was 62.7 +/- 32.8 cc. The mean GTVp response after induction phase was 21.4 +/- 12.3 % with a mean rate of volume change of 0.31 +/- 0.19 cc/day which corresponded to a 0.56 +/- 0.35 % daily reduction in tumour volume. The total mean GTVp response after completion of treatment (T3) was 77.6 ± 21.6 %. Subgroup analysis of subjects who underwent an additional MRI showed a mean GTVp reduction of 42.5 ± 22.6 % and a mean rate of volume change of 0.87 ± 0.08 cc/day which corresponded to a 1.7 ± 0.93 % daily reduction in tumour volume (from T1 to T2).

Conclusions: Preliminary results suggest that the GTVp progressively diminishes following both induction chemotherapy and CRT. The mean GTVp response after 4-5 weeks of CRT exceeded the response observed after induction chemotherapy by a factor of 2. The rate of volume change at 4-5 weeks of CRT was threefold the rate during induction chemotherapy. These observations may support the optimal timing of imaging for replanning in the context of adaptive field radiotherapy. Analysis of the full NPC patient dataset is ongoing and will be reported.

A12 **Joshua Giambattista**, Radiation Oncology

Title: A mixed methods survery on the impact of a difficult Canadian job market on radiation oncology residents and program directors

Joshua Giambattista, Shaun Loewen, Division of Radiation Oncology, Department of Surgery, University of British Columbia

Background: The Canadian job market for radiation oncology currently presents challenges to newly trained radiation oncologists, including decreased workforce demand, unemployment and under-employment following postgraduate training completion.

Objectives: 1) To assess the perceptions of radiation oncology residents (RORs) and residency program directors (RPDs) on the current job market status in Canada using a mixed methods approach, and determine its impact on personal and professional well-being. 2) To identify contributing factors to post-graduate employment difficulties, opinions regarding career mentorship, and trainees' future plans.

Methods: RORs and RPDs from 13 Canadian training programs were emailed invitations to participate. Face-to-face and telephone interviews were conducted between January to May 2014 using a semi-structured guide to collect demographic information and prompt discussion and reflection. Self-identified concerns, morale, and well-being were ranked by participants on a 10-point Likert scale. Interview transcripts were assessed independently by two observers and coded for common themes using MACQDA qualitative data analysis software (v11.0). Thematic disparities were resolved through group consensus. Student's t-test was used to evaluate associations between Likert scores and demographic information.

Results: Twenty of 113 eligible RORs (18%) and 4/13 RPDs (31%) participated with near equal distribution with respect to PGY1/2 (n = 9) vs. PGY3-5 (n = 11) resident participants. Participants identified delayed retirement (79%), graduate oversupply (67%), and inadequate new RO position funding (50%) as barriers to workforce entry. RORs were primarily concerned with post-graduate job uncertainty, work location, and potential consequences for their partner or family. Compared to their junior colleagues, senior residents were more concerned with the job market (mean severity 6.5 vs. 4.3, p = 0.05) with higher colleague-interaction stress levels (5.4 vs. 1.8, p = 0.001). Most participants (18/24) felt that employment difficulties worsened resident morale. Participant well-being was positive overall (7.6/10) with junior residents ranking their well-being higher than senior RORs (8.4 vs. 6.8, p = 0.014). RPDs expressed that their job satisfaction was negatively impacted by the current employment market instability (mean severity 7.3/10). Adequate, but often informal, career counselling was reported by 60% of RORs, while RPDs felt they required additional resources and training to implement a formal career planning curriculum. 75% of RORs intend to pursue fellowships, and 40% would consider specialist employment outside Canada.

Conclusions: Perceived job market hardships induced personal and professional stressors and negatively influenced resident morale and well-being as well as RPD job satisfaction in qualitative interviews. Senior RORs were more affected than their junior resident colleagues. Strategies are needed to expand employment opportunities for RORs in Canada and improve career planning and counselling.

A13 **Germain Ho,** Otolaryngology

Title: Development of an in-vitro porcine inner ear cell model

Germain Ho, Juzer Kakal, Elizabeth Hui, Calvin D Roskelley, Desmond A Nunez,University of British Columbia, Department of Cellular and Physiological Science & Department of Surgery, Division of Otolaryngology

Background: The inner ear is highly specialized to generate electrical signals in response to sound and changes in position. Initiation of these signals is governed by changes in the membrane potential of inner ear epithelial hair cells. Human inner ear tissue is not easily accessible; alternatively, porcine inner ear cells, having close similarities to humans are being investigated as a potential surrogate to study otological dysfunction in vitro.

Aim: The aim of this project is to culture and characterize porcine inner ear cells.

Methods: Two sources of tissue isolated from the inner ear were investigated, namely porcine labyrinths harvested within one hour of euthanasia and cells derived from previous cell culture obtained through the same means that have undergone freeze-thaw. The labyrinth specimens were micro-dissected to harvest tissue from both the cochlea and vestibular labyrinth. Post-dissection, the tissue was transported in 20% FBS, Penicillin-Steptomycin in DMEM with anti-mycotics prior to culturing onto petri-dishes. Initial growth of primary cells from fresh tissue was carried out for 7 days using the transport media, but was cultured thereafter in 10% FBS, Penicillin-Steptomycin in DMEM. Differential trypsinization was used to preferentially select epithelial cells over fibroblasts. Western blot and immunocytochemistry were used to characterise the cells cultured.

Results: A stable monolayer culture was observed using light microscopy displaying strong cell-cell junctions only in fresh harvested tissue. Analyses of western blot and immunocytochemistry results revealed that many of the cells harvested from porcine inner ear tissue were positive for vimentin, a cytoskeletal protein characteristic of fibroblastic cells. The positive results of the western blots were dependent on cells being lysed in sample buffer to avoid pelleting of the proteins.

Myosin VIIa results were non-specific for western blot, but are positive in immunocytochemistry. Looking at cytokeratin 18, an epithelial marker, the immunocytochemistry staining was considerable weak. Meanwhile, western blots of passage 4 differentially trypsinized cultures revealed presence of cytokeratin 18. Additionally, neuronal markers were observed in the culture throughout the various differential trypsinizations.

Conclusion: Light microscopy observation indicates a relative increase in epithelial-fibroblastic morphology ratio in response to initial trypsinization. The cultured cells demonstrated characteristics of fibroblasts, hair cells and neural tissue, in which the latter could represent spiral ganglion cells. Further work is required to improve cytokeratin 18 antibody specificity and optimize porcine inner ear epithelial cell growth conditions.

A14 **Nicole Krentz,** General Surgery

Title: Pancreatic progenitor cell G1 lengthening is required for efficient endocrine cell differentiation

Nicole A. J. Krentz, Akie Watanabe, Mei Tang, Francis C. Lynn

Background: Cell-based therapies for diabetes require an understanding of pancreatic development, including how differentiation is initiated during lineage specification. During pancreas development, endocrine progenitor cells activate the transcription factor Neurog3, exit the cell cycle and differentiate. Recent work in our lab demonstrated that pancreatic progenitor cell cycle length increases almost 1.5-fold between e11.5 and e13.5 and that this increase is due to a lengthening of the G1 phase of the cell cycle. These studies suggest that changes in cell cycle length occur prior to differentiation of endocrine progenitors.

Objective: Changes in progenitor cell cycle length, in particular G1 lengthening, is required for efficient endocrine cell differentiation.

Methods and Results: Two mouse models were used to investigate if cell cycle lengthening within pancreatic progenitors stimulates endocrine differentiation. First, KrasLSL-G12D mice, which have only one functional copy of Kras and have increased endocrine cell differentiation, also have increased pancreatic progenitor cell cycle length. Secondly, overexpression of the cyclin-dependent kinase inhibitor p27 in Sox9+ progenitor cells increases G1 length, resulting in a 2.5-fold increase in the formation of Gcg+ endocrine cells at e12.5.

Conclusions: In sum these studies demonstrate for the first time that pancreatic progenitor cell cycle lengthening is required for normal endocrine cell genesis and has important implications for producing functional insulin-producing cells from human embryonic stem cells.

Simultaneous Session B

B01 **Jennifer Liang,** Neurosurgery

Title: Evaluating student achievement in the summer research program at British Columbia Children's Hospital: a quantitative and qualitative Study

Jennifer Liang[1], Ash Singhal[1, 2], Damian Duffy[3], Ross Hengel[2]

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Background: Over the last few decades, the documented decline in the number of physician-scientists has been an ongoing concern for health services and universities. Although studies have suggested the utility of exposing students to research, few have examined the tangible long-term benefits of this exposure and answered questions regarding future research interest or research output.

Objectives: To explore the experiences of past Summer Student Research Program (SSRP) participants at British Columbia Children's Hospital (BCCH) in the Department of Surgery, and to assess if these participants continue to have research dimensions in their ongoing training or careers.

Methods: Students who took part in the SSRP at BCCH in the Department of Surgery from 2008-2014 were invited to participate in an online survey to gather information on demographics, level of satisfaction, and research interest and output post-SSRP. Semi-structured phone interviews were then conducted with students who opted to participate to further explore their SSRP experience. A separate online survey was sent out to research supervisors who provided mentorship to students in the SSRP at BCCH over the same time period.

Results: One hundred and thirteen individuals were invited to participate in the online survey and 89 responses were received (79%). Of the 89 participants, 71 (81%) participants were medical students when they took part in the SSRP, 15 (17%) were undergraduate students and the remaining 3 (3%) were in high school or other forms of post-graduate education. Seventy eight (88%) students indicated that they were satisfied or very satisfied with the SSRP, 8 (9%) participants were neither satisfied nor dissatisfied, and 3 (3%) participants were very dissatisfied. Seventy one (80%) participants have had an abstract published and 53 (60%) have had a paper published. Fifty four (61%) participants are currently involved in research while 40 (45%) indicated an interest in incorporating research into their future career. Analysis of the 12 qualitative interviews conducted showed a saturation of themes after 4 interviews. Prominent themes included career exploration opportunities and clinical research exposure. Of the 26 supervisors contacted, 19 responses were received (73%). Seventeen (89%) supervisors were either satisfied or very satisfied with the SSRP and 2 (11%) were neither satisfied nor dissatisfied. In addition, 16 (85%) supervisors indicated that students have helped them achieve their research goals and contributed to their own learning.

Conclusion: Students and supervisors both indicated benefits from the SSRP in their careers. Early saturation of themes from the semi-structured interviews suggests that participants share similar views about their experience. The majority of participants who participated in the SSRP currently have an abstract and/or a paper published and over half continue to be involved in research.

B02 **Daphne Lu,** Otolaryngology

Title: Detection of abnormally shaped ears in newborns

Daphne Y.D. Lu 1,2, Julie Pauwels 2, Lisa Jin 1,2, Frederick K. Kozak, MD, FRCSC 1,2, Neil K Chadha, MBChB(Hons), MPHe, BSc(Hons), FRCS 1,2
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Background: Many children are born with abnormally shaped ears, including protruding ears or oddly shaped outer ears. While the majority of abnormally shaped ears are benign, they can cause significant issues with self-esteem and bullying. Molding with soft splints or tape can resolve some of these abnormalities and avoid the need for future corrective surgery. However, newborns with these abnormalities are rarely identified and treated within the first few days of life, a time window when molding is most effective.

Objective: In this study, we investigate whether a trained non-specialist can correctly identify ear abnormalities in newborns.

Method: A non-specialist (medical student) was trained on normal and abnormal ear anatomy using photographs and descriptions. Newborns within 72 hours of age were recruited from the maternity wards at BC Women's Hospital. Newborns' ears were photographed and each photograph was assessed by a specialist and the non-specialist. Ears were classified as either normal or abnormal along with the type of abnormality.

Results: A total of 661 ears were photographed and assessed. High inter-rater agreement was achieved in both double-blinded and non-blinded assessments with a kappa statistic of 0.863 (SE 0.078) and 0.892 (SE 0.044), respectively.

Conclusion: Our study illustrates the potential for a trained non-specialist to accurately detect newborn ear abnormalities, providing a cost-effective means of ensuring that these children's health care needs are met in a timely fashion. Specifically, assessment of ear shape could be integrated into the current newborn hearing screening program.

B03 **Serge Makarenko,** Neurosurgery

Title: Craniotomy for Perisellar Meningiomas, Comparison of Simple (Appropriate for Endoscopic) Versus Complex Anatomy and Surgical Outcomes

Serge Makarenko MD BSc, Erick Carreras BSc, Ryojo Akagami MD BSc MHSc FRCSC

Introduction: Microsurgical resection of perisellar meningioma tumors has remained as the gold standard, with extended endoscopic endonasal surgery emerging as a viable alternative. Current historical series do not distinguish based on tumor anatomy, and are being used as a comparison against endonasal surgery. Here we retrospectively reviewed and compared the anatomy of perisellar meningiomas at our institution while separating them into two groups based on whether or not they would be appropriate for endoscopic resection, and compared our surgical outcomes.

Methods: Between 2001 and 2013, 53 patients (73.6% female) with perisellar meningiomas underwent open microsurgical resection at Vancouver General Hospital by the senior author. We separated these tumors into two groups based on their anatomy, and analyzed the resection rates, surgical results, patient quality of life, and complications.

Results: Fifty-three patients presented with perisellar meningiomas, and we were able to identify 18 lesions with "simple anatomy" suitable for endoscopic resection, and 35 lesions with "complex anatomy suited for craniotomy resection. Mean age of study cohort was 57.4 years (range 33-88 years), and most patients presented with visual loss (68.0%) and visual field restriction (64.2%). There were no major differences in patient demographics between two groups. Patients with "simple" anatomy had smaller lesions (2.1 vs 3.5 cm, $p = 0.004$), had no optic canal invasion (89% vs 26%, $p < 0.0001$), minimal vascular encasement (cortical cuff 83% vs 9%, $p < 0.0001$), and a rounded shape (100% vs 31.8%, $p = 0.0001$) when compared to those with "complex" anatomy, with the majority of lesions originating from tuberculum sellae and planum sphenoidale. Greater degree of resection was achieved in the favourable anatomy group (99% vs 87.1%, $p < 0.0001$). Vision was improved or normalized in 96.6% of patients. Patient cohort with complex anatomy had more transient complications, and there were no incidences of surgical site infections, meningitis, nor mortalities in our series. One patient who underwent a removal of a recurrent lesion experienced a CSF leak requiring endoscopic repair. Our overall permanent complication rate was higher in the group with complex anatomy (11.1% vs 37.1%, $p = 0.0498$) with overall 28.3% of our patients experiencing disabling complications. Patient quality of life perception improved in the simple anatomy group following their surgery (ΔSF-36 +16.6 vs -8.4, $p = 0.0045$).

Conclusion: Extended endoscopic surgery is emerging as a viable alternative to microsurgical resection of perisellar meningiomas. We have identified two patient groups based on anatomy with distinctly separate surgical outcomes. In the future patients considered for endoscopic resection should be compared against the surgical group with simple anatomy that included smaller tumors, no vascular encasement, and limited optic canal invasion.

B04 **Paul Mick,** Otolaryngology

Title: Hearing loss and Injury-Related Expenses in the United States

Paul Mick MD MPH[1], Danielle Foley MHS[2], Frank Lin MD PhD[3]
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Background: In the United States, total annual health care expenditures for injuries among adults is approximately $90 billion. Hearing loss (HL) reduces an individual's awareness of environmental hazards and may be a modifiable risk factor for injury. The prevalences of HL and injury are large and growing due to population aging.

Objectives: The purpose of the study was to determine if self-reported HL is independently associated with excess healthcare expenditures for injuries in the United States.

Methods: Data was obtained from the 2002-2012 Medical Expenditure Panel Survey and
is representative of the U.S. civilian non-institutionalized population aged 18 years and older. Expenditures for injuries include payments from all sources to hospitals, physicians, other medical care providers, and pharmacies for services received for injury-related conditions over the past 12 months. HL (any versus none, excluding deafness) was self-reported. A two-part multivariate model was used to account for the right-skewed expenditure distribution and the large proportion of zeros in the data. Multivariate logistic regression was first used to assess the relative odds of having any versus no expenditures according to hearing status. Then, among the sub-sample who had any injury-related expenses, per capita excess costs associated with HL were estimated using a generalized linear model with log link and gamma (Poisson) family. Effect modification according to age, sex and hearing aid use were analyzed. All models adjusted for relevant demographic, lifestyle and medical confounders.

Results: The odds of having any injury-related expense in the past year were 62% greater for adults aged 18-64 with HL (OR 1.62, 95% CI 1.49-1.75, $p<.001$), and 23% greater for adults aged 65 or older with HL (OR 1.23, 95% CI 1.12-1.35, $p<.001$), relative to people with normal hearing in their respective age groups. Among the sub-sample of people with injuries, HL was not associated with excess expenditures. In other words, people with HL were more likely to be injured but their per capita treatment was not more expensive. The increased risk of injury associated with HL translates to an estimated $2.5 billion in excess expenditures per year.

Conclusion: HL is independently associated with increased risk of having injury-related healthcare expenditures among American adults.

B05 **David Mo,** Pediatric Surgery

Title: Trauma team leadership attributes: a qualitative analysis with discrete choice experiments

David Mo[1], Dr. Ash Singhal[2], Nathan O'Hara[3], Ross Hengel[2]
[1]University of British Columbia, Faculty of Medicine, [2]Division of Pediatric Neurosurgery, [3] Office of Pediatric Surgery Evaluation and Innovation (OPSEI)

Background: The Trauma Team at BC Children's Hospital consists of ER Physicians, Trauma Nurses, Sub-specialty Surgeons, Radiology Technologists, and others. Although an effective trauma team is often thought to be self-evident - there is little formal literature identifying the personal and professional characteristics and attributes associated with quality care. Effective leadership has been identified as a critical component for provision of care, but there is little knowledge of what attributes make for an effective team leader. Moreover, little is known about what constitutes a successful event in the eyes of the entire trauma team. This project will explore and define the key attributes of the pediatric multi-disciplinary trauma team as a whole, as well as its constituent participants. The project will also attempt to define what the trauma team participants view as a successful trauma management event.

Objective:

1) Determine the traits and characteristics deemed of greatest value in a trauma leader (and other members of the trauma team) by trauma team members.
2) To determine what attributes characterize a "successful" trauma event.

Methods: Twenty-one members of the Trauma team participated in a semi-structured interview until saturation of themes was achieved. Interviews were recorded in audio and transcribed, verbatim, post-interview. Interview transcripts were analyzed and used to develop a Discrete Choice Experiment (DCE) questionnaire. Surveys contained 10 choice-sets, and were developed using a D-optimal design with the software JMP (Version 11.2.0, SAS Institute Inc., Cary, NC). The DCE was then administered by convenience to sixty-four members of the trauma team via an iPad through QuickTap Survey Tool.

Results: Six themes were identified from interviews as being most important for trauma team leadership. The top three most important leadership attributes were collaboration, communication, and decisiveness (L-R chi-square test). Conversely, the three least important were experience, adherence to protocols, and organization. All results were significant, with the exception of experience.

Conclusion: We found that collaboration, communication, and decisiveness to be the most desired leadership attributes in a pediatric trauma team setting. In the future, similar investigations could be made in a multi-centered trial to further investigate if individual covariates such as age, sex, and occupation can be used to predict preference of attributes. In addition, long-term strategic development and mentorship could be refined to foster attributes deemed most important by trauma team members.

B06 **Seyed Morteza,** Otolaryngology

Title: Determinants of hearing aid uptake, and satisfaction or use: a review

Seyed Morteza Mousavi[1] , Desmond A. Nunez[2] [1] The University of British Columbia, Faculty of Science 2 The University of British Columbia, Department of Surgery, Division of Otolaryngology

Background: Hearing loss is one of the major disabilities affecting the elderly, and this segment of the population is increasing rapidly. Hearing aids are the most effective means of managing hearing loss. However many of the hearing impaired elderly do not seek out or use hearing aids.

Objectives: To identify factors that determine the uptake, satisfaction with, and use of hearing aids.

Methods: Articles were identified by a systematic search of Pubmed, Medline, and Embase. The included articles were published between January 1990 and January 2015, were all in English, had a sample size of more than 20, were published in a peer-reviewed journal, and presented quantitative data. Results: 125 abstracts were identified and 101 were rejected. 24 articles were selected for study, 6 explored factors affecting uptake, 18 satisfaction or use. Out of the three studies focusing on pre-fitting expectations and hearing aid uptake 2 found a correlation and 1 did not find any. Only two of the studies investigated the impact of attitude towards hearing aids on uptake and their results were contradictory. Furthermore, only two studies examined the effect of expectation from the aid on its use where their results were contradictory, however 4 of the studies inspected the relation between satisfaction with expectation from hearing aids, and all 4 were conclusive.

Conclusion: Non-physical determining elements of uptake based on our study are degree of perceived hearing handicap and stigma from wearing hearing aids. Furthermore gender is not a determining factor of uptake. Main determinants of satisfaction are individual subject's attitude and expectation. Finally out of the seven studies, which conducted different counselling interventions only two were able to find a statistically significant result from their intervention.

B07 **Layla Nabai,** Plastic Surgery

Title: Reduced post-surgical fibrosis by implantation of kynurenic acid microspheres *in vivo*

Layla Nabai, [1] Malihe-Sadat Poormasjedi-Meibod, [1] Ryan Hartwell, [1] John Jackson,[2] Aziz Ghahary. [1]
1 BC Professional Fire Fighters' Burn & Wound Healing Research Lab
2 Faculty of Pharmaceutical Sciences, The University of British

Background: Fibrosis is the main outcome of tissue repair after serious injuries including surgery. The subsequent complications of fibrosis such as hypertrophic scarring, capsular contracture, and adhesions may lead to considerable disfigurement and/or discomfort especially in younger age groups. Despite advances in knowledge, refinements of techniques, and various therapeutic methods, the management of post- surgical fibrosis remains a challenge. Topically applied kynurenic acid (KynA) to open wound in rabbit ear model of hypertrophic scarring has been proven to have anti- fibrogenic effect. Here we proposed that controlled release of KynA in wound bed using a drug delivery system will reduce fibrosis in closed wound as well.

Hypothesis: In this study we hypothesised that implantation of KynA loaded biocompatible, biodegradable microspheres in wound bed before suturing will reduce fibrotic scar formation following surgical procedures.

Methods: Poly (lactic-co-glycolic acid) (PLGA) and methoxypolyethylene glycol-block-poly(D, L-lactide) (MePEG-b-PDLLA) were used to encapsulate KynA using emulsion/solvent evaporation technique. The encapsulation efficiency and in vitro release profile were determined using HPLC. To evaluate the in vivo efficacy of the microspheres we used an animal model of fibrosis with some modifications. In this model PVA sponges alone or loaded with empty or KynA microspheres were implanted subcutaneously in rats. After 35 and 66 days, the PVA sponges and the overlying skin were removed and examined histologically. The collagen deposition inside PVA sponges was quantified using hydroxyproline assay.

Results: The average encapsulation efficiency of the kynA acid loaded microspheres was 80.65%±18.49.The release profile revealed an initial burst release of around 10% of the encapsulated drug in the first 24 hours and additional 4% up to day 6. After 30 days of almost no release, there was an additional 50% release over the next 30 days. The histological examination and Masson's trichrome staining of the samples harvested after 66 days revealed significant reduction in collagen deposition inside and around the PVA sponge implants loaded with KynA microspheres compared to the PVA alone or loaded with empty microspheres. The result was further confirmed by hydroxyproline assay. There was no significant difference in the cellularity of the granulation tissue inside PVA sponges of different groups.

Conclusion: KynA, the natural metabolite of amino acid tryptophan, can efficiently be encapsulated in a biocompatible polymer with a release profile that reduces fibrotic tissue deposition in vivo. This drug delivery system provides a promising solution for prevention of scar formation after surgery.

B08 **Luis Macias-Valle,** Otolaryngology

Title: The Efficacy Of A Thermosensitive Poloxamer 407-Based Topical Medication Regimen For Chronic Rhinosinusitis: A Retrospective Review

Luis Macias-Valle MD, Andres Finkelstein-Kulka MD, Christopher Okpaleke MPH, Jamil Manji MSc, Fahad Alasousi MD, Amin Javer MD FRCSC FARS.
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Background: Poloxomer-407 is a gel-like polymer with unique thermoreversible properties that remains liquid in cool temperature but reverts to a gel at higher temperatures. It can be loaded with two or more medications that can remain stable and act to reduce inflammation/infection in the sinuses. The advantage to treatment of chronic inflammation is that the time the medication stays inside the sinuses is greatly increased.

Objective: This study aims to examine the safety, efficacy and our early experience with Poloxamer-407.

Methods: Post-surgical patients with recalcitrant infection and inflammation despite maximal medical management, and who had been treated with medication-impregnated Poloxamer-407 were reviewed retrospectively. Only patients with at least 3 treatments were included. Endoscopic scores before and after treatment was recorded. Patient-reported adverse events were also recorded. Paired students' t-tests were used to test the difference in means of endoscopic scores before and after treatment.

Results: Thirty patients (10 males, 20 females, average age of 58.5 years) were reviewed. There was a 3.3-point (26.2%) decrease in mean endoscopic scores, before (mean=12.6 SD=10.9) and after (mean=9.3 SD=10.0) the three treatments. Two patients reported transient increase in headaches and postnasal drips respectively. There were no major or long term adverse events. The physicians' experience with Poloxamer-407 was very good.

Conclusion: Patients with CRS can be safely treated with Poloxamer-407 impregnated with medication. Though there was improvement in endoscopic scores in this difficult to treat patient group, further prospective clinical trials to further evaluate the efficacy of Poloxamer-407 are necessary.

B09 **Maryam Dosani,** Radiation Oncology

Title: Do Pre-Greatment PET Parameters Predict For Outcome in Early-Stage Lung Cancer Patients Treated With Stereotactic Body Radiotherapy?

Maryam Dosani, Ruobing Yang, Annie Houle, Don Wilson, Mitchell Liu, Chad R. Lund, Devin Schellenberg

Background: Despite the increasing use of stereotactic body radiotherapy (SBRT) for non-operable early-stage lung cancer, few prognostic factors have been identified. Pretreatment PET values such as maximum standardized uptake (SUVmax), metabolic tumor volume (MTV) and total lesion glycolysis (TLG) may serve as the best prognostic factors.

Objective: To determine whether patients with tumors with higher SUVmax, MTV, or TLG have reduced overall survival (OS) or local control (LC).

Methods: Charts of lung cancer patients treated with SBRT from 2009-2013 were reviewed and clinicopathologic characteristics obtained. Tumors were re-contoured in MIMvista software to obtain SUVmax, MTV and TLG.

Results: One hundred and thirty-nine patients were included and 55% were female. The cohort had a median age of 76 (range 43-94), median Charlson comorbidity score of 2 (0-8), and ECOG mean of 1 (0-3). Tumors had mean diameter of 2.4cm (0.9 to 5.1), SUVmax of 9.0, MTV of 5.5, and TLG of 36.4. Median follow-up was 2 years, with local control of 91% and median OS of 34 months. On univariate analysis, patients with larger tumors (HR 2.57, 95% CI 1.58-4.03, p<0.0001), higher SUVmax (HR 1.12, 95% CI 1.04-1.21, p=0.005), higher MTV (HR 1.13, 95% CI 1.07-1.18, p<0.0001) and higher TLG (HR 1.01, 95%CI 1.01-1.02, p<0.0001) had reduced LC. Patients with higher MTV (HR=1.04, 95%CI 1.01-1.07, p=0.014), and TLG (HR 1.00, 95% CI 1.00-1.01, p=0.001) had reduced OS. Multivariate analysis will be performed.

Conclusions: Both MTV and TLG predicted for worse LC and OS. These risk factors can identify patients who may benefit from dose escalation.

B10 **Simon Turner,** Thoracic Surgery

Title: Development and validation of competency assessment instruments in Thoracic Surgery

Simon R Turner[1], Basil S Nasir[1], Eric LR Bédard[2]

Divisions of Thoracic Surgery, University of British Columbia[1] and University of Alberta[2]

Background: The ability to reliably and objectively determine a surgical trainee's ability to perform operations is fundamental to any surgical education program and is essential for patient safety. In North America, this is reflected in the requirements of the Royal College of Physicians and Surgeons of Canada (RCPSC) and the Accreditation Council for Graduate Medical Education (ACGME), both of which have established specialty specific "Milestones" that must be met prior to certification. In thoracic surgery, these include competence in the specialty's core operations such as lung resection and invasive mediastinal staging.

Objectives: The goal of this study is to develop and validate competency assessment instruments for core operations in thoracic surgery. The first such tools to be developed assess competency in anatomic lung resection (LR) and in invasive mediastinal staging (MS). These will be followed by tools for other thoracic operations such as tracheostomy, esophagectomy and mediastinal mass resection. Each checklist-style tool will be tailored for the given operation and will allow educators to make more informed decisions about trainees' competence and provide detailed, individualized feedback about which steps a trainee has mastered and which require further development.

Methods: The development of each assessment instrument is begun with a collaborative effort by the authors to generate a comprehensive set of each fundamental step that must be safely performed in the execution of the operation in question. Once this initial list is complete, it is refined using a modified Delphi procedure involving the membership of the Canadian Association of Thoracic Surgeons. Each tool undergoes multiple iterations until consensus is reached. The tool is then validated in a several step process. First the tool is pilot tested at the Interventional Thoracic Surgery Training Course (ITSTC). This is followed by a six-month longitudinal study of thoracic surgery residents from training centers in Canada and the US, whose operative performance is measured using the assessment instrument and compared against scores from the previously validated Objective Structured Assessment of Technical Skill (OSATS). Scores are also compared against an expert-level standard which is generated by measuring the performance of expert surgeons.

Results: Assessment instruments have been developed for lung resection and mediastinal staging. Both have completed the Delphi process with high response rates (LR=52.9%, MS=55.4%), reaching consensus after several iterations. The final LR tool has 35 items in 5 sections, with a mean approval of 4.87/5 and mode 5/5. The final IS tool has 30 items in 4 sections with a mean approval of 4.75/5 and mode 5/5. Pilot testing at ITSTC resulted in further refinement of each checklist. Longitudinal studies of thoracic residents and expert surgeons is currently underway, with preliminary data available by the time of presentation.

Conclusions: Objective, validated assessment tools are necessary to fulfil the requirements of the RCPSC and ACGME and to ensure graduating surgical residents are competent to enter practice. Specialty and procedure specific tools can allow for both summative and formative assessment of resident competency. Rigorous validation is required given the importance of competency measurements to both patient safety and resident education.

B11 **Helen Wong,** General Surgery

Title: Deletion of the pro-apoptotic function of cytochrome c protected beta-cells from amyloid toxicity: implications for clinical islet transplantation

Helen Wong, Nooshin Safilkhan, Ziliang Ao, Mark Meloche, Garth Warnock, Lucy Marzban, Department of Surgery, Faculty of Medicine, University of British Columbia

Introduction: Human islet transplantation is a promising approach for treatment of type 1 diabetes (T1D) but is currently limited by low number of islet donors and significant loss of islets during pre-transplant culture and post-transplantation. Formation of toxic protein deposits named islet amyloid, due to aggregation of the beta-cell peptide human islet amyloid polypeptide (hIAPP), in cultured and transplanted human islets is closely correlated with loss of beta-cell function and mass. The mechanisms underlying hIAPP-mediated beta-cell toxicity are still not fully understood. Our recent studies showed that extracellular hIAPP aggregates promote upregulation of the cell death receptor Fas and activation of the extrinsic (Fas-mediated) apoptotic pathway initiated by caspase-8. The finding that extrinsic and intrinsic (cytochrome c) apoptotic pathways are inter-connected and that hIAPP also forms intracellularly, suggests a potential role for the cytochrome c apoptotic pathway in amyloid beta-cell toxicity.

Objectives: In this study, we examined if amyloid formation can initiate the cytochrome c apoptotic pathway and tested if blocking cytochrome c-mediated apoptosis can protect islet beta-cells from amyloid toxicity.

Methods: INS-1 transformed rat beta-cells and dispersed human islet cells were cultured with synthetic hIAPP or non-fibrillogenic rIAPP (as control) at different time points and double immunolabeled for insulin/cytochrome c, insulin/cleaved caspase-9 and insulin/TUNEL. We similarly treated dispersed islet cells from homozygous mice with a cytochrome c mutation ($Cytc^{KA/KA}$) and their wild-type littermates ($Cytc^{+/+}$) with fibrillogenic hIAPP. Furthermore, we transduced dispersed human islet cells from cadaveric pancreatic donors (n = 3) with an adenovirus that codes for the expression of hIAPP (Ad-prohIAPP) or rIAPP (Ad-prorIAPP) as control and cultured cells to allow formation of intracellular hIAPP aggregates. Non-transduced and transduced cells cultured with or without Bax or caspase-9 inhibitors were double immunolabelled for insulin/A11 (oligomer antibody to detect intracellular hIAPP aggregates), insulin/cytochrome c, insulin/cleaved caspase-9 and insulin/TUNEL.

Results: Exposure to exogenously applied hIAPP (but not rIAPP) in INS-1 beta cells and dispersed human islet beta cells increased cytochrome c release from mitochondria, caspase-9 activation and beta-cell apoptosis. The time point of cytochrome c release preceded that of caspase-9 activation and beta-cell death. hIAPP-treated $Cytc^{KA/KA}$ mouse islet cells had lower number of apoptotic beta cells than wild-type islet cells. In addition, intracellular hIAPP aggregation in Ad-prohIAPP-transduced islet cells resulted in elevated cytochrome c release, caspase-9 activation and beta-cell apoptosis as compared with Ad-prorIAPP-transduced and control cells. Treatment with either Bax or caspase-9 inhibitor reduced beta-cell apoptosis in Ad-prohIAPP-transduced cells.

Conclusions: These data suggest that both extracellular and intracellular hIAPP aggregates can trigger the cytochrome c apoptotic pathway in islet beta-cells. Blocking the pro-apoptotic function of cytochrome c may provide a new approach to protect human islets from amyloid toxicity during pre-transplant culture and in islet grafts following transplantation.

B12 **Dan Wu,** General Surgery

Title: Regulatory T cells and adipose tissue inflammation in bariatric surgery patients

Dan Wu1, Jonathan Han1, Nam Nguyen2,3, Sharadh Sampath2, David Harris2,3 and Megan Levings1
1Department of Surgery, UBC and Child and Family Research Institute
2Metabolic and Bariatric Surgery Program, Richmond General Hospital
3Faculty of Medicine, University of British Columbia

Background: The prevalence of obesity is on the rise, and bariatric surgery remains the most effective form of therapy to reverse obesity-associated disorders. Obesity is linked to chronic inflammation, which promotes diseases such as type 2 diabetes, cardiovascular disorders and cancer. Recent studies have shown that adipose tissue (AT) is a key site of obesity-associated inflammation, and that the anti-inflammatory regulatory T cells (Tregs) have a role in controlling AT inflammation. We and others have previously shown that Treg function in the AT is inversely linked to the severity of AT inflammation and insulin resistance in mouse models of obesity.

Hypothesis: We hypothesize that the number and function of Tregs in the AT is inversely related to the severity of AT inflammation in obese bariatric surgery patients.

Methods: We obtained AT from omental and gastric fat pads of obese patients at the time of bariatric surgery. The fat pads were digested into single cell suspensions. Flow cytometry was performed to analyse the proportions and phenotypes of immune cells in the AT.

Results: Unexpectedly, we found that the proportion of FOXP3+ Tregs amongst CD4+ T cells is positively correlated with the prevalence of pro-inflammatory immune cells such as CD11c+CD206+ macrophages (Wentworth et al, 2010). On the contrary, the expression of neuropilin-1 (Nrp1), a key regulator of Treg stability and function, by Tregs is negatively correlated to the presence of pro-inflammatory CD11c+ cells.

Conclusion: These data suggest that the excessive AT inflammation found in obesity is not due to a reduction in the number of Tregs, but may instead be due to an impairment of Treg function. The increased proportion of Tregs in more inflamed AT may reflect increased expansion or migration of Tregs in an attempt to suppress inflammation. However, these attempts may be unsuccessful, because Tregs in more inflamed AT tend to have reduced expression of Nrp1, indicating that they have impaired stability and function.

B13 **Gary Yang**, Vascular Surgery

Title: Factors associated with the development and resolution of venous leg ulcers in a Canadian population

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Introduction: Venous leg ulcers (VLU) are common problems that are difficult to treat and can significantly impact the quality of life of those affected. Even with the existing modalities, successful treatment of VLU can take months to years and frequently recur due to underlying venous insufficiency. Better understanding of the factors involved in the development and the resolution of VLU can help guide treatment.

Objectives: The objective of this study was to evaluate the patients that presented to the regional wound clinic with VLU to investigate their presenting comorbidities and the course of their treatment.

Methods: Retrospective analyses were performed on patients that visited the Toronto Regional Wound Healing Clinic for venous ulcers in the legs from January 2012 to January 2015. Patient demographics were collected and tabulated. Multivariate binomial analyses were performed to calculate odds ratios between patients that had successful VLU resolution within a 12-month follow up period and those that did not.

Results: Between the three-year period of 2012-2014, 554 patients presented to our wound clinic with unresolved VLU. The mean age of patients was 67.4 ± 0.7 yr with a higher proportion of females (56%). The most common comorbidities were hypertension, dyslipidemia, smoking and diabetes. The mean ulcer size was 3.8 ± 0.2 cm in maximum diameter (median 2.5 cm) and the wound duration prior to presentation to clinic was 16 ± 3 mth (median 5 months). Patients that did not have full resolution of their VLU were younger (64 ± 1 vs. 68 ± 1 yr), had larger ulcer size (4.6 ± 0.3 vs. 3 ± 0.2 cm) and had longer ulcer duration prior to clinic presentation (29 ± 6 vs. 8 ± 1 mth).

Conclusions: Management of ulcers resulted from venous insufficiency continues to be a struggle among health care professionals. Our clinic achieves around 50% ulcer resolution in 12 months with half of the patients requiring ongoing or more aggressive therapy. Giving our findings, new patients that present with larger VLU or for longer durations prior to the first clinic visit may warrant more aggressive initial therapy with early referral to vascular surgery.

B14 **Michael Yong,** Otolaryngology

Title: Endoscopic ear surgery in Canada: a cross-sectional study

Michael Yong, Tamara Mijovic, and Jane Lea

Background: Endoscopes have provided a new dimension to ear surgery with recent literature suggesting many advantages over the traditional microscopic approach. This study aims to characterize the current state of endoscopic ear surgery in Canada and identify the beliefs and concerns regarding the use of endoscopes in ear surgery.

Methods: A cross-sectional study of otolaryngologists who were subscribed to the Canadian Society of Otolaryngology was conducted though an online survey in March and April 2015. Study participants included all otolaryngologists, whether they perform ear surgery or not. Trainees and those who do not perform ear surgery at all were excluded from some sub-analyses.

Results: The majority of participants in this study (70%) used an endoscope in their practice, with a large amount of these using it for cholesteatoma or tympanoplasty surgeries. Up to now, 40 Canadian otolaryngologists have used an endoscope for at least one case during surgery, but only six have performed more than 50 cases. The majority of Canadian otolaryngologists (57%) still use the microscope as their primary instrument with the endoscope as an adjunct. The general attitude surrounding endoscopes is, however, positive with 81% of surgeons believing that endoscopes have a role to play in the future of ear surgery and 53% indicating that they were likely to use endoscopes in their future practice. Participants who were earlier in their practice or who had more exposure to the endoscope were more likely to have a positive stance towards endoscopic ear surgery in general ($p < 0.05$, $p < 0.01$, respectively). The top concern regarding endoscopes was the technical challenge of one-handed surgery, while the top perceived advantage was the reduced rates of residual or recurrent disease.

Conclusions: Endoscopic ear surgery is a prevalent technique among ear surgeons in Canada. It is gaining popularity as a primary surgical approach and there is overall enthusiasm for the advantages that endoscopes can offer. Further investment in training courses and guidance for those looking to start or advance their use of the endoscope in their practice will be vital in the years to come.

B15 **Irena Zivkovic,** Pediatric Surgery

Title: Feasibility of implementing Chlorhexidine Gluconate (CHG) for pre-operative cleansing in pediatrics

Irena Zivkovic(1), Julie Bedford(2), Erik Skarsgard(3), Kourosh Afshar(4)
1) Undergraduate Student, Faculty of Science, University of British Columbia; 2)NSQIP-P, BC Children's Hospital, Vancouver, Canada; 3) Erik Skarsgard, MD, FRCSC, Surgeon-in-Chief, BC Children's Hospital; 4) Kourosh Afshar MD, MHSc, FRCSC Associate Chief of Surgery, Quality and Safety, BC Children's Hospital

Background: British Columbia Children's Hospital (BCCH) has been identified as having a high surgical site infection (SSI) rate compared to other NSQIP-P sites. 2% Chlorhexidine Gluconate (CHG) wipes have been shown to significantly reduce SSI rates in adult populations.

Objectives: The purpose of this study is to determine the feasibility of implementing these CHG wipes within the Surgical Day Care Unit (SDCU) as pre-operative skin cleansing agents.

Methods: Patients were sampled from a selection of surgeons who agreed to participate in the study. Targets of this study included high risk surgical patients, excluding those undergoing head, neck or spine surgery, with skin conditions, and patients whose parents feel uncomfortable using wipes. Areas for determining feasibility include the workload burden on SDCU nurses as well as caregiver satisfaction with the product. Surveys were created for caregivers and nurses to complete. Nurses received prior teaching sessions and education materials. Educational materials were available for parents in SDCU.

Results: A total of 27 parent surveys were completed and all stated that the wipes were 'very easy' or 'easy' to use.' 81% of parents reported that their child felt 'warm' and 'relaxed.' All parents stated that the process of using the wipes went smoothly and that they would use them in the future. The results of 6 nurse surveys indicated that the use of CHG wipes preoperatively resulted in either no impact or neutral impact on their workload in the SDCU and that there were no adverse patient reactions.

Conclusion: Parents reported that the wipes are easy to use and that they would use them again in the future. Nurses reached a consensus in that the wipes leave no impact on their workload.

Evening Reception

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

2015 Department of Surgery Faculty Achievement Awards

Hjalmar Johnson New Investigator Award – Robert Olson BSC, MD, FRCPC MSc

Assistant Professor, Department of Surgery, Division of Radiation Oncology and Developmental Radiotherapeutics, UBC, Director of Faculty Development, UBC Northern Medical Program, Research and Clinical Trials Lead | Radiation Oncologist, BC Cancer Agency – Centre for the North

Dr. Olson obtained his medical training from the University of Calgary, residency training in Radiation Oncology from UBC and a Master of Science in Epidemiology from Harvard University in 2010. Dr. Olson was the first physician hired to the BC Cancer Agency – Centre for the North (BCCA-CN), where he primarily treats Head & Neck, Breast, Palliative, and Lung cancer patients. He is the Research & Clinical Trials Lead, as well as the Fellowship Director. He has opened the first cancer clinical trials in Northern BC, as well as being the provincial principal investigator on numerous clinical trials. Working with the Northern Medical Program (NMP), Dr. Olson is the Director of Faculty Development, as well as the Discipline Specific Site Leader for radiation oncology. However, his primary relationship with the NMP is conducting research. Although he has a diverse area of interest aimed at improving cancer care for patients in BC, his primary areas of interest are: (1) collecting patient reported outcomes, and subsequently improving cancer care based on patients' feedback, and (2) improving cancer care for rural and northern patients. Dr. Olson has been recognized with many awards including: in 2009, Award in Support of Psychosocial Oncology Excellence from the Brain Tumour Foundation of Canada; in 2010, Canadian Association of Radiation Oncology Jean Roy Memorial Award; and in 2010 the Award in Support of Psychosocial Oncology Excellence, Brain Tumour Foundation of Canada, 2012.

Richard J Finley Senior Investigator Award – Sam Wiseman BSc, MD, FRCSC, FACS

Associate Professor, Department of Surgery, UBC, Chair, Endocrine Tumor Group, BC Cancer Agency Surgical Oncology Network, Director of Research, Dept. of Surgery, St. Paul's Hospital & Providence Health Care

Dr. Wiseman obtained his medical and General Surgery residency training at the University of Manitoba in Winnipeg. He then spent three years in subspecialty fellowship training at Roswell Park Cancer Institute, including an American Head and Neck Society Advanced Training Council approved Head & Neck Surgery Fellowship, a Society of Surgical Oncology approved Surgical Oncology and Endoscopy Fellowship, and an Oncology research fellowship that was focused on studying the molecular biology of cancer. In 2003 Dr. Wiseman joined the staff at St. Paul's Hospital and is currently an Associate Professor in the Department of Surgery at UBC. While his research has especially focused on thyroid and parathyroid disease, Dr. Wiseman has also continued to study other human cancer types, as well as many other General Surgery questions. Much of his research has taken a translational approach, or he has applied new knowledge/discoveries learned in the laboratory to address important clinical diagnostic, prognostic and treatment questions. Dr. Wiseman has been recognized with many honors and awards. Notably, Dr. Wiseman in 2005 was the first surgeon to ever receive the prestigious Michael Smith Foundation for Health Research Scholar Award; in 2007 he received an American College of Surgeons Travelling Fellowship to Japan; in 2008 he received a Canada's Top 40 Under 40 award; and in 2010 Dr. Wiseman was the first surgeon to receive the Providence Health Care Research and Mission Award.

Kudos & Congratulations 2015

Dr. Sharadh Sampath has been named a winner of "Forty under 40" by Business in Vancouver. Dr. Sampath represents a new generation of critical thinking in surgery: the doctor who embraces the broad role of patient-centred caregiver and physician as business person.

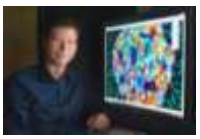
Kate MacDonald (supervisor **Dr. Megan Levings**) has won the Norman Wong Prize for the best oral presentation at the UBC Experimental Medicine Research Day. Kate described her work showing how cells called Tregs (which normally function to protect us against inappropriate T cell activation) contribute to scleroderma.

Soroush Shakibakho (supervisor **Dr. Alice Mui**) won the runner-up prize at the Experimental Medicine Research Day for his presentation on his discovery of a drug discovered in the lab.

Dr. Christopher Ong has received $500,000 from Prostate Cancer Canada to fund his clinical trials of *"Therapeutic protein inhibitors of SEMA3C in treatment of advanced prostate cancer".* Dr. Ong's lab discovered that all epithelial cancers (including prostate, breast, bladder) require the growth factor SEMA3C to survive. Furthermore, previously described growth factor receptor pathways such as Her2, HGF, VEGF SEMA3C actually work through SEMA3C..... so SEMA3C inhibitors will work as a master drug for treatment of these cancers.

Dr. Aziz Ghahary is the recipient of the "CIHR/ IMHA Research Ambassadors Knowledge Translation Award**"**. This award is given to the Principal Investigator who submitted a superior lay abstract for an IMHA- funded grant or award. This summary was considered well written, easily understood by a lay audience, comprehensive and highly informative. The award was created in hopes of encouraging CIHR applicants to write excellent lay abstracts that can be understood by a lay audience.

Dr.Sandra Jarvis-Selinger is the recipient of the Young Educator's Award for excellence in medical education by the Association of Faculties of Medicine of Canada. This award recognizes Dr. Jarvis-Selinger's many contributions to medical education and professional development.



Dr. Tim Kieffer has extended his pioneering stem cell work for treating Type 1 Diabetes to Type 2 Diabetes. In his latest study, published last week in the journal Stem Cell Reports, Dr. Kieffer's lab showed that Type 2 diabetes can be eliminated in mice using a combination of conventional diabetes drugs and specially cultured stem cells.

Dr. Geoffrey Blair has won the 2015 Year 3 Teaching Award from the UBC Medical Undergraduate Society. This award recognizes Dr. Blair's long-standing excellence in and dedication to teaching, as well as his commitment to students.

Dr. Guy Fradet has been recognized with a Leadership Award from the BC Patient Safety and Quality Council. This award recognizes individuals who have displayed leadership in implementing measures or initiatives to improve the quality of care in BC.

Dr. Bruce Verchere has won the Faculty of Medicine's Award for Excellence in Early Career Mentoring. This award recognizes faculty members who have formally been identified as mentors and who exemplify a deep commitment to fostering the professional and personal development of faculty members in the early stages of their academic careers.

Dr. Cathie Garnis and **Dr. Eitan Prisman** have received a Team Grant from Vancouver Coastal Health Research Institute (VCHRI) to support their project titled "Molecular and Tissue Architecture Changes as Biomarkers for Early Detection of Oropharyngeal Carcinoma".

Dr. Desmond Nunez is a co-investigator on a $3 million dollar clinical trials grant from the National Institute of Health (UK). Investigators will undertake a randomised controlled trial of ear drops for treatment of acute otitis media (AOM, middle ear infection).

Dr. Brian Westerberg and Dr. Louise Straatman have received a VCHRI Innovation and Translational Research Award.

Dr. Dan Luciani and **Dr. Francis Lynn** have been awarded CIHR operating grants to continue their work towards understanding and developing treatments for diabetes. Dr. Luiciani will study how two related proteins (Bcl-2 and Bcl-xL) protect pancreatic beta cells from dying. Dr. Lynn will study the role and therapeutic potential of the protein Npas4 in brain and pancreas regulation of glucose levels.

Dr. Aziz Ghahary along with **Dr. Ruhangiz Kilani** and Dr. Walter Maksymowych (U. Alberta) have developed a diagnostic test called JointStat that provides early detection of arthritis prior to joint damage. Inflammed cells at the joint specifically secrete the protein 14-3-3η into the blood which can be detected by the JointStat test.

Dr. Ravi Sidhu has been selected as the 2015 James IV Traveling Fellow. These fellowships are given to young faculty who have already distinguished themselves in terms of their academic achievements, and are considered emerging leaders in surgery. Travelers are ambassadors representing their home countries as they visit academic surgical centres around the world and act as conduits for the dissemination of knowledge.

Congratulations to other Department of Surgery Award Winners

Dr. Nadine Caron: Recipient of the A.D. McKenzie Clinical Teaching Award in recognition of outstanding clinical teaching of medical students and residents.

Dr. Paris Ingledew: Recipient of the Rocke Robertson Award presented in recognition of outstanding clinical teaching in the MD program acclaimed by undergraduate students.

Dr. Charles Haw: Recipient of the A.D. Forward Postgraduate Faculty Teaching Award in recognition of outstanding teaching acclaimed by surgical residents.

Dr. Andrew Thamboo: Recipient of the Best Resident Teacher Award and the Holibitsky Memorial Award presented to the surgical resident who demonstrates the highest qualities of surgical excellence.

Dr. Sheena Sikora: Recipient of the A.W.D. Bill Knox Award to assist a surgical resident in postgraduate surgical studies.

Dr. Stephanie Chartier-Plante: Recipient of the C.H. Scudamore HPB Award presented to the surgical resident who demonstrates the highest qualities of surgical excellence in Hepatobiliary and Pancreatic Surgery.

Bindy Sahota and Julie Morey: Recipients of the Dorken Award for Excellence in Service, awarded annually to a UBC Department of Surgery staff member(s). Bindy Sahota is the Senior Administrative Assistant, Pediatric Surgery and Julie Morey is the Senior Administrative Assistant, Thoracic and Vascular Surgery.

A History of WB & MH 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. Each paper was 10 minutes in duration and a five minute discussion period followed for each paper.

The visiting professor presented original research as part of the day as well as judged the clinical and basic science presentations.

The first visiting professor was Lloyd D. MacLean, MD, FRCSC, FACS who was head of the Department of Surgery at McGill University as well as President of the American College of Surgeons.

Each of the Research Days has been attended by Dr. Chung who has been actively involved in the Department for almost fifty years.

Dr. Chung was heartened by the active interests of the Residents as well as Basic Scientists and Faculty in exchanging information at the Research Day. The Department is grateful for this wonderful legacy that Madeline and Wally Chung have left for the Department.

1995 Lloyd MacLean, McGill University

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"