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Department of Otolaryngology - Head and Neck Surgery

FORTY-SECOND ANNUAL

RESIDENTS' RESEARCH DAY

Friday, May 6, 2016
Kenny Theatre,
in the Darryl J. King Student Life Centre
King's University College
266 Epworth Avenue,
Western University · Canada

CONTINUING PROFESSIONAL DEVELOPMENT
PLANNING COMMITTEE MEMBERS
Disclosure Form

I have/have not had in the past 2 years, a financial interest, arrangement or affiliation with one or more organizations that could be perceived as a direct/indirect conflict of interest in the content of the subject of this or any other program.

1. Josee Paradis: None
2. Lorne Parnes: None
3. Kathryn Roth: Hoffman-La Roche
4. Leigh Sowerby: None
5. John Yoo: None

LEARNING OBJECTIVES

To critically appraise the scientific presentations with respect to methodology and clinical applicability pertaining to Otolaryngology-Head and Neck Surgery.

To actively participate in the discussions surrounding scientific presentations with reflection on implications for patient care.

STUDY CREDITS

This event is an Accredited Group Learning Activity (Section 1) as defined by the Maintenance of Certification Program of The Royal College of Physicians and Surgeons of Canada and approved by Continuing Professional Development, Schulich School of Medicine and Dentistry, Western University.
Each participant should claim only those hours of credit that he/she actually spent participating in the educational program.
(6 credit hours)

DEPARTMENT OF OTOLARYNGOLOGY – HEAD AND NECK SURGERY
42nd ANNUAL RESIDENTS' RESEARCH DAY PROGRAM

8:00 – 8:30 ***COFFEE IN THE EXHIBITORS' AREA – Spriet Learning Commons***

8:30 – 8:40 ***WELCOME AND INTRODUCTION OF CPD DIRECTOR*** **Dr. John Yoo**

8:40 – 8:50 **Educational Objectives Overview** **Dr. Kathryn Roth**

CHAIR – DR. LEIGH SOWERBY

8:50 – 9:05 **Dr. Rakhna Araslanova** Prior Radiotherapy and Age strongly predict survival after salvage surgery for recurrent oral cavity squamous cell carcinoma – A recursive partitioning analysis (Supervisor:Dr. A. Nichols)

9:05 – 9:15 *Interactive Discussion*

9:15 – 9:30 **Dr. Horace Cheng** Virtual-reality myringotomy simulator – face validity and performance metrics analysis (Supervisors: Drs. S. Agrawal & H. Ladak)

9:30 – 9:40 *Interactive Discussion*

9:40 – 9:55 **Dr. Christopher Dwyer** Survival outcomes for cutaneous head and neck melanoma: An institutional analysis of the current AJCC staging system as a prognostic factor (Supervisor: Dr. K. Roth)

9:55 – 10:05 *Interactive Discussion*

10:05 – 10:35 ***COFFEE IN THE EXHIBITORS' AREA – Spriet Learning Commons***

10:35 – 10:50 **Dr. Sandeep Dhaliwal** Biomechanical Properties of the Oropharynx- Toward a Robust Finite Element Model of the Upper Airway in Obstructive Sleep Apnea Patients (Supervisor: Dr. B. Rotenberg)

10:50 – 11:00 *Interactive Discussion*

INTRODUCTION of DR. CAROL ROSSIER BRADFORD **Dr. Kevin Fung**

11:00 – 11:45 **Dr. Carol Rossier Bradford** Cutaneous Head and Neck Melanoma: The State of the Art

11:45 – 12:00 *Interactive Discussion*

12:00 – 13:00 ***LUNCH IN LABETT HALL***

DEPARTMENT OF OTOLARYNGOLOGY – HEAD AND NECK SURGERY
42nd ANNUAL RESIDENTS' RESEARCH DAY PROGRAM

CHAIR – DR. ANTHONY NICHOLS

13:00 – 13:10	***WELCOME BACK***	
	Sponsor – Education Grant Support Award	**Dr. Kathryn Roth**
13:10 – 13:25	**Dr. John Scott**	Sinonasal Surgery in an under-resourced setting: The safety and efficacy of office based rhinology (Supervisors: Drs. B. Rotenberg & L. Sowerby)
13:25 – 13:35	*Interactive Discussion*	
13:35 – 13:50	**Dr. Matthew Harris**	Does Endoscopic Sinus Surgery Alter the Biomechanics of the Facial Skeleton? (Supervisors: Drs. C. Moore, L. Sowerby, M. Johnson)
13:50 – 14:00	*Interactive Discussion*	
14:00 – 14:15	**Dr. Krupal Patel**	Genetic markers of treatment failure in HPV-Positive oropharyngeal cancer (Supervisor: Dr. A. Nichols)
14:15 – 14:25	*Interactive Discussion*	
14:25 – 14:40	***Intermission***	
14:40 – 14:55	**Dr. Chandheeb Rajakumar**	Velopharyngeal Wall Motion in Velocardiofacial Syndrome (Supervisor: Dr. M. Husein)
14:55 – 15:05	*Interactive Discussion*	
	INTRODUCTION of DR. MATTHEW BROMWICH	**Dr. Lorne Parnes**
15:05– 15:50	**Dr. Matthew Bromwich**	Thinking Differently: Navigating Research, Business & Innovation.
15:50 – 16:00	*Interactive Discussion*	
16:00 – 16:10	**PRESENTATION OF RESIDENT AWARDS**	**Drs. B. Rotenberg & M. Husein**
16:10 – 16:25	**EVALUATION FORM COMPLETIONS**	
16:25 – 16:30	**CLOSING EDUCATIONAL COMMENTS:** AND Group Photo	

Dr. Carol Rossier Bradford

Distinguished Visiting Professor

Dr. Bradford serves as the Charles J. Krause, M.D., Professor and Chair of the Department of Otolaryngology-Head and Neck Surgery and Co-Director of the Head and Neck Oncology Program within the Comprehensive Cancer Center. She has served as Director of the Head and Neck Surgery Division and Associate Chair of clinical programs and education in the Department previously. Dr. Bradford is a past president of the American Head & Neck Society.

She has long been a part of the University of Michigan community. Dr. Bradford began her academic career at the University, and earned her B.S., M.S. and M.D. degrees here. She received her medical degree and completed an otolaryngology-head and neck surgery residency at the University of Michigan. Following her residency at U of M, she joined the faculty in 1992.

Dr. Bradford specializes in head and neck cancer surgery and reconstruction as well as cutaneous oncology and sentinel lymph node biopsy. Her research interests include identifying predictive biomarkers for response of head and neck tumors to chemotherapy and radiation and the development of novel therapeutics.

She has completed several highly regarded leadership opportunities including the prestigious Executive Leadership in Academic Medicine Program for Women at Drexel University, the University of Michigan Healthcare Leadership Institute, and the Global Institute for Leadership Development.

Her many awards include a Distinguished Service Award from the American Academy of Otolaryngology-Head and Neck Surgery in 2007 and a listing in Best Doctors since 2001 and The Global Directory of Who's Who since 2006. In 2009, Dr. Bradford was the recipient of the 2009 Clinical Excellence Award from Castle Connolly National Physician of the Year Awards. In 2010, she was the recipient of the University of Michigan Medical School's Community Service Award.

Dr. Bradford has authored more than 200 journal articles and eight book chapters. She has boosted our international efforts with her volunteer work as the lead surgeon of the Annual Medical Head and Neck Surgery Mission Trip to Honduras with the Christian Medical Association.

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Dr. Matthew Bromwich

Distinguished Alumnus

Dr. Matthew Bromwich, is an Assistant Professor, Department of Surgery, Division of Pediatric Otolaryngology, Faculty of Medicine, University of Ottawa and Clinical Investigator, Children's Hospital of Eastern Ontario (CHEO) Research Institute. He has 12 years leadership experience in medical research, policy and technology.

He is Fellow of the Royal College of Surgeons of Canada specializing in Otolaryngology, Head and Neck Surgery (ENT). Dr. Bromwich completed his residency training at the University of Western Ontario and sub-specialized in Pediatric ENT at the Cincinnati Children's Hospital in Ohio. He is known nation-wide for his innovation, successful patenting and production of several specialty-specific inventions. He has recently designed an app for diagnosis and treatment of vertigo, a portable audiology application for use in remote areas, and the Clearscope – an adaptor for a smartphone that fits onto the nasoendoscope, allowing video production and transfer.

Dr. Bromwich has published his research in the areas of Pediatric Surgery, Telemedicine, Active Noise Cancellation Audiometry and BPPV amongst others. He has successfully authored multiple technology transfer grants. He has been awarded the PSI Research Award (2006), the CSCI Research Award (2006) as well as the Scientific Achievement Award (2007) from the University of Western Ontario and the Stars in Global Health Award (2013) from the Government of Canada. He holds 4 patents and has been awarded over $500,000 in research funding since he began at The Children's Hospital of Eastern Ontario in 2009.

Current Research

- Deployment of hearing screening in low resource environments
- Development of a portable audiometer for children and adults
- Predicting morbidity and mortality outcomes in tonsillectomy
- Ergonomic surgery stool
- Iphone EndoScope adaptor for endoscopy
- Use of mobile technology as a teaching and treatment tool for BPPV
- Patient Privacy in a world of mobile technology
- Cerumenolytic enzymes for the management of impacted cerumen

Dr. Bromwich has completed leadership opportunities; such as one at the Telfer School of Business. He is the Division Lead for Epic – a Healthcare Software Company; as well as the Founder and Current Chief Medical Officer of Clearwater Clinical Limited www.clearwaterclinical.com

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Distinguished Alumnus

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ABSTRACTS IN SPEAKER ORDER

PRIOR RADIOTHERAPY AND AGE STRONGLY PREDICT SURVIVAL AFTER SALVAGE SURGERY FOR RECURRENT ORAL CAVITY SQUAMOUS CELL CARCINOMA – A RECURSIVE PARTITIONING ANALYSIS

Dr. Rakhna Araslanova

OBJECTIVE:
Locoregional recurrence of oral cavity squamous cell carcinoma (OCSCC) carries a poor prognosis. Salvage therapy offers potentially curative treatment, but itself poses significant associated morbidity. Despite treatment, outcomes are poor in the recurrent setting. This study aims to outline prognostic factors influencing overall and progression-free survival following salvage surgery in order to guide optimal treatment for patients with locoregionally recurrent OCSCC.

METHODS:
From 1999-2011, all patients presenting with locoregionally recurrent OCSCC were retrospectively reviewed and included in our analysis. The primary outcome was overall survival (OS) and progression-free survival from second salvage treatment to last follow-up or death. Univariate and multivariate analysis was carried out using the Cox-Proportional Hazards model. A recursive partitioning analysis (RPA) was used to create risk groups based on prognosis.

RESULTS:
Fifty-nine patients had identified locoregional recurrence after their initial cancer treatment. Thirty-nine of these patients underwent salvage surgery with curative intent. Median follow-up was 8.25 years from first oral cancer diagnosis. Five year progression-free and overall survival from the time of salvage surgery was 31.3% and 42.5%, respectively. Univariate analysis identified age, initial and recurrent T stage, initial N stage, pathologic variables at initial and salvage surgery (positive margins, perineural invasion, lymphovascular invasion), and use of prior adjuvant chemoradiation (CRT) or radiation (RT) as predictors of survival after salvage surgery. Multivariate analysis showed the following factors to be associated with inferior survival: age (HR=2.47, p=0.09) and prior adjuvant CRT or RT (HR= 6.47, $p \leq 0.001$). Recursive partioning analysis created 3 risk groups: high-risk (patients receiving prior adjuvant CRT or RT after previous surgery), with a 5 year OS 11%; intermediate risk (previous surgery alone, age ≥62), with a 5 year OS 47%; and low-risk (previous surgery alone, age up to 62), with a 5 year OS 86% ($p<0.001$).

CONCLUSIONS:
The most important prognostic factor for patients undergoing salvage surgery for OCSCC was previous treatment with adjuvant therapy, followed by age. The prognostic importance of previous adjuvant therapy likely reflects more aggressive initial disease and the lack of availability of adjuvant therapy in the salvage setting. Counselling about marked differences in survival between these two patient groups should be taken into consideration when managing patients with locoregionally recurrent OCSCC.

Supervisor: Dr. A. Nichols

VIRTUAL-REALITY MYRINGOTOMY SIMULATOR – FACE VALIDITY AND PERFORMANCE METRICS ANALYSIS

Dr. Horace Cheng

OBJECTIVE:
To perform face and discriminant validity testing on the Western virtual-reality (VR) myringotomy simulator.

METHODS:
A training system comprised of computer-simulated virtual-reality model of the ear coupled with 3-D stereoscopic vision system and haptic arm control was tested by seven junior surgical residents and five staff otolaryngologists. A questionnaire focused on the face validity of the simulator and the training experience was presented to the users. Important aspects of the VR simulator, including appearance and realism of the contents as well as training potential of surgical tasks, were graded using a 7-point Likert scale. Automated metrics were developed in the simulator to test for discriminant validity. The residents and experts performed ten trials of the myringotomy and tube insertion using the simulator with data logging. Key parameters including time to completion, myringotomy length and angle, microscope zoom setting, and impact with critical structures were recorded for analysis.

RESULTS:
The responses to face validity questionnaire were predominantly positive with 12 of the 14 questions scoring average five or above out of the 7-point Likert scale. The two issues of concerns were contact modeling related to tube insertion into the eardrum and movement of the blade and forceps. Both of these issues could be addressed by further improvements to the hardware and software components of the simulator. Responses with regard to training potential were 64% positive, 21% neutral, and 15% negative. Analysis of the automated metrics showed that staff otolaryngologists required less time to complete the tasks, committed less technical mistakes, and performed more precise myringotomies. The clear distinction of scores from users of different levels of expertise demonstrated the discriminant validity of the simulator.

CONCLUSIONS:
The Western myringotomy simulator appears to have sufficient face and content validity to warrant further testing. The novel automated metrics developed demonstrate discriminant validity between residents and experts. A further VR to OR transference study is needed to determine if this simulator can be incorporated into a learning environment.

Supervisors: Dr. S. Agrawal and Dr. H. Ladak

SURVIVAL OUTCOMES FOR CUTANEOUS HEAD AND NECK MELANOMA: AN INSTITUTIONAL ANALYSIS OF THE CURRENT AJCC STAGING SYSTEM AS A PROGNOSTIC FACTOR

Dr. Christopher Dwyer

OBJECTIVES:
This study aims to evaluate for prognostic heterogeneity within the Stage II and III subgroups for cutaneous melanoma of the head and neck. The primary endpoint of interest is 1 and 5-year overall survival; other endpoints of interest include disease free survival before a first recurrence at any site and melanoma specific survival, stratified by current 7th AJCC disease subgroups.

METHODS:
This is an institutional based observational retrospective study of patients with cutaneous melanoma of the head and neck. Data was collected via the CMRN patient registry. All patients were required to have completed at least one year follow up to be included in the analysis. Patients were identified through the review of oncology clinic lists dating from 2010 to present. All hospital and clinic charts for all potentially eligible subjects were reviewed and detailed by a trained data collection staff at each participating site. Pre-developed and pre-tested data collection forms corresponding to the CMRN registry database were the method of data collection. The information was then entered into the electronic CMRN registry database by a designated data entry officer at each site.

RESULTS:
For cutaneous melanoma of the head and neck, 58 patients were diagnosed with Stage II disease, and 24 were diagnosed with Stage III disease. 5-year overall survival was 57.69%, 47.37%, 53.33% for Stage IIA, IIB, IIC subgroups respectively, and 57.14%, 44.44% and 12.50% for subgroups IIIA, IIIB, IIIC. Both Stage II and III disease demonstrated high rates of local-regional recurrence. While the local-regional recurrence rates were highest for stage IIIA and IIIB disease, the mean time to recurrence was also longest (34.75 months and 20.6 months).

CONCLUSIONS:
Stage III head and neck melanoma demonstrates prognostic heterogeneity. Much like the reported 7th edition AJCC outcomes, the overall and disease free survivals for Stage IIIA disease are higher than those of the Stage IIB and IIC subgroups at our institution. While the presence of micrometastasis may upstage patients to Stage III disease, prognosis is not as poor as other Stage III subgroups. Further refinement of prognostication in Stage IIIA disease would be useful for appropriately counseling patients.

Supervisor: Dr. K. Roth

BIOMECHANICAL PROPERTIES OF THE OROPHARYNX – TOWARD A ROBUST FINITE ELEMENT MODEL OF THE UPPER AIRWAY IN OBSTRUCTIVE SLEEP APNEA PATIENTS

Dr. Sandeep Dhaliwal

OBJECTIVE:
Obstructive sleep apnea (OSA) is a common clinical entity with a number of associated negative health effects. Surgical intervention is ideally targeted towards patient-specific areas of upper airway collapse, yet identification of these precise areas is exceedingly difficult. For example, assessment of the airway during awake endoscopy is challenging, as soft tissue obscures adequate airway visualization and there is high intra-patient and inter-rater variability. Sleep assessments have good predictive value and reliability, but are costly from an operative time and resource standpoint. Therefore, computer modeling offers a potentially novel and cost-effective alternative to help guide therapeutic intervention.

Our group has begun preliminary work on modeling patients' pharyngeal anatomy using finite modeling techniques. Ideally, preoperative imaging followed by finite element modeling allows for determining an optimal resection configuration. A robust model requires the inclusion of accurate biomechanical soft-tissue parameters of various subsites of the upper airway including the uvula, soft palate, base of tongue, and palatine tonsils. The literature contains calculated values of Young's modulus and hyperelastic parameters for some, but not all, of these various subsites. Although values have been derived for the uvula and soft palate, none have been published for the palatine tonsils or tongue base. Moreover, what values have been derived are calculated from estimated palate closing pressures or obtained from either cadaveric or animal histological specimens. The purpose of our study was to obtain biomechanical data from human specimens of the upper aerodigestive tract toward developing our computer model of the upper airway to aid in the surgical management of OSA patients.

METHODS:
Patients undergoing surgery for OSA were recruited into the study. Surgical specimens of palatine tonsils, uvula, soft palate, and base of tongue that would otherwise have been discarded were obtained for biomechanical testing. Indentation testing generated an experimental force-displacement curve that was used to calculate each specimen's Young's modulus and hyperelastic parameters of the Yeoh and Ogden models. These parameters were determined using an inverse Finite Element (FE) technique. The technique uses a conversion factor obtained from the inverse FE technique to convert the experimental force-displacement slope into Young's modulus. To calculate these parameters, the technique involves numerical optimization which varies the hyperelastic parameters iteratively until the force-displacement data obtained from the FE model matches the experimental force-displacement data.

RESULTS:
A total of 13 patients undergoing OSA surgery were recruited to participate in the study over a 12 month period at our institution. Our calculated Young's modulus values (mean ± SD) were 6.91 ± 3.48 kPa for palatine tonsillar tissue, 12.24 ± 7.25 kPa for the soft palate, 3.42 ± 1.26 kPa for the uvula, and 7.27 ± 2.14 kPa for the base of tongue. Yeoh and Ogden hyperelastic parameters for each tissue type were also determined.

CONCLUSIONS:
Our novel study is the first to derive Young's modulus and hyperelastic parameters of upper airway tissue directly from live-human surgical specimens. Moreover, we contribute the first biomechanical values for tonsillar and base of tongue tissue to the literature. Inclusion of these biomechanical values of oropharyngeal subsites in a computer model of the upper airway in OSA patients offers a potential for patient-specific disease management.

Supervisor: Dr. B. Rotenberg

CUTANEOUS HEAD AND NECK MELANOMA:

The State of the Art

Dr. Carol R. Bradford

Standard of care for melanoma treatment remains wide local excision of the primary lesion. Therapeutic lymph node dissection (TLND) is universally accepted as the treatment for proven regional disease in the neck. Prophylactic, elective neck dissection for the N0 neck has failed to demonstrate an overall survival benefit and is no longer advocated. Instead, the procedure has been replaced by sentinel lymph node biopsy for patients with melanomas $\geq$ 1mm Breslow depth (or 0.75 – 1.0 mm with adverse features). Sentinel lymph node biopsy is a minimally invasive, cost-effective, and efficient means to screen patients for regional disease. This screening modality identifies the 10%-20% of patients harboring occult nodal metastasis who then may benefit from TLND and adjuvant therapy. Long term results from the Multicenter Selective Lymphadenectomy Trial-1 demonstrated improved disease-free and overall melanoma-specific survival rates for patients with intermediate thickness melanomas who underwent wide local excision with sentinel lymph node biopsy as compared to those who had wide local excision alone and nodal observation.

High dose interferon-α2b is an FDA approved adjuvant treatment for stage III disease. It is reserved for patients at high risk for tumor recurrence, including individuals with regional metastasis or a primary lesion measuring > 4mm in thickness. Approximately 45% of melanoma patients harbour the BRAF mutation (v600 variant most common). Patients whose tumors harbour this mutation who have stage IV disease can be considered for the FDA-approved adjuvant therapy, Vemurafenib. Ipilimumab is an FDA-approved monoclonal antibody (CTLA-4 inhibitor) recommended for stage IV melanoma. Side-effects include severe immune reactions. Tumor response is seen in 20% of patients and can take months to observe. However, if present, most responses are long term.

Hypofractionated radiation is also an adjuvant for high risk patients with extracapsular spread or multiple node involvement. Addition roles include palliative care and, on rare occasions, as the primary treatment for extensive lentigo malignant melanomas in nonsurgical candidates.

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Balch CM, et al. Prognostic factors analysis of 17,600 melanoma patients: validation of the American Joint Committee on Cancer melanoma staging system, J Clin Oncol. 19:3622, 2001.

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Xing Y, et al. Contemporary diagnostic imaging modalities for the staging and surveillance of melanoma patients: a meta-analysis. J Natl Cancer Inst. 103:129, 2011.

HELPFUL WEB SITES

Guidelines:

- National Comprehensive Cancer Network: www.nccn.org
- AJCC Cancer Staging Manual, 7th ed: www.cancerstaging.net
- National Cancer Institue: current melanoma clinical trials: www.cancer.org

Patient Education:

- Electronic predictive tool for localized melanoma derived from AJCC database: www.melanomaprognosis.org
- Preventing skin cancer: Findings of the task force on community preventive services on reducing exposure to UV light: www.cdc.gov/cancer/skin/basic_info/prevention.htm
- American Academy of Family Physicians. "Safe Sun" Guidelines, 2000. www.aafp.org/afp/20000715/375ph.html

SINONASAL SURGERY IN AN UNDER-RESOURCED SETTING: THE SAFETY AND EFFICACY OF OFFICE BASED RHINOLOGY

Dr. John Scott

OBJECTIVE:
In our Canadian healthcare system the wait times for most sinonasal surgeries exceed Ministry standards. As a result, there has been a movement at our center to do certain procedures under local anesthetic in an outpatient clinic setting when possible. Literature within this area is lacking and the studies that have been published focus predominantly on minimally invasive balloon sinus dilation. There has been no research focusing on more advanced office based procedures. The purpose of this project is to review the work of our two rhinologists, focusing on the safety, efficacy and tolerability of the office based sinonasal surgeries.

METHODS:
A retrospective chart review was conducted from January 2010 to May 2015 for the two rhinologists. All patients undergoing in-clinic turbinoplasty, septoplasty, rhinoplasty, septorhinoplasty, endoscopic sinus surgery (ESS) or a combination of procedures with a minimum of 3 months follow-up were included. Information regarding intra-operative and post-operative complications and revision procedures were recorded. For the ESS procedures the indication, sinuses operated on and type of revision were also collected. Descriptive statistics were used to analyze data.

RESULTS:
A total of 314 patients met inclusion criteria. Overall there were 166 turbinoplasty, 117 ESS, 35 septoplasty, 34 rhinoplasty and 4 septorhinoplasty surgeries performed. For the ESS procedures, 74 (63.2 %) were bilateral and experience was had operating in all paranasal sinuses. The most common indication for ESS was chronic rhinosinusitis with polyposis. Mean follow-up was 10.9 months (Range: 3 – 65 months). Intra-operative and post-operative complication rates were each 2.5 % across all procedures. These complication rates are comparable to those under general anesthetic for equivalent surgeries. Subsequent secondary surgery was done in 11.5 % of all cases, which included 7.5 % of the ESS procedures.

CONCLUSION:
Office based sinonasal surgery is safe, effective and well tolerated by patients. The need for revision surgery in our series was low. An in-clinic procedure may avoid a general anesthetic in the operating room for appropriately selected patients.

Supervisors: Dr. B. Rotenberg and Dr. L. Sowerby

DOES ENDOSCOPIC SINUS SURGERY ALTER THE BIOMECHANICS OF THE FACIAL SKELETON?

Dr. Matthew Harris

BACKGROUND: Functional endoscopic sinus surgery (FESS) is considered the gold standard therapy for patients with chronic rhinosinusitis that have failed medical management. This involves removing the uncinate process of the ethmoid bone and the bony septations of the ethmoid air cells in order to reestablish drainage into the infundibulum.

The normal functions of the paranasal sinuses include decreasing the weight of the skull, and providing surface area for warming and humidifying inspired air. Previous studies have shown that the sinuses also act as a "crumple zone" protecting the eye during maxillofacial trauma. As a traumatic force is applied to the eye, hydraulic pressure is transmitted through the globe and an orbital blowout fracture occurs, preventing globe rupture. Despite its thin nature, the medial orbital wall, or lamina papyracea, is less likely to fracture than the orbital floor. We hypothesize that this is because the uncinate process and ethmoid air cell septations act as a buttress for the medial orbital wall.

OBJECTIVE: It is not known if the bony alterations of sinus surgery destabilize the lamina papyracea, leading to an increased risk of medial orbital wall fracture in the post-FESS patient. The purpose of this experimental cadaver study was to determine if endoscopic sinus surgery leads to a change in the pattern of orbital blowout fractures, and a reduction in the force required to create them.

METHODS: Ten fresh-frozen cadaver heads were acquired and underwent endoscopic uncinectomy, maxillary antrostomy and anterior ethmoidectomy on one, randomized, side. The contralateral sinuses were used as intra-specimen control. Hyaluronic acid globe injections were used to increase globe pressure to normal intra-ocular pressure. Pre-op and post-op CT scans confirmed no orbital fractures prior to trauma testing. Orbital trauma was induced using a guided weight-drop technique. Both orbits were tested in random order for each round, and sequentially higher drops were performed until both the test and control side demonstrated an orbital fracture on CT scan.

RESULTS: Two heads contained no globes and were excluded. Two heads were excluded due to enophthalmos that prevented adequate impact to the globe. In the remaining 6 heads, the post-FESS side incurred a medial orbital wall fracture in all cases. No orbital floor fractures were identified. On the control side, all 6 heads incurred orbital floor fractures at drop heights equal to, or higher than, the surgical side. Fisher's exact test demonstrated a significant difference in fracture pattern ($p<0.01$).

CONCLUSIONS: This study supports the theory that the uncinate process and ethmoid air cell septations act as a buttress for the medial orbital wall. The anatomic changes of FESS may alter the biomechanics of the orbit and affect the pattern of subsequent traumatic blowout fractures.

Supervisors: Dr. C. Moore, Dr. L. Sowerby, Dr. M. Johnson

GENETIC MARKERS OF TREATMENT FAILURE IN HPV-POSITIVE OROPHARYNGEAL CANCER

Dr. Krupal Patel

BACKGROUND:
There has been a dramatic rise in oropharyngeal squamous cell cancer (OPSCC) worldwide due to increasing rates of oral infection with human papillomavirus (HPV). These patients experience markedly improved survival compared with tobacco and alcohol related cancers, however approximately 25% of patients still fail treatment with chemotherapy and radiation. Biomarkers of treatment failure would be highly useful to select patients for treatment intensification or deintensification.

OBJECTIVES:
To determine if frequent, recurrent mutations in HPV-positive OPSCC predicts treatment response to chemoradiation.

METHODS:
Formalin fixed HPV-positive primary site pretreatment biopsies of patients that developed local, regional or distant failure and matched successfully treated patients were retrieved and genomic DNA was isolated. DNA was then analyzed with a custom designed IonTorrent next generation sequencing analyzing 42 significantly mutated and/or potentially targetable genes in head and neck cancer.

RESULTS/CONCLUSION:
Pending.

Supervisor: Dr. A. Nichols

VELOPHARYNGEAL WALL MOTION IN VELOCARDIOFACIAL SYNDROME

Dr. Chandheeb Rajakumar

OBJECTIVE:
To determine the contribution of lateral wall motion (LWM) to velopharyngeal insufficiency (VPI) in patients with velocardiofacial syndrome (22q11.2 microdeletion), based on Multiview Videofluoroscopy (MVV).

METHODS:
The charts of patients presenting to our VPI clinic with velocardiofacial syndrome over a 12 year period were reviewed. Patients who had undergone MVV were identified. MVVs were reviewed and LWM was measured along with velar movement. The pattern of LWM was also measured. The presence of a Passavant's ridge and adenoid size was recorded as well.

RESULTS:
Thirty-one patients were identified with velocardiofacial syndrome. Thirteen of these patients underwent MVV. Mean LWM was 27%. Forty-six percent of patients had LWM less than 20%. Mean velar movement was 76%. Twenty-three percent of patients had velar movement less than 60%. LWM followed a shelf pattern in 54% of patients and a balloon pattern in 46%. A Passavant's ridge was only present in two patients.

CONCLUSIONS:
LWM may be considerably reduced in patients with velocardiofacial syndrome presenting with VPI. These patients can also have difficulties with velar movement. It is important to characterize the anatomic contributions to VPI in these patients, as this may greatly effect which surgical options may be most successful.

Supervisor: Dr. M. Husein

THINKING DIFFERENTLY: NAVIGATING RESEARCH, BUSINESS AND INNOVATION

Dr. Matthew Bromwich

Innovation in Medicine has a proud tradition. With the advent of advanced communications research and collaboration it has become ever easier to generate new knowledge. However, the translation of new knowledge into Healthcare Innovation is fraught with challenges. Key aspects of navigating these challenges include choosing the right questions, finding strategic partners and demonstrating impact.

Drawing on my own personal experiences of researching, developing and marketing several medical devices I hope to highlight the various mistakes I have made and successes I have encountered. Specifically, the concept of private sector collaboration within the broader public healthcare sector will be elucidated.

Creating an environment that fosters translational research and business partnerships is an essential part of securing the future of Canadian healthcare. Over the next 50 years hospitals will be facing many difficult challenges including demographic shifts and increasing complexity. In order to prevent disease, promote wellness and treat illness innovative healthcare solutions that "shift left" will be required.

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Presented for the most impactful research project.

Charles A. Thompson Plaque

PETER CHESKI INNOVATIVE RESEARCH AWARD

Presented for the most innovative research project.

DEPARTMENT OF OTOLARYNGOLOGY – HEAD AND NECK SURGERY AWARD for PERFECT PITCH

Presented for the most eloquent presentation.

RESIDENT BOOK AWARDS

Presented to residents who did not receive one of the above awards.

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Notes