

## Abstracts

### Podium: POLYQUIN RESIDENTS' COMPETITION

Saturday, June 6, 2015 @ 13:00-16:25

**Developing A New Diagnostic Algorithm for Human Papilloma Virus Associated Oropharyngeal Carcinoma: An Investigation of Novel Surrogate Testing - N. Cohen, McMaster University;** L. Doerwald-Munoz, D. Jang, J. Young, J. Lee, S. Archibald, B. Jackson, M. Gupta, M. Chernesky, Hamilton, ON

Objectives: Human papilloma virus (HPV) is implicated in the development of many oropharyngeal squamous cell carcinoma. Current diagnostic techniques for HPV etiology require histopathologic analysis. We aim to investigate novel diagnostic tests to help facilitate diagnosis of HPV-related oropharyngeal tumors, specifically in the tonsillar and soft palate sub-sites. Methods: Patients with oropharyngeal cancer metastatic to lymph nodes were consecutively recruited from a multidisciplinary cancer clinic. Appropriate samples were collected and analyzed. The various tests examined include HPV RNA and DNA testing with APTIMA, and COBAS DNA testing. These tests were compared to p16 staining. Results: Both the APTIMA RNA on cytologic specimens (area under ROC=0.9048) and the COBAS saliva testing (area under ROC = 0.9375) performed well. Conclusion: Alternative testing methods for HPV are feasible and closely predict the results of current gold standard testing. In the future, these could not only avoid invasive biopsies, but also help diagnose and treat patients with unknown primaries.

**Depression as a Predictive Factor of Postoperative Functional Performance Status and Treatment Adherence in Head and Neck Cancer Patients: A Prospective Study – B. Barber, University of Alberta;** M. Nesbitt, N. Mitchell, J. Dergousoff, J. Harris, D. O'Connell, D. Côté, V. Biron, H. Seikaly, Edmonton, AB

Objectives: To investigate the relationship between preoperative depressive symptoms (PDS) and postoperative functional performance status (PFPS) as well as other determinants of rehabilitation and survival. Methods: All new adult HNC patients undergoing surgery as primary therapy from March 2013 to March 2014 underwent evaluation with the Quick Inventory of Depressive Symptomatology (QIDS) 2 weeks preoperatively, and 6 and 12 months postoperatively. PFPS was assessed 6 and 12 months postoperatively on the Functional Assessment of Cancer Therapy for Head & Neck (FACT-HN). Secondary outcomes included completion of adjuvant therapy (CAT), narcotic dependence, return to detrimental habits including smoking and/or alcohol use, and loss of follow-up. Differences between the Normal-Mild (NM) and Moderate-Severe (M-S) groups were assessed using Mann-Whitney and Fischer's Exact statistical analyses. Results: 70 of 74 approached patients completed the initial assessment (94.6%). The incidence of preoperative M-S and Mild depressive symptoms was 17.1% and 41.2% respectively. Significantly lower FACT-HN scores were noted in the M-S group at 6 ( $p=0.032$ ) and 12 months ( $p=0.04$ ). Rate of CAT was significantly lower ( $p=0.037$ ), and narcotic dependence was significantly higher ( $p=0.0001$ ) in the M-S group. Conclusions: Patients with M-S PDS have significantly decreased PFPS, increased narcotic use, and decreased treatment adherence. HNC patients should be monitored for depressive symptoms.

**Identification of Serum microRNA Biomarkers as a Potential Diagnostic Tool in Papillary Thyroid Cancer – E. Graham, Dalhousie University;** F. Makki, M.H. Rigby, J.R.B. Trites, S.M. Taylor, R. D. Hart, Halifax, NS

Objectives: Papillary thyroid cancer (PTC) is increasing in incidence. Fine needle aspiration is the gold standard for diagnosis, but results can be indeterminate. Identifying tissue and serum biomarkers, like microRNA, is therefore desirable. We sought to identify miRNA that is differentially expressed in the serum of patients with PTC. Methods: Serum miRNA was quantified in 31 female thyroidectomy patients: 13 with benign disease and 18 with PTC. qPCR results were compared for fold-changes in 175 panel miRNAs, against a pooled control. Results: 128 miRNA qualified for analysis. There were fold-changes in miRNA levels between benign and control, and between PTC and control. There was fold change in the level of four miRNA between benign and PTC: hsa-miR-146a-5p and hsa-miR-199b-3p were down-regulated, while hsa-let7b-5p and hsa-miR-10a-5p were up-regulated. Conclusions: MicroRNA is differentially expressed in the serum of patients with PTC. Serum miRNA has the potential to aid in thyroid cancer diagnosis.

**Predictive Value of Nodal SUV(max) Obtained by 18F-FDG-PET-CT in Oropharyngeal Squamous Cell Carcinoma – J. Clark, University of Alberta;** C. Jeffery, H. Zhang, D. A. O’Connell, J. Harris, H. Seikaly, V. L. Biron, Edmonton, AB

Background: The incidence of human papillomavirus (HPV)-related oropharyngeal squamous cell carcinoma (OPSCC) has been rising in recent years. Given the clinical impact of HPV/p16 positivity in OPSCC, identifying surrogate markers of this disease early in the diagnostic work-up of these patients could improve patient care. Methods: Demographic, pathologic, staging and PET-CT data from patients diagnosed with OPSCC from 2009-2013 were obtained from a prospectively collected provincial cancer registry. Tumor HPV/p16 status was correlated to SUV(max) of the primary tumor and cervical nodes. Pearson’s correlation and linear regression models were used to calculate associations between p16 and SUV(max). Positive and negative predictive value of SUV(max) over defined threshold values was calculated. Kaplan-Meier and Cox regression was used to calculate survival outcomes. Results: PET-CT and HPV/p16 data was obtained for 162 patients treated surgically for OPSCC. Significantly higher nodal SUV(max) was associated with HPV/p16 positive nodes (SUVmax 10.1 vs 7.9). No significant differences were seen between HPV/p16 positive vs negative primary tumor SUV(max) (10.6 vs 10.7). In combination with other clinical parameters, higher nodal SUV(max) was highly correlated with HPV/p16 positivity. Conclusions: Elevated nodal SUV(max) is a significant predictor of HPV/p16 positive disease. To date, this is the largest cohort of OPSCC patients comparing PET-CT to HPV/p16 status.

**Vestibular Function Following Unilateral Cochlear Implantation for Profound Sensorineural Hearing Loss – G. Le Nobel, University of Toronto;** E. Hwang, S. Cushing, V.Y. Lin, Toronto, ON

Objectives: The objective of this study was to assess vestibulopathy following unilateral cochlear implantation (CI) for sensorineural hearing loss. Methods: Twenty-five patients were assessed pre-operatively and at immediate, one week, one month, and six month post-operative intervals. Assessments consisted of the dizziness handicap inventory (DHI), subjective visual vertical (SVV), head impulse (HIT), and timed up-and-go testing (TUG). When applicable, testing was repeated with the implant device on and off. Results: More patients had an abnormal SVV immediately post-operatively than pre-operatively (75% vs. 40%). At 1 month post-operatively, more patients with abnormal SVVs deviated away from the implanted side with the implant on than off (80% vs. 40%), however, this effect did not persist at 6 months. Statistically significant differences were not found between pre-operative and post-operative DHI, HIT, and TUG. Conclusions: Cochlear implantation and implant activity appear to have, at least, transient effects on the vestibular system. N.B. Data accrual is on-going, however, we anticipate approximately 50 patients enrolled in the study. Statistical analysis is pending further data accrual.

**Mass Spectrometry-based Proteomic Analysis of Cholesteatoma – D. Randall, University of Calgary;** Phillip S. Park, Justin K. Chau, Calgary, AB

Objectives: Cholesteatoma are cyst-like structures lined with a matrix of differentiated squamous epithelium overlying connective tissue. Epithelium normally exhibits self-limited growth; however, cholesteatoma matrix erodes mucosa and bones, suggesting functional changes in matrix protein content permit destructive behaviour. Differential proteomic studies can measure and compare the cholesteatoma proteome to normal tissues, revealing protein alterations propagating the destructive process. Methods: Human cholesteatoma matrix, cholesteatoma-involved ossicles, middle ear mucosa, post-auricular skin, and non-involved ossicles were subjected to multiplex peptide labeling followed by liquid chromatography and tandem mass spectrometry analysis. Relative protein abundances were compared and evaluated for ontologic function and putative involvement in cholesteatoma. Results: Our methodology detected 10 764 peptides constituting 1678 unique proteins. Thirty candidate proteins were identified in soft tissue analysis, while thirty-three additional proteins had altered abundances in bone samples. Conclusions: We identified 63 cholesteatoma proteome alterations contributing to pathophysiology, as well as potential biomarkers of disease.

**Objective and Subjective Sino-nasal and Pulmonary Outcomes in Aspirin Desensitization Therapy: A Prospective Study – T. Cooper, University of Alberta;** S. Greig, H. Zhang, H. Vliagoftis, K. Sideri, E. Wright, D. W.J. Côté, Edmonton, AB

Background: Sampter's triad patients are a challenge to manage with sino-nasal and pulmonary symptoms refractory to maximal medical and surgical therapies. Objective: To examine objective and subjective sino-nasal and pulmonary measures to determine the efficacy of aspirin desensitization therapy in Sampter's triad patients. Methods: A prospectively recruited cohort of 12 patients with documented Sampter's triad underwent aspirin desensitization therapy. Baseline Sino-nasal Outcomes Test (SNOT-22) and Asthma Control Questionnaire (ACQ) responses, as well as acoustic rhinometry, peak flow readings, and endoscopic scoring of nasal polyps were recorded. These measures were repeated at 4, 8, and 12 weeks follow-up after aspirin desensitization. Results: Preliminary results suggest statistically significant ( $\alpha < 0.05$ ) improvement in SNOT-22 and ACQ scores following aspirin desensitization. Conclusions: This first prospective study to examine subjective and objective measures for both asthma and sino-nasal outcomes in aspirin desensitization therapy demonstrates promise for its use as an adjunct in managing Sampter's triad patients.

**Molecular Analysis of Indeterminate Thyroid Nodules – M. Gill, McMaster University;** J.C. Cutz, M.K. Gupta, Hamilton, ON

Objective: To determine if the analysis of mutations (BRAF, NRAS, KRAS and HRAS) using readily available molecular techniques can help better classify indeterminate nodules. Methods: Consecutive patients undergoing diagnostic procedures were recruited in a data base which analyzed the presence or absence of mutations in FNA samples. Markers chosen were locally available and currently used in Hamilton for other clinical indications. These were then compared to the histopathology from their thyroidectomy specimens to see if they could help better classify these indeterminate thyroid nodules. Results: 60 patients with indeterminate FNAs were recruited. 23 patients had malignant tumors while 37 were benign. Multiple different mutations were identified in the FNA samples. Overall 18 cases had a positive mutation (10 malignant and 8 benign). The sensitivity of BRAF, HRAS, KRAS, and NRAS were as follows 8.7, 8.7, 8.7, and 17.4 while the specificity were as follows 100, 83.7, 100 and 94.6. Conclusion: While molecular analysis remains promising, it requires further refinement. Several markers showed promise as good "rule-in" tests.

**3-phase Dual-energy CT Scan as a Feasible Salvage Imaging Modality for the Identification of Non-localizing Parathyroid Adenomas: A Prospective Study – M. Roskies, McGill University;** X. Liu, M. Levental, A. Mlynarek, R. J. Payne, M. P. Hier, R. Forghani, Montreal, QC

Objectives: Accurate pre-operative imaging of parathyroid adenomas (PAs) is essential for successful minimally invasive surgery; however, rates of non-localizing PAs can be as high as 18%. Multiphasic dual-energy CT (DECT) has the potential to increase accuracy of PA detection by enabling multispectral iodine content evaluation. This study prospectively evaluated the utility of 3-phase DECT for PA identification in patients with failed localization via standard imaging (i.e. ultrasound, sestamibi, MRI). Methods: Patients with primary hyperparathyroidism and non-localizing PAs underwent DECTs that were prospectively evaluated by head and neck radiologists. Reports were compared to intraoperative localization and final histopathology. A post-hoc DECT material density characterization was performed on pathologically-proven PAs. Results: Out of 29 patients with primary hyperparathyroidism and non-localized PAs, DECT identified candidates in 25 (86.2%). Of the 16 patients who underwent parathyroidectomy, DECT provided anatomic localization in 12 (PPV = 75%). Material density characterization performed demonstrated a unique spectral attenuation curve in comparison lymph nodes at low energy levels. Conclusion: 3-phase DECT is a feasible salvage imaging modality for previously non-localizing parathyroid adenomas.

**Acoustic Rhinometry to Evaluate Post-operative Outcomes in Endonasal Spreader Graft Surgery for Nasal Valve Collapse – B. Ericson, University of Alberta;** R. Hurowitz, K. Ansari, D. WJ Cote, Edmonton, AB

Objectives: To use objective and subjective measurements to assess the outcomes of endonasal spreader grafts in patients with internal nasal valve collapse. Methods: This prospective cohort study was carried out in a tertiary care rhinoplasty practice including patients undergoing septoplasty with unilateral or bilateral endonasal

spreader graft placement for internal nasal valve collapse. The primary outcome was cross-sectional area at the internal nasal valve measured at baseline and post-operatively with a standardized acoustic rhinometry protocol. Secondary outcomes included SNOT-22 and NOSE scores as well as objective internal nasal valve collapse on video endoscopy. Results: Preliminary analysis reveals patients undergoing septoplasty with endonasal spreader graft placement have improved cross-sectional area and internal nasal valve collapse on direct endoscopic assessment. These results are commensurate with an subjective assessment through the SNOT-22 and NOSE scores. Conclusions: This study provides a correlation of objective measurement of internal nasal valve function with subjective improvement supporting endonasal cartilagenous spreader grafts in combination with septoplasty for patients with internal nasal valve collapse.

**Exploring the Psychological Morbidity of Waiting for Sinus Surgery Using a Mixed Methods Approach – G. Tsang, University of Toronto; C. McKnight, L. M. Kim, J. M. Lee, Toronto, ON**

Objectives: Assess the psychological morbidity of patients with chronic rhinosinusitis (CRS) currently on a waitlist for endoscopic sinus surgery (ESS). Methods: Questionnaires measuring CRS symptom severity and health-related anxiety and stress were sent to over one hundred patients diagnosed with CRS and currently on a waitlist for ESS. Additionally, fifteen of the participants completed one-on-one semi-structured interviews discussing their experience. A grounded theory approach was used to analyse the interview data. Results: Participants waiting for ESS had a reduced quality of life and increased levels of health related anxiety and stress. This health-related psychological morbidity is multifactorial. The qualitative data demonstrated that both the symptom burden of CRS and factors only attributable to waiting for surgical treatment were important in explaining the questionnaire findings. Conclusions: These results can help better manage patients enduring long waits for ESS and also inform policy makers on treatment wait time optimization for CRS.

**Brief Electrical Stimulation After Facial Nerve Transection and Neuroorrhaphy: A Randomized Prospective Animal Study – A. Mendez, University of Alberta; H. Seikaly, V. Biron, L. Zhu, D. Cote, Edmonton, AB**

Introduction: Recent studies have examined the effects of brief electrical stimulation (BES) on nerve regeneration, with some suggesting that BES accelerates facial nerve recovery. However, the facial nerve outcome measurement in these studies has not been precise or accurate. Objective: To study the effect of BES on accelerating facial nerve functional recovery from a transection injury in the rat model. Methods: A prospective randomized animal study using a rat model was performed. Two groups of 10 rats underwent facial nerve transection and repair at the main trunk of the nerve. Group 2 additionally received BES on post-operative days 1 through 4 using an implantable stimulation device. Primary outcome was measured using a laser curtain model, which measured amplitude of whisking at 2, 4, and 6 weeks post-operatively. A secondary outcome of muscle fiber count of two facial muscles was also measured at 8 weeks post-operatively. Results: Preliminary results indicate that group 2 has statistically ( $\alpha < 0.05$ ) higher amplitude measurement of whisking and muscle fiber count as compared to group 2 at 4 weeks post operatively. Conclusions: This is the first study to use an implantable stimulator for serial BES following neuroorrhaphy in a validated animal model. Results suggest performing BES after facial nerve transection and neuroorrhaphy at the main trunk of the facial nerve is associated with improved facial nerve function in a rat model compared with a control group.

**The Usefulness of Routine Histopathology of Bilateral Nasal Polyps - A Systematic Review and Meta-Analysis – J. Wong, McMaster University; S. Hoffbauer, D. Yeh, B. Rotenberg, M. Gupta, D. Sommer, Hamilton, ON**

Background: Controversy regarding the usefulness of sending bilateral nasal polyps removed during endoscopic sinus surgery for routine histopathology still exists. This is a systematic review investigating the usefulness of routine histopathology of bilateral nasal polyps in identifying clinically significant unexpected diagnoses. Methods: A comprehensive search strategy was performed. Two independent reviewers were used. Results: Initial search yielded 1986 results. Seven studies ( $n = 4872$  patients) were included. Of the 4872 patients, 4841 had a pre-operative clinical and post-operative pathological diagnosis of inflammatory nasal polyps. Agreement proportion was 99.36%. There were 4 unexpected malignancies. This translated to a proportion of 0.08%. Number needed to screen to pick up an unexpected malignancy was 1218. A pooled proportion was calculated from the review. A cost-effectiveness evaluation was performed and compared to

existing screening programs. Conclusion: Routine histopathology of bilateral nasal polyps to screen for clinically significant unexpected diagnoses (malignancies) is of questionable usefulness.

**Optimal Detection of Hypothyroidism in Early Stage Laryngeal Cancer Treated with Radiotherapy – G. Mulholland, University of Alberta;** H. Zhang, H. Seikaly, N. Tkaczyk, D.I O'Connell, V. Biron, J. Harris, Edmonton, AB

Objective: To determine the prevalence of, and optimal timing of testing for hypothyroidism in early stage laryngeal squamous cell cancer (LSCC) treated with radiotherapy (RT). Method: Data was extracted from a prospectively collected provincial cancer database. Demographic information, survival data, and post and pre-treatment thyroid stimulating hormone (TSH) levels were obtained for patients diagnosed with early stage LSCC from 2008-2010. Results: We analyzed 143 patients: 90.9% received RT as primary treatment. Average follow-up was 40 months. Five-year disease specific survival using Kaplan-Meier curves was 82%. Incidence of hypothyroidism after RT was 45.5%. Average post-treatment peak TSH was at 12.2 months (Range: 5.8 - 15.6 months). Sensitivity of testing for hypothyroidism was highest at 12.4 months. Conclusions: Prevalence of hypothyroidism for early stage LSCC treated with RT is high, therefore, routine screening is required. To our knowledge, this is the first study demonstrating the optimal timing for the detection of hypothyroidism.