

# COMBINED SECTIONS MEETING FEBRUARY 4-7, 2010 ORLANDO, FLORIDA

## THURSDAY, FEBRUARY 4 PALAZZO E-H

8:00 Welcome by Vice Presidents

### **Head and Neck Surgery**

Moderator: Richard E. Hayden, MD\*, Phoenix, AZ

### **8:10 Use of the Medicinal Leech for Salvage of Venous Congested Microvascular Free Tissue Transfer of the Head and Neck**

Cody A. Koch, MD PhD, Rochester, MN; Steven M. Olsen, MD, Rochester, MN; Eric J. Moore, MD\*, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) identify indications for the use of leech therapy; 2) understand the risks associated with leech therapy; and 3) recognize leech therapy as an option for the salvage of venous congested microvascular free tissue transfers that do not have venous drainage or have failed surgical revision.

**Objectives:** The success of microvascular free flaps in head and neck reconstruction is high; however, flap failure occurs for many reasons, most frequently venous congestion. Leech therapy is a known mechanism of aiding a venous congested flap until venous outflow can be improved, but it is not commonly described as a sole source of venous outflow. We review our experience with leech therapy in venous congested microvascular free flaps in which venous outflow could not be established or surgical revision was unsuccessful. **Study Design:** Retrospective chart review. **Methods:** Patients from January 2002 to December 2008 who received leech therapy for a venous congested microvascular free flap in which venous outflow could not be established or failed surgical revision were included. The medical record was reviewed for demographics, indications for treatment, duration and frequency of leech therapy, morbidity and outcomes. **Results:** Five patients were identified. Leech therapy was required for a median of 9 days (4-14 days). The median lowest hemoglobin per patient was 7.4 g/dL (5.4-9.3 g/dL). All patients (5/5, 100%) required blood transfusions during therapy. The median number of units of packed red blood cells transfused per patient was 16 units (4-29 units). All flaps (5/5, 100%) were successfully salvaged with leech therapy. There were two minor complications, observed as two episodes of syncope in the same patient related to anemia. **Conclusions:** Leech therapy can be safely used to successfully salvage venous congested microvascular free flaps in the absence of primary venous outflow.

### **8:18 Clinical Outcomes following Transoral Robotic Surgery or Primary Radiotherapy for Squamous Cell Carcinoma of the Oropharynx**

Nathan S. Alexander, MD, Birmingham, AL; Brian P. Sullivan, BS, Birmingham, AL; Jeffery S. Magnuson, MD\*, Birmingham, AL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the outcomes and clinical courses between patients with squamous cell carcinoma (SCC) of the oropharynx who underwent treatment with primary radiotherapy versus transoral robotic surgery (TORS).

**Objectives:** To compare the outcomes and clinical courses between patients with squamous cell carcinoma (SCC) of the

oropharynx who underwent treatment with primary radiotherapy versus transoral robotic surgery (TORS). **Study Design:** Retrospective review. **Methods:** Patients with SCC of the oropharynx undergoing treatment with primary radiotherapy with or without chemotherapy were compared to a similar cohort of patients treated with TORS. Inclusion criteria consisted of T1 and T2 lesions of the tonsil and base of tongue. Parameters analyzed included demographics, overall staging, total dose radiation, chemotherapy, need and duration of gastrostomy tube, tracheotomy, and recurrence. **Results:** Twenty-seven patients received primary radiotherapy and 32 patients underwent robotic assisted resections. Most patients were males (80%) and the mean age was 55 years. Overall stage distribution for the radiotherapy group was I-0, II-4%, III-19%, IV-78%, and for the TORS group was I-9%, II-22%, III-13%, IV-66%. Sixteen (50%) TORS patients received postoperative radiotherapy. Total radiation dose in the primary radiotherapy group was 73Gy and in the TORS group was 60Gy ( $p<0.001$ ). Nineteen (70%) patients received chemotherapy in the primary radiotherapy group versus three (9%) patients in the TORS group ( $p=0.002$ ). Twenty-four (89%) patients in the radiotherapy group required gastrostomy tubes for an average of 9.4 months and 9 (28%) TORS patients used gastrostomy tubes for an average of 4.5 months ( $p=0.09$ ). No radiotherapy patients received a tracheotomy and three (9%) TORS patients underwent tracheotomy ( $p=0.25$ ). One patient was decannulated on postoperative day three. Four (14%) patients developed recurrence in the primary radiotherapy group while 1 (3%) TORS patient developed a recurrence ( $p=0.16$ ). **Conclusions:** Transoral robotic assisted surgery for cancer of the oropharynx may allow for decreased doses of radiation and chemotherapy while providing similar outcomes.

## 8:26 A Novel Quantitative Approach to Nal Expression Evaluation in Benign and Malignant Thyroid Disease

Sunny S. Khichi, BS, Augusta, GA; Paul M. Weinberger, MD, Augusta, GA; Ross A. Udoff, BS, Augusta, GA; Julien A. Norton, BS, Augusta, GA; David J. Terris, MD\*, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the use of multispectral imaging in the quantification of Nal symporter expression and correlate symporter expression with the expression of key glucose transport and metabolism enzymes in a panel of benign and malignant thyroid tissue.

**Objectives:** To quantitatively measure the expression of the sodium-iodide symporter (Nal) and correlate that with the immunohistochemically recorded expression of key glucose transport and metabolism enzymes in benign and malignant thyroid tissue. **Study Design:** Laboratory based evaluation of tissue microarray (TMA) protein expression in benign and malignant thyroid tissue using a novel quantitative imaging technique. **Methods:** A commercially available tissue microarray consisting of benign and malignant thyroid tissue was queried by immunohistochemistry. Expression of Nal was measured using multispectral imaging software to accurately quantify and record protein expression. Nal expression was then correlated to the expression of GLUT-1, HK2, and F1-ATPase, key enzymes in cellular glucose uptake and metabolism. Comparisons between protein expression level and clinical/pathologic data were made by Wilcoxon-Mann-Whitney test. **Results:** Thirty-seven unique samples from 33 patients, in duplicate, were analyzed. There were 23 malignancies (11 PTC, 5 follicular, 5 medullary and 2 anaplastic carcinoma), 10 BND, and 4 normal thyroids. In all tissue we noted a significant positive correlation between Nal expression and Glut1/Hex2 expression ( $p<0.014$ ). With regards to Nal expression, no significant difference was noted between PTC, FC, BND and normal. Medullary and anaplastic carcinoma had decreased Nal expression compared to normal thyroid tissue. Among cancers, no correlation was noted between TNM stage and Nal expression. **Conclusions:** Multispectral imaging in combination with TMA techniques can be successfully applied to the analysis of thyroid cancer. Co-overexpression of Nal and Glut-1/HK2 in select thyroid malignancies suggests a biologic relationship between increased glucose consumption and Nal activity.

## 8:34 Cervical Metastasis from Unknown Primary: Clinical Outcomes after Combined Modality Therapy

Eli R. Groppo, MD, San Francisco, CA; Sue S. Yom, MD, San Francisco, CA; Vivek V. Gurudutt, MD, New York, NY; David W. Eisele, MD\*, San Francisco, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss cervical metastasis with unknown primary survival.

**Objectives:** Cervical metastasis from an occult primary is an uncommon cancer of the head and neck. Agreement on the optimal treatment for this disease is lacking. Treatment typically includes some combination of neck dissection (ND), external beam radiation (XRT), and chemotherapy (CH). The goal of this study was to evaluate outcomes in patients initially treated surgically versus those treated nonoperatively. **Study Design:** Retrospective cohort. **Methods:** A 15 year retro-

spective cohort design was employed. Only patients diagnosed with metastatic squamous cell or undifferentiated carcinoma with occult primary were included. Patients were divided into two treatment groups: 1) ND + XRT ± CH or 2) XRT ± CH. Demographic, nodal (N) stage, and survival data were compared. **Results:** A total of 35 patients met all inclusion criteria, of whom 15 had initial surgery and 20 did not. There were no significant differences among these groups with regard to demographics, risk factors, and presenting nodal stage. The average followup was 33.1 months in the surgical group and 22.6 months in the nonoperative group. The average 5 year survival was 91.7% in the surgical group and 84.2% in the nonoperative group ( $p = 0.36$ ). Mortalities occurred only in patients with N3 disease at presentation, who had 50% mortality at 18 months, regardless of treatment type. **Conclusions:** Both surgical and nonoperative treatment algorithms achieve excellent 5 year survival rates in patients with cervical metastasis from an unknown primary. The survival of patients with advanced neck disease (N3) is poor regardless of treatment type and protocol based intensification of therapy should be considered.

## 8:42 Salivary Endoscopy for the Management of Giant Sialoliths: Feasibility of Gland Preservation, Results, and Review of Literature

Rohan R. Walvekar, MD, New Orleans, LA; Eric Wallace, BSc, New Orleans, LA (Presenter); Marcie Tauzin, MD, New Orleans, LA; Barry Schaitkin, MD, New Orleans, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the current literature on large stones, management of giant stones and the impact of salivary endoscopy on the management of giant salivary stones.

**Objectives:** To report our experience with management of giant stones using sialoendoscopic and to evaluate feasibility of gland preservation, and update current literature on giant stones. **Study Design:** Retrospective chart review.

**Methods:** A retrospective review of giant stones treated at our institution from 2005 to 2008 is presented. All patients were treated with sialoendoscopic localization of stones and a simultaneous combined approach (intraoral removal for submandibular gland and external parotid approach for parotid stone) stone extraction with gland preservation. In addition, an internet based literature search was performed via PubMed with key words, "giant sialoliths, sialolithiasis, and salivary stone of unusual size". Forty-seven articles from 1942—2009 were reviewed to update literature on reported giant stones.

**Results:** Seven patients (4 male and 3 female patients) with giant stones (mean size, 19mm x 11mm) were identified. The site of stone was most common on the left and in the submandibular gland. Our series was in agreement of the meta-analysis of 47 stones from our literature review. Gland preservation rate with salivary endoscopy was 6/7 (85%) as compared to 17/47 (36%) with traditional techniques. **Conclusions:** Sialoendoscopy with combined approach is an effective means of managing giant stones, maintaining postoperative salivary flow with higher gland preservation rate. Our literature review updates reported giant stones to 54, including our 7 patients.

8:50 - 8:58 Discussion/Q&A

## General Otolaryngology

Moderator: Ronald G. Amedee, MD\*, New Orleans, LA

## 8:58 JOHN J. CONLEY RESIDENT RESEARCH AWARD (Eastern Section) Disposable Sheaths for Fiberoptic Flexible Endoscopes to Prevent Cross-Contamination Compared to Standard Germicidal Liquid Disinfection

Alphi P. Elackattu, MD, Boston, MA; Mary Zoccoli, MD, Boston, MA; Jeffrey H. Spiegel, MD, Boston, MA; Kenneth M. Grundfast, MD\*, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) compare methods of disinfection for flexible endoscopes; 2) explain the importance of adequate flexible endoscope processing; and 3) discuss potential dangers in current endoscope processing.

**Objectives:** To determine the efficacy of a sterile disposable sheath in preventing contamination of fiberoptic nasopharyngoscopes (FNPL) and review current disinfection guidelines. **Study Design:** Randomized controlled trial.

**Methods:** All FNPL's were disinfected according to applicable federal guidelines from the Center for Disease Control

(CDC) and industry recommendations from the Association for the Advancement of Medical Instrumentation (AAMI) (industry). Baseline cultures were taken from multiple sites on 100 FNPL's. Each FNPL was then randomly assigned to either the sheath alone (experimental) or germicidal immersion (control) group. After use, and disinfection according to the respective protocol for each group, bacterial cultures were repeated. In addition, the ability of medical assistants to adhere strictly to protocol methods was observed unbeknownst to the staff and the time required for use of each method was recorded. **Results:** The disposable sheath provides protection against cross-contamination equivalent to immersion in germicidal solutions. Time spent using the sheath method averaged 89 seconds versus 14 minutes for the germicidal process. Subjective observations of staff suggest that germicidal immersion may subject patients to increased risk of contamination due to the relative increased complexity of this method. **Conclusions:** Sterile disposable sheaths are effective in preventing cross-contamination and have some advantages when compared with sterilization via germicidal liquid immersion.

## 9:06 Efficacy of Sound Level Teaching for Hearing Conservation among College Students Using Personal Digital Audio Players

Jordan L. Wallin, MD, Winston Salem, NC; Matthew W. Wade, MD, Irvine, CA; Sung Won Kim, MD MS, Milwaukee, WI; Benjamin N. Voorhies, MD, Salt Lake City, UT; Ayman El Mohandes, MBBCh MD, Washington, DC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) describe limitations regarding one's ability to self-monitor potentially harmful personal digital audio player usage; and 2) counsel patients about the current risks, recommendations, and prevention of hearing loss associated with noise exposure in leisure time.

**Objectives:** Determine if college students can identify safe volume levels on their personal digital audio players (PDAPs) after receiving didactic teaching with an audio demonstration of safe volume levels. **Study Design:** Prospective cohort study of 78 participants. **Methods:** Flexible probe tubes were placed in the external auditory canal to collect sound pressure measurements using the participants' PDAPs. Participants were taught appropriate volumes correlating to specific time exposures and then required to repeat the volumes within  $\pm 5$  decibels (dBA). Participants returned 1-3 weeks later to retest their ability to reproduce safe volumes. **Results:** After the didactic educational intervention participants were statistically better at identifying the recommended volume for an 8 hour exposure (10.9% vs. 68.7,  $p=0.001$ ) and a 15 minute exposure (56.3% vs. 79.7%,  $p=0.0021$ ). Seventy-seven percent of participants were able to reproduce the demonstrated volumes (85 dBA and 100 dBA) on their PDAP within  $\pm 5$  dBA at the first teaching intervention. Upon followup, accuracy within  $\pm 5$  dBA of 85 dBA was 46.2%. Similarly, 43.6% were able to reproduce 100 dBA within  $\pm 5$  dBA. Ninety-six percent of participants kept the volume level at or below standards to prevent NIHL after the intervention. **Conclusions:** The ability to reproduce safe PDAP volumes increased significantly after education. While inaccurate at reproducing the taught volume levels, participants were able to maintain volume levels below accepted industrial levels to reduce NIHL. Manufacturers and regulators should work together to implement protective measures for PDAP use.

## 9:14 Retained Ductal Stone after Submandibular Gland Removal - A Preventable Problem

Andrea E. Potash, MD, Iowa City, IA; Henry T. Hoffman, MD\*, Iowa City, IA (Presenter)

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain a new retrograde use of the sialendoscope to ensure complete stone removal when performing submandibular gland removal for sialolithiasis and discuss and compare different techniques for sialolithiasis treatment.

**Objectives:** We present a preventable case of a retained stone after incomplete submandibular gland excision causing persistent symptomatic disease and necessitating further surgery; that could have been avoided using a new retrograde use of the sialendoscope to ensure complete stone removal when performing submandibular gland removal for sialolithiasis. **Study Design:** We describe six cases at a tertiary care center of submandibular gland removal for sialolithiasis(es). All were performed by a single surgeon from November 2007 to June 2009. Two were performed prior to obtaining sialoendoscopy equipment and four after. **Methods:** Use of the sialendoscope following submandibular gland resection was readily done in a retrograde fashion by identifying and cannulating the duct as the gland is removed. Our retrograde technique is performed for selected cases after removal of the submandibular gland via the standard excision. **Results:** The retained stone case caused persistent infection, discomfort, morbidity and required further surgery to excise the remaining gland and duct with stone. Retrograde use of sialendoscopes in the last four cases helped to identify and remove further stones and ensure there were no retained concretions in Wharton's duct. **Conclusions:** Retrograde sialoendoscopy would have been useful in the first two cases as it was in the last four. This novel technique could have prevented a sec-

and surgery as well as continued symptomatic disease. Use of the sialendoscopes in the antegrade and retrograde fashion could treat at the time of initial intervention and eliminate the risk of retained stones thereby decreasing cost and morbidity for patients.

## 9:22

### Ten Year Retrospective Review of Supraglottitis among All Ages at One Hospital in the Haemophilus Influenza Type B Vaccine Era

Earl H. Harley, MD, Washington, DC; Elizabeth A. Guardiani, MD, Washington, DC (Presenter);  
Morgan R. Bliss, BS, Washington, DC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the current demographics, presentation, interventions and outcome of supraglottitis to the classic demographics, presentation, and interventions from the pre-vaccine era.

**Objectives:** The purpose is to review the demographics, presentation, interventions and outcome of supraglottitis at one hospital that treats all ages. Data is reviewed over a ten year period when the haemophilus influenza type B vaccine is routinely administered and is compared to the classic demographics, presentation, and interventions in the pre-vaccine era.

**Study Design:** Charts from 1995 to 2005 were obtained. Diagnosis codes were used to identify charts. Exclusion criteria were incomplete charts or unsupported diagnoses. Information was organized into a flow sheet and objectively analyzed. **Methods:** Two reviewers determined accuracy of the diagnosis by confirming the results from radiology, laryngoscopy, and/or cultures. **Results:** Fifty-one diagnoses of epiglottitis or supraglottitis were identified. Complete data was available for review from twenty patients. The average age was 45 years old and the range was 7 to 75 years old. Fourteen patients were male. Most common symptoms at presentation were odynophagia (95%) and dysphagia (75%). Stridor, drooling and leaning forward were uncommon. All were examined with laryngoscopy, and radiographs of the neck were used in nine. Steroids were used in addition to antibiotics in sixteen patients. Oral intubation was attempted in one and tracheotomy was performed in two. There were no mortalities. **Conclusions:** The data from this review support the hypothesis that supraglottitis in the era of the haemophilus influenza type B vaccine is an adult disease with a more subtle presentation and milder course than classically taught. Laryngoscopy aids in diagnosis without causing obstruction of the airway. Patients treated with antibiotics and steroids may recover without intubation.

## 9:30

### Population Based Analysis of Oral and Oropharyngeal Carcinoma: Changing Trends of Differentiation, Survival and Patient Demographics

Vikas Mehta, MD, New York, NY; Guopei Yu, MD, New York, NY; Stimson P. Schantz, MD\*, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to observe temporal trends in histologic differentiation, patient demographics and 5 year relative survival rates of oral cavity (OC) and oropharyngeal (OP) squamous cell carcinoma seen using the Surveillance, Epidemiology and End Results (SEER) database. They will be able to discuss the population based impact of human papilloma virus (HPV) and smoking incidence on prognosis, treatment and possible prevention of OC/OP carcinoma.

**Objectives:** Oral cavity and oropharyngeal (OC/OP) squamous cell carcinoma (SCCA) has changed significantly since the 1970s due to a decline in smoking rates and an increased percentage of human papillomavirus (HPV) related tumors. We tested the hypothesis that HPV is changing the demographics, histology and survival of the US OC/OP cancer patient population. **Study Design:** Retrospective cohort analysis was done using the Surveillance, Epidemiology and End Results (SEER) database of the national cancer institute. **Methods:** SEER data was used to design 7 cohorts: 1975-1979, 1980-1984, 1985-1989, 1990-1994, 1995-1999, 2000-2004, and 2005-2006. Histologic tumor grade and five year survival rates were analyzed over time. Further subgroup delineation was performed according to site, age, gender, marriage status and race. **Results:** In both the oral cavity and oropharynx, well differentiated (grade I) tumors decreased significantly over time, from 33% to 16%, between 1975-2006 ( $p < 0.001$ ). In contrast, poorly differentiated tumors (grade III) increased from 23% to 34% ( $p < 0.001$ ). This trend was more pronounced in the single, never married male population. Overall, five year survival rates improved for all sites over time, but increasingly in the less differentiated tumors compared to the well differentiated (57% vs. 15.5%). Tonsil, oropharyngeal and tongue subsites showed the greatest change in survival over time. Racial and gender trends were also investigated. **Conclusions:** Comprehensive population based analysis of oral cavity and oropharyngeal carcinoma from 1975-2006 demonstrated significant trends toward decreased tumor differentiation and increased survival over time. These findings support the role of HPV in OC/OP carcinoma and may have implications for treatment, prognosis and possibly prevention.

9:38 - 9:46 Discussion/Q&A

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9:46 - 10:15 **Break with Exhibitors/Visit Posters**  
(Mediterranean 1-4)

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**10:20** Presidential Address  
ENT and the Magic Kingdom  
Frank E. Lucente, MD\*, Brooklyn, NY

### **Otology/Neurotology**

Moderator: David M. Barrs, MD\*, Phoenix, AZ

**10:40** Device Fixation in Cochlear Implantation—Is Bone Anchoring Necessary?

Timothy B. Molony, MD, New Orleans, LA; Jerald E. Giles, MD, New Orleans, LA (Presenter); T. Luke Thompson, MD, New Orleans, LA; Kevin K. Motamedi, BS, New Orleans, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare outcomes between cochlear implant devices placed using different techniques.

**Objectives:** To compare complication rates between patients whose cochlear implants were secured by a bony tie-down technique versus those secured by a periosteal tie-down technique. **Study Design:** A retrospective review of 302 consecutive patients undergoing cochlear implantation (327 implants), including both adults and children, at a single institution by a single surgeon. **Methods:** Cochlear implantation was performed in standard fashion with bony securement of the device in the first subset of patients. The surgical technique was then modified to exclude the bony tie-down step in favor of a periosteally placed suture tie-down in the next subset of patients. The patient's medical records were then reviewed to determine complications, which were then compared between groups using chi-squared testing. **Results:** The overall complication rate for the periosteally secured cochlear implant subset was 9.88%, with no significant difference noted when compared to the 12.2% overall complication rate seen with the bone secured implants. Minor complication rates were 9.88% and 7.7% respectively, with major complications occurring in 0% and 4.47% of periosteally secured versus bone secured devices. There were no statistical differences between groups for major, minor, or any specific complications. **Conclusions:** Cochlear implant devices may be secured in place with periosteally anchored sutures in lieu of bony anchored sutures without any significant increases in perioperative complications.

**10:48** Hearing Loss Alters Auditory Nerve Synaptic Dynamics to VCN Stellate Cells

Alexander W. Rich, BA, Chapel Hill, NC; Paul B. Manis, PhD, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the effects of noise induced hearing loss on stellate cells in the ventral cochlear nucleus and how that may be a central cause of tinnitus.

**Objectives:** Noise induced hearing loss (NIHL) affects over 10 million people in the United States. Auditory nerve (AN) synapses in ventral cochlear nucleus (VCN) end on two principal cell types, bushy and stellate cells (SC). While hearing loss degrades temporal processing in bushy cells, little is known about its effects on SCs. The goal of this study was to investigate the effects of NIHL on SCs. **Study Design:** Comparative animal experimental study. **Methods:** We characterized transmission from AN to SCs in CBA/Caj mice exposed for 2 hours to 100 dB SPL 8-16kHz noise to produce a temporary threshold shift (TTS, 2 days) and 116 dB SPL to produce a permanent threshold shift (PTS, 2 weeks). AN-evoked excitatory postsynaptic currents (eEPSCs) and spontaneous miniature currents (mEPSCs) were then measured in brain slices. The results were analyzed for relative synaptic depression, and mEPSC frequency/amplitude, which reflect the prob-

ability of presynaptic vesicle release. **Results:** Auditory brainstem response thresholds were elevated by 35dB in TTS and PTS mice. eEPSCs showed significantly greater synaptic depression in PTS mice at 200Hz and 300Hz, but not at 50 or 100Hz. Spontaneous mEPSC frequency was dramatically higher in TTS mice (Control 1.8Hz; TTS 10.1Hz,) and PTS mice (6.7Hz), and mEPSC amplitude was larger in PTS mice (Control 55pA; PTS 71pA). **Conclusions:** Our results show a differential processing of AN activity by the bushy and stellate cells in the VCN, and thus may be important in optimizing cochlear implant stimuli. The dramatic increase in spontaneous vesicle release after NIHL may be a mechanism underlying tinnitus.

## 10:56 WILLIAM W. MONTGOMERY RESIDENT RESEARCH AWARD (Eastern Section) Symptomatic Sleep Disturbance and Idiopathic Dizziness - A Novel Association

Leigh J. Sowerby, MD, London, ON Canada; Meggan A. Brine, BSc, London, ON Canada; Brian W. Rotenberg, MD, London, ON Canada; Charles F.P. George, MD, London, ON Canada; Lorne S. Parnes, MD\*, London, ON Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be aware of the potential need to screen patients presenting with idiopathic dizziness for symptoms of sleep disturbance.

**Objectives:** To determine if an association exists between symptomatic sleep disturbance and idiopathic dizziness. **Study Design:** Case control study of new patients presenting to a tertiary neurotologic practice. A total of 46 subjects with idiopathic dizziness (ID), 20 positive controls with benign paroxysmal positional vertigo (BPPV), and 69 negative controls with hearing loss but no dizziness (HL), were enrolled. **Methods:** Participants (patients diagnosed with BPPV, ID or HL, and meeting all other inclusion criteria) completed a sleep disturbance questionnaire and had a complete physical exam and investigations to establish or exclude a neurotologic diagnosis. They were subsequently evaluated for risk of symptomatic sleep disturbance based on the Epworth Sleepiness Scale (ESS), the Berlin Questionnaire, and the Multivariate Apnea Risk Index (MAP). Statistical analysis was carried out using SPSS. **Results:** There was no significant demographic difference amongst the groups in terms of age, sex, body mass index, neck size, alcohol consumption or smoking. Using a cutoff of both 10 and 12 on the ESS, the ID were more likely to have significant daytime somnolence than the HL group, with a likelihood ratio of 7.8 for the ESS12 score ( $p=0.021$ ) and 7.1 for the ESS10 score ( $p=0.029$ ). Using the MAP score, a statistically significant difference between the ID group and both the BPPV group (LR 3.99,  $p=0.046$ ) and the HL group (LR 5.46,  $p=0.019$ ) was found. **Conclusions:** This study suggests that a previously undescribed link between idiopathic dizziness and symptomatic sleep disturbance might exist. Prospective investigation is warranted to determine whether treatment of sleep disturbance resolves symptoms of idiopathic dizziness.

## 11:04 Association between Vascular Loops and Ipsilateral Auditory Symptoms

Sean R. Wise, MD, San Diego, CA; Caroline T. Messmer, MD, San Diego, CA; David A. Besachio, MD, San Diego, CA; Daniel B. Hawley, MD, San Diego, CA; Ben J. Balough, MD, San Diego, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to have an improved understanding of the clinical significance of vascular loops in contact with the eighth nerve complex as seen by MRI.

**Objectives:** To evaluate the imaging characteristics of vascular loops formed by the anterior inferior cerebellar artery (AICA) within the cerebellopontine angle (CPA) and internal auditory canal (IAC), and to clinically correlate these findings to ipsilateral tinnitus and asymmetric sensorineural hearing loss. **Study Design:** Retrospective chart and records review. **Methods:** A retrospective chart review was performed for 521 consecutive adult patients who were referred for MRI for unexplained unilateral auditory symptoms. The MRI protocol utilized a three dimensional fast imaging employing steady-state acquisition (3D-FIESTA) screening sequence for each patient. Identified vascular loops were characterized by position within the CPA and IAC, and when possible, by the specific site and extent of contact with the seventh-eighth nerve complex. The contralateral, asymptomatic ears of all patients served as controls. Data was analyzed to assess for associations between the presence and characteristics of identified vascular loops and ipsilateral auditory symptoms identified through chart review. **Results:** Vascular loops were identified in 90.98% of right ears, and in 89.06% of left ears. Loops were seen entering the IAC in 33% of cases. Vascular contact with the cochlear nerve was identified in 28.21% of right ears and in 34.36% of left ears. No significant associations were identified when comparing ipsilateral auditory symptoms against the presence of a vascular loop, degree of penetration into the IAC, or location or extent of nerve contact. **Conclusions:** Vascular loops identified by MRI within the CPA and IAC should be considered a normal finding and appear unrelated to ipsilateral auditory symptoms.

## 11:12 Electrode Failure and Device Failure in Adult Cochlear Implantation

Bradley P. Schow, BS, Milwaukee, WI; David R. Friedland, MD PhD\*, Milwaukee, WI; Christina L. Runge-Samuelson, PhD, Milwaukee, WI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand 1) the incidence of electrode failure and device failure in cochlear implants; and 2) the relationship between electrode failure and device failure.

**Objectives:** To determine the frequency of cochlear implant electrode failure and the relationship with overall device failure. **Study Design:** Retrospective chart review. **Methods:** We analyzed electrode status in 322 functioning and in use devices from 366 adult cochlear implant patients currently followed at our center. We also analyzed an additional 16 devices that had been explanted. Electrode failure was defined as unacceptably high impedance alone or in combination with aberrant percepts. **Results:** At least one electrode had been turned off in 173 devices (54%). Most inactivated electrodes were the basal-most and had been turned off to improve sound quality. Of 5870 total electrodes, 32 were considered to have failed (0.5%), occurring in 22 devices (7%). These 22 devices are still in use (mean: 43.0 ±29.8 months) without further electrode failures or device failure. There were no statistically significant differences in electrode failure rates among device models. Six of 16 device explantations were due to device failure and only 1 of those 6 had failed electrodes prior to explantation. These 4 electrodes all failed within a timeframe of 4 months. **Conclusions:** An inherent risk of cochlear implantation, as with all implanted electrical prostheses, is device failure. Failure of individual electrodes has been postulated to represent an early indicator of impending device failure. Our data demonstrate that electrode failure does not necessarily predict impending device failure. Although maps containing inactivated electrodes are fairly common, electrode failure as a reason for bypassing an electrode is rare and is often manageable with programming.

11:20 - 11:28 Discussion/Q&A

## 11:30 Keynote Address Health System Reform and the Arrogance of Power Donald J. Palmisano, MD JD, Metairie, LA - Past President, AMA

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12:10 - 1:20 Lunch/Visit Exhibits and Posters  
(Mediterranean 1-4)

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# THURSDAY, FEBRUARY 4

## PALAZZO E-H

### 1:20 - 2:15

#### COMPREHENSIVE REVIEW OF MENIERE'S DISEASE

**Moderator:** Michael E. Hoffer, MD\*, San Diego, CA  
**Panelists:** Derald E. Brackmann, MD\*, Los Angeles, CA  
Joni K. Doherty, MD PhD, San Diego, CA  
Lorne S. Parnes, MD\*, London, ON  
Herbert Silverstein, MD\*, Sarasota, FL

**Educational Objective:** At the conclusion of this presentation, attendees should be able to 1) understand the variety of options available to practitioners after conservative therapy fails; 2) understand the current state of the art for established Meniere's therapy including endolymphatic sac and nerve section; and 3) understand the current state of the art for novel new therapies for Meniere's disease.

### 2:20 - 3:15

#### CONTROVERSIES IN PEDIATRIC TONSILLITIS, OTITIS, AND SINUSITIS: WHY ARE WE STILL TALKING ABOUT THESE COMMON DISEASES?

**Moderator:** Margaret A. Kenna, MD\*, Boston, MA  
**Panelists:** Kenny H. Chan, MD\*, Denver, CO  
Joseph Haddad Jr., MD\*, New York, NY  
Laura J. Orvidas, MD\*, Rochester, MN  
David E. Tunkel, MD\*, Baltimore, MD

**Educational Objective:** Participants will learn 1) about the current indications for T and A, tympanostomy tube placement, and sinus surgery in children; 2) the current diagnostic criteria for tonsillitis, OSA, sinusitis and otitis in children; and 3) about the newer diagnoses of PFAPA and PANDAS.

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3:15 - 3:40 *Break/Visit Exhibits and Posters*

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### 3:45 - 4:35

#### CONTROVERSIES IN AIRWAY MANAGEMENT

**Moderator:** Marion E. Couch, MD PhD, Chapel Hill, NC  
**Panelists:** Joseph A. Brennan, MD, San Antonio, TX  
William R. Carroll, MD, Birmingham, AL  
Christine G. Gourin, MD\*, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, attendees should be able to 1) develop an algorithm for managing the airway of patients with severe facial trauma; 2) develop an algorithm for managing the airway of patients with head and neck cancer; 3) know the advantages and disadvantages of percutaneous tracheostomies; 4) know new technology for managing the airway of intubated patients in the intensive care units.

# 4:40 - 5:30

## **SURGICAL SALVAGE FOR RECURRENT HEAD AND NECK CANCER**

**Moderator:** Robert L. Ferris, MD PhD, Pittsburgh, PA

**Panelists:** Daniel G. Deschler, MD, Boston, MA  
David W. Eisele, MD\*, San Francisco, CA  
Thomas D. Shellenberger, MD, Orlando, FL

**Educational Objective:** At the end of this presentation, attendees should be able to 1) understand the role of surgery after recurrence of head and neck cancer; and 2) compare the relative merits of salvage surgical approaches to head and neck cancer after chemoradiotherapy.

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**6:00 - 8:00** *President's Welcome Reception*  
*(Valencia Terrace)*

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# THURSDAY, FEBRUARY 4

## PALAZZO AB

### **Head and Neck Surgery**

Moderator: Jan L. Kasperbauer, MD\*, Rochester, MN

# 1:20

### **Photofrin-Mediated Photodynamic Therapy for Treatment of Early Stage Laryngeal Malignancies**

Melissa L. Somers, MD, Detroit, MI; Vanessa G. Schweitzer, MD\*, Detroit, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand administration and indications for use of photodynamic therapy in laryngeal malignancies.

**Objectives:** To evaluate the efficacy of PHOTOFRIN-mediated photodynamic therapy (PDT) for the treatment of Tis through T1 squamous cell carcinoma (SqCCa) of the larynx in patients not amenable to or that failed conventional head and neck treatment. **Study Design:** This is a retrospective study of 30 patients with field cancerization and early stage Tis-T1 SqCCa of the larynx treated with PHOTOFRIN-mediated PDT. **Methods:** Intravenous PHOTOFRIN (porfimer sodium) (dose 2.0 mg/kg) was administered as an outpatient, followed 48-60 hours later by intraoperative photoactivation at 630 nm via fiberoptic microlens surface delivery (surgical light dose 50-100 J/cm<sup>2</sup>). **Results:** Nineteen of 30 patients (63%) have demonstrated complete remission (followup 1 month to 131 months). There were 11 patients that were noted to have partial remission with recurrence observed at 1-18 months subsequently retreated with conventional therapy. **Conclusions:** PHOTOFRIN-mediated photodynamic therapy can be used as a primary modality to treat Tis-T1 tumors of the larynx or for treatment for those that have failed prior surgery and/or radiation therapy. PDT allows for preservation of function and structure to maintain or improve voice with absence of systemic toxicity. Patients may have multiple drug administrations and laser light retreatment for local disease control.

# 1:28

### **The Impact of Radiotherapy on Facial Nerve Repair**

Paul W. Gidley, MD, Houston, TX; Stephanie J. Herrera, MD, Houston, TX; Matthew M. Hanasono, MD, Houston, TX; Peirong Yu, MD, Houston, TX; Roman J. Skoracki, MD, Houston, TX; Randal S. Weber, MD\*, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the success of facial nerve repair despite radiotherapy.

**Objectives:** To study the impact of radiotherapy on the success of direct facial nerve repair and cable grafts. **Study Design:** Retrospective review. **Methods:** Pre- and postoperative facial nerve function was assessed using the House-Brackmann (HB) grading system. **Results:** Thirty-nine (39) patients were identified who had undergone facial nerve repair: primary repair in 5 patients (13%) and nerve graft in 34 patients (87%). Radiotherapy was administered postoperatively to 34 (87%) of these patients. Preoperative House-Brackmann scores were HB I = 18, II = 11, III = 3, IV = 3, V = 3, and VI = 1. Postoperative scores were HB I = 1, II = 4, III = 16, IV = 6, V = 3, and VI = 9. Only patients with isolated branch deficits recovered to HB I or II function. Good facial function (HB I-III) was achieved in 17/34 (50%) patients who received postoperative radiotherapy compared to 4/5 (80%) patients who did not receive postoperative radiation (Pearson chi square  $p = 0.548$ ). Of patients who had either HB I or II preoperatively, fifty-nine percent (59%) achieved good postoperative function (HB I to III). Four out of 10 (40%) patients with significantly compromised preoperative facial function (HB III to VI) were able to achieve a HB III score. **Conclusions:** Postoperative radiation therapy does not prevent achieving good facial function from a nerve repair, especially when normal or near normal function is present preoperatively. Some patients with fair to no function preoperatively can achieve reasonable postoperative function with facial nerve reconstruction.

# 1:36

### **Analysis of Primary Total Laryngectomy vs. Salvage Total Laryngectomy: Differences in Populations, Surgical Findings, and Outcomes**

VyVy N. Young, MD, Louisville, KY; Jeffrey M. Bumpous, MD\*, Louisville, KY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) recognize demographic and tumor related differences in the patients typically undergoing primary versus salvage total laryngectomy; 2) compare rates of primary versus pectoralis flap closure in these groups; 3) understand and anticipate complication rates in these groups of patients; and 4) apply this information to developing a management algorithm for their own laryngeal cancer patients.

**Objectives:** To evaluate patients undergoing salvage vs. primary laryngectomy. **Study Design:** Retrospective review. **Methods:** 22 patients undergoing primary total laryngectomy (PTL) between 1996-2004 were randomly selected. Comparison was made to a previously studied salvage total laryngectomy (STL) group (n=20) from the same time period. **Results:** There was no difference in age, gender, or tobacco/alcohol use history. At presentation, PTL patients tended to be advanced stage (T3-4), 86% vs. 40%, p=0.005 while STL patients were more likely to be early stage (T1-2), 55% vs. 13.6%, p=0.012. STL patients were more likely to have true glottic lesions, 50% vs. 9%, p=0.009. PTL patients were more likely to have moderately differentiated tumors, 72% vs. 30%, p=0.014. There was no difference in rate of primary (p=0.856) or pectoralis flap (p=0.851) closure. PTL patients reported a higher average number of medical problems, 3.1 vs. 1.65, p=0.016. However, there was no difference in specific types of comorbidities or percent of patients with no comorbidities. Early complications were more often seen in STL patients p<0.0001. The type of complication was not different between groups (p=0.128 for minor, p=0.527 for major, p=0.669 for both). **Conclusions:** Various options exist for management of laryngeal cancer. Laryngectomy can be performed as an initial or salvage procedure. PTL is done more frequently in late T-stage cancers that are predominantly supraglottic and moderately or poorly differentiated in grade, in patients with a significantly higher number of comorbidities. STL tends to be performed in patients with initially early T-stage tumors that are usually glottic lesions, in patients with fewer comorbidities. Interestingly, there was no statistically significant difference in rate of primary versus pectoralis flap closure or in incidence of major, minor or overall complications between primary and salvage total laryngectomy.

1:44 - 1:50 Discussion/Q&A

## 1:50 Endoscopic Thyroidectomy--Modifications of the Miccoli Technique for the Low Volume Surgeon

David J. Terris, MD\*, Augusta, GA; Melanie W. Seybt, MD, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the principles of minimally invasive thyroid surgery, and compare the advantages of modifications for the low volume surgeon to the classical approach.

**Objectives:** To describe experience with modifications of the Miccoli minimally invasive thyroidectomy. **Study Design:** Planned analysis of a prospectively maintained database was undertaken after IRB approval. **Methods:** Demographic and surgical data were obtained and analyzed with attention to age, gender, pathology, incision lengths and complications. **Results:** From a single surgeon series of 784 consecutive thyroidectomies, 163 patients were identified who underwent an endoscopic thyroidectomy. A series of modifications of the classical Miccoli technique evolved over a period of 4 years and include presurgical factors (patient marking in holding area, intubation with laryngeal EMG tube using Glidescope, rotation of operating table away from anesthesia), intraoperative principles (use of operative loupes, slave monitor, laryngeal nerve monitoring and novel instrumentation; identification of the medial cleft and ligation of superior pedicle bundle using ultrasonic technology; avoidance of clips) and postoperative techniques (deep extubation, laryngeal endoscopy, outpatient management, and oral calcium supplementation). **Conclusions:** A minimally invasive endoscopic thyroidectomy is possible even in a practice with moderate surgical volumes by employing several techniques that facilitate the performance of this procedure. A high success rate and low complication rate can be achieved, resulting in improved patient satisfaction.

## 1:58 The Use of Surveillance PET-CT in the Detection of Asymptomatic Recurrence in Head and Neck Cancer Patients

Katherine A. Fernandez, BS, Saint Louis, MO; Daniel J. Wehrmann, BS, Saint Louis, MO; Medhat M. Osman, MD, Saint Louis, MO; Mark A. Varvares, MD, Saint Louis, MO

**Educational Objective:** At the conclusion of this presentation, the participants should be able to evaluate the efficacy of PET-CT as a surveillance tool in previously treated head and neck cancer patients.

**Objectives:** Fused positron emission tomography and conventional computer tomography (PET-CT) has been used for surveillance in head and neck cancer patients to detect early disease recurrence. The utility in scanning asymptomatic patients using PET-CT has not yet been defined. **Study Design:** Retrospective review. **Methods:** A retrospective review was performed on a series of head and neck cancer patients (n=180) at a single institution who had undergone nonstaging FDG-PET-CT scans as an integral part of the patient's followup after receiving definitive treatment. All scans (n=308) were evaluated by board certified physicians and final scan readings from medical records were reviewed for this study. Lesions were defined as a primary, regional or distant site of disease at some point in a patient's course. Each positive lesion was confirmed clinically or histologically as determined by the treating head and neck surgical oncologist. Lesions were considered "asymptomatic recurrence" if clinically undetectable at the time of the scan. The university's institutional review board approved this study. **Results:** The majority of patients evaluated had squamous cell carcinoma of the oral cavity, pharynx and larynx. 28 (9%) of the 308 scans evaluated found asymptomatic disease, or 32 (5%) lesions. Asymptomatic lesions were detected most frequently at distant sites (59%) thoracic, but included primary (9%) and regional (19%) sites as well. **Conclusions:** When utilized, PET-CT scans detected previously unknown asymptomatic recurrence in 9% of scans. This study supports that PET-CT is an effective tool for detecting early asymptomatic recurrent disease and may result in lifesaving interventions in patients followed with this modality.

## 2:06 Factors Associated with Non-Participation in 1 Year Quality of Life Assessment in Patients with Head and Neck Squamous Cell Carcinoma

Christine G. Gourin, MD\*, Baltimore, MD; Kavon C. Kaboli, BS, Baltimore, MD; Brian J. Boyce, MD, Augusta, GA; Lori M. Burkhead, PhD, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the factors associated with 1 year global quality of life and the factors associated with non-participation in quality of life analysis.

**Objectives:** To identify factors associated with long term quality of life (QOL) in head and neck squamous cell cancer (HNSCC) patients. **Study Design:** Prospective cohort study. **Methods:** Two hundred sixty one previously untreated HNSCC patients were prospectively evaluated using the University of Washington QOL questionnaire. **Results:** At 1 year, 152 patients (58%) had complete QOL data. Decreased 1 year global QOL was seen for males, advanced tumor stage, recurrence, lack of insurance, and patients residing in areas with <10% of the population below the poverty level. Multiple linear regression showed a significant effect for larynx tumors ( $\beta=20.421$ ,  $P=0.005$ ), nonoperative treatment ( $\beta=-11.403$ ,  $P=0.004$ ), advanced comorbidity ( $\beta=-21.255$ ,  $P=0.0032$ ), government aid ( $\beta=-21.016$ ,  $P=0.0003$ ), recurrence ( $\beta=-32.521$ ,  $P<0.0001$ ), and initial QOL ( $\beta=-0.719$ ,  $P<0.0001$ ). Insurance status showed a significant interaction with comorbidity that was associated with improved QOL at 1 year for patients with advanced comorbidity receiving aid ( $\beta=33.308$ , 95% CI 10.760-55.856,  $P=0.004$ ). Logistic regression demonstrated significant differences in the odds of non-participation at 1 year for males (OR 0.437,  $p=0.012$ ), T4 disease (OR 0.398,  $P=0.02$ ), lack of insurance (OR 3.423,  $P<0.008$ ), recurrence (OR 0.173,  $P<0.0001$ ), and comorbidity (OR 0.492,  $P=0.02$ ). **Conclusions:** Baseline predictors of QOL, including comorbidity and initial QOL score, significantly impact long term global QOL. Comorbidities and aid status each adversely affect global QOL; however, patients with comorbidities receiving aid appear to have improved QOL after controlling for other variables. QOL analysis may be biased by greater participation from patients who require greater medical attention because of advanced tumor stage, recurrent disease, or comorbidity, while patients without insurance are underrepresented.

2:14 - 2:20 Discussion/Q&A

## Facial Plastic and Reconstructive Surgery

Moderator: J. Regan Thomas, MD\*, Chicago, IL

## 2:20 Novel Applications of Ultrasonic Bone Aspirator in Endonasal Surgery

Leela S. Lavasani, MD, Philadelphia, PA; Edmund A. Pribitkin, MD\*, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the principle of ultrasonic bone aspiration and describe its advantages in endonasal surgery.

**Objectives:** Endonasal surgery often requires precise, graded bone removal without damage to surrounding nasal soft tissue and mucosa. Unfortunately, current techniques using drills and rongeurs may be associated with decreased visualization, heat generation, mechanical chatter and lack of surgical precision with resultant soft tissue injury. We describe the advantages of ultrasonic bone removal in septoplasty, dorsal hump reduction, turbinate reduction and endonasal orbital decompression. **Study Design:** Case series. **Methods:** The SONOPET ultrasonic bone aspirator (MIWATEC Co., Ltd.) utilizes ultrasonic waves to emulsify bone while concurrent irrigation and microsuction of the bone particles produces a clean surgical field. This enables precise, graded removal bone under direct visualization without thermal or mechanical injury to the surrounding soft tissue or mucosa. We describe the first application of this technology to septoplasty, dorsal hump reduction, nasal spine reduction, turbinate reduction and endonasal orbital decompression. **Results:** No individuals experienced delayed healing, infection, scarring or other complications. Advantages of each ultrasonic aspirator technique over commonly accepted methods are delineated through intraoperative video. **Conclusions:** Ultrasonic bone aspiration permits precise, graded bone removal without damage to surrounding nasal soft tissue and mucosa. We describe novel applications of ultrasonic bone aspirator in endonasal surgery and delineate its advantages over conventional techniques.

## 2:28 Transforming Growth Factor- $\beta$ 1 and Oncostatin-M Exhibit Synergy in Osteoinduction

J. Paul Moxham, MD\*, Vancouver, BC Canada; S. Danielle MacNeil, MD, Vancouver, BC Canada (Presenter); Douglas J. Kibblewhite, MD, Vancouver, BC Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the concept of osteoinduction with specific reference to cytokines involved. They should also understand its relevance to reconstruction in otolaryngology.

**Objectives:** Transforming growth factor-beta1 (TGF- $\beta$  1) is a polyfunctional cytokine with known roles in fibrosis and bone formation. Oncostatin-M (OSM) is a member of the interleukin-6 family with controversial roles in bone homeostasis but recent evidence to suggest osteoinductive properties at lower doses. To determine if synergistic osteoinduction exists between OSM and TGF- $\beta$  1 in a rabbit critical calvarial defect model. **Study Design:** Controlled animal study using arms of increasing concentrations of OSM in combination with a low dose of TGF- $\beta$  1 to evaluate the osteoinductive potential of each arm. **Methods:** Fifteen skeletally mature New Zealand white rabbits were randomized into control and experimental arms. Incremental doses of OSM combined with 10 $\mu$ g TGF- $\beta$  1 delivered in an inactivated guanidine-extracted demineralized bone matrix (Gu-DBM) carrier were implanted into a critically sized 13mm calvarial defect. The animals were sacrificed at 4 weeks and histomorphometric analysis was then accomplished. **Results:** TGF- $\beta$  1 and OSM appear to act synergistically with a greater effect noted at lower doses of OSM. At the higher dose of OSM, the synergy is lost and the overall effect appears to be negative on new bone formation. **Conclusions:** In this study TGF- $\beta$  1 and OSM appear to act synergistically in osteoinduction.

## 2:36 Scapular, Parascapular, and Latissimus Dorsi Flap as a Single Multi-Tissue Flap for Repair of Complex Oral Defects

Jeffrey R. Janus, MD, Rochester, MN; Eric J. Moore, MD\*, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the clinicopathological history and various techniques of free tissue transfer for complex oral defects; this will include fibular, radial free flaps, and double flaps. They will also be able to demonstrate knowledge of the physiology, specific technique, and general outcomes for the use of a scapular, parascapular, and latissimus dorsi free flap as a single multi-tissue flap for repair of these oral lesions, which would otherwise require multiple free flaps.

**Objectives:** Complex composite defects of the oral cavity are often created due to en bloc resection of malignant tumors. These defects can involve bone, soft tissue, oral mucosa, and external skin, posing a formidable challenge to the microvascular surgeon. Though advances have been made in free tissue transfer via chimera principles, piggybacking techniques, and double free flaps, increases in operative time and morbidity remain limiting factors. Likewise, advancements in single composite flaps (e.g., Double Skin Paddle Fibular Free-Flap) allow for a single donor site, but limit workable tissue. This report describes our experience with scapular, parascapular, and latissimus dorsi (SPLD) as a combined single unit, multi-tissue flap for composite reconstruction of complex oral defects. **Study Design:** A retrospective review of patients at our institution for which SPLD single multi-tissue flaps were used for the repair of complex oral defects. **Methods:** Outcomes examined include methods of reconstruction based on defect, flap complications (necrosis, venous congestion, fistula), and donor site complications. **Results:** Patients requiring resection of carcinoma with sizable resultant defect were recon-

structed with SPLD flaps. All cases required mandibular reconstruction. Soft tissue deficits included oral mucosa, floor of mouth, extraoral skin, or a combination thereof. All patients were found to be free of carcinoma, with viable reconstruction and minimal complication rate at followup. **Conclusions:** A SPLD free flap as a single multi-tissue flap is a viable and beneficial option for reconstruction of complex oral defects. It provides the volume of tissue necessary to fill composite defects and may not carry the same morbidity of multiple free tissue transfers.

## 2:44 - 2:50 Discussion/Q&A

### 2:50 Free Flap Reconstruction of Lip Defects following Tumor Ablation and Its Effects on Oral Function

Michael J. Latshaw, BA, Birmingham, AL; Nichole R. Dean, DO, Birmingham, AL (Presenter); Robert F. Garza, MD, Birmingham, AL; Eben L. Rosenthal, MD\*, Birmingham, AL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to better understand the expected outcomes in terms of oral function and survival for patients undergoing lip reconstruction following head and neck cancer ablation.

**Objectives:** To evaluate head and neck cancer patients undergoing free flap lip reconstruction. **Study Design:** Retrospective case review. **Methods:** Lip reconstruction using free flaps following ablation of head and neck cancer were reviewed in 21 patients between March 2002 and April 2009. Followup was 10 months (range, 1-46). Outcomes assessed include: oral competency, time to return of oral intake, diet, complications, and mortality rates. Other variables include: defect size, previous cancer treatment, postoperative radiation and surgery, and comorbidity. **Results:** A total of 28 free flaps were harvested during 22 procedures. Patients with full lower lip defects accounted for 43%; the lower lip was involved in 90%. Radial forearm was the most common donor (67.8%). Average hospital stay was 7 days (range, 4-17). Postoperative complications occurred in 47.6%, infection was most common (31%). Postoperative radiation was delivered to 57%. Additional surgery was required in half the patients (47%), with an average of 1.4 procedures each. Two flaps of 28 failed. Oral competency was achieved by the majority of patients (71%). Average time to oral intake was 17 days (range, 0-81); the majority remained on a soft diet (76%). Delay in oral intake correlated with hospital stay ( $P = 0.01$ ). Perioperative mortality from cancer was 14%; 76% had no evidence of disease. Preoperative ASA III status ( $P = 0.03$ ) and preoperative radiation ( $P = 0.11$ ) were predictors of survival. **Conclusions:** Lip reconstruction following tumor ablation produces return of good oral function for most patients. Patients with previous radiation exposure and high comorbidity should be advised of greater risk.

### 2:58 Ridged Repair of Superior Orbital Rim Defects

Casey G. Nekl, MD, Winston-Salem, NC; Dale J. Browne, MD, Winston-Salem, NC; Patrick R. Yeatts, MD, Winston-Salem, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe a straightforward ridged reconstruction strategy for recreating the pitch and contour of the superior orbital rim with limited donor site morbidity.

**Objectives:** A retrospective case series at a single institution involving the use of a split thickness calvarial bone graft harvested from the frontal skull to reconstruct the pitch and contour of the superior orbital rim. **Study Design:** Case series. **Methods:** Retrospective review of a series of four patients (2 with squamous cell carcinoma involving the orbit, 1 with a deforming osteoma resection, and 1 with a osseous hemangioma) who underwent complex resections that included the superior orbital rim. Each was reconstructed with a curved, split thickness calvarial bone graft taken from the frontal skull located at the superior aspect of the created defect. **Results:** All four patients had an aesthetically pleasing result of the contour of the superior orbital rim. None had extrusion or reabsorbance of the graft. There were no recurrences in our study population. **Conclusions:** This technique is a straightforward, effective method of recreating the pitch and contour of the superior orbital rim with ease of donor site harvest. By doing so, it eliminates the difficulty encountered with shaping the rim curvature with straight bone grafts alone.

### 3:06 Enhancement of Ischemic Wound Healing through Inducement of Local Angiogenesis

Hannah S. Milch, BA, Boston, MA; Shai Schubert, PhD, Boston, MA; Jeffrey H. Spiegel, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the viability of stimulating endogenous monocytes to an angiogenic form in order to improve vascularity to skin flaps and ischemic tissues.

**Objectives:** To determine if monocytes can be made into angiogenic progenitor cells and used to improve ischemic tissue healing in a rat model. **Study Design:** Prospective experimental study on Wistar rats. **Methods:** Fifteen rats received caudally based 9x3 cm dorsal skin/panniculus carnosus flap. The rats were divided into three groups, two treatment groups and a control group. Group 1 (N=5) received subcutaneous topical application of i-Monogrid, a biodegradable matrix of collagen and polycaprolactone (PCL) particles containing angiogenic monocytes. Group 2 (N=5) received subcutaneous topical application of Restogel-151, a biodegradable matrix of collagen and PCL particles designed to recruit and host endogenous monocytes. Group 3 (N=5) received no treatment. Skin flaps of all 15 animals were stapled in place and observed daily for wound ischemia and necrosis of the skin flap. One week postoperatively, skin and underlying muscle were harvested for histologic analyses. **Results:** Histologic evaluation of the skin flaps and the underlying base was conducted. This data in addition to the external appearance of the skin is used to determine the effectiveness of the interventions. **Conclusions:** Local delivery of progenitor cells to ischemic wounds has been demonstrated to enhance wound healing. However, the availability of stem cells for therapeutic use is limited, and the use of proangiogenic monocytes may prove to be a viable alternative.

3:14 - 3:20 Discussion/Q&A

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3:20 - 3:50 Break/Visit Exhibits and Posters

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## **Advanced Sinus Surgery/Rhinology**

Moderator: Ralph B. Metson, MD\*, Boston, MA

### **3:55 Photoactivated Disinfection in Chronic Rhinosinusitis**

Yosef P. Krespi, MD\*, New York, NY; Victor Z. Kizhner, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate the effect of laser illumination as an alternative to antibiotics in managing persistent CRS symptoms.

**Objectives:** Near infrared laser illumination (NILI) with or without photoactivated agents was shown to be bactericidal and enhance wound healing. Persistent symptoms of chronic rhinosinusitis (CRS) even following surgery may have negative effect on quality of life, necessitating therapy with antibiotics and steroids. NILI may have future role in the management of CRS patients thus avoiding overuse of antibiotics. **Study Design:** Prospective clinical study. **Methods:** Twenty symptomatic postsurgical patients CRS patients with or without polyposis and positive cultures were divided to two treatment groups, each patient receiving two in-office treatments. Endoscopic appearance grading (EAG) was elaborated. One group was treated with topical agent, Indocyanine green (ICG) followed with 810nm laser, second group was treated with 940nm laser. SNOT20, EAG and cultures obtained prior to each illumination. Saccharin test was performed one week following completion of treatment. **Results:** Staph aureus was the predominant bacterium. Cultures remained positive through treatment. Both therapy arms demonstrated clinical efficacy. SNOT20 scores change was 1.33 (P<0.05) in the 940nm group and 0.66 in the 810nm+ICG (P<0.05) group. Significant improvement (P<0.05) was observed based on the EAG. No significant difference was observed between two groups. All patients passed the saccharin test. Therapeutic effect was sustained for two months. Side effects included mild transient heat sensation during NILI. **Conclusions:** NILI with or without photoactivated agents proved to be beneficial in CRS objectively and subjectively. NILI was safe, reproducible, sustained and appears not to interfere with ciliary motility. Exacerbations of CRS symptoms were avoided without using antibiotics and steroids during the study.

### **4:03 FRANCIS LEJEUNE, SR. RESIDENT RESEARCH AWARD (Southern Section) Exposure to Cigarette Smoke Condensate Reduces Calcium Activated Chloride Channel Transport in Primary Sinonasal Epithelial Cultures**

Frank Wadsworth Virgin, MD, Birmingham, AL; Daniel Schuster, BS, Birmingham, AL; Jumin Sunde, BS, Birmingham, AL; Shaoyan Zhang, PhD, Birmingham, AL; Eric J. Sorscher, MD, Birmingham, AL; Bradford A. Woodworth, MD, Birmingham, AL

**Educational Objective:** At the conclusion of this presentation, the participants should understand the effect of cigarette smoke condensate on calcium activated chloride channels and discuss the therapeutic implications in individuals with chronic rhinosinusitis and frequent tobacco smoke exposure.

**Objectives:** Tobacco-related effects on sinonasal mucociliary clearance (MCC) include decreased hydration of the airway surface liquid (ASL) via inhibition of chloride ( $\text{Cl}^-$ ) secretion and decreased ciliary function. Cystic fibrosis transmembrane conductance regulator (CFTR) channels contribute the predominant  $\text{Cl}^-$  transport conduit within respiratory epithelial cells. Activation of secondary  $\text{Cl}^-$  transport pathways through calcium activated chloride channels (CaCC) has been postulated as a potential mechanism to rescue CFTR mediated transport. However, it is unclear whether CaCC's are affected by tobacco exposure. The current study investigates the effect of cigarette smoke condensate (CSC) on CaCC transport. **Study Design:** In vitro study. **Methods:** Well characterized primary murine nasal septal epithelial (MNSE) and human sinonasal epithelial (HSNE) cultures were exposed to CSC in Ussing chambers. We isolated CaCC short circuit current through stimulation of P2Y purinergic receptors with UTP, ATP- $\gamma$ -S, or ATP and selective inhibition of CFTR pathways. Characterization of CaCC current was also accomplished in transgenic CFTR $^{-/-}$  (knockout) MNSE cultures. **Results:** Change in CaCC mediated current, ( $\Delta I_{\text{sc}}$  - representing transepithelial Ca-mediated  $\text{Cl}^-$  secretion in  $\mu\text{A}/\text{cm}^2$ ) was significantly decreased in CSC exposed wild type MNSE when compared to controls  $\{(32.8 \pm 4.6 \text{ vs. } 47.5 \pm 2.3; \text{ respectively}) p < 0.02\}$ . A similar effect was demonstrated in CFTR / MNSE cultures  $(33.4 \pm 2.8 \text{ vs. } 38.6 \pm 2.0; p < 0.05)$ . HSNE cultures also had a significant reduction in  $I_{\text{sc}}$   $(16.1 \pm 0.6 \text{ vs. } 22.7 \pm 0.5; p < 0.05)$ . **Conclusions:** CSC affects multiple pathways of  $\text{Cl}^-$  transport, including CaCC's. Stimulation of  $\text{Cl}^-$  transport could be therapeutic in individuals with CRS and frequent tobacco smoke exposure.

## 4:11 Treatment of Recurrent Sinonasal Polyposis Using Steroid Infused Carboxymethylcellulose Foam

Steven D. Pletcher, MD, San Francisco, CA; Andrew N. Goldberg, MD MSCE\*, San Francisco, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the role of steroid infused carboxymethylcellulose foam as a treatment for recurrent sinonasal polyposis.

**Objectives:** To evaluate the efficacy of steroid infused carboxymethylcellulose (CMC) foam as a treatment for recurrent sinonasal polyposis following endoscopic sinus surgery. **Study Design:** Prospective cohort study. **Methods:** Patients with recurrent sinonasal polyposis following endoscopic sinus surgery were enrolled in the study. Treatment entailed endoscopic placement of 4ml of CMC foam hydrated with triamcinolone 40mg/ml (Kenalog 40) into the ethmoid cavities bilaterally. Patients were evaluated using videoendoscopy and a disease specific quality of life survey (Sinonasal Outcomes Test 20; SNOT-20) at three time points: immediately prior to treatment, 7-14 days following treatment, and 28-35 days following treatment. The videoendoscopies were randomized and scored in a blinded fashion using a modification of the perioperative sinus endoscopy (POSE) scoring system as well as a visual analogue scale. **Results:** Ten treatments were performed in seven patients; three patients underwent multiple treatments. Mean SNOT-20 score improved at both one week and one month following treatment  $(2.44 \text{ vs. } 1.65; p < 0.05 \text{ and } 2.44 \text{ vs. } 1.36; p < 0.01, \text{ respectively})$ . Videoendoscopy also revealed improvement when evaluated with the modified POSE score at 1 week  $(11.8 \text{ vs. } 8.2; p < 0.001)$  and 1 month  $(11.8 \text{ vs. } 7.9; p < 0.001)$ . Similar results were noted using the visual analogue scale at 1 week  $(6.8 \text{ vs. } 4.7; p < 0.001)$  and 1 month  $(6.8 \text{ vs. } 5.6; p = 0.01)$ . **Conclusions:** Endoscopic placement of steroid infused carboxymethylcellulose foam improves symptoms and endoscopic findings in patients with recurrent sinonasal polyposis following endoscopic sinus surgery. Further research is required to evaluate the duration of improvement and the level of systemic steroid absorption with this treatment.

## 4:19 Minimally Invasive Endoscopic Resection of Sinonasal Undifferentiated Carcinoma (SNUC)

Peter C. Revenaugh, MD, Cleveland, OH; Rahul Seth, MD, Cleveland, OH; Justin B. Pavlovich, MD, Cleveland, OH; P. Daniel Knott, MD, Cleveland, OH; Pete S. Batra, MD FACS, Dallas, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the role of minimally invasive endoscopic resection in the multimodality treatment paradigm of sinonasal undifferentiated carcinoma.

**Objectives:** To review a single institution experience with endoscopic resection of sinonasal undifferentiated carcinomas (SNUC). **Study Design:** Retrospective case series. **Methods:** Seven patients underwent endoscopic resection of SNUC for curative intent between January 2002 and July 2009 at a tertiary care academic medical center. Data collected included demographics, tumor characteristics, surgical strategy, adjuvant therapies, local and regional recurrence, distant metastasis, overall survival and disease free survival. **Results:** Mean patient age was 48 years and stage at presentation was T4 in 6 of 7 (85.7%) patients. All 7 patients underwent complete endoscopic surgical extirpation with negative intra-operative margins. Endoscopic anterior skull base resection was required in 2 patients and endoscopic assisted craniofacial resection was performed in one patient to clear the superior tumor margin. Six patients received pre- or postoperative chemoradiation. Simultaneous local and regional recurrence was observed in one patient (14%) after 30 months. Distant metastases were observed in 2 other patients (28%) without local or regional recurrence. All three patients with recurrences died of their disease. The remaining 4 patients were clinically, endoscopically, and radiographically free of disease resulting in overall and disease free survival rates of 57% at a mean followup of 33 months. **Conclusions:** These preliminary data suggest a role for minimally invasive endoscopic resection in the comprehensive management algorithm of SNUC. Patient outcomes including local and regional recurrence, distant metastases, overall and disease free survival are comparable to traditional open craniofacial resection in appropriately selected patients.

**4:27**

**SHIRLEY BARON RESIDENT RESEARCH AWARD (Western Section)**

**Triamcinolone Impregnated Nasal Dressing following Endoscopic Sinus Surgery**

David W.J. Côté, MD MPH, Edmonton, AB Canada; Erin D. Wright, MD CM FRCSC\*, Edmonton, AB Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to critically appraise the value of steroid impregnated nasal dressing in healing following endoscopic sinus surgery.

**Objectives:** To evaluate the role of steroid impregnated absorbable nasal dressing in sinus surgery in early and long term wound healing. **Study Design:** A prospective, randomized, double blinded, placebo controlled trial. **Methods:** Chronic rhinosinusitis patients with polyposis who were to undergo bilateral endoscopic sinus surgery were recruited and randomized to receive triamcinolone impregnated Nasopore (Stryker, USA) absorbable dressing in one nasal cavity and saline impregnated dressing contralaterally. Postoperative healing assessments of edema, crusting, secretions and scarring were done at postoperative days 7, 14, 28 and at 3 and 6 months using validated POSE scores and Lund-Kennedy scores. **Results:** Analysis of 19 enrolled patients having completed observation shows no significant difference between the cavity scores preoperatively using both the POSE and Lund-Kennedy scores. There was, however a statistically significant difference at day 7 and 14 in both the Lund-Kennedy ( $p=0.04$ ,  $0.03$ ) and POSE scores ( $p=0.03$ ,  $0.001$ ) for the treatment and control groups. The difference lacked statistical significance at postoperative day 28 (L-K  $p=0.13$ ; POSE  $p=0.27$ ) but significance resumed at 3 and 6 month observations (L-K  $p=0.007$ ,  $0.02$ ; POSE  $p=0.049$ ,  $0.01$ ). **Conclusions:** Data analysis suggests a significant improvement in early postoperative healing in nasal cavities receiving triamcinolone impregnated absorbable nasal packing following endoscopic sinus surgery and is also associated with improved intermediate term healing up to 6 months postoperatively.

**4:35 - 4:43 Discussion/Q&A**

**Pediatric Otolaryngology**

Moderator: Roland D. Eavey, MD\*, Nashville, TN

**4:43**

**Characterization of Abnormalities on Balance Testing in a Pediatric Referral Population Presenting with Vertigo**

Anali Dadgostar, MD, Vancouver, BC Canada; J. Paul Moxham, MD\*, Vancouver, BC Canada; Art Mallinson, MSc, Vancouver, BC Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify the commonly encountered abnormalities on balance testing in a population of children presenting with vertigo.

**Objectives:** To examine the findings on balance testing (ENG, posturography, etc) in a pediatric referral population whose presenting complaint is vertigo. **Study Design:** Review of a prospectively maintained database on all pediatric patients (age <17 years) presenting with vertigo to a tertiary referral children's hospital between 1999 and 2006. Those patients who had balance testing with positive findings were reviewed for their etiologies. **Methods:** All children seen with a presenting complaint or referral diagnosis of vertigo who completed full balance testing were included. Those with results deemed abnormal were then analyzed with respect to presenting symptoms and signs, ancillary investigations and final diagnoses. **Results:** 72 complete balance assessments were done, of which 15 were designated as abnormal. Caloric reductions were found in 9 (60%) patients which corresponded to pediatric onset Meniere's disease most often. Cerebellar signs were found in 3 (20%) patients which uniformly were found to be secondary to malignant tumors of the brainstem or cerebellum. Directional preponderance was found in 1 patient secondary to a post-neurosurgical procedure brainstem infarction, while 2 patients with BPPV demonstrated positive Dix-Hallpike testing. **Conclusions:** Balance testing in the pediatric population presenting with vertigo is possible and can provide valuable diagnostic assistance.

## 4:51 Use of Flexible CO<sub>2</sub> Laser Fiber in the Pediatric Airway

Kimberly K. Caperton, MD, Oklahoma City, OK; German Paul Digoy, MD, Oklahoma City, OK

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the indications for use of a novel flexible carbon dioxide laser in the treatment of pediatric airway pathologies and understand the possible complications using this laser technique.

**Objectives:** Laser application for the treatment of pediatric airway pathologies represents a very attractive option because of the limited adjacent tissue destruction after photocoagulation. One novel laser used for such pathologies is the flexible carbon dioxide laser fiber. At our institution we have been using this laser fiber in pediatric surgical airway procedures, which has been quite successful. Our aim is to present our 25 month experience in the spectrum of procedures performed and review the complications using this laser technique. **Study Design:** A retrospective review of 26 patients who underwent 60 laser procedures from January 2007 to January 2009 was performed. **Methods:** The mean age was 3.66 years. Indications included removal of suprastomal granulation tissue after tracheostomy (n=10), granulation accumulation post-laryngotracheal reconstruction (n=6), subglottic stenosis (n=5), recurrent respiratory papillomas of distal trachea (n=1), supraglottic stenosis (n = 1), laryngeal cleft (n=1), left main stem bronchus stenosis (n=1), and excision of subglottic cyst (n=1). Procedures were performed via microdirect laryngoscopy using either a handpiece or a laser fiber threaded through a rigid bronchoscope. **Results:** No complications including postoperative glottic webs, concentric scar formation, or airway fires occurred in any patients during or after laser surgery. **Conclusions:** Endoscopic application of a flexible carbon dioxide laser fiber for the management of pediatric airways lesions provides good outcomes in selected patients. Distal tracheal respiratory papillomas, subglottic, supraglottic, or bronchial stenosis, and development of granulation tissue post-tracheostomy or laryngotracheal reconstruction are, in our experience, excellent indications.

## 4:59 The Effects of an Anti-Stick Phospholipid Solution on Pediatric Electrocautery Adenoidectomy

Jeffrey C. Baker, MD, Morgantown, WV; Hassan H. Ramadan, MD MSc FACS\*, Morgantown, WV

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe what Electro Lube is and what its benefits as an adjunct in electrocautery adenoidectomy are.

**Objectives:** The primary objective of this study is to determine if coating the suction cautery tip with an anti-stick phospholipid solution decreases the time required to complete a primary pediatric adenoidectomy. **Study Design:** This is a chart review of prospectively collected data related to surgical times in pediatric patients undergoing adenoidectomy. **Methods:** From February 2009 to June 2009 all patients between the ages of 1 and 12 years presenting for adenoidectomy were considered for the study. On the day of surgery, patients were randomized to undergo adenoidectomy either with or without the addition of an anti-stick phospholipid solution (Electro Lube). Variables measured included surgical time, quantity which the cautery required cleaning, adenoid size, age and weight. Exclusion criteria were age less than 1 or greater than 12, previous adenoidectomy, cleft palate, and small adenoid pad. **Results:** 61 patients met inclusion criteria. The average time to complete an adenoidectomy was 6 minutes and 39 seconds. Coating the suction cautery tip with the phospholipid solution decreased the amount which the instrument required cleaning on average 3 times (p = <0.0001). The solution decreased the time required to complete an adenoidectomy by 23%, or 1 minute and 45 seconds (p = 0.036). These differences in time and number of handbacks were even greater when the adenoid pad was larger in size.

**Conclusions:** Coating the electrocautery tip with an anti-stick phospholipid solution significantly decreases surgical times in pediatric adenoidectomy. We postulate that this time reduction is a result of the decreased frequency which the cautery tip requires cleaning.

## 5:07 Choanal Atresia Repair in the Preterm Neonate: Modifying Existing Image Guidance Technology

Matthew S. Clary, MD, Philadelphia, PA; James J. Daniero, MD, Philadelphia, PA (Presenter); Joseph J. Depietro, BS, Philadelphia, PA; Douglas R. Johnston, MD, Philadelphia, PA; Udayan K. Shah, MD, Wilmington, DE

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the technique for image guided choanal atresia repair in the undersized neonate using existing technology.

**Objectives:** To introduce a novel technique for image guided choanal atresia repair in the undersized neonate using existing technology to overcome previous limitations. **Study Design:** Case report. **Methods:** We present our technique of navigational system modification for use in the repair of choanal atresia in a preterm neonate, while discussing its importance in increasing the safety and effectiveness of endoscopic transnasal repair. **Results:** A neonate, ex-34 weeks, presenting with postnatal respiratory distress underwent successful endoscopic repair of bilateral choanal atresia on the tenth day of life with the assistance of the Stryker navigation system (Kalamazoo, MI). The small size of the patient required unique modification and positioning of the mask apparatus on the skull. The patient was successfully extubated without any need for further respiratory support on the first postoperative day. **Conclusions:** To our knowledge, this is the youngest infant to undergo transnasal bilateral choanal atresia repair using image guidance technology. This allowed for optimal visualization of the bony atretic plates and avoided potential damage to the skull base and lateral nasal vault. The use of this technology is safer to use in light of the smaller and sometimes dysmorphic anatomy of neonates with choanal atresia. There are far reaching implications for both clinical use and further development of image guidance systems in regards to pediatric head and neck surgery.

## 5:15 Development of a Calcium Alginate Tympanostomy Tube

Ethan G. Sherman, PhD, Gainesville, FL; Patrick J. Antonelli, MD\*, Gainesville, FL (Presenter); Roger Tran-Son-Tay, PhD, Gainesville, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss factors important in the development of an absorbable tympanostomy tube.

**Objectives:** Tympanostomy tubes (TTs) are prone to complications resulting in part from the unpredictable duration that the TT remains in the tympanic membrane. General anesthesia may be necessary to remove TTs that fail to extrude. The purpose of this study was to develop a TT that could be dissolved on demand, but remain functional with exposure to common otologic exposures. **Study Design:** Prospective, in vitro analysis. **Methods:** Dissolvable TTs were developed from calcium alginate. Mechanical properties and occlusion susceptibility were optimized by varying ingredient concentrations and compared to commonly used commercial TTs using in vitro measures. **Results:** Alginate TTs had a greater Young's modulus and compressive strength than commercial silicone tubes. TTs composed of 0.5M CaCl were stronger than high molarity CaCl concentrations. Albumin coated alginate TTs showed a 50% reduction in occlusion propensity. Exposure of alginate TTs to otological solutions for 24 hours resulted in degradation of their mechanical properties, but they remained superior to commercial silicone TTs. **Conclusions:** Alginate TTs appear to be a good alternative to current commercial tubes based on high mechanical strength and low occlusion propensity. Furthermore, unlike commercial silicone TTs, alginate TTs have the potential to be dissolved in vivo if retained.

5:23 - 5:30 Discussion/Q&A

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6:00 - 8:00 **President's Welcome Reception**  
(Valencia Terrace)

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# **FRIDAY, FEBRUARY 5**

## **PALAZZO E-H**

**7:15 - 8:25 Business Meeting (Members Only)**

**8:30 - 9:45 Welcome to Section Members and Other Attendees**

John W. Youngblood, MD\*, San Antonio, TX

**Introduction of Guest of Honor**

Fred D. Owens, MD\*, Dallas, TX

**Introduction of Citation Awardees**

G. Richard Holt, MD\*, San Antonio, TX

Randal A. Otto, MD\*, San Antonio, TX

**Introduction of New Section Candidates in Attendance**

**Introduction of Section Resident Research Awards and Presentation of Abstracts by Awardees**

Frank Wadsworth Virgin, MD, Birmingham, AL

Ryan D. Winters, MD, New Orleans, LA

Paul M. Weinberger, MD, Augusta, GA

**Guest of Honor Remarks**

Fred D. Owens, MD\*, Dallas, TX

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**9:45 - 10:15 Break/Visit Exhibits and Posters**

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# **FRIDAY, FEBRUARY 5**

## **PALAZZO B**

**7:15 - 8:25 Business Meeting (Members Only)**

**8:30 - 9:45 Welcome to Section Members and Other Attendees**

Charles W. Beatty, MD\*, Rochester, MN

**Introduction of Citation Awardees**

Stephen G. Harner, MD, Rochester, MN

Thomas J. McDonald, MD\*, Rochester, MN

**George Adams, MD Young Faculty Awardees**

Abraham Jacob, MD, Columbus, OH

David L. Steward, MD, Cincinnati, OH

**Introduction of New Section Candidates in Attendance**

**Introduction of Section Resident Research Awards and Presentation of Abstracts by Awardees**

Akihiro J. Matsuoka, MD PhD, Indianapolis, IN

Andrew G. Shuman, MD, Ann Arbor, MI

Peter N. Schilt, MD, Indianapolis, IN

**Introduction of Guest of Honor**

**Guest of Honor Lecture**

Why Join the Triological Society?

H. Bryan Neel III, MD PhD\*, Rochester, MN

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**9:45 - 10:15 Break/Visit Exhibits and Posters**

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# **FRIDAY, FEBRUARY 5**

## **PALAZZO D**

**7:15 - 8:25 Business Meeting (Members Only)**

**8:30 - 9:45 Welcome to Section Members and Other Attendees**  
Margaretha L. Casselbrant, MD PhD\*, Pittsburgh, PA

**Introduction of Citation Awardees**

Kenny H. Chan, MD\*, Denver, CO  
Margaret A. Kenna, MD\*, Boston, MA  
Robert F. Yellon, MD\*, Pittsburgh, PA

**Introduction of New Section Candidates in Attendance**

**Introduction of Section Resident Research Awards and Presentation of Abstracts by Awardees**

Brian T. Shaffer, MD, Philadelphia, PA  
Leigh J. Sowerby, MD, London, ON Canada  
Alphi P. Elackattu, MD, Boston, MA

**Introduction of Guest of Honor  
Guest of Honor Lecture**

Evolution's Role in Otitis Media  
Charles D. Bluestone, MD\*, Pittsburgh, PA

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**9:45 - 10:15 Break/Visit Exhibits and Posters**

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# **FRIDAY, FEBRUARY 5**

## **PALAZZO A**

**7:15 - 8:25 Business Meeting (Members Only)**

**8:30 - 9:45 Welcome to Section Members and Other Attendees**

Karl L. Horn, MD\*, Albuquerque, NM

**Introduction of Citation Awardees**

Roger L. Crumley, MD MBA\*, Irvine, CA

Herbert H. Dedo, MD\*, San Francisco, CA

Fred D. Owens, MD\*, Dallas, TX

**Introduction of New Section Candidates in Attendance**

**Introduction of Section Resident Research Awards and Presentation of Abstracts by Awardees**

David W.J. Côté, MD MPH, Edmonton, AB Canada

Chadwick J. Donaldson, MD, San Diego, CA

**Introduction of Guest of Honor**

**Guest of Honor Lecture**

Cochlear Implants for Children: Surgery Is Just the First Step

Jean Moog, MS, St. Louis, MO

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**9:45 - 10:15 Break/Visit Exhibits and Posters**

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# FRIDAY, FEBRUARY 5

## PALAZZO E-H

### 10:15 - 11:10

#### UPDATE ON OFFICE PROCEDURES 2010

- Moderator:** M. Boyd Gillespie, MD MSc,  
Charleston, SC (Sleep)
- Panelists:** Marc L. Bennett, MD, Nashville, TN (Otology)  
Michael M. Johns III, MD,  
Atlanta, GA (Laryngology)  
Krishna G. Patel, MD PhD,  
Charleston, SC (Facial Plastics)  
Bradford A. Woodworth, MD,  
Birmingham, AL (Sinus)

**Educational Objective:** At the conclusion of this presentation, participants will have increased practical knowledge of current procedures that can be performed in the general otolaryngology office to address common disorders of the ear, nose, and throat.

### 11:15 - 12:10

#### ELECTRONIC MEDICAL RECORDS: PANACEA OR PROBLEM?

- Moderator:** Rahul K. Shah, MD, Washington, DC
- Panelists:** Kenny H. Chan, MD\*, Denver, CO  
Brian Nussenbaum, MD\*, St. Louis, MO

**Educational Objective:** At the conclusion of this presentation, attendees should be able to describe the current and future role of electronic medical records as it pertains to otolaryngologists and how to best utilize this technology to optimize the flow, safety, and quality of their practice.

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12:15 - 1:25 *Lunch/Visit Exhibits and Posters*

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# FRIDAY, FEBRUARY 5

## PALAZZO D

### ***Pediatric Otolaryngology***

**Moderator:** David E. Tunkel, MD\*, Baltimore, MD

### 10:15 Global Warming and the Prevalence of Frequent Otitis Media in Childhood

Mia E. Miller, MD, Los Angeles, CA; Nina L. Shapiro, MD, Los Angeles, CA; Neil Bhattacharyya, MD\*,

**Educational Objective:** At the conclusion of this presentation, participants should be able to discuss possible associations between environmental temperature and otolaryngologic disease children.

**Objectives:** To determine if changes in annual temperature influence the prevalence of frequent otitis media (FOM) and respiratory allergy in children. **Study Design:** Cross-sectional analysis of national health survey data. **Methods:** Annual prevalence data for FOM (defined as  $\geq 3$  ear infections/year), respiratory allergy and seizures (nonrespiratory, control condition) in children were extracted from the National Health Interview Survey for 1998-2006. Average U.S. annual temperature for the same time period was recorded from the Environmental Protection Agency. Complex samples logistic regression analyses were performed to identify possible correlations between annual temperature and each of the 3 disease conditions, controlling for age and sex. **Results:** 113,067 children were studied (mean age, 8.6 years; 51.1% female). Overall prevalences ( $\pm 95\%$  confidence interval) were  $6.3 \pm 0.2\%$ ,  $11.8 \pm 0.2\%$  and  $0.7 \pm 0.1\%$  for FOM, respiratory allergy and seizures, respectively. Average annual temperature ranged from 53.64 to 55.09 °F. Regression analysis found that annual temperature did not influence the prevalence of FOM ( $p=0.681$ ); female sex and increasing age were associated with a higher prevalence of FOM ( $p=0.025$  and  $p<0.001$ , respectively). Similarly, annual temperature did not influence prevalence of respiratory allergy ( $p=0.883$ ); male sex and increasing age were associated with a higher prevalence of respiratory allergy (both  $p<0.001$ ). Annual temperature, sex and age did not influence seizure prevalence. **Conclusions:** Average annual temperature does not appear to influence the prevalence of otitis media or respiratory allergy. This negative finding suggests that although global warming continues to affect our environment, otolaryngologic disease prevalence in children may not be directly correlated.

## 10:23 Patterns of Speech and Language Development after Cricotracheal Resection in Aphonic Children

Lauren Andrea Heise, BS, Ann Arbor, MI; Lynn E. Driver, MS CCC-SLP, Ann Arbor, MI; Glenn E. Green, MD, Ann Arbor, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe 1) the normal developmental sequence of prelinguistic vocalizations; 2) the effect of subglottic stenosis and subsequent cricotracheal resection on speech and language development in children; and 3) the importance of babbling in speech and language development.

**Objectives:** To determine the importance of prelinguistic babbling by studying patterns of speech and language development after cricotracheal resection in aphonic children. **Study Design:** We reviewed the medical records of seven previously aphonic children, who underwent cricotracheal resection by our pediatric thoracic airway team. The analyzed variables included age, sex, comorbidity, grade of stenosis, concomitant glottic stenosis, length of resected trachea, speech-language pathology evaluations, and complications. **Methods:** Data regarding the children's pre- and postsurgical communication methods, along with their utilization of speech therapy services, were obtained via a standardized telephone survey supplemented by parental documentation, clinical observations and speech-language pathology evaluations. Postsurgical voice quality was assessed using the Pediatric Voice Outcomes Survey. **Results:** All seven subjects underwent tracheostomy by two months of age, when corrected for prematurity. The subjects remained aphonic for the entire duration of cannulation. Following cricotracheal resection, they experienced an initial delay in speech acquisition. Vegetative functions were the first laryngeal sounds to emerge. Initially, the children were only able to produce these sounds reflexively, but they subsequently gained voluntary control over these laryngeal functions. All subjects underwent an identifiable stage of canonical babbling that often occurred concomitantly with vocalizations. This was followed by the emergence of true speech. **Conclusions:** The initial delay in speech acquisition observed following decannulation, along with the presence of a postsurgical canonical stage in all study subjects, supports the hypothesis that babbling is a necessary precursor to speech and language development. Furthermore, the significance of babbling is evident regardless of the age at which it occurs.

## 10:31 Racial/Ethnic and Socioeconomic Disparities in the Prevalence and Treatment of Pediatric Otitis Media in the United States

David F. Smith, MD PhD, Baltimore, MD; Emily R. Boss, MD, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain what is known about racial/ethnic and socioeconomic disparities in children with OM in the US.

**Objectives:** Although racial/ethnic and socioeconomic disparities in child health are prevalent in the United States, little is known about these disparities within common pediatric otolaryngic problems. Otitis media (OM) is a frequent diagnosis in children, and pressure equalization tube (PET) placement is the most common minor procedure performed under general anesthesia in the U.S. We sought to identify what is currently known about racial/ethnic and socioeconomic disparities in children with OM. **Study Design:** MeSH database abstract review. **Methods:** PubMed search for publications identifying racial/ethnic or socioeconomic disparities for children with OM or PET insertion in the U.S. over a 30 year period. **Results:** Of 418 abstracts identified, 15 met inclusion criteria. Articles addressed disparities in OM prevalence (13/15), risk factors (9/15), and PET insertion (3/15). Minority racial/ethnic groups studied were black (7/15), Hispanic (3/15), American Indian (2/15), and Asian (1/15). Predominant findings showed: 1) the most common uniformly identified risk factor for OM is socioeconomic deprivation; 2) considerable variability exists concerning racial/ethnic disparities in disease prevalence; and 3) white children are more likely to undergo PET insertion compared to black or Hispanic children. **Conclusions:** Racial/ethnic and socioeconomic disparities exist among the prevalence and treatment of children with OM. Low socioeconomic status increases the risk for OM in children. Despite the frequency of PET insertion in children in the U.S., few studies have addressed disparities in utilization of surgical therapy. Given the changing healthcare climate and the social and economic impact of OM in children, further investigation of racial/ethnic and socioeconomic disparities targeting access to surgical treatment of OM should take precedence in health services research.

## 10:39 - 10:47 Discussion/Q&A

### 10:47 Floor of Mouth Benign Mature Cystic Teratoma in a Pediatric Patient

Tara L. Rosenberg, MD, Jackson, MS; J. Mark Reed, MD FAAP FACS, Jackson, MS

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the incidence, clinical features, and surgical management of floor of mouth cystic masses, specifically benign mature cystic teratomas.

**Objectives:** The clinical history of a pediatric patient with a large floor of mouth benign mature cystic teratoma will be reviewed. Previously reported cases will be examined to allow for comparison of this rare diagnosis. **Study Design:** Case report and literature review. **Methods:** A five month old female presented with a congenital, progressively enlarging floor of mouth cystic structure that resulted in decreased oral intake. **Results:** Surgical intervention included resection of the mass and sublingual glands. Intraoperatively, the mass was found to have replaced much of the musculature of the tongue and included a midline stalk that extended to the central hyoid bone. Final pathology revealed a mature benign cystic teratoma. Postoperatively, the patient has returned to an age appropriate diet and the incision is well healed. **Conclusions:** Pediatric floor of mouth mature benign cystic teratomas are uncommon. Treatment requires complete surgical resection.

### 10:55 A Novel Approach to Removal of Upper Airway Foreign Bodies

Byron K. Norris, MD, Jackson, MS;  
John M. Schweinfurth, MD\*, Jackson, MS

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the treatment of upper airway foreign bodies and be familiar with a novel approach to removal that utilizes an instrument that incorporates both flexible endoscopy and rigid instrumentation for transoral retrieval.

**Objectives:** We report a novel approach to removal of upper airway foreign bodies utilizing an instrument that incorporates both flexible endoscopy and rigid instrumentation for transoral retrieval. **Study Design:** New technique and product development. **Methods:** Removal of foreign bodies located in the base of tongue and vallecula was performed on fresh cadavers. Visualization and ease of exposure was rated on a five point, visual analog scale. **Results:** Removal of foreign bodies located in the base of tongue and vallecula was performed on 3 cadavers. All foreign bodies were successfully removed under good visualization without injury to underlying mucosa or dislodgement of the foreign body. **Conclusions:** Upper airway foreign bodies commonly lodge in the base of tongue and vallecula. Increasingly, these foreign bodies are managed endoscopically without the need for general anesthesia. We report a novel approach to removal of airway foreign bodies utilizing an instrument that incorporates both flexible endoscopy and rigid instrumentation for transoral retrieval. This technique provides excellent visualization and exposure while allowing removal to be performed by a single practitioner.

## **Head and Neck Surgery**

Moderator: Randal A. Otto, MD\*, San Antonio, TX

### **11:12 Hedgehog Antagonist GDC-0449 Effective in the Treatment of Advanced Basal Cell Carcinoma**

Shivan Harish Amin, MD, Oakland, CA; C. Patrick Hybarger, MD FACS, San Rafael, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the importance of the Hedgehog signalling pathway in the pathogenesis of basal cell carcinoma. Although advanced basal cell carcinoma has traditionally been subject to surgical and radiation therapy, a promising new drug which targets the Hedgehog pathway is currently in phase II clinical trials.

**Objectives:** To demonstrate the therapeutic efficacy of GDC-0449 (a once daily oral drug) in the treatment of advanced basal cell cancer (BCC). **Study Design:** Case series. **Methods:** Four patients with advanced head and neck basal cell carcinoma status post multiple treatment failures were enrolled in a phase I clinical trial of the drug GDC-0449. This is an inhibitor of the Hedgehog signalling pathway, which is critical for embryogenesis, and has been linked to several other cancers. Results of tumor regression are reported over a 3-9 month period with clinical and PET CT data. **Results:** Patient 1, who has basal cell nevus syndrome, had tumor invasion of the L orbit, maxillary sinus, and multiple large ulcerating facial lesions. She has shown complete radiologic and clinical response to therapy, currently with no evidence of disease. Patient 2, with metastatic morpheaform BCC to the neck and lungs, also has complete radiologic and clinical response to therapy. Patient 3, with metastatic BCC to the R neck had a partial response, with residual tumor in a prior resection cavity despite continuous GDC-0449 therapy. Patient 4, with invasive BCC of the R orbit abutting the skull base has a 50% reduction in tumor size after 3 weeks of therapy. Side effects to date have been mild taste changes and minimal hair loss.

**Conclusions:** Advanced basal cell carcinoma, although rare, is a formidable treatment challenge for otolaryngologists and Mohs surgeons. Describing three patients with impressive BCC regression with oral GDC-0449, we have shown an effective new treatment pathway for patients who have otherwise very limited therapeutic options. In addition, the efficacy of the drug has been shown in a number of other cancers, including medulloblastoma, colorectal, ovarian and breast cancer. Side effect profiles of the drug at this stage are mild, with taste changes and hair loss possibly secondary to effects on olfactory, taste bud, and hair follicle stem cell loss. In addition, there is a possibility that these patients may develop drug resistance during the course of their continuous therapy. Despite this uncertainty, GDC-0449 shows true promise in the treatment of advanced basal cell carcinoma.

### **11:20 Primary Surgery for Oropharyngeal Cancer**

Ross A. Udoff, BS, Augusta, GA; Jackson C. Elam, BS, Baltimore, MD; Christine G. Gourin, MD\*, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the outcomes of primary surgery for oropharyngeal cancer and the factors associated with poorer survival.

**Objectives:** The development of new techniques for transoral and robotic resection has led to a renewed interest in primary surgical treatment of oropharyngeal cancer. We sought to review our experience with primary surgery for oropharyngeal cancer to identify factors associated with survival. **Study Design:** Retrospective cohort analysis. **Methods:** Patients who underwent primary surgical treatment of oropharyngeal SCCA from 1985-2002 were analyzed. Patients who had failed nonoperative treatment or had distant metastases at presentation were excluded. **Results:** A total of 105 patients had operable disease and met study criteria. The majority of patients (91%) had advanced stage disease (III/IV). All patients received postoperative radiation; postoperative chemoradiation was used in only 8 patients with stage IV disease. Five year disease free survival was 83% for stage I, 67% for stage II, 56% for stage III, and 43% for stage IV disease. Crude local control rates were 94% for T1 disease, 90% for T2 disease, 81% for T3 disease and 80% for T4 disease; crude regional control rates were 100% for N0 disease, 90% for N1 disease, 84% for N2 disease and 82% for N3 disease. Cox proportional hazards models revealed that nodal stage (hazard ratio 2.1) was the only significant predictor of disease free survival (P=0.036). **Conclusions:** Primary surgical treatment of oropharyngeal SCCA is effective in achieving excel-

lent locoregional control and permits de-intensification of adjuvant therapy, even in patients with advanced stage disease. Nodal status is the primary determinant of disease free survival. These data provide useful information for counseling and treatment planning.

## 11:28 PAUL HOLINGER RESIDENT RESEARCH AWARD (Middle Section) Predictors of Poor Sleep Quality among Head and Neck Cancer Patients

Andrew G. Shuman, MD, Ann Arbor, MI; Sonia A. Duffy, PhD RN, Ann Arbor, MI; David L. Ronis, PhD, Ann Arbor, MI; Susan L. Garetz, MD, Ann Arbor, MI; Karen E. Fowler, MPH, Ann Arbor, MI; Jeffrey E. Terrell, MD, Ann Arbor, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate the correlation between sleep and quality of life, and to identify the risk factors for poor sleep among head and neck cancer patients. Participants should be able to describe interventions which may improve quality of life in head and neck cancer patients.

**Objectives:** Sleep represents a historically overlooked component of quality of life in head and neck cancer patients. This study was designed to determine the predictors of sleep among head and neck cancer patients one year after diagnosis.

**Study Design:** Prospective, multisite study. **Methods:** After IRB approval, the Medical Outcomes Study (MOS) sleep measure was administered in a multisite study assessing health behaviors and quality of life of patients with head and neck cancer (n=457). Bivariate associations were calculated, and multiple linear regression was used to determine significant predictors of 1 year MOS sleep scores. **Results:** Xerostomia, increased pain, depression, presence of a tracheotomy tube, increased comorbidity and younger age were statistically significant predictors of poor sleep one year after diagnosis of head and neck cancer on multivariate analysis. Type of treatment (surgery, radiation and/or chemotherapy), primary tumor site and cancer stage did not correlate with significant differences in sleep scores. **Conclusions:** Many factors adversely affecting sleep in head and neck cancer patients are potentially modifiable and appear to contribute to a decreased quality of life. Strategies to reduce pain, xerostomia and depression may be warranted not only for their own inherent value but also because they may enhance quality of life by improving sleep.

11:36 - 11:44 Discussion/Q&A

## 11:44 The Utility of Computed Tomography Surveillance for Primary Site Recurrence of Squamous Cell Carcinoma of the Head and Neck

Brian P. Sullivan, BChE, Birmingham, AL; Karen A. Parks, BS, Birmingham, AL; Nichole R. Dean, DO, Birmingham, AL; J. Scott Magnuson, MD\*, Birmingham, AL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the utility of computed tomography (CT) in evaluating head and neck tumor recurrences at the primary site and determine which situations may benefit from post-treatment CT scans.

**Objectives:** The utility of computed tomography (CT) scans in evaluating neck node metastasis has been shown. This study aims to evaluate the utility of CT compared to physical examination (PE) in evaluating primary site recurrences.

**Study Design:** A retrospective cohort study. **Methods:** Patients who received both CT scans and PE after primary treatment for squamous cell carcinoma of the upper aerodigestive tract (oropharynx, hypopharynx, and larynx) were identified. Each individual CT scan and PE was evaluated for its ability to detect a patient's recurrence status. Positive test results were compared to subsequent biopsy results to determine their validity. Sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated for each test. Recurrence rate and mortality were calculated for each site and the entire group. **Results:** 131 patients underwent a total of 886 PE and 346 CT scans during the 2 year followup. The overall recurrence rate was 26.7%. The recurrence rate by site was 40.5% for larynx, 16.6% for hypopharynx and 18.3% for oropharynx. The sensitivity for PE and CT was 84.0% and 66.7%; for specificity, 98.7% and 90.7%; for PPV, 65.6% and 31.8%; for NPV the values were 99.5% and 97.7% respectively. **Conclusions:** Due to the low sensitivity and PPV of CT scans compared to physical examination in evaluating primary site tumor recurrences, the utility of computed tomography for surveillance may be limited.

## 11:52 Radiation Induced Salivary Hypofunction: An Animal Model for Cell Based Therapeutic Applications

Seth Purcell, BS, Winston Salem, NC; Millie Surati, MD, Winston Salem, NC; Kenneth Wheeler, MD,

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the effects of radiation on human and rodent salivary gland and assess a rodent disease model for use in salivary gland tissue engineering.

**Objectives:** To create an animal model of salivary gland hypofunction that simulates the human clinical condition of radiation induced xerostomia. Such a model could be used to test preclinical salivary cell replacement therapies. **Study Design:** Prospective interventional animal study. **Methods:** Adult rats were randomized to age/sex-matched control and experimental groups. Experimental animals were exposed to a single 20Gy dose of Cesium137 irradiation to the neck. The field included both submandibular glands. Induced salivary flow volumes were measured in all animals pre-irradiation and at 3, 6 and 12 weeks post-irradiation. Animals were sacrificed and submandibular glands were harvested at each time point. Acinar cell counts, cell characterization and qualitative histological analyses were performed on representative samples in experimental and untreated control animals. Animal tissue specimens were compared to irradiated submandibular gland specimens from patients undergoing neck dissection after radiation therapy. **Results:** A statistically significant decrease in salivary flow volume was observed in irradiated animals when compared to untreated controls. A statistically significant reduction in the number of acinar cells was observed in experimental animals when compared to control animals. Histopathologic features in animal and human specimens included ductal preservation, fibrosis and vacuolization. Histopathologic changes associated with radiation in rats were less severe than changes in human radiated glands. **Conclusions:** A single 20Gy dose of Cesium137 irradiation to the submandibular glands is sufficient to cause durable salivary hypofunction and corresponding acinar cell loss in a rat. Additional optimization experiments at higher radiation doses are necessary to more closely simulate the severity of human salivary gland damage after chemoradiation therapy.

**12:00 - 12:08 Discussion/Q&A**

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**12:15 - 1:25 Lunch/Visit Exhibits and Posters  
(Mediterranean 1-4)**

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# FRIDAY, FEBRUARY 5

## PALAZZO E-H

### 1:30 - 2:20

#### THE INFLAMED LARYNX

**Co-Moderators:** Andrew McWhorter, MD, Baton Rouge, LA  
C. Gaelyn Garrett, MD\*, Nashville, TN

**Panelists:** Clark A. Rosen MD\*, Pittsburgh, PA  
Dana M. Thompson, MD\*, Rochester, MN

**Educational Objective:** At the completion of the panel, attendees should 1) have a better understanding of the differential diagnosis of diseases that cause laryngeal inflammation; 2) be comfortable with the work-up and evaluation of the inflamed larynx; and 3) be able to discuss treatment options for these inflammatory disease processes.

### 2:25 - 3:15

#### MANAGEMENT OF PEDIATRIC CONGENITAL FACIAL AND NECK MASSES

**Moderator:** Amelia F. Drake, MD\*, Chapel Hill, NC

**Panelists:** Lisa M. Buckmiller MD, Little Rock, AR  
(Hemangiomata/Vascular Lesions)  
Soham Roy, MD FAAP, Houston, TX  
(Branchial Cleft Cysts/Sinuses)  
David R. White, MD, Charleston, SC  
(Lymphangioma including Sclerotherapy)  
Carlton J. Zdanski, MD FAAP, Chapel Hill, NC  
(Prenatal Assessment and Planning  
including EXIT)

**Educational Objective:** At the end of the panel, the participant should be able to 1) recognize the indications and potential benefit of the EXIT procedure; 2) understand the multidisciplinary and multimodality approach to treatment of hemangiomata in children; and 3) appreciate alternate approaches to lymphangiomas, including sclerotherapy.

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3:15 - 3:45 **Break/Visit Exhibitors and Posters**

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**3:50** - Guest Lecture/Discussion/Q&A  
Primer for Genomics and Individual Medicine  
Thomas C. Spelsberg, PhD, Professor & Distinguished Investigator, Dept. of  
Biochemistry & Molecular Biology, Mayo Clinic, Rochester, NY

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5:30 - 7:30 **"Meet the Authors" Poster Reception**  
**(Mediterranean 1-4)**

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# FRIDAY, FEBRUARY 5

## PALAZZO D

### Otology/Neurotology

Moderator: Paul R. Lambert, MD\*, Charleston, SC

#### 1:30 Attenuating the Effects of Gentamicin Induced Ototoxicity via Antioxidants

Adam M. Cassis, MD, Morgantown, WV; Stephen J. Wetmore, MD\*, Morgantown, WV; George A. Spirou, PhD, Morgantown, WV; Albert S. Berrebi, PhD, Morgantown, WV; Peter H. Mathers, PhD, Morgantown, WV

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the deleterious effects of gentamicin on the cochlea and the effectiveness of antioxidants in attenuating those effects.

**Objectives:** To determine whether antioxidants are effective in decreasing hearing loss associated with gentamicin induced ototoxicity. **Study Design:** ABR was used to determine threshold shifts in guinea pigs treated with saline, antioxidants, gentamicin, or gentamicin plus antioxidants. **Methods:** Twenty male pigmented guinea pigs were included in this study. Animals underwent a treatment period of fourteen days where they received daily treatments of one of four regimens: saline, antioxidants (vitamin A, vitamin C, vitamin E, magnesium), gentamicin, and gentamicin plus antioxidants. Auditory brainstem response (ABR) was performed immediately before and after the treatment period was performed for each animal. The threshold shift was measured for each animal at 5 kHz, 10 kHz, and 18 kHz. **Results:** Threshold shifts for the control group (saline, antioxidants only) were 3.5 dB, 3.6 dB, and 0 dB for 5, 8, and 18 kHz respectively. The gentamicin group had threshold shifts of 15 dB, 21 dB, and 13 dB for 5, 8, and 18 kHz respectively. The gentamicin plus antioxidant group (study group) had threshold shifts of 11 dB, 11 dB, and 0 dB for 5, 8, and 18 kHz respectively. The attenuated hearing loss between the gentamicin and gentamicin plus antioxidant groups were 4 dB, 10 dB, and 13 dB for 5, 8, and 18 kHz respectively. **Conclusions:** Antioxidant prophylaxis significantly attenuates the hearing loss associated with gentamicin induced ototoxicity. Histologic examination of cochlear tissue will give us further insight into the results of our study.

#### 1:38 Prospective, Randomized Study of the Effect of Topical Antimicrobial Therapy on Post-Tympanostomy Tube Otorrhea and Tube Occlusion

Michele A. Streeter, MD, Lexington, KY; Brian K. Heaberlin, MD, Huntington, WV; Thomas J. Gal, MD MPh\*, Lexington, KY; Raleigh O. Jones, MD, Lexington, KY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to appreciate the higher frequency of postoperative otorrhea and ear tube occlusion with the use of Floxin otic drops intraoperatively in comparison to Ciprodex or Cortisporin.

**Objectives:** The use of topical antimicrobials following tympanostomy tube placement has been shown to be beneficial in reducing both postoperative otorrhea and tube occlusion. The objective of this study is to assess the effect of specific antimicrobial drops on the incidence of postoperative otorrhea and tube occlusion after tympanostomy placement in the sterile ear. **Study Design:** Randomized, prospective, double blinded study. **Methods:** Patients with indications for tympanostomy tube insertion at a single institution, intraoperatively found to have dry ears or serous effusions were included. Double blinded randomization by ear was performed, using one of the antimicrobial drops, applied intraoperatively. Patients were randomized to be treated with Ciprofloxacin/dexamethasone otic (Ciprodex), ofloxacin otic (Floxin), or hydrocortisone/polymyxin B neomycin otic suspension (Cortisporin). Incidence of otorrhea and tube occlusion was assessed at 1 and 6 weeks postoperatively using Fisher's exact test. **Results:** 417 ears from 231 patients were included. The incidence of postoperative otorrhea was 9.56% (n=13) for Floxin, 1.49% (n=2) for Ciprodex and 1.36% (n=2) for Cortisporin. The difference in otorrhea between Floxin and other preparations was statistically significant ( $p=0.0016$ ). Similarly, although infrequent, the incidence of tube occlusion was higher in the Floxin group. This was not statistically significant. **Conclusions:** Overall, the incidence of post-tympanostomy otorrhea is relatively low. The use of Floxin otic appears to be associated with a higher incidence of both otorrhea and tube occlusion. Etiology and implications will be discussed.

# 1:46

## RICHARD J. BELLUCCI RESIDENT RESEARCH AWARD (Eastern Section)

### Validation of a Disease Specific Quality of Life Instrument for Acoustic Neuroma

Brian T. Shaffer, MD, Philadelphia, PA; Michael S. Cohen, MD, Pittsburgh, PA; Douglas C. Bigelow, MD, Philadelphia, PA; Michael J. Ruckenstein, MD MSc FACS FRCSC\*, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the importance of disease specific instruments in quality of life studies.

**Objectives:** To design and validate the first disease specific quality of life instrument for acoustic neuroma. **Study Design:** Prospective instrument validation. **Methods:** One hundred forty-three patients with acoustic neuromas completed an 80 question preliminary instrument and the SF-36 general health survey. A chart review documented patient disease and treatment information. Statistical analysis was performed for item reduction and evaluation of validity criteria. A repeat application of the final instrument was given for reliability testing. **Results:** Analysis of item-total and item-item score correlations eliminated 38 items from the preliminary instrument. Exploratory principal component factor analysis eliminated 16 additional items and identified a natural grouping of remaining items into 7 domains, forming the final 26 item instrument. Test-retest reliability and internal consistency measures for the instrument were high. All domain scores except facial and pain domains showed wide normal distributions. Instrument domain scores correlated significantly with related SF-36 domain scores and correlated significantly with related visual analogue scale questions given with the preliminary survey. Facial domain scores showed significant differences across House-Brackmann Grading System scores and correlated inversely with tumor size. No domain in either the instrument or SF-36 had a strong correlation with pure tone average or speech discrimination scores. The instrument discriminated acoustic neuroma cases from controls better than the SF-36. **Conclusions:** We have developed the first disease specific validated quality of life instrument for patients with acoustic neuromas. Given the lack of a validated equivalent, this tool has the potential to become a critical outcome measure for studies evaluating treatment of patients with acoustic neuromas.

# 1:54

## VICE PRESIDENT'S RESIDENT RESEARCH AWARD (Western Section)

### Evaluation of Medical and Vestibular Indices in the Prediction of Outcomes in Patients with Post-Traumatic Migraine Associated Dizziness (PTMAD)

Chadwick J. Donaldson, MD, San Diego, CA; Michael E. Hoffer, MD\*, San Diego, CA; Ben J. Balough, MD, San Diego, CA; Kim R. Gottshall, PhD, San Diego, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to better understand the complexity associated with PTMAD. Also, participants will be better able to evaluate certain variables that will signify which patients will respond to treatment.

**Objectives:** The aim of this study was to compare a variety of characteristics, treatments, and vestibular testing metrics in post-traumatic migraine associated dizziness (PTMAD) population to ascertain a better understanding of certain predictive parameters associated with better outcomes. **Study Design:** Retrospective chart review. **Methods:** The electronic medical records of 83 patients presenting to a tertiary referral center with a diagnosis of PTMAD who had undergone a course of vestibular rehabilitation were retrospectively reviewed. General characteristics, clinical treatment, pre- and post-vestibular therapy testing metrics, and success and failure outcomes were assessed. Patients were ultimately assigned into responder and nonresponder groups related to their headaches and evaluated at two specific time points. Medication failures and vestibular test metrics were compared to identify and predict clinical outcomes. **Results:** Seventy-two (88%) of 82 patients were analyzed at two distinct time points. Use of verapamil, topiramate, gabapentin, amitriptyline, and valproic acid showed no comparative treatment benefit in responders compared to nonresponders ( $p=.294$ ). Significant predictors associated with successful treatment included response to initial medication ( $p=.001$ ), final dynamic gait index (DGI) scores ( $p=.016$ ), final vertical dynamic visual acuity test (DVAT) scores (up,  $.007$ , down,  $.006$ ), and both final and change in computerized dynamic posturography-sensory organization test (CDP-SOT) scores ( $p=.001$ ,  $p=.031$ ). The antipsychotic, quetiapine, was specifically associated with outcome failures ( $p=.003$ ). **Conclusions:** Specific prophylactic anti-migraine medications were not specifically associated with improved outcomes in PTMAD patients. Initial clinical responses and vestibular test metrics may guide physicians to predict successful outcomes. Patients on antipsychotic medications are more likely to fail PTMAD therapy.

# 2:02

## Cochlear Implantation in Patients with Autoimmune Inner Ear Disease (Including Cogan's Syndrome): A Comparison with Age and Sex Matched Controls

Jenny R. Wang, BHSc, Toronto, ON Canada; Heng W. Yuen, MD, Toronto, ON Canada; David B. Shipp, MA FAAA, Toronto, ON Canada; Vincent Y.W. Lin, MD, Toronto, ON Canada; Joseph M. Chen, MD, Toronto, ON Canada; Julian M. Nedzelski, MD\*, Toronto, ON Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) discuss the outcomes of cochlear implantation in patients with autoimmune inner ear disease; and 2) compare the outcome of cochlear implantation in AIED patients to age and sex matched controls.

**Objectives:** 1) Evaluate the characteristics and outcomes of patients with autoimmune inner ear disease (AIED) who have undergone cochlear implantation (CI); and 2) compare post-CI performance in AIED to matched controls. **Study Design:** Retrospective case control study. **Methods:** Study cohort comprised of 25 adult implantees (AIED [n=18], Cogan's [n=7]). The AIED group was defined by rapidly progressive bilateral sensorineural hearing loss leading to unusable hearing within weeks to months. Patients with Cogan's syndrome, the archetypal inner ear autoimmune disease, were also examined and used for within-cohort comparison. Clinical and operative records were reviewed. Post-CI performance was assessed using Hearing In Noise Test (HINT) scores. Age and sex matched individuals deafened by other postlingual causes were used as controls. **Results:** All Cogan's and 13 (72%) AIED patients received corticosteroids with poor rates of hearing recovery. Macrocytosis was a common laboratory finding in the AIED group. Of 25 patients, 24 had uneventful, full electrode insertions. One AIED patient had partial insertion due to cochlear ossification and did not achieve open set speech perception post-CI. Average HINT scores for the cohort  $\geq 6$  months post-CI was 92.2% (AIED=90.6%, Cogan's=96.4%). Post-CI performance in AIED was significantly better than controls for patients with uneventful insertions ( $p < 0.05$ ). Cogan's patients had significantly higher post-CI HINT scores ( $p < 0.05$ ) than controls, but were no different from AIED patients. **Conclusions:** To our knowledge this is the largest study of cochlear implantation in AIED and Cogan's syndrome. In our experience, both groups generally attain high levels of post-CI speech perception and perform above average. Cochlear ossification affecting implantation in Cogan's was not observed in our series, contrary to some reports.

2:10 - 2:18 Discussion/Q&A

## General Otolaryngology

Moderator: Karen H. Calhoun, MD \*, Columbus, OH

### 2:20 Ultrasound Gel Causes Misread FNAs? A Clear Choice

Mark C. Royer, MD, Indianapolis, IN; Mimi S. Kokoska, MD, Indianapolis, IN; Darrell D. Davidson, MD, Indianapolis, IN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the cytopathological artifact seen in specimens from ultrasound guided fine needle aspirations (FNAs) with various ultrasound gels and they will be able to provide a low cost solution, which eliminates the artifact in their practice and institutions.

**Objectives:** To identify the ultrasound gel media that are causing the artifact, which simulates apoptosis or necrosis in cytopathologic specimens and to provide a solution that minimizes or eliminates this artifact. **Study Design:** Prospective fresh human cadaveric study. **Methods:** Three separate ultrasound guided FNAs were performed on the thyroid and parotid glands in situ of a fresh human cadaver using three different types of ultrasound gel media. The slides were prepared in standard fashion (Quik-Diff and Papanicolaou smears). The slides were subsequently analyzed by a cytopathologist for the presence of any artifact that interferes with his ability to visualize the cellular aspirate material. **Results:** Two of the three gel media revealed significant artifact mimicking apoptosis, necrosis or colloid, which made it difficult to visualize the cellular components and differentiate the artifact from thyroid colloid. One of the gel media did not contain any significant artifact compared to the others and there was no discernible difference in its quality with regard to the ultrasound image during FNA procedures. **Conclusions:** Ultrasound gels can be associated with significant artifact in FNA specimens. In order to eliminate this artifact, which may alter the diagnosis or cytologic description, we recommend a specific type of gel for ultrasound guided FNAs.

# 2:28

## Perioperative Medication Errors in Otolaryngology

Rebecca F. Rosenwasser, , Gainesville, FL; Almut G. Winterstein, PhD, Gainesville, FL; Amy L. Rosenberg, PharmD, Gainesville, FL; Eric I. Rosenberg, MD MPH, Gainesville, FL; Patrick J. Antonelli, MD\*, Gainesville, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to better understand the nature, causes, and potential means of preventing perioperative medication errors.

**Objectives:** Information on perioperative medication errors is scarce. This study was aimed at identifying the nature, cause, and potential remedies for medication errors in otolaryngologic surgery. **Study Design:** Prospective, observational, and descriptive. **Methods:** Faculty and residents were remunerated for reporting medication errors at pre- or post-operative clinic visits, surgery, or postoperative admission (n=589) over a 2 month period. Each report was investigated by a panel of faculty from otolaryngology, medicine, and pharmacy to determine validity, preventability, contributing factors, and potential preventative measures. A random sample of procedures and clinic visits were monitored for use of safe medication practices and information flow. **Results:** Twenty medication errors were reported (2 preoperative, 4 operative, 5 during hospital admission, 2 in transition between services, 4 during discharge, and 3 postoperative). Medication errors included dose omission (5), improper dose (5), monitoring error (3), wrong strength (3), and wrong drug (1). Causes included failure to consider weight based dosing in children, to use of accurate drug references, to calculate the total medication supply needed, to validate "side", to review prior information (e.g., allergies or pregnancy), to reconcile medications with transfers, and to fully document medication histories. Use of preprinted order forms (paper) was flawed (e.g., medication changes not noted, default medications administered, amended information illegible and ignored, and discharge instructions insufficient to guide patients postoperatively). **Conclusions:** Improvement in medication documentation, following established safe practices, integration of patient information and use of clinical decision support is necessary to prevent perioperative medication errors in otolaryngology.

# 2:36

## Endoscopic Assisted Management of Obstructive Chronic Sialadenitis

M. Boyd Gillespie, MD, Charleston, SC; Jared M. Intaphan, MD, Charleston, SC (Presenter)

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the effectiveness of salivary endoscopes in gland preserving salivary surgery.

**Objectives:** Review outcomes and techniques of endoscopic assisted minimally invasive management of obstructive chronic sialadenitis. **Study Design:** Retrospective case series. **Methods:** The electronic medical record of patients who underwent salivary endoscopy were reviewed to determine endoscopic findings, associated procedures, complications, rate of gland preservation, and symptom control. **Results:** Thirty consecutive patients with chronic obstructive sialadenitis unresponsive to medical therapy underwent endoscopic assisted surgical management. Disease etiology included salivary stones in 14 patients (47%), idiopathic swelling in 13 patients (43%), and Sjogren's syndrome in 3 patients (10%). Diagnostic salivary endoscopy was performed on all patients followed other indicated endoscopic assisted procedures including steroid infusions (43%), stone extraction (33%), sialodochoplasty (33%), botulinum toxin injection (17%), stricture dilation (13%), and ductal stenting (10%). The main duct and hilum were the most common location for both parotid (75%) and submandibular stones (75%) which reached a mean diameter of 4.9 mm (range, 2-12 mm). The most common cause of idiopathic glandular swelling was stricture (38%), sialodochitis (38%), ductal anatomic anomaly (7%), radiolucent stone (7%), or a combination of stone and stricture (7%). The only observed complication was ductal perforation in one patient (3%). Gland preservation with symptom control was achieved in 24 (80%) of patients. The most common reason for gland excision included impacted stone in a secondary or tertiary duct (3 patients), followed by intraglandular abscess (1 patient), ductal anomaly (1 patient), and persistent obstructive sialodochitis (1 patient). **Conclusions:** Endoscopic assisted management of chronic obstructive sialadenitis is both safe and effective and allows gland preservation with symptom control in the majority of patients.

# 2:44

## Correlation of Depression, Sleepiness and Disease Severity in Patients with Obstructive Sleep Apnea

Stacey L. Ishman, MD, Baltimore, MD; Christine G. Gourin, MD\*, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) compare the inci-

dence of depression in patients with OSA versus a control population; and 2) discuss the relationship between depression, OSA disease severity and daytime sleepiness.

**Objectives:** To determine if a relationship exists between depression, disease severity and sleepiness in patients with obstructive sleep apnea (OSA). **Study Design:** Prospective cohort study with comparison to an unmatched control cohort. **Methods:** Sixty-eight consecutive patients presenting for evaluation of OSA were prospectively evaluated with the Beck Depression Inventory (BDI), an Epworth sleepiness scores (ESS) and sleep study prior to treatment. **Results:** Similar to previous studies, the association between respiratory disturbance index (RDI) and BDI on univariable analysis was weak ( $p=0.0756$ ) although the association was stronger on adjusted analysis ( $p=0.0253$ ). Notably, the correlation between BDI and the ESS was significant ( $r = 0.3401$ ,  $p=0.0096$ ), although only RDI was a significant predictor of BDI in a multiple linear regression model including race, gender, ESS and RDI. Evaluation of this population versus a control group of patients presenting to the otolaryngology clinic for non-sleep complaints showed depression to be significantly more common in OSA patients than in controls (RR=1.571, 95% CI: 1.128-2.188,  $p=0.0001$ ). **Conclusions:** Patients with OSA are more likely to have depression compared to non-OSA controls. An association exists between the depression (BDI) and OSA disease severity, as measured by the RDI, on both univariable and multiple linear regression analysis. In addition, it appears that there is a strong correlation between sleepiness (ESS) and disease severity (RDI). These data suggest that patients with high ESS scores and elevated RDIs may benefit from screening for depressive symptoms.

## 2:52 Mentorship in Otolaryngology Residency: The Resident Perspective

Amy K. Hsu, MD, New York, NY; Abtin Tabaei, MD, New York, NY; Elsa M. Carlo, BA, New York, NY; Mark S. Persky, MD\*, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to assess the current state of mentorship in otolaryngology residency and identify potential areas of improvement.

**Objectives:** To assess the current state of mentorship in otolaryngology residency. **Study Design:** Internet based anonymous survey of chief residents in otolaryngology residency. **Methods:** Non-identifying demographic information, career plans and general questions about residency experience were queried. Participants were asked to rate the general mentorship experience during residency and specifically with regards to research, personal quality of life, and career preparation. Responses were scored using a 5 point ordinal Likert scale with higher scores representing more favorable responses. **Results:** The survey was completed by 47 (17.2%) respondents. Eighteen respondents (38%) were assigned an official faculty mentor and 23 respondents (49%) were assigned a research mentor during their residency. Thirty-nine respondents (83%) reported receiving meaningful mentorship from faculty who were not officially assigned mentors. Overall, 18 respondents (38%) were neutral or not satisfied with the mentorship they received during residency. Statistically significant higher scores were noted for mentorship in career preparation (median:4) versus mentorship in research (median:3,  $p<0.001$ ) and resident quality of life (median:3,  $p<0.001$ ). Lower scores were noted for availability of mentorship in preparation for a career in private practice versus academic medicine (median:4 versus 5,  $p<0.001$ ). Residents who were officially assigned mentors reported statistically significant higher scores with regards to satisfaction with the overall mentorship experience (median:4 versus 3,  $p=0.05$ ), and different aspects of mentorship in career preparation and research training. **Conclusions:** The current study reveals variability in the mentorship experience in otolaryngology residency. Potential deficiencies may exist including absence of formal mentorship in some residency programs. Increased attention to mentorship especially with regards to research, career preparation and quality of life may improve the overall residency experience.

3:00 - 3:10 Discussion/Q&A

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3:10 - 3:45 Break/Visit Exhibitors and Posters

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## Laryngology/Bronchoesophagology

Moderator: C. Gaelyn Garrett, MD\*, Nashville, TN

## 3:45

### Simple Primary Mucosal Closure in Endoscopic Cricopharyngeal Myotomy

William J. Richtsmeier, MD PhD\*, Cooperstown, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the value of and perform a simple primary mucosal closure in endoscopic cricopharyngeal myotomy.

**Objectives:** Most descriptions of cricopharyngeus (CP) myotomy do not describe a mucosal closure and have a period of observation beyond 24 hours. The objective of this study was to determine the value of providing a simple, primary, mucosal closure in endoscopic CP myotomy where stapler assistance is not possible. **Study Design:** A retrospective case review. **Methods:** Nine patients with CP dysfunction were retrospectively reviewed. Five patients were labeled as having Zenker's diverticulum with pouches less than 1 cm. in depth; four had no pouch. Swallowing function was measured by patient interview and barium contrast studies where appropriate. The exposure was similar to endoscopic stapler assisted esophagodiverticulostomy. A CO2 laser was used for the sagittal plane, mucosal incision and myotomy. Mucosal closure was performed in the axial plane with simple, interrupted, absorbable sutures to increase the circumference of the CP segment. Endoscopic suturing technique employed instrument selection from available endoscopic equipment. **Results:** Followup periods varied from 7 to 34 months. Eight patients were allowed to have an oral diet the night of surgery and were discharged the day of surgery or the following morning. All patients' food quality tolerance significantly improved. Absence of recurrent pneumonia was observed in one patient and lack of painful cricopharyngeal spasm in another. One patient had a difficult intraoperative exposure of the laryngopharyngeal complex, providing a valuable insight for intraoperative decision regarding closure technique. **Conclusions:** Simple primary mucosal closure may be a valuable adjunct to endoscopic CP myotomy by improving the postoperative experience and shortening hospital stay.

## 3:53

### Neurotrophin Expression of Laryngeal Muscles in Response to Recurrent Laryngeal Nerve Transection

Xavier Vega-Cordova, MD, Springfield, IL; Todd M. Weiss, MD, Corpus Christi, TX; Nicole M. Cosenza, MS, Springfield, IL; Robert H. Helfert, PhD, Springfield, IL; Gayle E. Woodson, MD\*, Springfield, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss changes in neurotrophin expression of laryngeal muscles after recurrently laryngeal nerve transection, and understand to role that such responses could play in the specificity of muscle reinnervation.

**Objectives:** The recurrent laryngeal nerve (RLN) commonly regenerates after injury; however functional motion is rarely recovered. Animal experiments have documented aberrant reinnervation after nerve transection. Motor axons reach inappropriate muscles, with preferential reinnervation of adductor muscles. The vocal fold remains in adducted position due to inadequate reinnervation of the posterior cricoarytenoid muscle (PCA), the only laryngeal abductor muscle. Neurotrophins (NTs) are important in reinnervation and could influence specificity of reinnervation. The objective of this study was to compare the expression of NTs in the thyroarytenoid TA and PCA muscles after RLN injury. **Study Design:** Animal experiment. **Methods:** In 20 rats, 1 centimeter was resected from the right RLN. After set intervals, TA and PCA muscle were harvested for immunohistochemistry, staining for brain derived nerve growth factor (BDNF), nerve growth factor (NGF) and neurotrophin receptor 4 (NT-4). **Results:** 3 days after injury, BDNF and NT-4 levels were increased in the TA, while NGF expression was diminished. NGF expression was elevated in the TA at 6 weeks after injury. No significant changes were detected in the PCA muscle. **Conclusions:** We conclude that the TA and PCA differ in NT expression after RLN injury, and this likely plays a role in preferential reinnervation of adductor muscles.

## 4:01

### Cutting Balloon Use to Treat Acquired Subglottic Stenosis

Brett T. Comer, MD, Lexington, KY; Joseph R. Valentino, MD, Lexington, KY; Abbas A. Younes, MD, Lexington, KY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate understanding in the cutting balloon dilation technique for subglottic stenosis.

**Objectives:** To examine the complications and outcomes associated with cutting balloon dilation of subglottic stenosis. **Study Design:** Retrospective chart review. **Methods:** The medical records of five patients, ages seven months to eight years, were reviewed to examine operative technique and outcomes for cutting balloon dilation of subglottic stenosis.

A Peripheral Cutting Balloon Microsurgical Dilatation Device (Boston Scientific, Natick, MA) was used to perform dilation in all patients. The cutting balloon device has three to four atherotomes, or blades, that sit longitudinally along the length of the surface of a noncompliant balloon. When the balloon is placed in the trachea and expanded, the blades cut into surrounding tissue in a controlled fashion as graduated pressures are placed in the balloon, thus performing incision and dilation concurrently. **Results:** No patients required intubation, tracheostomy, or any other surgical intervention immediately post-dilation. None of the patients have required additional surgical intervention (e.g. dilation) related to subglottic stenosis in six weeks to nine months of followup. **Conclusions:** Preliminary results have been promising when using cutting balloons to treat subglottic stenosis. With this early success, future controlled studies comparing this balloon dilation technique to other techniques would be reasonable to consider.

## 4:09 Suspension Laryngoscopy Assisted Percutaneous Dilatational Tracheostomy in High Risk Patients

Hilliary N. White MD, Birmingham, AL; Dawn B. Sharp, MD, Birmingham, AL; Paul F. Castellanos, MD FCCP, Birmingham, AL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the outcomes of extended indications for bedside percutaneous dilatational tracheostomy as a direct benefit of the use of suspension laryngoscopy (SL-PDT) in high risk patients in the intensive care unit (ICU).

**Objectives:** To describe the outcomes of extended indications for bedside percutaneous dilatational tracheostomy as a direct benefit of the use of suspension laryngoscopy (SL-PDT) in high risk patients in the intensive care unit (ICU). **Study Design:** Retrospective chart review. **Methods:** Charts of 101 consecutive patients who underwent SL-PDT from April 2006 to July 2008 were reviewed. Data gathered included patient demographics, anatomical conditions, ventilator settings, intraoperative findings, presence of coagulopathy, and outcomes. Analysis was made using standard statistical methods. **Results:** One hundred and one patients underwent SL-PDT. Sixty-one patients were considered "high risk" by virtue of one or more of the following: morbid obesity, coagulopathy, prior neck surgery or head and neck trauma, laryngotracheal stenosis or malacia, a high riding innominate artery, or high ventilator demands. Twenty-eight (46%) patients had > 2 of the above risk factors. In the high risk group, 2 (3.3%) major complications occurred involving severe bradycardia and perioperative airway obstruction. Six (9.8%) minor complications occurred: 1 skin edge bleed, 3 endotracheal bleeds, 1 transient arrhythmia, and 1 transient desaturation. There were no adverse sequelae. **Conclusions:** SL-PDT is a safe and effective means of bedside airway management in critically ill patients. While this new technique offers advantages over traditional percutaneous dilatational tracheostomy (T-PDT), it can be safely employed by otolaryngologists, especially in high risk patients, when T-PDT is considered untenable or when transport to the operating room for open tracheostomy is considered too cumbersome or dangerous.

## 4:17 - 4:25 Discussion/Q&A

## 4:25 LAWRENCE R. BOIES RESIDENT RESEARCH AWARD (Middle Section) An Experimental Model to Investigate Early Tracheal Anastomosis Pull-Through Strength

Peter N. Schilt, MD, Indianapolis, IN; Bryan R. McRae, MD, Indianapolis, IN; Susan R. Cordes, MD, Indianapolis, IN; Stacey L. Halum, MD, Indianapolis, IN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the stability of tracheal anastomoses, understand mechanisms of tracheal rupture, and discuss differences between 3-0 PDS and 3-0 Vicryl suture in tracheal anastomosis.

**Objectives:** Early anastomotic dehiscence is a devastating complication of segmental tracheal resection. While wound healing, patient comorbidities, and anastomotic tension are all influential factors, there is a paucity of information available on initial tracheal stability after various tracheal anastomosis techniques in human tissue. **Study Design:** Prospective cadaver study. **Methods:** We present a novel, inexpensive pulley based system to apply symmetrical tension on the trachea in a longitudinal direction to the point of anastomotic dehiscence. The validity of this mechanism was confirmed with trials that incrementally increased quantities of the same suture type. Twenty-six trials were then performed on thirteen cadaver tracheas (6 fresh and 7 preserved) to compare anastomotic pull-out strength with two commonly used suture materials (3-0 Vicryl versus 3-0 PDS). **Results:** Validation studies demonstrated that the force increased appropriately with an increasing number of sutures tested. In the tracheal anastomoses, tracheal suture pull-through was the most common

mechanism of dehiscence, regardless of suture type. No significant difference in anastomotic stability was detected between the fresh versus preserved cadaver tracheas, nor between the first (178.2 N) and second (174.7 N) trials for each specimen ( $p=0.808$ ). The mean anastomotic strength was slightly greater for Vicryl (179.9 N) when compared to PDS (161.5 N), but the difference did not reach significance ( $p=0.207$ ). **Conclusions:** We introduce an inexpensive tool for measuring tracheal stability with human cadavers. While the current study did not detect differences based on suture type, the model may be useful in future studies that wish to quantify initial tracheal anastomotic strength.

## 4:33 The Relationship between Depressive Symptoms and Voice Handicap Index Scores in Laryngopharyngeal Reflux

Jackson C. Elam, BS, Baltimore, MD; Christine G. Gourin, MD\*, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the effect of LPR on vocal impairment as measured by the Voice Handicap Index and understand the potential influence of depressive symptomatology.

**Objectives:** To determine if a relationship exists between depression and Voice Handicap Index (VHI) scores in patients with laryngopharyngeal reflux (LPR) disease. **Study Design:** Prospective patient analysis. **Methods:** One hundred nineteen patients were prospectively evaluated with the VHI questionnaire and the Beck Depression Inventory Fast Screen (BDI-FS) survey. Patients with incomplete data or a preexisting diagnosis of depression were excluded. **Results:** Complete data was available for 36 patients with LPR and 53 controls. No significant differences existed between groups with respect to age, race or gender. Mild depressive symptoms were identified in 9% of controls and 3% of LPR patients by BDI-FS screening ( $P=0.3956$ ); no patient in either group had moderate or severe depression symptom severity. Compared to controls, patients with LPR had significantly higher mean scores for total VHI (16.2 versus 6.6,  $P=0.0016$ ) and the functional VHI (5.8 versus 2.4,  $P=0.0180$ ) and physical VHI (6.9 versus 2.5,  $P=0.0085$ ) domains. Mean scores for the VHI emotional domain (3.5 versus 1.7,  $P=0.2$ ) and BDI-FS (0.2 versus 0.8,  $P=0.3$ ) did not differ between patients with LPR and controls. For all participants, a positive correlation was found between BDI-FS score and VHI emotional domain score ( $r=0.3$ ,  $P=0.0084$ ). **Conclusions:** Patients with LPR report poorer VHI functional and physical scores compared to controls; however, LPR symptoms do not result in significantly worse VHI emotional domain scores or depressive symptoms. There is a correlation between VHI emotional domain scores and BDI-FS scores. These data suggest that LPR patients with poor VHI emotional domain scores may benefit from screening for depressive symptoms.

## 4:41 Combitube® Utility, Proper Use, and Potential Complications

Brittany E. Howard, BS, Albuquerque, NM; Tania L. Kraai, MD, Albuquerque, NM; Garth T. Olson, MD, Albuquerque, NM; Michael F. Spafford, MD, Albuquerque, NM; Thomas R. Howdieshell, MD, Albuquerque, NM; Melissa A. Hertler, MD, Milwaukee, WI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the indications and proper use of the Combitube® oropharyngeal airway. Additionally, they will have an understanding of potential aerodigestive tract injuries associated with emergent intubation by Combitube® and their appropriate management.

**Objectives:** To present data on eleven patients who sustained aerodigestive tract injuries following Combitube® placement, and review the utility, proper use, and methods to avoid complications with this device. **Study Design:** Retrospective study. **Methods:** Data was collected on patients who presented to a tertiary referral center from 2002-2008 with Combitube® placement for emergency airway access. The transport and inpatient medical records, radiology images, procedure reports, and autopsy reports were reviewed and analyzed and compared to complications published in the literature. **Results:** Complications were identified in 11 of 15 patients undergoing intubation with Combitube®: traumatic intubation (81.8%), subcutaneous emphysema (72.7%), paraesophageal air (54.5%), pneumothorax (54.5%), pneumomediastinum (45.5%), hemothorax (45.5%), gastric distension (45.5%), hemomediastinum (18.2%), and aspiration (18.2%). Management required tracheostomy for airway control, prolonged mechanical ventilation, and further evaluation including swallow studies, direct laryngoscopy, bronchoscopy, and rigid esophagoscopy to evaluate the extent of injury. **Conclusions:** Although the Combitube® has an established role in the management of the difficult emergent airway, proper technique is paramount to prevent aerodigestive tract injury. Injuries are common (73% of patients), but are usually self-limited and not associated with long term morbidity. However, severe injury is possible and should be considered in patients presenting after Combitube® placement.

4:49 - 4:57 Discussion/Q&A

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5:30 - 7:30 *“Meet the Authors” Poster Reception*  
*(Mediterranean 1-4)*

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# SATURDAY, FEBRUARY 6

## PALAZZO E-H

8:00 Announcements by Vice Presidents

### 8:10 - 9:00

#### IS IT TIME FOR SINUS SURGERY GUIDELINES? A DEBATE

**Moderator:** Berrylin J. Ferguson, MD\*, Pittsburgh, PA

**Panelists:** Neil Bhattacharyya, MD\*, Boston, MA  
John M. DelGaudio, MD\*, Atlanta, GA  
H. Peter Doble II, MD\*, Twin Falls, ID  
Thomas A. Tami, MD\*, Cincinnati, OH

**Educational Objective:** At the conclusion, the attendees should be able to 1) outline a logarithm for diagnosing and treating the patient with sinonasal complaints, before taking the patient to the operating room; 2) know the minimum indications for sinus surgery; and 3) understand that optimal medical and sinus surgery will vary by patient.

### 9:05 - 9:55

#### RHINOPLASTY, THE NASAL VALVE, AND THE SEPTUM

**Moderator:** Brian J.F. Wong, MD PhD\*, Irvine, CA

**Panelists:** Patrick J. Byrne, MD FACS, Baltimore, MD  
Brian S. Jewett, MD, Miami, FL  
John S. Rhee, MD MPH\*, Milwaukee, WI

**Educational Objective:** Educational Objective: At the conclusion of this presentation, attendees should be able to be better able to select surgical methods to improve nasal airway obstruction without compromising aesthetics.

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10:00 - 10:30 *Break/Visit Exhibits/View Posters*  
(Mediterranean 1-4)

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### 10:30 - 12:00

#### HEALTH CARE REFORM FOR THE OTOLARYNGOLOGIST

**Moderator:** Dana M. Thompson, MD\*, Rochester, MN

**Panelists:** Ellis M. Arjmand, MD MMM PhD, Cincinnati, OH  
Jeffrey O. Korsmo, Rochester, MN  
Ronald B. Kuppersmith, MD, College Station, TX

**Educational Objective:** At the conclusion of this presentation, attendees should be able to 1) understand the basic economics of government and private insurance reimbursement for otolaryngology; 2) learn how health care reform changes may impact the practice of otolaryngology; and 3) learn how we might create a health care system with improved access, pays for value and is affordable for all patients.

**12:30**

**TRIOLOGICAL SOCIETY THESIS SEMINAR**

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*Golf Tournament, Tennis Tournament, Free Time  
for Families  
No Evening Function*

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# SATURDAY, FEBRUARY 6

## PALAZZO D

8:00 Announcements by Vice Presidents

### **Facial Plastic and Reconstructive Surgery**

Moderator: David B. Hom, MD\*, Cincinnati, OH

### 8:10 Virtual Surgical Planning for Mandibular Reconstruction

Tammara L. Watts, MD PhD, Portland, OR; Kevin Arce, MD, Portland, OR; Julie Ann Smith, DDS MD, Portland, OR; Mark K. Wax, MD, Portland, OR

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the latest computer generated 3D surgical modeling for mandibular reconstruction.

**Objectives:** Fibula free tissue transfer has become the mainstay for mandibular reconstruction following composite resection for benign and malignant tumors, congenital deformities, and traumatic bone loss. This free flap is not without its technical challenges; including designing and fashioning osteotomies that follow the contour of the native mandible and manipulating the reconstruction plate. These are two critical components that require technical expertise for successful surgical and aesthetic outcomes following fibula free tissue transfer. The objectives of this study were to apply medical modeling techniques during presurgical planning and to apply computer generated models intraoperatively for a composite resection. **Study Design:** Case study. **Methods:** We describe here the use of medical modeling based on high resolution 3D CT imaging for mandibular reconstruction following fibula free tissue transfer. A presurgical interactive web based conference call between the surgeon and the engineer allows the surgeon to directly interact with the engineer designing the model. The surgical margins and planned osteotomies are determined, which allows for two templates to be custom designed. One template accurately determines the amount of bone required and the precise cuts for the osteotomies, and another template outlines the surgical margins. The reconstruction bar is fabricated based on these models obviating the need to bend the bar during the operative procedure. **Results:** The osteotomy template allowed for more accurate design and guided the placement of the osteotomies for the mandibular reconstruction, better restoring the patient's native facial projection and contour. The prefabricated reconstruction bar facilitated placement of the composite tissue into the defect and likely saved valuable operating room time. **Conclusions:** We feel that these technical advances assist in surgical planning and may reduce some of the surgical challenges faced with designing and manipulating the fibula free flap for mandibular reconstruction as well as potentially reduce operative time.

### 8:18 Practical Device for Rapid and Precise Cutting of Costal Cartilage Grafts to Uniform Thickness

Allen I. Foulad, BS, Irvine, CA; Cyrus T. Manuel, BS, Irvine, CA; Brian J.F. Wong, MD PhD\*, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the principles relevant to fashioning costal cartilage grafts of uniform thickness using a simple mechanical device and appreciate the value for use in clinical and research settings.

**Objectives:** Costal cartilage is becoming increasingly popular as a graft source for facial reconstruction. However, carving methods have not changed in decades and have relied upon time consuming maneuvers with a scalpel. There are few reports of mechanical devices for shaping costal cartilage, and their accuracy and precision are not reported. This study describes a simple mechanical costal cartilage slicing apparatus that results in reproducible sections of uniform thickness to a user defined thickness. **Study Design:** Laboratory research using 200 ex vivo porcine costal cartilage slices. **Methods:** A two component apparatus was constructed consisting of a device to secure the costal cartilage and a double bladed microtome to cut the rib graft through a central cross section. Optimizing compression forces and blade design were critical. The apparatus is capable of obtaining slices with lengths up to 4cm and widths up to 1cm, while thickness is adjustable to 1mm and greater. To confirm uniformity, thickness was measured at 8 fixed regions per section using a digi-

tal micrometer. **Results:** All costal cartilage slices appeared extremely uniform upon visual and manual inspection. Specifically, slices cut to 2cm x 1cm x 1mm had less than 0.1mm deviation in thickness. Larger specimens demonstrated similar uniformity and tolerances. Each specimen required less than 15 seconds to cut. **Conclusions:** Our study demonstrates the precision of utilizing a simple mechanical slicing apparatus to section costal cartilage to a clinically relevant and uniform thickness. This mechanized technology will decrease the error and carving time associated with the use of a traditional scalpel.

## 8:26 Parotidectomy Using Modified Facelift Incision: Improved Cosmesis without Compromising Functional Outcome

Helen E. Perakis, MD, Augusta, GA; Lana L. Jackson, MD, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the indications and advantages of using a modified facelift incision for parotidectomy.

**Objectives:** To compare parotidectomy using a modified Blair incision to a modified facelift incision with or without the use of an abdominal fat graft with respect to intraoperative data and postoperative complications including facial nerve function. **Study Design:** Retrospective clinical review at a tertiary care center. **Methods:** 68 patients underwent parotidectomy, where 39 patients underwent a traditional parotidectomy using a modified Blair incision and 29 underwent a parotidectomy using a modified facelift incision with and without abdominal fat graft reconstruction. Demographics and operative data was collected and postoperative outcomes were analyzed. **Results:** There was no significance between utilizing a modified facelift incision with/without fat graft reconstruction versus a modified Blair incision with respect to tumor size, estimated blood loss, drain output, days drain was kept and length of hospital stay. The length of surgery was slightly higher when utilizing a facelift incision with fat graft reconstruction (p 0.05). Complication rate of seroma was slightly higher in the modified facelift cohort, although this was not significant. Initial facial nerve weakness was slightly higher in the modified Blair incision group, although this was not significant. The incidence of Frey's syndrome was slightly reduced in the fat graft reconstructed subset, yet this was not significant. **Conclusions:** Modified facelift incision with/without abdominal fat graft reconstruction following parotidectomy improves cosmesis without sacrificing functional outcomes or increasing complication rates. The modified facelift incision is a feasible alternative to the modified Blair incision for patients who seek an aesthetically pleasing result.

## 8:34 A Comparison of a Novel Pressure Dressing with Conventional Pressure Dressings

Tucker M. Harris, MD, Syracuse, NY; Ronald E. Walsh, NP, Syracuse, NY; Jack M. Hsu, MD, Syracuse, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify limitations of conventional pressure dressings, compare the performance of conventional pressure dressings with that of a novel type of pressure dressing, and learn how to apply the novel type of pressure dressing.

**Objectives:** Pressure dressings usually consist of gauze and elastic tapes. Limitations of such dressings include difficulty in maintaining consistent or significant pressure, discomfort for patients during dressing application and removal, and increased health care costs. The objective of this report is to compare the performance of conventional pressure dressings with the performance of a novel pressure dressing in experimental and clinical settings. **Study Design:** Experiment and case report. **Methods:** A sphygmomanometer cuff was held in place along the lower lateral neck of a mannequin by applying gauze and elastic tape for 24 hours, and the pressure reading was recorded at regular intervals. The procedure was repeated with another dressing consisting of gauze and a different brand of elastic tape. The procedure was repeated again with a dressing consisting of gauze and a 4 inch wide elastic bandage attached with safety pins to an abdominal binder. The experiment was repeated on a normal human subject. The chart of a patient who wore the novel dressing was reviewed. **Results:** The conventional dressings each applied less than 20 mm Hg of pressure by 2 hours. The novel dressing applied 32 mm Hg of pressure over a 24 hour period. The patient had a postoperative chylous accumulation refractory to conventional pressure dressings that resolved with the application of the novel pressure dressing. **Conclusions:** The novel pressure dressing described in this report outperforms conventional pressure dressings in an experimental setting. It provides sustainable, localized pressure, is easy to apply, is tolerated well by patients, and improves direct and indirect health care costs.

# 8:42

## Management of Self-Inflicted Submental Gunshot Wounds in the Age of Free Flap Reconstruction

Nichole D. Dean, DO, Birmingham, AL; Shane M. McKinney, MS, Birmingham, AL (Presenter); Mark K. Wax, MD, Portland, OR; Patrick J. Louis, DDS MD, Birmingham, AL; Eben L. Rosenthal, MD\*, Birmingham, AL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the risk factors and clinical outcomes associated with self-inflicted submental gunshot wounds that are reconstructed using free flaps.

**Objectives:** Self-inflicted, submental, ballistic injuries result in significant soft tissue and bone destruction. Reconstruction of these defects requires the transfer of free tissue flaps to restore function. We propose to understand clinical outcomes for this patient population. **Study Design:** We conducted a retrospective review of treatment outcomes in 12 patients with self-inflicted, submental, gunshot wounds over a 7 year period at two tertiary care centers. **Methods:** Risk factors and postoperative outcomes were assessed. **Results:** Patients had a mean age of 48 years (range, 16 to 76 years). Out of 12 patients, 8 had a psychiatric history and 3 were known to abuse illicit substances. Median followup was 12 months. All patients required free tissue repair and 18% (n=2) required multiple free flaps. Hospitalization for free flap reconstruction averaged 8 days. Patients required an average of 1.6 initial reconstructive procedures and 2.2 procedures after free flap reconstruction. Donor sites included osteocutaneous radial forearm (n=10), osteocutaneous fibula (n=3), and anterior lateral thigh (n=1). Overall complication rate after initial reconstructive surgery was 27% (n=3), encompassing hematomas (n=1), fistula (n=1), and repeat anastomosis (n=1). A majority of patients had PEG tubes placed (67%), 50% of which retained PEG tubes for a median of 24 weeks. Long term aspiration was present in 8% of patients and a significant portion remained tracheostomy dependent (37%). However, most patients had oral competence (50%), adequate speech (75%), and adequate swallowing (92%). **Conclusions:** Submental gunshot wounds require multiple procedures with a return to oral intake at 14 weeks on average, but have functional speech and swallowing outcomes.

8:50 - 8:58 Discussion/Q&A

## Head and Neck Surgery

Moderator: David J. Terris, MD\*, Augusta, GA

# 8:58

## JOHN E. BORDLEY RESIDENT RESEARCH AWARD (Southern Section) HPV-Associated Head and Neck Cancer and Minority Health Disparities: A Possible Link

Paul M. Weinberger, MD, Augusta, GA; Mark M. Merkley, PhD, Augusta, GA; Sunny S. Khichi, BS, Augusta, GA; Diamando Psyrrri, MD, New Haven, CT; Lana L. Jackson, MD, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate familiarity with HPV-associated head and neck cancer and describe possible associations between ethnic health disparities and prevalence of more aggressive HPV-negative cancers.

**Objectives:** Mortality for black males with head and neck cancer (HNSCC) is twice that of white males or females. HPV-active HNSCC is associated with decreased mortality. We hypothesized that prevalence of HPV-active disease would be lower in black HNSCC patients compared to white patients. **Study Design:** Multi-institutional retrospective cohort analysis. **Methods:** Laser capture microdissection was used to enrich for tumor cells. Real time PCR was used to evaluate for high risk HPV DNA presence. Immunohistochemistry (IHC) for p16 protein was used as a surrogate marker for HPV oncoprotein activity. Patients were classified as HPV-negative (HPV DNA negative, p16 low), HPV-inactive (HPV DNA positive, p16 low) and HPV-active (HPV DNA positive, p16 high). Prevalence rates and survival were compared by Fisher's exact test and Kaplan-Meier analysis. **Results:** There were 140 patients with HNSCC who met inclusion criteria (24 patients at institution 1; 116 patients at institution 2). Self-reported ethnicity was white (115), black (25), and other (0). There were 102/140 patients with successful DNA amplification and p16 determination. Patients were classified as HPV-negative (44), HPV-inactive (33) and HPV-active (25). Patients with HPV-active HNSCC had improved overall survival (59.4%) compared to HPV-negative and HPV-inactive patients (17.4%) (p=0.005). Black patients were less likely to have HPV-active disease (0%) compared to white patients (21%), p=0.01. **Conclusions:** Patients with HPV-active HNSCC have improved overall

survival. This favorable disease class is less common in black patients with HNSCC. It is possible that differences in prevalence of HPV-active HNSCC may partly explain observed ethnic health disparities for HNSCC patients.

## 9:06 Outcomes of Salvage Surgery with Free Flap Reconstruction for Recurrent Oral and Oropharyngeal Cancer

John P. Kostrzewa, MD, Birmingham, AL; William P. Lancaster, BS, Birmingham, AL; Tim A. Iseli, MBBS, Birmingham, AL; Renee A. Desmond, DVM PhD, Birmingham, AL; William R. Carroll, MD, Birmingham, AL; Eben L. Rosenthal, MD\*, Birmingham, AL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to review the current morbidity, functional and survival outcomes of salvage surgery with free flap reconstruction for recurrent oropharyngeal and oral cavity cancer given the increased use of primary and adjuvant chemoradiotherapy.

**Objectives:** To evaluate outcomes of salvage surgery with free flap reconstruction for recurrent squamous cell carcinoma of the oropharynx and oral cavity with increased use of chemoradiotherapy. **Study Design:** Retrospective review. **Methods:** All patients undergoing salvage surgery with free flap reconstruction for oropharynx (n=36) and oral cavity (n=36) squamous cell carcinomas between January 2001 and January 2008 were obtained. Mean followup was 14 months. Previous chemoradiotherapy was used in 39% and radiotherapy alone in 61%. **Results:** Complications were more frequent in oropharynx than oral cavity tumors (36% and 14%, p=0.05) requiring more secondary procedures (15 versus 6). Few patients returned to a normal diet (8%) and a majority retained an enterogastric feeding tube (56%). Median survival overall following salvage surgery was 44.8 months for oral cavity and 53.8 months for oropharynx head and neck squamous cell carcinoma (HNSCC). Overall estimated 1, 2 and 5 year observed survivals were 98%, 77.2% and 58.8%. Twelve patients had a disease free interval of < 6 months, 92% of whom died of disease. Of 17 patients with disease at the primary site and involved regional lymph nodes, 94% died of disease. **Conclusions:** Salvage surgery with free flap reconstruction for recurrent oral and oropharyngeal tumors after chemoradiotherapy has acceptable morbidity and similar cure rates as salvage following radiotherapy without chemotherapy. Concurrent nodal recurrence and short disease free interval are associated with reduced cure rates. A significant proportion will require enterogastric feeding and few will tolerate a normal diet.

## 9:14 Analysis of Outcomes after Lateral Temporal Bone Resection

Nichole R. Dean, DO, Birmingham, AL; Dale S. Carter, BS, Birmingham, AL (Presenter); Benjamin M. McGrew, MD, Birmingham, AL; Eben L. Rosenthal, MD\*, Birmingham, AL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to know what type of outcomes and survival rates to expect when patients undergo lateral temporal bone resection.

**Objectives:** We propose to determine the outcomes and the survival in patients with lateral temporal bone resection. **Study Design:** Retrospective review. **Methods:** There were 26 patients that underwent lateral temporal bone resection between 2002 and 2009. Surgical data included patient and defect characteristics, neck dissection, reconstruction details, facial nerve outcomes, auriclectomy, hearing results, recurrence rates, and overall survival. The median followup time was (14 months, range 2-56 months). **Results:** The majority of patients were male (88%) and all had malignant tumors of which most were squamous cell carcinoma (65%). All tumors were staged as T4 and 4 patients had nodal involvement. Fourteen patients (54%) had facial nerve resection, of which four patients (29%) underwent facial nerve graft resulting in a return of musculature (House-Brackmann Average III-IV). The majority of patients required total auriclectomy (58%) and middle ear obliteration (73%). Free flaps were used for reconstruction, donor sites included the anterolateral thigh (35%), rectus (31%), or radial forearm free flap (23%). Audiogram analysis demonstrated an average air bone gap increase of 18 db in patients with middle ear ablation. Nine patients recurred at an average of 1.8 years after the end of treatment (SD=0.3). Overall survival was 65% (17/26). Patients who received no radiotherapy had a 60% 2 year survival, whereas patients who received postoperational radiation had a 2 year survival of 80% (P=0.4). **Conclusions:** Survival from malignancies involving the temporal bone approaches 65% with acceptable morbidity. Aggressive surgical resection of the temporal bone is recommended.

## 9:22 - 9:30 Discussion/Q&A

# 9:30

## Ultrasound Guided Fine Needle Aspiration: The Impact of Immediate Cytopathology Evaluation

Aaron C. Moberly, MD, Indianapolis, IN; Mimi S. Kokoska, MD, Indianapolis, IN; Emre A. Vural, MD, Little Rock, AR; Michelle T. Ziebarth, FNP-BC, Indianapolis, IN

**Educational Objective:** Participants will gain an understanding of how immediate cytopathology assessment of ultrasound guided fine needle aspirates improves the quality of care for patients with head and neck masses. In addition, they will see an example of a mobile cytopathology unit that works seamlessly with an otolaryngology practice.

**Objectives:** To compare the diagnostic adequacy of ultrasound guided fine needle aspiration (USFNA) biopsies of the head and neck with immediate examination of specimens and feedback by a cytopathologist (IMMEDIATE) versus delayed examination without immediate feedback by a cytopathologist (DELAYED). **Study Design:** Retrospective chart review of office based ultrasound guided fine needle aspiration biopsies (USFNA) performed in both IMMEDIATE and DELAYED settings by the same otolaryngologist. **Methods:** Cytopathologic reports were reviewed for adequacy of USFNA biopsies that were obtained in the DELAYED setting, compared with adequacy of USFNA biopsies obtained in the IMMEDIATE setting. **Results:** A total of 175 USFNA procedures in the head and neck were performed by one practitioner. One hundred twenty-five USFNA biopsies were in the DELAYED setting, whereas fifty were performed in the IMMEDIATE setting. The adequacy of the specimens in the final cytopathology report was 80% in the DELAYED group as compared with 100% in the IMMEDIATE group. There was a significant improvement in the adequacy of USFNA specimens with the immediate evaluation by a cytopathologist. **Conclusions:** The presence of a cytopathologist during USFNA is strongly recommended. The immediate feedback can be used to improve the quality of care by 1) decreasing the need for repeated USFNA biopsies when initial biopsies are inadequate; 2) allowing the otolaryngologist to target another area of a mass if the initial feedback suggests the need for further sampling; and 3) providing an opportunity for immediate communication between the patient, otolaryngologist, and cytopathologist, which is useful for the cytopathologist in formulating a final diagnostic report.

# 9:38

## The Increasing Incidence of Small Thyroid Cancers - Where Are the Cases Coming from?

Louise Davies, MD MS\*, White River Junction, VT; Michelle L. Ouellette, BS, Hanover, NH; Mark A. Hunter, MD, Albany, NY; H. Gilbert Welch, MD MPH, White River Junction, VT

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the most common ways small, asymptomatic thyroid nodules are identified in the course of regular medical care, and discuss how this can contribute to treatment of clinically insignificant thyroid cancers.

**Objectives:** To identify the trigger events which lead to the detection of otherwise asymptomatic thyroid cancers. **Study Design:** Retrospective cohort. **Methods:** Chart abstraction of patients who underwent thyroidectomy. Iterative development of a classification scheme to identify trigger events. **Results:** 184 thyroidectomies were performed, and this resulted in 59 new diagnoses of thyroid cancer. The majority of identified cancers (38 cancers - 64%) were in thyroidectomies performed after identification of a thyroid abnormality by either "screening" or "chance". A "screening" trigger event occurs when a physician performs a routine thyroid examination when there is no specific neck complaint. A "chance" trigger event can occur either by serendipity (a radiologic test done for a different reason), or by diagnostic cascade (identification of a thyroid abnormality on any test which does not plausibly explain the patient's presenting complaint). Physician screening examination was the trigger event for 33 thyroidectomies (18%). Serendipity was the trigger event for 31 thyroidectomies (17%). Diagnostic cascade was the trigger event for 24 thyroidectomies (13%). Fifty-six thyroidectomies (30%) were performed because of symptoms directly referable to a neck mass, such as a patient complaint of feeling something in their neck. Just over a third of those patients received a cancer diagnosis (21/56). **Conclusions:** Screening and chance identification were the trigger events for most of the cancers diagnosed, and just under half of thyroidectomies performed. These "extra" cancer diagnoses and surgeries are a significant burden for patients. These data will help direct future efforts to curb treatment of clinically unimportant thyroid nodules.

9:46 - 9:54 Discussion/Q&A

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10:00 - 10:30 Break/Visit Exhibits/View Posters  
(Mediterranean 1-4)

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## **Laryngology/Bronchoesophagology**

Moderator: Mark S. Courey, MD\*, San Francisco, CA

### **10:30 Dissociated Cultures and Trophic Factor Effects on Cranial Nerve X Motoneurons in vitro**

Bryan R. McRae, MD, Indianapolis, IN; Stacey L. Halum, MD, Indianapolis, IN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate an understanding of methods for obtaining dissociated cell cultures of cranial nerve X motoneurons and to discuss various trophic factors' effects on the neuronal cultures.

**Objectives:** Peripheral injuries or central lesions involving cranial nerve X (CN X) often lead to severe dysphagia or dysphonia, with motoneuron losses from the corresponding nucleus ambiguus. The development of improved pharmacologic or surgical treatments for such lesions will require more precise detail regarding the cellular machinery involved. To date, CN X motoneuron responsiveness has only been studied indirectly—generally via expensive, small scale in vivo applications—with no known methods for studying isolated CN X motoneurons. The aim of this study was to facilitate CN X research by developing an in vitro model of obtaining and evaluating dissociated motoneuron cultures from the nucleus ambiguus. **Study Design:** In vitro experiments in mammalian cells. **Methods:** A novel, reliable method of harvesting and maintaining dissociated cultures of primary brainstem motoneurons, enriched in motoneurons from the nucleus ambiguus, was studied in adult and postnatal (P1) rats. Motoneurons were then incubated in ascending concentrations of selected trophic factors (GDNF, BDNF, and CNTF) and compared with controls. **Results:** Characteristics of branchial motor neurons obtained from the nucleus ambiguus of both adult and postnatal rats were described. Viable motoneurons remained detectable for up to one month. The model responded appropriately to the addition of various trophic factors. **Conclusions:** In conclusion, this study demonstrates that motoneurons can be derived and maintained in culture from the nucleus ambiguus, providing a useful model for direct study of dissociated CN X motoneurons in vitro and for further characterization of the molecular processes involved in vagus nerve injuries or disease.

### **10:38 Laryngeal Cultures in Clinical Practice: Review of a Patient Series**

John D. Clinger, MD, Iowa City, IA; Derek J. Robinson, MD, Charlottesville, VA; Jonathan M. Bock, MD, Nashville, TN; Henry T. Hoffman, MD\*, Iowa City, IA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the expected results and clinical role of laryngeal cultures, as well as compare expected culture findings in different categories of patients.

**Objectives:** 1) To review a large series of patients to determine the incidence and spectrum of laryngeal culture results; and 2) to compare patient characteristics (i.e., history of diabetes, inhaler use) as predictors of laryngeal culture outcome. **Study Design:** A single surgeon, single institution case series with a chart review. **Methods:** 41 laryngeal cultures obtained by the senior author from 34 patients with laryngeal lesions over a four year period of time were reviewed. Patient characteristics including sex, diabetes status, history of reflux, and inhaler usage were obtained by chart review. Patient characteristics were compared to cultured species. **Results:** 41 sets of laryngeal cultures (41 aerobic, 12 anaerobic, 28 fungal) resulted in the isolation of 59 different species of bacteria or fungus. 30 aerobic cultures (73%) grew mixed oral flora. Other aerobic isolates included staph aureus (7%) and beta hemolytic strep—non grp A (5%). 8 anaerobic cultures (67%) were negative and 3 (25%) grew mixed anaerobic oral flora (17% included Prevotella). There was no significant pattern noted between diabetes status, history of reflux, inhaler use, and culture results. **Conclusions:** Laryngeal cultures can be used to identify clinically significant bacterial and fungal infections and guide their treatment.

### **10:46 Development and Pilot Testing of an Operative Competency Assessment Tool for Pediatric Bronchoscopy**

Stacey L. Ishman, MD, Baltimore, MD; David J. Brown, MD, Milwaukee, WI; Emily R. Boss, MD, Baltimore, MD; Margaret L. Skinner, MD, Baltimore, MD; David E. Tunkel, MD\*, Baltimore, MD; Sandra Lin, MD, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the feasibility and validity of a new objective evaluation tool to evaluate operative competency in pediatric bronchoscopy.

**Objectives:** To develop and pilot test objective instruments to evaluate residents' surgical performance and animal model simulation of pediatric bronchoscopy, with emphasis on feasibility, validity, and interrater agreement. **Study Design:** Prospective, unblinded educational quality improvement project with a combination of paired and unpaired observations.

**Methods:** New OSATS based evaluation instruments were developed based on faculty input. Two instruments were created, one with a surgical checklist format, and the second as a more global assessment of surgical performance. The instruments were pilot tested in an animal model resident bronchoscopy course with 4 faculty observers and utilized in the operative suite. Paired observations were used to determine interrater agreement, while multiple evaluations were used to calculate construct validity and internal consistency. **Results:** A total of 44 assessments were complete for 18 residents who were evaluated by 7 faculty members as they performed pediatric bronchoscopy on an animal model or pediatric patients. Feasibility was noted for the instrument and overall interrater agreement was 69% (range 29-94%). Construct validity was noted with increasing mean global and task specific scores by postgraduate year ( $p < 0.0001$ ). Internal consistency, as measured with Cronbach alpha, was high at 0.968. **Conclusions:** This instrument appears to be feasible and valid in a limited evaluation and suggests that a reliable and valid instrument for objective evaluation of operative competency can be developed for pediatric bronchoscopy. The instrument can be used for formative and summative feedback on resident operative performance, but larger studies are required to validate its utility.

## 10:54 Spontaneous Epiglottic Hematoma and Airway Compromise Secondary to Supra-therapeutic Anticoagulation with Warfarin

Cody A. Koch, MD PhD, Rochester, MN; Steven M. Olsen, MD, Rochester, MN; Laura J. Orvidas, MD\*, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) recognize the clinical presentation and exam findings of a patient with a hematoma of the soft tissues of the upper airway; 2) understand the importance of a prompt and accurate diagnosis of upper airway hematoma; and 3) recognize the importance of reversing the underlying coagulopathy and securing the airway in a controlled fashion.

**Objectives:** Report a case of spontaneous epiglottic hematoma secondary to supra-therapeutic anticoagulation with warfarin with airway compromise, initially misdiagnosed as epiglottitis. **Study Design:** Retrospective. **Methods:** Case report extracted from patient's medical record, imaging studies, laboratory studies and followup. Review of the literature on spontaneous airway hemorrhage. **Results:** A 37 year old male with Factor V Leiden mutation receiving chronic anticoagulation with warfarin was transferred from an outside institution with the diagnosis of epiglottitis based on clinical presentation and CT findings. Evaluation at our institution revealed mild respiratory distress, a large epiglottic hematoma on flexible fiberoptic laryngoscopy and an INR greater than 12.0. The patient was initially treated with fresh frozen plasma and vitamin K and his airway secured via awake tracheostomy. Repeat flexible fiberoptic laryngoscopy 7 days later revealed resolution of the hematoma and airway edema and the patient was decannulated. The patient was discharged from our care with followup in vascular medicine for further management of his anticoagulation. **Conclusions:** We report only the second case of spontaneous epiglottic hematoma in the literature. Epiglottic hematoma should be considered in the differential of any anticoagulated patient presenting with upper airway compromise. The coagulopathy should be rapidly corrected and the airway secured in a controlled fashion.

## 11:02 Ten Month Laryngeal Allograft Survival Using Pulsed Everolimus and Anti-TCR Antibody Immunosuppression

David G. Lott, MD, Cleveland, OH; Samir S. Khariwala, MD, Minneapolis, MN; Olivia Dan, BS, Cleveland, OH; Marshall Strome, MD MS FACS\*, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the challenges associated with immunosuppression for laryngeal transplantation. They will learn the newest techniques for minimizing the risks of immunosuppression while maximizing allograft tolerance.

**Objectives:** The risks associated with daily immunosuppression limit laryngeal transplantation as a reconstructive option. Delivering immunosuppressives in a pulsed fashion can lessen these risks. The objective of this study was to develop an effective, long term pulsing regimen that minimizes exposure to immunosuppressive agents. **Study Design:** All transplant recipients received everolimus and anti-TCR antibodies for 7 days perioperatively. The same regimen was given for 5 days

beginning on day 90. On day 180, the treatment differed between two groups of 5 rats. Group 1 was given the same regimen for 3 days. Group 2 received 1 mg/kg/day of everolimus daily until euthanized. **Methods:** Larynges were transplanted from Lewis-Brown Norway (RT11+n, Fl) rats into Lewis (RT11) recipients. Euthanasia occurred when parathyroid hormone (PTH) levels dropped <11 (previously correlated with graft rejection) or at 300 days. Histological analysis was performed on each allograft for evidence of rejection. **Results:** Group 1: 4/5 rats had normal PTH levels at 300 days. PTH for one rat was <11 at 270 days. Group 2: 0/5 rats had normal PTH levels at 300 days. 2/5 were <11 at 270 days. 3/5 became <11 at 300 days. No allografts surviving to 300 days demonstrated evidence of rejection. **Conclusions:** Pulsed immunosuppression with everolimus and anti-TCR is the first regimen to prevent rat allograft rejection for 10 months. This appears to be more effective than switching to daily dosing of everolimus. Short term perioperative therapy followed by decreasing pulsed doses is a viable alternative to traditional immunosuppressive techniques and may serve to decrease the associated risks.

11:10 - 11:27 Discussion/Q&A

## **Advanced Sinus Surgery/Rhinology**

Moderator: James A. Hadley, MD, Rochester, NY

### **11:27 Regional Gene Expression in the Sinonasal Cavity of Patients with Chronic Sinusitis and Nasal Polyps**

Michael P. Platt, MD, Boston, MA; Ralph B. Metson, MD\*, Boston, MA; Konstantina M. Stankovic, MD PhD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand regional alterations in nasal polyps and the implications for further research.

**Objectives:** To compare gene expression of nasal polyps associated with chronic sinusitis and mucosa harvested from various anatomical sites along the sinonasal tract. **Study Design:** Prospective, controlled study conducted at an academic medical center. **Methods:** Tissue expression levels of five key genes, previously found to be characteristic of nasal polyps associated with chronic sinusitis in genome wide expression profiling, were measured using real-time quantitative RT-PCR in 100 sinonasal tissue samples. Specimens harvested from the ethmoid sinus, septum, inferior turbinate, middle turbinate, and lateral nasal wall in ten patients with chronic sinusitis and ethmoid polyps were compared to tissue from similar regions in ten control patients without sinusitis. **Results:** Gene expression signatures of ethmoid polyps differed significantly from those of healthy ethmoid mucosa, as well as tissue from all four surrounding anatomical sites in both patients with sinusitis and controls. Alterations specific to the polyp tissue included downregulated genes, prolactin-induced protein (PIP, fold change  $377.2 \pm 169.0$ ,  $p < 0.0001$ ) and zinc alpha2-glycoprotein (AZGP1, fold change  $72.10 \pm 26.5$ ,  $p < 0.0001$ ), and trends for upregulated genes, met proto-oncogene (MET, fold change  $2.5 \pm 0.7$ ,  $p = 0.029$ ) and periostin (POSTN, fold change  $7.5 \pm 3.4$ ,  $p = 0.003$ ). No significant differences in gene expression was found for neurabin 2 (PPP1R9B, fold change 1.0,  $p = 0.99$ ). **Conclusions:** Ethmoid polyps appear to have unique transcriptional signatures compared to tissue from other subsites in the sinonasal cavity. Care must be taken when collecting specimens for genetic studies of the sinonasal tract to differentiate polyp from non-polyp tissue.

### **11:35 The Surgical Treatment of Chronic Rhinosinusitis May Improve Sleep and Sexual Function**

Michael S. Benninger, MD\*, Cleveland, OH; Ayesha N. Khalid, MD, Portland, OR; Rayn M. Benninger, Oxford, OH; Timothy L. Smith, MD\*, Portland, OR

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) demonstrate an understanding of the impact of surgical management of chronic rhinosinusitis on a patient's perception of quality of sleep and sexual function; and 2) explain the use of outcomes instruments such as the Rhinosinusitis Disability Index in assessing specific areas of perception of quality of life in rhinosinusitis.

**Objectives:** This study was designed to evaluate the effect of surgical therapy in impacting the sexual function and sleep of patients with CRS. **Study Design:** A retrospective review of a cohort of prospectively enrolled patients with chronic rhi-

nosinusitis who have undergone endoscopic sinus surgery. **Methods:** Each patient completed the Rhinosinusitis Disability Index (RSDI) prior to surgery and at least 12 months following endoscopic sinus surgery, and the preoperative and postoperative scores for the questions related to sleep and sexual activity were evaluated. Wilcoxon Signed-Rank test was used to assess the magnitude and direction of change between observation points. **Results:** Mean response scores regarding sexual activity between preoperative ( $1.1 \pm 1.0$ ) and postoperative scores ( $0.7 \pm 0.8$ ) are significantly different ( $p < 0.001$ ). Mean response scores regarding sleep dysfunction between preoperative ( $2.4 \pm 1.0$ ) and postoperative scores ( $1.5 \pm 1.1$ ) are also significantly different ( $p < 0.001$ ). For both questions a higher frequency of subjects responded “never” and “almost never” in the postoperative period compared to preoperative measures. **Conclusions:** Using the questions from the RSDI, there is an improvement in scores of sexual function and sleep after surgery for patients with chronic rhinosinusitis. Further, more in depth evaluations of these potential benefits are recommended.

## 11:43 Endoscopic Treatment of Pituitary Apoplexy: Outcomes in a Series of 10 Patients

Madeleine R. Schaberg, MD, New York, NY; Dimitri Sigounas, MD, New York, NY; Vijay K. Anand, MD\*, New York, NY; Gurston G. Nyquist, MD, New York, NY; Theodore H. Schwartz, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss presentation of pituitary apoplexy and the treatment of this entity via the endoscopic transsphenoidal approach.

**Objectives:** Pituitary apoplexy is a rare clinical entity heralded by headaches, ophthalmoplegia, and decreased endocrine function. It usually results from an acute mass expansion within a preexisting pituitary adenoma due to hemorrhage. This condition can be successfully treated by an endoscopic transsphenoidal approach. **Study Design:** A retrospective chart review. **Methods:** A retrospective chart review was performed of 275 patients who underwent endoscopic transsphenoidal surgeries between 12/2003 and 6/2009 performed by senior authors. **Results:** Ten patients were identified with pituitary apoplexy. The most common presenting symptoms included: headaches (70%), preoperative endocrinopathy (60%), and visual loss (70%). All patients were evaluated both pre- and postoperatively with computed tomography (CT) and magnetic resonance imaging (MRI). All patients underwent endoscopic transsphenoidal approach. Surgical navigation was used in all cases and intrathecal injection of fluorescein via lumbar puncture was administered. Average operative time was 155 minutes and average blood loss was 50 ml. Intraoperative CSF leak was identified in 90% of patients. The surgical defect was closed with various combinations of fat, vomer, Medipore, fascia lata, FloSeal and Duraseal. Postoperatively, three of six patients with preoperative endocrinopathies had long term normalization of secretory deficits without need for permanent replacement. In those with visual disturbances, six patients had complete resolution and one had moderate improvement. All patients had resolution of headaches. Average length of followup was one year. **Conclusions:** Pituitary apoplexy is an extremely rare entity. Outcomes after endoscopic transsphenoidal resection allows good functional results including return of pituitary performance and resolution of visual disturbance and headaches.

## 11:51 Epidemiologic Factors Affect Surgical Outcomes in Allergic Fungal Sinusitis

Jason P. Champagne, MD, Augusta, GA; Justin L. Antisdell, MD, Augusta, GA; Troy D. Woodard, MD, Cleveland, OH; Stilianos E. Kountakis, MD PhD\*, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss differences in presenting symptoms, objective measures and postoperative outcomes among gender and racial groups.

**Objectives:** To evaluate discrepancies in presentation and postoperative outcomes in a population of allergic fungal sinusitis (AFS) patients. **Study Design:** Prospective cohort study. **Methods:** Clinical and demographic records of 48 patients (26 males, 22 females) who underwent endoscopic sinus surgery (ESS) for treatment of AFS were collected from 2003-2008. All patients completed pre- and postoperative Sinonasal Outcome Test (SNOT)-20 questionnaires. Patients also underwent objective grading via the Lund-Kennedy nasal endoscopy and the Lund-Mackay computed tomography (CT) scan scoring systems. This data was interrogated by means of both univariate and multivariate analysis through the use of Mann-Whitney and chi-square tests to calculate statistical significance. **Results:** Preoperatively African Americans had significantly higher Lund-Mackay and mean endoscopy scores ( $p < 0.05$ ) than Caucasians. However, there was no significant difference among SNOT-20 scores. Postoperative symptom and endoscopy scores improved in all patient groups with significantly greater improvement in women (both  $p < 0.05$ ) versus men at 12 months. Improvement ratio of preoperative versus postoperative endoscopy scores trended toward significance at 6 months ( $p = 0.08$ ), with African Americans

improving more than Caucasians. **Conclusions:** Allergic fungal sinusitis presents at different stages among racial groups with African Americans presenting with more advanced disease using objective measures. However, these objective measurements do not correlate with subjective symptoms, and AFS patients present at nearly uniform SNOT-20 levels. Given the worse disease status at presentation, African Americans show a greater incremental improvement on endoscopy after ESS. Gender also plays a role with women showing increased long term improvement both symptomatically and endoscopically.

**11:59 - 12:06 Discussion/Q&A**

**12:30 TRIOLOGICAL SOCIETY THESIS SEMINAR**

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*Golf Tournament, Tennis Tournament, Free Time  
for Families  
No Evening Function*

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# **SUNDAY FEBRUARY 7**

## **PALAZZO E-H**

**8:00**            **Announcements; Introduction of Vice Presidents**

### **8:10 - 9:05**

**INFLUENZA AND EPIDEMIC VIRUSES: IMPACT ON OTOLARYNGOLOGIC DISEASES AND PRACTICE**

**Moderator:** Michael D. Poole, MD PhD, Savannah, GA

**Educational Objective:** At the conclusion of this presentation, attendees should be able to: 1) recognize patients who are likely to have various types of influenzae; 2) appropriately use antivirals and antibiotics in influenza patients; and 3) counsel families on the effectiveness and safety of influenzae vaccines.

### **9:05 - 10:00**

**ROBOTIC SURGERY IN OTOLARYNGOLOGY-HEAD AND NECK SURGERY: STATE OF THE ART AND THE FUTURE**

**Moderator:** G. Richard Holt, MD MSE MPH MABE\*,  
San Antonio, TX

**Panelists:** Ronald B. Kuppersmith, MD, College Station, TX  
Jeffery Scott Magnuson, MD\*, Birmingham, AL  
Gregory S. Weinstein, MD\*, Philadelphia, PA

**Educational Objective:** At the conclusion of the panel discussion participants should 1) understand the mechanics and engineering of the robotic surgical system; 2) learn the current and future applications of robotic surgical techniques to the field of otolaryngology-head and neck surgery; and 3) understand the feasibility, safety, and efficacy of this surgical technique in selected surgical procedures.

### **10:00 - 11:30**

**RESIDENT BOWL COMPETITION**

**Moderators:** Michael E. Hoffer, MD\*, San Diego, CA  
David M. Barrs, MD\*, Phoenix, AZ

**Educational Objective:** At the conclusion of this presentation, attendees should be able to have a better knowledge base in otolaryngology.

## **General**

### **S1.**

#### **Thyroidectomy Incision Using a Novel Anatomic Landmark System**

C. Ron Cannon, MD\*, Jackson, MS

**Educational Objective:** At the conclusion of this presentation, the participants should be able to utilize a new method of marking out an incision for thyroid/parathyroid surgery.

**Objectives:** Describe a new method of marking out an incision for thyroid/parathyroid surgery using bony anatomic landmarks. **Study Design:** 65 patients undergoing thyroid/parathyroid surgery had an incision marked out using bony anatomic landmarks. **Methods:** After patient positioning the midline is marked at the sternal notch. Each clavicle is then marked in cm long increments as measured from the sternal notch. An incision is then made “connecting the dots” from each clavicle across the central part of the neck. **Results:** This method allowed skin incisions to be placed at an appropriate site in the neck for surgery. **Conclusions:** This system of marking out a skin incision can be reliably reproduced and results in a symmetrical aesthetically pleasing scar.

### **S2.**

#### **Topographical Analysis of the Recurrent Laryngeal Nerve during Thyroidectomy**

C. Ron Cannon, MD\*, Flowood, MS; William R. Replogle, PhD, Jackson, MS

**Educational Objective:** At the conclusion of this presentation, the participants should be able to have an understanding of the course of the RLN as seen during thyroidectomy.

**Objectives:** Study the RLN as measured during thyroidectomy in terms of the length of nerve dissected, distance from TE groove, and possible implications for the thyroid surgeon. **Study Design:** Prospective observational. **Methods:** After completion of thyroidectomy measurements were obtained with calipers as to the length of RLN dissected, width of the nerve and distance from the TE groove and entered into a database. **Results:** There were 79 right and 65 nerves dissected. The median length of dissection on the right was 27.72 mm and 31.40 mm on the left. The distance from the TE groove was 4.28 mm on the right and 4.09 on the left. There were 4 cases of temporary palsy, two right sided, one left sided and one bilateral. **Conclusions:** Low rates of RLN palsy may be due to the short distance of nerve dissected. Additionally in the surgical field the right RLN is not significantly displaced from the TE groove as compared to the left side.

### **S3.**

#### **Respiratory Distress Requiring Surgical Intervention following Traumatic Central Internal Jugular Vein Cannulation: Review of Two Cases**

Matthew L. Carlson, MD, Rochester, MN; David J. Archibald, MD, Rochester, MN; Rajanya Petersson, MD, Rochester, MN; Jan L. Kasperbauer, MD\*, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand presentation and management of patients with respiratory distress following traumatic internal jugular vein (IJV) access and hematoma formation.

**Objectives:** Hematoma development following IJV central line access occurs in less than 1% of cases and rarely causes airway compromise. We present 2 patients who required endotracheal airway protection and surgical intervention. **Study Design:** Case series. **Methods:** Retrospective chart review. **Results:** Patient #1 is a 75 year old male who developed neck hematoma formation after IJV central line placement during cardiac catheter ablation. Postoperatively the patient remained intubated and CT imaging demonstrated an 8X12 cm fluid collection resulting in contralateral tracheal deviation and ipsilateral pharyngeal effacement. The patient's neck was explored, a 0.5cm tear in the IJV was repaired and the hematoma was evacuated. The following morning the patient was successfully extubated. Patient #2 is a 67 year old male who developed an expanding neck hematoma after IJV access for hemodynamic monitoring. Approximately 5 hours after his procedure he was noted to have progressive neck swelling and increased hoarseness. CT imaging demonstrated a large hematoma with retropharyngeal extension and airway encroachment. Over the ensuing 4 hours the patient deteriorated.

rated and required awake-fiberoptic intubation for airway protection. The following morning the hematoma was evacuated and the patient was subsequently extubated the next day. **Conclusions:** Cervical hematoma following traumatic IJV cannulation is a rare but potentially life threatening complication that requires early recognition and intervention.

## **S4. Metastatic Renal Cell Carcinoma to the Parotid Gland Presenting 19 Years after Nephrectomy: Case Report and Review of Literature**

Robert H. Deeb, MD, Detroit, MI; Natalie A. Rizk, PhD, Detroit, MI; Tamer A. Ghanem, MD PhD, Detroit, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the entity of metastatic renal cell carcinoma to the parotid gland.

**Objectives:** To present a case of metastatic renal cell carcinoma to the parotid gland occurring 19 years after nephrectomy with review of literature. **Study Design:** Case report and literature review. **Methods:** Literature review of cases of metastatic renal cell carcinoma to the parotid gland and discussion of a recent representative case within our tertiary care health system. **Results:** We present a case of an 82 year old male who presented with an 18 month history of progressive right parotid enlargement. His past medical history is notable for renal cell carcinoma status post partial nephrectomy in 1990, followed by completion nephrectomy 15 years later. He also has a history of chronic lymphocytic leukemia, which has not been treated. He complained of some pain symptoms, but no signs of facial paralysis. Fine needle aspiration was nondiagnostic. The patient underwent a total parotidectomy with facial nerve preservation, and final pathology was consistent with metastatic renal cell carcinoma, clear cell type. Based on our literature review we believe this to be the longest disease free interval of renal cell carcinoma preceding a metastatic lesion to the parotid gland. **Conclusions:** Documentation of a case of metastatic renal cell carcinoma to the parotid gland is important to note as it serves to remind clinicians that any patient with a history of renal cell carcinoma is at risk for late metastases; including sites within the head and neck. Thus, metastasis is a reasonable consideration in any patient presenting with a new parotid mass, particularly those with a history of renal cell carcinoma.

## **S5. Cutaneous Metastasis to the Lower Eyelid**

Michael A. Goodier, MD MPH, Jackson, MS; J. Randall Jordan, MD FACS, Jackson, MS

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize unusual lesions of the eyelid and consider metastatic disease in the differential diagnosis of eyelid lesions.

**Objectives:** The objective of this study is to describe the presentation of a patient with cutaneous metastasis to the lower eyelid and to review the literature regarding such lesions. **Study Design:** Case report and literature review regarding the epidemiology and clinicopathologic features of cutaneous metastases to the eyelid. **Methods:** Case report describing a 68 year old female who presented with a 3 month history of a painless, enlarging violaceous right lower eyelid nodule. Biopsy was obtained revealing metastatic mucinous adenocarcinoma. Literature review regarding cutaneous lesions of the eyelid was performed. **Results:** Biopsy of the lesion revealed histopathologic features consistent with metastatic mucinous adenocarcinoma. She was subsequently found to have a primary lesion in her right breast and underwent right modified radical mastectomy followed by chemotherapy. Metastatic lesions to the eyelid are a rare occurrence representing approximately 0.1-0.3% of eyelid lesions. Reported cases of metastatic eyelid disease include the breast, gastrointestinal system, respiratory system, skin, and genitourinary system. The usual presentation includes solitary painless nodules, diffuse nontender eyelid thickening, and ulcerative lesions. In 19-45% of cases, the metastatic eyelid lesion manifests before the primary site. Additionally, it can be the first sign of recurrence after apparently successful treatment of the primary site. **Conclusions:** Cutaneous metastases to the eyelid are rare however must be in the differential diagnosis of patients with solitary nodules, ulceration, and skin changes. Suspicion should be higher in patients with a history of carcinoma of the breast, gastrointestinal system, respiratory system, skin, and genitourinary system.

## **S6. Vascular Malformation Masquerading as Sialolithiasis and Parotid Obstruction: A Case Report and Review of the Literature**

Eli R. Groppo, MD, San Francisco, CA; Christine M. Glastonbury, MBBS, San Francisco, CA; Lisa A. Orloff, MD, San Francisco, CA; Paul E. Krause, MD, Soquel, CA; David W. Eisele, MD\*, San Francisco, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the imaging

characteristics of common and unusual causes of salivary gland obstruction.

**Objectives:** Salivary gland obstruction is one of the most common problems affecting the major salivary glands. This is most commonly caused by sialolithiasis or stricture. Vascular malformations are a highly unusual cause of salivary duct obstruction. Phleboliths are common in vascular malformations, and their clinical and radiographic appearance may resemble sialoliths, further obscuring the diagnosis. We present a case of intermittent parotid obstruction caused by a vascular malformation with phleboliths misdiagnosed as ductal calculi. **Study Design:** Illustrative case report and literature review. **Methods:** A 48 year old woman presented to our office with 9 months of intermittent left parotid swelling. On bimanual examination, multiple small firm nodules were palpated along the left Stenson's duct. A CT scan demonstrated multiple radiopaque lesions that appeared to be in the duct. Sialoendoscopy failed to reveal parotid duct obstruction and specifically, no sialoliths were identified. Intraoperative ultrasound revealed a vascular lesion surrounding the distal Stenson's duct. Postoperatively, the patient underwent MRI which confirmed the diagnosis of venous malformation with phleboliths. **Results:** Currently, the patient is being treated conservatively and has not had a recurrence of her symptoms. Presentation will include illustrative CT and MRI images, as well as endoscopic photos. Literature review shows that venous malformations causing salivary gland obstruction are rare, with only 7 cases reported previously. **Conclusions:** While parotid obstruction is most commonly due to calculi or duct stenosis, other rarer causes including venous malformations should be considered. Ultrasound is a useful tool when sialoendoscopy does not correlate with preoperative CT.

## **S7. Retropharyngeal Abscess in the Setting of Immune Modulation for Rheumatoid Arthritis**

Kiran Kakarala, MD, Boston, MA; Marlene L. Durand, MD, Boston, MA; Kevin S. Emerick, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be familiar with the management of serious head and neck infections occurring in patients on biologic agents for rheumatoid arthritis.

**Objectives:** 1) Present a case of retropharyngeal abscess managed in a patient on abatacept, a T-cell immune modulator, for rheumatoid arthritis; and 2) review the literature on the relationship between biologic agents for rheumatoid arthritis and head and neck infections. **Study Design:** Case report. **Methods:** Retrospective case review including a review of the relevant literature. **Results:** The case of a 62 year old woman with retropharyngeal abscess is presented. Her medical history was significant for rheumatoid arthritis treated with abatacept, a T-cell immune modulator. She presented with progressive odynophagia and neck pain, and a computed tomography scan revealed large retropharyngeal abscess extending to the superior mediastinum with bilateral pleural effusions. Transcervical incision and drainage was performed and infectious disease consultation was obtained. Full recovery was achieved after a month long course of intravenous antibiotics. **Conclusions:** Biologic agents that achieve selective immune modulation have revolutionized the treatment of rheumatoid arthritis. However, there is a small but significant risk of serious infection that accompanies these drugs. Otolaryngologists should be vigilant for signs and symptoms of serious head and neck infection in patients who are on biologic agents for rheumatoid arthritis. Management of these patients must account for their diminished immune response to infection.

## **S8. Removal of an Intraparotid Foreign Body without Dissection of the Facial Nerve**

Michael V. Medina, MD, Philadelphia, PA; Natasha Pollak, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss how imaging and intraoperative facial nerve monitoring may be used in the removal of an intraparotid foreign body without dissection of the facial nerve.

**Objectives:** 1) To present a rare case of a metallic intraparotid foreign body introduced as a projectile; 2) to discuss how CT images were used to guide the surgical exploration; and 3) to discuss the surgical approach to retrieve an intraoperative foreign body without facial nerve dissection. **Study Design:** This is a clinical case report with review of literature. **Methods:** We present the pertinent history and physical examination findings. We discuss the CT images. The technique of surgical exploration and foreign body retrieval is presented. **Results:** This is the case of a man who presented to the emergency department with a metallic foreign body lodged in the parotid introduced accidentally as a projectile. CT images were analyzed and the patient underwent successful removal of the intraparotid foreign body without facial nerve dissection via a posterior approach with facial nerve monitoring. A review of intraparotid foreign bodies is presented.

**Conclusions:** Intraparotid foreign bodies may be successfully removed without dissecting the facial nerve if imaging shows that it can be approached safely and intraoperative facial nerve monitoring is used.

## **S9. Primary Cutaneous Mucinous Adenocarcinoma of the Face: A Case Report in a 63 Year Old Male**

Kim P. Murray, MD, Newark, NJ; Rakesh B. Patel, MD, Newark, NJ; Shakira P. Payne-Blackmon, MD, East Orange, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the important management considerations of this rare entity.

**Objectives:** To present a rare case of primary cutaneous mucinous carcinoma of the face. **Study Design:** Case report. **Methods:** N/A. **Results:** N/A. **Conclusions:** Primary cutaneous mucinous adenocarcinoma is a rare sweat gland malignancy that is typically treated successfully with wide local excision. Clinicians must be cognizant however, of the histopathological similarities of this lesion with other visceral mucinous carcinomas. Seemingly isolated skin lesions could in fact be the initial manifestation of previously unrecognized disease elsewhere in the body. Therefore, all patients require thorough full body search for an occult primary malignancy, typically consisting of CT chest/abdomen/pelvis and upper/lower endoscopy. PET/CT should also be considered, although there is still some uncertainty as its role in the workup of this entity.

## **S10. Bezold's Abscess in the Setting of Untreated HIV**

Nitin J. Patel, MD, Washington, DC; Joseph Goodman, MD, Washington, DC; Ameet Singh, MD, Washington, DC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the incidence and pathophysiology of Bezold's abscess, evaluate the clinical presentation of Bezold's abscess with special reference to immunocompromised HIV patients and explain appropriate treatment.

**Objectives:** Reports of Bezold's abscess are rare. Classically, Bezold's abscess is described as a complication of mastoiditis in which infection spreads deep to the sternocleidomastoid muscle and throughout the fascial planes of the neck. Antibiotic treatment of suppurative otitis media has considerably decreased the incidence of complications resulting from this disease. We present a unique case report of Bezold's abscess in the setting of a patient with untreated HIV. To our knowledge, this is the first reported case of Bezold's abscess and HIV. Despite its rarity, clinicians must have a low suspicion for Bezold's abscess in the setting of complicated otitis media and HIV; it must be recognized early in immunocompromised patients and treated aggressively due to its potentially fatal outcome. **Study Design:** Single case report. **Methods:** We review the clinical course of a thirty-five year old male HIV patient with a chronically draining ear and progressive neck stiffness, found to have a Bezold's abscess on CT. The incidence, pathogenesis and treatment of Bezold's abscess are discussed with special reference to the clinical presentation in the setting of an immunocompromised host. **Results:** After broad spectrum intravenous antibiotic therapy, mastoidectomy and surgical incision and drainage of the abscess, the patient recovered and has begun antiretroviral therapy at six months followup. **Conclusions:** Bezold's abscess should be considered in the setting of complicated otitis media with neck stiffness and immunocompromise, specifically untreated HIV. The diagnosis and prompt, aggressive treatment of Bezold's abscess is necessary for an optimal clinical outcome.

## **S11. Bilateral Giant Submandibular Sialoliths and the Role for Salivary Endoscopy**

Carlos M. Rivera-Serrano, MD, Pittsburgh, PA; Barry M. Schaitkin, MD, Pittsburgh, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the potential role of salivary endoscopy in the management of giant salivary stones. Also, the participant should be able to discuss the characteristics of giant sialoliths.

**Objectives:** 1) Describe the potential role of salivary endoscopy in the management of giant salivary stones; and 2) describe the characteristics of giant salivary stones and the first report of bilateral giant sialoliths. **Study Design:** Case report. **Methods:** 1) Patient/case presentation; and 2) review of literature. **Results:** A 69 year old man presented with chronic unrelenting purulent discharge from bilateral submandibular ducts despite appropriate medical therapy. A CT scan

revealed large salivary stones. The patient underwent surgical removal of the stones. Exploration was made via a transpapillary approach and also through the intraoral sialolithotomy opening. Small pieces of the larger stones and/or smaller stones were found lodged in the intraglandular ducts immediately distal to the cavity, which were removed under direct visualization. The right and left stone measured 2 x 1.5 x 1.5 and 2.3 x 1.6 x 1.3 respectively. **Conclusions:** Sialolithiasis is the most common disease of the salivary glands. Sialoliths that exceed 15mm or 1gr in weight have been classified as giant. We found that all giant sialoliths documented in the English language have been unilateral, and present the first case of simultaneous bilateral giant sialoliths. The management of large salivary gland calculi has always been a therapeutic challenge. Traditionally, when they cannot be retrieved by marsupialization, removal of the gland has been advocated. In this case both giant stones were removed with a combined approach and without removing the glands. A combined approach consists in the combination of classic noninvasive sialoendoscopy plus open sialolithotomy. In this patient, the salivary endoscope permitted the exploration of the ducts and the stone cavity both proximally and distally, which guided a more precise retrieval of fragments and/or additional smaller stones, which otherwise would not have been easily identified. This is also the first report that associates giant sialoliths and the use of salivary endoscopy.

## S12. Triangulation Applied to Facial Nerve Localization: Is Math the Answer?

Mark C. Royer, MD, Indianapolis, IN; Ahmed S. Sufyan, MD, Indianapolis, IN (Presenter); Mimi S. Kokoska, MD, Indianapolis, IN; Mark F. Seifert, MD, Indianapolis, IN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to see and understand how the mathematical principle of multiplanar intersection (triangulation) is used to guide a surgeon in reliable, safe and consistent identification of the facial nerve trunk (CNVII) after exiting the skull base during parotidectomy.

**Objectives:** To offer a novel framework that provides residents and practitioners with a reliable and surgically relevant method for identifying the facial nerve trunk (CN VII) after exiting the skull base during parotidectomy. **Study Design:** A prospective review of the literature and the most commonly referenced otolaryngology-head and neck surgery textbooks and atlases (both online and paper sources). **Methods:** The currently available literature and textbooks do not completely address the challenges trainees encounter in learning how to identify CN VII during parotidectomy. In response to this gap in the literature and potential associated deficits in surgical training, we developed an approach that integrates multiplanar intersections (based on mathematical principles) with surgical anatomy to create a reliable method for CN VII identification during parotidectomy. **Results:** The literature and textbooks underscore the importance of why CNVII identification during parotidectomy is critical for avoiding the debilitating morbidity of facial paralysis. There are significant gaps in existing educational materials with regard to teaching surgeons how to identify the CN VII reliably in a surgically relevant manner. The multiplanar intersections shown via our medical illustrations and surgical photography demonstrate the application of the triangulation concept to improve the accuracy and efficiency in surgical localization of CN VII. **Conclusions:** In the current climate of reduced resident training hours per week, it is imperative that concise, reliable and efficient surgical instruction is widely available. The integration of multiplanar localization with surgical anatomy provides a reliable method for a surgeon to consistently and rapidly identify the CN VII, which inherently reduces the risk for inadvertent injury to the CN VII.

## S13. Uvulopalatopharyngoplasty a National Perspective: Demographics and Outcomes

Shankar K. Sridhara, MD, Washington, DC; Lina Lander, ScD, Omaha, NE; Elie E. Rebeiz, MD, Boston, MA; Rahul K. Shah, MD, Washington, DC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand national variances in the care of patients undergoing uvulopalatopharyngoplasty from a perspective of demographics and outcomes and relate this to their own results.

**Objectives:** To study uvulopalatopharyngoplasty (UPPP) from a national perspective, focusing on patient demographics and outcomes. **Study Design:** Descriptive study of data from a publicly available national database. **Methods:** The Nationwide In-patient Sample 2006 was searched for patients admitted after uvulopalatopharyngoplasty. **Results:** There were 6857 admissions after UPPP in 2006 (mean age 42.1 years, SD 0.9; average stay 2.0 days, SD 0.1). Males represent ¾ of admissions. Mean total charges were \$19,664 (SD \$1,017). Caucasians constitute 68.2% of these patients, followed by 11.9% Hispanic and 11.8% African American (there was no significant difference in total charges based on race). 97% of admissions resulted in routine discharge, 2.7% in discharge with services or to another facility, and 0.15% in post-

operative mortality. The primary payer was private in 74.8% of admissions, and Medicare/Medicaid in 20.3% (there was no significant difference in charges based on payer). There was no significant difference in charges based on hospital region or hospital bed size. Most common concomitant procedures were palatoplasty (1422), pharyngoplasty (1252), tonsillectomy without adenoidectomy (836), septoplasty, turbinectomy, and glossopexy. Most common diagnosis codes were obstructive sleep apnea, nasal septal deviation, sleep apnea NOS, tonsillitis, and nasal turbinate hypertrophy. **Conclusions:** This study is the first to present a national perspective on patients undergoing uvulopalatopharyngoplasty. The typical patient is a middle aged, Caucasian male, with private insurance, undergoing surgery in a major metropolitan area with charges totaling \$19,664, and on average a 2 day admission after which he is discharged home. A small minority requires further hospital level care. The mortality from this series is 0.15%.

## **S14. LLOYD STORRS RESIDENT RESEARCH AWARD (Southern Section) A Comparison of p16INK4a Immunohistochemistry, Chromogenic in situ Hybridization and Polymerase Chain Reaction Genotyping for Screening for Human Papillomavirus in Basaloid Squamous Carcinoma**

Ryan D. Winters, MD, New Orleans, LA; Mark F. Evans, PhD, Burlington, VT; Winifred E. Trotman, MS, Burlington, VT; Alice Tang, BS, Burlington, VT; Abdelmonem Elhosseiny, MD, Burlington, VT

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe p16INK4a immunohistochemistry as an effective screening tool for oncogenic human papilloma virus (HPV) infection in basaloid squamous carcinoma.

**Objectives:** Compare p16INK4a immunohistochemistry (IHC), HPV chromogenic in situ hybridization (ISH), and HPV polymerase chain reaction (PCR) genotyping for detection of HPV infection in basaloid squamous carcinoma. **Study Design:** Retrospective histopathological analysis of 40 basaloid squamous carcinomas from a single institution. **Methods:** P16INK4a immunohistochemistry, HPV DNA extraction and chromogenic in situ hybridization, and HPV polymerase chain reaction (PCR) genotyping were performed on sequential 5¼m sections from each basaloid squamous carcinoma. **Results:** There was excellent agreement among all three methods of HPV detection. Analysis of variance (ANOVA) yielded no significant differences among the results of the three tests ( $P = 0.354$ ) and Pearson product-moment correlation coefficients calculated for each pair of tests demonstrated direct correlation ( $r = 0.61$  for PCR and IHC,  $r = 0.61$  for PCR and ISH, and  $r = 1.00$  for ISH and IHC). **Conclusions:** P16INK4a immunohistochemistry is a useful screening tool for HPV infection in basaloid squamous carcinoma, and its results are perhaps more relevant given they are specific for oncogenic HPV infection. The relatively low cost and ease of use of the test make it a desirable option in comparison to PCR or in situ hybridization.

## **S15. Doctors within Borders: The Potential Benefit of Otolaryngology “Medical Missions” at Home**

Ryan D. Winters, MD, New Orleans, LA; Anna M. Pou, MD, New Orleans, LA; Paul L. Friedlander, MD, New Orleans, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the distribution of otolaryngologists and uninsured or underinsured patients, and the potential role for visiting otolaryngology clinics in the rural southeast.

**Objectives:** Describe the population, Medicaid, uninsured, and otolaryngology practice demographics for seven representative rural southeastern states, and propose academic affiliated outreach clinics as a service to help meet the specialty care needs of an underserved rural population, based on the “medical mission” model employed in international outreach clinics. **Study Design:** Needs assessment. **Methods:** Review of medical licensing and practice location data from state medical licensing authorities, together with population, Medicaid, and uninsured data from state health/human services departments and the U.S. Census Bureau. **Results:** Of the states examined, 38-74% of the population lives outside major state metropolitan areas, and 23-47% reside in a county in which there are no practicing otolaryngologists. These rural areas contain from 43-75% of the states’ Medicaid recipients as well as 37-77% of the uninsured residents. **Conclusions:** Borrowing design elements from the international outreach clinics which involve many US otolaryngologists, a similar “medical mission” model could be of benefit domestically. There are rural areas of the southeast where visiting outreach clinics could improve access to otolaryngology care, and facilitate effective use of existing “safety net” healthcare resources.

## **S16. Acute Airway Obstruction Associated with the Use of Bone-Morphogenetic Protein in Cervical Spinal Fusion**

Kathleen L. Yaremchuk, MD\*, Detroit, MI; Melissa L. Somers, MD, Detroit, MI; Mark S. Toma, BS, Detroit, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to diagnose and manage acute airway obstruction associated with use of bone-morphogenetic proteins in cervical spine fusions.

**Objectives:** To diagnose, manage and adopt a clinical pathway for acute airway obstruction associated with the use of bone-morphogenetic protein in cervical spinal fusion. **Study Design:** Retrospective case series. **Methods:** A retrospective study of patients undergoing cervical spinal fusion procedures from 2004-2008 with bone-morphogenetic protein (BMP) that experienced postoperative acute airway obstruction and their resultant clinical course. **Results:** Bone-morphogenetic proteins used in anterior spinal fusion procedures cause an inflammatory response that results in upper airway obstruction during the early postoperative period. A collaborative effort between the spine surgeon, anesthesia and the otolaryngologist is required for management of the complications of acute airway obstruction, dysphagia and hoarseness that occurs after surgery. **Conclusions:** Bone-morphogenetic proteins promote bone creation and remodeling. Clinical use of BMP was approved by the FDA in 2002 for surgery of the anterior lumbar spine to promote bone fusion. Although not approved for use in the cervical spine, 16.38% of cervical spinal fusions performed in the United States in the past five years have used BMP. Acute airway obstruction in the postoperative period requiring intubation is a severe complication of its use. Because of the degree of obstruction and difficulty with intubation postoperatively, a clinical pathway was developed to manage patients in a controlled and safe environment.

### **Head and Neck**

## **S17. Recurrent High Output Chyle Fistula Post-Neck Dissection Resolution with Conservative Management: A Case Report and Review of the Literature**

Samer Al-khudari, MD, Detroit, MI; Lisa Vitale, BS, Detroit, MI; Tamer Ghanem, MD PhD, Detroit, MI; Scott McLean, MD PhD, Detroit, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss management options of intraoperative chyle leaks and fistulas after neck dissection.

**Objectives:** To present a unique case of neck dissection with intraoperative chyle leak and subsequent recurrent high output chyle fistula treated with conservative management. **Study Design:** Case report and literature review. **Methods:** Literature review of intraoperative chyle leak and postoperative chyle fistula management with discussion of a recent representative case within our health system. **Results:** We present a case of a 35 year old male who underwent a total laryngectomy and bilateral selective neck dissection for a T4N1 stage IVA squamous cell carcinoma of the right supraglottis. Intraoperatively a chyle leak was identified and surgical measures and fibrin sealant were used to control the leak with a negative fistula test at the completion of the dissection. A chyle fistula was identified with a peak output of 2.4 liters over 24 hours on postoperative day 4. The patient was treated with conservative nonoperative measures and the output decreased daily. He was discharged on postoperative day 22 with a drainage tube in place which was removed on postoperative day 26. He subsequently developed a recurrence of this fistula on postoperative day 37 which was treated conservatively and resolved on postoperative day 45. **Conclusions:** High output recurrent chyle fistula after intraoperative chyle leak may be managed with nonoperative conservative management even if persistent greater than 10 days or if output exceeds 2 liters over 24 hours. In addition to patient compliance with a low fat diet, it is important to replace fluids and monitor for any signs or symptoms of dehydration.

## **S18. Endoscopic Sentinel Lymph Node Dissection in Human Cadavers**

William H. Barber, MD, Jackson, MS; Karen T. Pitman, MD\*, Jackson, MS

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the utility and indications of sentinel lymph node biopsy in head and neck cancer and describe the procedure of endoscopic sentinel lymph node biopsy with its possible applications in the future.

**Objectives:** To evaluate the feasibility of endoscopic sentinel lymph node dissection in human cadavers. **Study**

**Design:** Experimental, nonrandomized cadaveric study. **Methods:** Two unembalmed cadavers were obtained from the department of anatomy. Endoscopic neck dissection was carried out on four necks with special attention paid to port placement, exposure of lymph node levels, and identification of relevant landmarks and structures. A combination of blunt dissection and CO2 insufflation were used to facilitate dissection and exposure. The port placement, node levels identified, and landmarks identified and preserved were noted. **Results:** Using our port placement, it was possible to expose all six levels of lymph nodes in the neck. Relevant landmarks and major structures were successfully identified and preserved. CO2 insufflation was successful at preserving exposure within the dissection pocket at a very low pressure and rate (2psi at 1 liter/min). We also found that port placement can be moved laterally along a standard neck dissection incision for more directed exposure of individual levels as may be the goal in sentinel lymph node biopsy. **Conclusions:** Endoscopic sentinel lymph node biopsy is feasible in the human neck. Based on these results, our previous success in animal studies as well as previous literature, this could be a viable alternative to open biopsy that may prove to be superior with regards to cosmesis and morbidity. Additional research is necessary in the clinical setting to determine applicability to living patients.

## S19. Transoral Submandibular Gland Excision

Nishant Bhatt, MD, Augusta, GA; Helen Perakis, MD, Augusta, GA; Jimmy J. Brown, MD DDS, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to outline the transoral (TO) approach to submandibular gland excision as well as to be able to compare and contrast this approach to the traditional transcervical approach. In addition to this, participants should gain a familiarity with harmonic technology and its applications to TO submandibular gland excision.

**Objectives:** To review a tertiary care hospital's experience with TO excision of the submandibular gland and compare it to the traditional transcervical approach. **Study Design:** Retrospective chart review. **Methods:** Seventeen patients underwent surgical excision of the submandibular gland over a period of 3.2 years, with the ages ranging from 11-77 years. 11 patients had chronic sialoadenitis, 2 patients had pleomorphic adenomas, 3 patients had a ranula and 1 patient had a granular cell tumor. **Results:** No persistence of chronic sialoadenitis or recurrence of the pleomorphic adenoma, ranula or granular cell tumor was present on followup examination. Of the seventeen surgeries, conversion to an open transcervical approach was not necessary. No gustatory changes or injury to the hypoglossal or marginal branch of the facial nerve was incurred. In addition, there was no incidence of postoperative hematoma. 79% had transient limitation of movement of the tongue secondary to pain, all of which resolved within 3 days after surgery. In comparison, long term incidence of nerve paralysis for facial, lingual and hypoglossal nerve injury have been reported between 0-20%, 0.6-6% and 0-31% respectively, with the transcervical approach. **Conclusions:** The transoral (TO) approach is a safe and effective method of submandibular gland excision. The key advantages to this approach are avoidance of an external scar with lower rates of injury to the lingual, submandibular and facial nerves when compared to transcervical approach. TO approach is however contraindicated in cases of malignancy, extensive scarring from a prior abscessed gland and surgeon lack of familiarity with the procedure.

## S20. Ectopic Intratracheal Thyroid Tissue Causing Airway Obstruction

Davin W. Chark, MD, Irvine, CA; Sepehr Oliaei, MD, Irvine, CA; William B. Armstrong, MD\*, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the clinical presentation, diagnosis, pathophysiology and surgical management options for ectopic intratracheal thyroid tissue.

**Objectives:** To present an unusual case of tracheal obstruction caused by ectopic intratracheal thyroid tissue that mimicked tracheal invasion by thyroid cancer and review the relevant literature. **Study Design:** Case report. **Methods:** Case report. **Results:** A 48 year old male with a remote history of total thyroidectomy for multinodular goiter presented with periodic episodes of wheezing and shortness of breath progressing to stridor. Computed tomography of the neck showed a right paratracheal tumor invading and obstructing 90% of the tracheal lumen. The patient underwent bronchoscopy with KTP laser excision of the intratracheal mass to obtain diagnostic tissue and relieve airway obstruction. Pathologic examination demonstrated benign thyroid tissue. At 15 month followup, the patient remains asymptomatic with <5% narrowing of the tracheal lumen from residual thyroid tissue. **Conclusions:** Ectopic intratracheal thyroid tissue is a rare cause of airway obstruction that can mimic tracheal invasion from thyroid cancer. This can be treated successfully with endoscopic laser debulking.

## S21. Timing of Esophageal Dilatation for Dysphagia in Head and Neck Cancer Patients Receiving Radiation Therapy

Allis H. Cho, MD, Shreveport, LA; Gloria C. Caldito, PhD, Shreveport, LA; Timothy S. Lian, MD, Shreveport, LA; Cherie-Ann O. Nathan, MD\*, Shreveport, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to evaluate whether timing of esophageal dilations after radiation therapy is important, and if there is a need for more aggressive esophageal dilations in certain patient populations.

**Objectives:** To determine 1) if timing of esophageal dilatation (ED) after radiation therapy (XRT) affects patient's subjective scores of dysphagia; and 2) if specific patient and tumor characteristics affect these scores. **Study Design:** Retrospective. **Methods:** Electronic medical records of head and neck cancer (HNC) patients who received ED after XRT between 2006-2009 were evaluated for subjective improvement scores of dysphagia. Factors that were evaluated included age ( $\leq$  or  $>50$ ), sex, primary site, T and N-staging, total laryngectomy (TL)  $\pm$  cricopharyngeal myotomy (CPM),  $\pm$  chemotherapy, bougie size ( $<$  or  $\geq 50$ ),  $\pm$ TEP at time of dilatation, and time from radiation to dilatation ( $<6$  months,  $<$  or  $\geq 1$  year). Postoperative improvement ratings from 0-10 with 10 being the best were measured at various intervals (1 week and 3, 6, 9, and 12 months or greater). **Results:** 26 patients had ED after therapy. 13 (50.0%) patients had TL, and 9 (69.2%) of these patients had a CPM performed at the time of surgery. Majority of patients had ED  $>6$  months (84.6%) and  $>12$  months (69.2%) from XRT. Univariate and multivariate analysis revealed that ED performed  $<1$  year from XRT, no concurrent chemotherapy, and CPM for TL patients had significantly improved scores at all postoperative time intervals ( $p < 0.01$ ) with ED at  $<6$  months being significant in univariate analysis as well. **Conclusions:** Esophageal dilations performed  $<1$  year after XRT have improved subjective scores for dysphagia. Patients who have received chemotherapy or did not have CPM at the time of TL may need more aggressive dilations because of poorer outcomes.

## S22. Anti-EMMPRIN Antibody Treatment of Head and Neck Squamous Cell Carcinoma in an ex vivo Model

Nichole R. Dean, DO, Birmingham, AL; Emily E. Helman, MS, Birmingham, AL; Joszi C. Aldridge, MD, Birmingham, AL; William R. Carroll, MD, Birmingham, AL; J. Scott Magnuson, MD\*, Birmingham, AL; Eben L. Rosenthal, MD\*, Birmingham, AL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the potential for a new therapeutic agent: anti-EMMPRIN monoclonal antibody for the treatment of head and neck carcinoma citing results from current preclinical studies.

**Objectives:** To evaluate anti-EMMPRIN monoclonal antibody as a targeted therapeutic agent using an ex vivo human head and neck cancer model. **Study Design:** Prospective nonrandomized preclinical study. **Methods:** Head and neck cancer specimens ( $n = 22$ ) were obtained at the time of surgery, tumor slices were prepared, exposed to varying concentrations of anti-EMMPRIN monoclonal antibody, and a pair wise comparison of mean ATP levels for control and antibody treated tissue slices was performed. Following treatment, tumor slices were assessed by immunohistochemistry and western blot analysis for apoptosis (TUNEL) and EMMPRIN expression. **Results:** Forty-seven percent of patients responded to anti-EMMPRIN therapy based on a significant reduction in mean ATP levels for antibody treated versus untreated controls ( $P < 0.05$ ) with tumor sections from these patients demonstrating greater EMMPRIN staining (49%) when compared to non-responders (25%,  $P = 0.06$ ). TUNEL analysis revealed a larger number of cells undergoing apoptosis in antibody treated tumor slices (77%) compared to controls (30%,  $P < 0.001$ ) with activation of caspase 3, 8 and 9. **Conclusions:** This study demonstrates that treatment with anti-EMMPRIN therapy inhibits proliferation and promotes apoptosis in ex vivo head and neck cancer specimens. Anti-EMMPRIN antibody may be a novel agent for targeted treatment of head and neck carcinoma.

## S23. Paraganglioma of the Hypoglossal Nerve

Daniel S. Fink, MD, Boston, MA; Margo M. Benoit, MD, Boston, MA; Glenn M. Lamuraglia, MD, Boston, MA; Daniel G. Deschler, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss proper evaluation and treatment for hypoglossal paraganglioma and how it differs from more common paragangliomas of the head and neck.

**Objectives:** To report a case of paraganglioma arising from the hypoglossal nerve and review the anatomy, clinical features, and literature to date. **Study Design:** Case report and literature review. **Methods:** Case records including paper and electronic chart and imaging reports were reviewed and summarized for the index case. A literature search was performed using PubMed keywords paraganglioma, hypoglossal, chemodectoma, carotid body, and glomus tumor. The available literature on the topic was reviewed and summarized. **Results:** Paragangliomas associated with the hypoglossal nerve were reported in 4 cases over the past 47 years. Our index case presented with similar clinical features compared to those reported in the literature. Imaging with computed tomography and angiography showed a hypervascular mass at the carotid bifurcation, splaying the internal and external carotid arteries. As in previously reported cases, the source of the paraganglioma was only identified intraoperatively. The current case differs from prior reported literature in that the tumor was dissected from the associated hypoglossal nerve which was preserved. The patient clinically had no deficits in articulation following excision of the lesion and was able to return to a normal diet within 24 hours of surgery. **Conclusions:** Paragangliomas of the hypoglossal nerve can present as carotid body tumors and caution must be exercised during excision to identify and preserve the hypoglossal nerve. Dissection of the tumor from the nerve may be possible with meticulous surgical technique. This approach may avoid postoperative morbidity associated with loss of hypoglossal function.

## **S24. Retropharyngeal Ganglioneuroma Presenting with Neck Stiffness: Report of a Case and Review of Literature**

Celeste Gary, BSc, New Orleans, LA; Bridget Loehn, MD, New Orleans, LA; Hugh Robertson, MD, New Orleans, LA; Bernardo Ruiz, MD, New Orleans, LA; Vladimir Zuzukin, MD, New Orleans, LA; Rohan R. Walvekar, MD, New Orleans, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the differential diagnosis of retropharyngeal masses, etiology, clinical presentation, radiological features, pathological characteristics and current reported literature on cervical ganglioneuromas.

**Objectives:** Ganglioneuromas rarely occur in the retropharynx. Clinical symptoms are usually mild and nonspecific. Our objective was to report an unusual clinical presentation and management of a retropharyngeal ganglioneuroma. **Study Design:** Case report and review of the literature. **Methods:** An internet based literature search was performed via PubMed with key words, “ganglioneuroma, retropharyngeal ganglioneuroma, cervical ganglioneuroma, retropharyngeal mass, neurogenic tumors of the retropharynx”. Clinical, pathological, radiologic data and followup information is reported. **Results:** A 42 year old woman presented to us with incapacitating neck pain, stiffness and right upper extremity weakness. Neurological work up was normal. Imaging revealed a hyperdense, ill defined, diffuse right retropharyngeal mass suggestive of a possible nerve sheath tumor with no communication with the cervical spine. Surgical removal was undertaken to relieve persistent severe symptoms. Surgery was uneventful but was associated with a postoperative Horner’s syndrome. Microscopically, the specimen consisted of immature ganglion cells scattered on a neuromatous stroma. In followup, neck symptoms had improved but persistent neurological symptoms of the right upper extremity required further neurological consultation. **Conclusions:** Ganglioneuromas are rare benign neurogenous tumors originating from the sympathetic chain. Surgical removal did not result in resolution of atypical symptoms and was associated with a Horner’s syndrome. Consequently, a detailed workup and informed consent is important from a medical legal perspective prior to surgical extirpation.

## **S25. Fabrication of 3 Dimensional Tissue Models to Study Head and Neck Squamous Cell Carcinoma**

Heather J. Gomes, MD MPH, Boston, MA; Richard O. Wein, MD FACS, Boston, MA; Jonathan A. Garlick, DDS PhD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the process of creating a 3D tissue model from head and neck squamous cell carcinoma (HNSCC) samples and explain the long term impact these models could have on the treatment of head and neck squamous cell carcinoma.

**Objectives:** To present the process for developing 3D tissue models from HNSCC samples, determine if these tissues recapitulate their in vivo phenotype and patterns of gene expression in these cultures, and discuss the long term plan for advancing the treatment of HNSCC. **Study Design:** Preliminary data from basic science research. **Methods:** Primary HNSCC tissue was obtained from patients at biopsy/resection, processed, with half the specimen grown in 2D monolayer cultures and banked in liquid nitrogen and the other half formalin fixed for routine pathologic analysis. After reaching con-

fluence, the 2D tumor associated fibroblasts are transferred to a contracted collagen matrix and 3D tissues were generated by growing cells at an air liquid interface. **Results:** Primary HNSCC tissue samples of less than 0.5cm were successfully transported to the lab and grown in 2D monolayer cultures. Several of the samples were overtaken by contamination of bacteria. Consequently, the culture media and then the transport media were altered to include streptomycin and penicillin. Some of the samples were then transferred to the collagen matrix and successfully grown into a 3D tissue on an air liquid interface. **Conclusions:** It is feasible to construct 3D tissues from primary human HNSCC samples in the lab. As further studies are completed, they demonstrate that these tissues will likely recapitulate their in vivo phenotype and gene expression patterns. This will subsequently provide the ability to work with other investigators to accelerate the design, screening and translation of new therapeutics to the clinical sphere.

## **S26. Perineural Spread of Cutaneous Squamous Cell Carcinoma: Two Cases of Cavernous Sinus Involvement via the Trigeminal Nerve**

Alan R. Grimm, MD, Jackson, MS; Karen T. Pitman, MD\*, Jackson, MS; Michael C. Baird, MD, Jackson, MS

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the high risk nature of perineural spread and its importance in attaining local control of disease and be able to discuss the need for adjuvant therapy.

**Objectives:** To describe two unique cases of perineural spread representing local failure of previous resections of cutaneous squamous cell carcinoma and in so doing very briefly review the case for adjuvant therapy in the setting of pathologically identified perineural spread. **Study Design:** Case report and review of pertinent literature. **Methods:** Herein we present two cases of patients who had previously undergone resection of cutaneous squamous cell carcinoma by outside surgeons before presenting to our institution with cranial nerve findings suggestive of neural involvement. Subsequent imaging of both patients revealed manifest evidence of gross nerve invasion with extension to the cavernous sinus. **Results:** Both patients were referred for radiation therapy; one receiving stereotactic radiotherapy and the other treated with conventional external beam therapy. Both patients achieved symptomatic relief and local control at time of publication. Additionally, a brief review of the prevailing wisdom regarding the treatment of pathologically identified perineural invasion is presented. **Conclusions:** Identification of perineural spread to the cavernous sinus can prove to be a diagnostic dilemma owing to the difficulty inherent in obtaining a tissue diagnosis and the unusual nature of the problem. We renew the recommendation for close followup for patients with nonmelanoma cutaneous malignancies in locations especially predisposed to perineural involvement, with or without pathologic evidence thereof.

## **S27. Pleomorphic Adenoma of the Infratemporal Fossa: Case Report and Literature Review**

Lowell E. Gurey, MD, Albany, NY; Chris D. Brook, BS, Albany, NY; Steven M. Parnes, MD\*, Albany, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the anatomic boundaries and contents of the infratemporal fossa in addition to frequent neoplasms that involve this space.

**Objectives:** To describe an unusual location for a common benign salivary gland neoplasm. **Study Design:** Case report and literature review. **Methods:** We describe an unusual lesion found in the infratemporal fossa on computed tomography of the facial skeleton, including the clinical presentation, workup, and surgical approach. A complete PubMed search of atypical presentations of pleomorphic adenoma was performed. The literature was also reviewed for all neoplasms involving the infratemporal fossa, pterygomaxillary fissure, and pterygopalatine fossa. **Results:** Pleomorphic adenoma has been reported to arise in such diverse locations as the nasal septum, main stem bronchus, trachea, lacrimal gland and external auditory canal. One case has been reported to occur in pterygopalatine fossa. No cases of pleomorphic adenoma involving the infratemporal fossa have been reported. There are, however, a number of other neoplasms that can arise, or more frequently, directly invade, this region. Malignancies can often have an insidious presentation that is initially referred to other disease entities. **Conclusions:** Though rare, there are a variety of neoplasms that can involve the infratemporal fossa. Patients with malignancies of this region usually present late in their disease course with invasion into surrounding structures. Diagnosis and approach to this region is difficult considering its concealed location.

## **S28. CyberKnife Stereotactic Radiosurgery for Recurrent Squamous Cell Carcinoma of the Head and Neck following Salvage Surgery with Close or Positive Margins**

Christian P. Hasney, MD, New Orleans, LA; Robert G. Swanton, MD, New Orleans, LA; Paul L.

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the role of stereotactic radiosurgery as a treatment option for patients with recurrent squamous cell carcinoma of the head and neck who have undergone salvage surgery with close or positive resection margins.

**Objectives:** In this case series, we present our experience with CyberKnife therapy in patients with recurrent squamous cell carcinoma of the head and neck who have undergone salvage surgery with close or positive margins. **Study Design:** Case series. **Methods:** Retrospective chart review of a series of patients receiving CyberKnife therapy for recurrent squamous cell carcinoma of the head and neck following salvage surgery with close or positive resection margins. **Results:** CyberKnife therapy was well tolerated in our series of patients. Minimal radiation toxicity or adverse reactions were noted. **Conclusions:** CyberKnife stereotactic radiosurgery is a novel treatment that may benefit patients with squamous cell carcinoma of the head and neck who have undergone salvage surgery with close or positive margins.

## S29. Mixed Medullary-Papillary Carcinoma of the Thyroid: A Case Report

Christian P. Hasney, MD, New Orleans, LA; Ronald G. Amedee, MD\*, New Orleans, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss and recognize mixed medullary-papillary thyroid carcinoma as a rare, but clinically and histologically distinct, thyroid malignancy.

**Objectives:** To present the case of a 73 year old woman with mixed medullary-papillary thyroid carcinoma and to discuss the clinical and pathological characteristics of the lesion. **Study Design:** Case report. **Methods:** We report the case of a 73 year old woman initially evaluated for a multinodular thyroid goiter. The patient denied a family history of medullary thyroid carcinoma or other endocrine neoplasms. Fine needle aspiration of a nodule of the thyroid isthmus suggested a follicular neoplasm with abundant Hurthle cells and colloid present. Considering these findings, the patient underwent a left thyroid lobectomy with isthmusectomy. **Results:** Histopathological analysis of the surgical specimen revealed a medullary thyroid carcinoma measuring 0.4cm in size. Within this lesion, a distinct focus of papillary thyroid carcinoma, follicular variant, measuring 0.1cm was also identified. In light of this result, the decision was made to proceed to surgery for a completion thyroidectomy. **Conclusions:** Mixed medullary-papillary thyroid carcinoma is a rare clinical entity but merits consideration in the differential diagnosis of thyroid nodules particularly in patients with a family history of thyroid malignancy. The foundation of treatment of this lesion is total thyroidectomy with central compartment node dissection in the clinically N0 neck and dissection of levels II-VII in the node-positive neck.

## S30. Schwannoma of the Oral Tongue

Benjamin T. Jeffcoat, MD, Jackson, MS; Karen T. Pitman, MD\*, Jackson, MS; Alexandra S. Brown, MD, Jackson, MS; Mithra Baliga, MD, Jackson, MS

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize schwannoma as a rare oral tongue lesion which is often asymptomatic and can be treated with surgical excision.

**Objectives:** To present a rare, benign lesion involving the oral tongue and its treatment. **Study Design:** Case report. **Methods:** Retrospective case report and literature review. **Results:** We present a 68 year old male who presented with an asymptomatic lateral tongue lesion. Fine needle aspiration was consistent with pleomorphic adenoma versus myoepithelioma. The patient underwent surgical excision which revealed schwannoma. He remains without recurrence following excision. Review of the literature reveals that intraoral schwannomas account for less than 1% of all head and neck schwannomas. Of intraoral schwannomas, the tongue is the most likely location. No evidence of recurrence has been reported following complete excision. **Conclusions:** Schwannoma of the tongue is a rare, often asymptomatic lesion which can be treated with complete surgical excision.

## S31. A Comparison of Histopathologic Margin Assessment after Steel Scalpel, Monopolar Electrosurgery, and Ultrasonic Scalpel Glossectomy in a Rat Model

Kiran Kakarala, MD, Boston, MA; William C. Faquin, MD PhD, Boston, MA; Daniel G. Deschler, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the tissue

effects of steel scalpel, monopolar electrosurgery, and ultrasonic scalpel glossectomy with respect to histopathologic margin assessment in a rat model.

**Objectives:** Histopathologic margin assessment is important in guiding treatment and determining prognosis for squamous cell cancer of the oral tongue. Energy based devices for glossectomy produce varying degrees of tissue distortion and artifact that can influence margin assessment. The purpose of this study is to compare the tissue effects of three surgical methods of glossectomy with respect to margin assessment by a pathologist. **Study Design:** Blinded histopathologic study of three surgical techniques for glossectomy using a rat model. **Methods:** The anterior tongue of thirty Sprague-Dawley rats was excised using either steel scalpel, monopolar electrosurgery, or ultrasonic scalpel (three groups of ten). Specimens were fixed in formalin and serially sectioned, and hematoxylin and eosin stains were examined by a pathologist blinded to the surgical procedure. Comparison between surgical techniques with respect to effect on the tissue margin was carried out using a previously described grading system for margin assessment. **Results:** Minimal tissue disruption at the surgical margin was produced by the steel scalpel, in contrast to monopolar electrosurgery and harmonic scalpel, which both produced varying levels of tissue distortion. Margin fragmentation, cautery artifact, and artifact depth were greater with monopolar electrosurgery when compared to ultrasonic scalpel. **Conclusions:** Energy based devices cause tissue distortion which may affect the ability to accurately assess surgical margins for tumor involvement on histopathology. In our rat model of glossectomy, the ultrasonic scalpel created less tissue distortion at the surgical margin than monopolar electrosurgery. Further study is required to determine the clinical relevance of these findings.

## **S32. Cervical Lymph Node Collision Tumor Consisting of Metastatic Squamous Cell Carcinoma and B Cell Lymphoma**

Kiran Kakarala, MD, Boston, MA; Peter M. Sadow, MD PhD, Boston, MA; Kevin S. Emerick, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the clinical and pathologic features of collision tumors in the head and neck.

**Objectives:** 1) Present a case of collision tumor of the head and neck consisting of metastatic squamous cell carcinoma and B cell lymphoma; and 2) review the literature on collision tumors of the head and neck. **Study Design:** Case report. **Methods:** Retrospective case review including a review of the relevant literature. **Results:** The case of a 73 year old man with collision tumor of the cervical lymph nodes is presented. He had a history of resection of a squamous cell carcinoma of the nasal ala seven years prior to presentation with a neck mass. Fine needle aspiration of the mass was consistent with squamous cell carcinoma and he underwent neck dissection. Pathology revealed both squamous cell carcinoma and low grade B cell lymphoma in the same cervical lymph nodes. The patient underwent postoperative concurrent chemotherapy and radiotherapy directed at the squamous cell carcinoma. Subsequently, he initiated chemotherapy directed at the lymphoma. **Conclusions:** Although collision tumors are exceedingly rare entities, pathologic review of neck dissection specimens, even with a known primary, should be careful to exclude additional insidious neoplasia. In our patient's case, a neck dissection was performed for metastatic squamous cell carcinoma. However, the unusual background lymph node architecture prompted a pathologic workup for lymphoma that revealed a concurrent low grade B cell lymphoma. A multidisciplinary team approach was required to treat the patient's concomitant epithelial and hematologic malignancies.

## **S33. A New Approach in Determining Lateral Facial Attractiveness**

Koohyar Karimi, BS, Irvine, CA; Zlatko Devcic, BS, Pacifica, CA; Natalie Popenko, BS, Laguna Beach, CA; David Avila, BS, Venice, CA; Brian J.F. Wong, MD PhD\*, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify key facial landmarks necessary to create realistic lateral facial images with morphing software, and use three previously validated tools to evolve lateral facial attractiveness from an initial cohort of lateral facial portraits. This new technique provides an alternative to the traditional approach of comparing attractiveness scores with anthropometric measurements and offers a new glimpse at more rigorously defining lateral facial aesthetics.

**Objectives:** Here we use a novel approach to more rigorously study lateral facial aesthetics by combining morphing software and a genetic algorithm to evolve attractive facial images. The objectives of this study were to 1) identify the key lateral facial landmarks that produce realistic and natural lateral portraits with morphing software; and 2) determine if a genetic

algorithm combined with morphing software can progressively evolve lateral facial attractiveness. **Study Design:** Basic research study incorporating morphing technology, a genetic algorithm, and focus group evaluations. **Methods:** A cohort of 30 lateral facial portraits were selectively paired using a genetic algorithm biased towards more attractive faces, and each pair was “bred” with morphing software to create a new cohort of faces more attractive than the original. The genetic algorithm simulates natural selection by using attractiveness scores as a selection pressure to pair faces. By repeating this process of pairing and “breeding”, facial attractiveness was “evolved” through several iterations of the algorithm. **Results:** Key facial landmarks for producing realistic and natural lateral facial portraits are: trichion to glabella, nasion to tip of nose, subnasale to labrale inferius, and pogonion to menton. In each successive cohort facial attractiveness scores increased, and distinct facial characteristics were identified. Faces within later cohorts were strikingly similar. **Conclusions:** Morphing software and a genetic algorithm can be used to simulate natural selection and evolve lateral facial attractiveness. This technique provides a more rigorous method to study lateral facial aesthetics, and it is a robust alternative to traditional approaches rooted in correlating attractiveness scores with anthropometric data.

## **S34. Incidental Trichinellosis of Strap Muscle Identified during Thyroglossal Duct Cyst Excision**

Maggie A. Kuhn, MD, New York, NY; Daniel M. Zeitler, MD, New York, NY; Beverly Y. Wang, MD, New York, NY; Mark D. Delacure, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize trichinella spiralis larva histologically within human tissue and discuss the significance and implications of subclinical trichinellosis.

**Objectives:** 1) Present a unique case of a thyroglossal duct cyst excised for recurrent infections and found to have adjacent strap muscle infected with trichinella spiralis; and 2) review the literature regarding the diagnosis and treatment of subclinical trichinellosis of the head and neck. **Study Design:** Case report and literature review. **Methods:** Case report and literature review. **Results:** We present the case of a 44 year old male immigrant from Serbia without preexisting comorbidities or immunosuppression who suffered from recurrent midline neck infections due to a thyroglossal duct cyst. The patient underwent an uneventful Sistrunk procedure. Histologic examination of the surgical specimen revealed a chronically infected thyroglossal duct cyst as well as remnants of skeletal muscle adjacent to the cyst containing nematode larvae, positively identified as trichinella spiralis. The patient was subsequently evaluated by an infectious disease specialist and required no further treatment for his parasitic infection. **Conclusions:** The presence of nematodes in developed countries is rare today given improved hygiene practices and control of meat quality. We present a unique case of incidentally noted trichinella spiralis infection of the head and neck contained within strap muscle adjacent to a thyroglossal duct cyst. To our knowledge, this is the first described case of trichinellosis of strap muscle adjacent to an excised thyroglossal duct cyst and furthermore highlights the rarity of trichinella spiralis infections of the head and neck.

## **S35. Tongue Necrosis: A Rare Complication of Oral Intubation**

Maggie A. Kuhn, MD, New York, NY; Daniel M. Zeitler, MD, New York, NY; David J. Myssiorek, MD\*, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to reflect upon a unique case of tongue necrosis and appreciate the importance of proper endotracheal tube positioning during prolonged intubation.

**Objectives:** 1) Present a unique case of partial necrosis of the dorsal tongue caused by an endotracheal tube; and 2) highlight the importance of verifying proper endotracheal tube placement during cases requiring prolonged intubation. **Study Design:** Case report and literature review. **Methods:** Case report and literature review. **Results:** A healthy 50 year old man with unilateral idiopathic vocal fold paralysis underwent an uncomplicated total thyroidectomy and bilateral lymphadenectomies for papillary thyroid carcinoma. Given preexisting vocal fold paralysis, a nerve monitoring endotracheal tube was used during the eight hour case and was secured in an unusual position over the patient’s forehead. Postoperatively, the patient reported tongue pain and examination revealed necrotic tissue along the midline of his dorsal tongue. His pain improved with oral analgesics and Carafate syrup. On followup, the patient reported improved tongue pain, and examination showed sloughing of necrotic tissue and a well healing dorsal tongue. **Conclusions:** We present the first case in the literature of tongue ischemia and partial necrosis due to endotracheal intubation, specifically with an oversized nerve monitoring endotracheal tube. There are several cases reporting tongue engorgement following use of a Combitube as well as reports of tongue necrosis secondary to hypercoagulability, embolic phenomena, arterial stenosis,

aortic balloon pump and cranial arteritis. Tongue necrosis due to compression by an endotracheal tube during prolonged intubation is unusual, however surgeons, anesthesiologists and those involved in the care of intubated patients should consider the potential for this complication when verifying placement and orientation of oral endotracheal tubes.

## **S36. Postauricular Approach for Removal of Branchial Cleft Cyst—Case Report and Review of Relevant Anatomy and Literature**

Brad W. Lebert, MD, New Orleans, LA; Sean R. Weiss, MD, New Orleans, LA; Rohan R. Walvekar, MD, New Orleans, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the steps involved in postauricular approach to the upper neck space, relevant anatomical considerations, and current literature on surgical approach to branchial cleft cysts.

**Objectives:** The traditional approach to removal of a branchial cleft cyst has been a transcervical incision. Roh JL has described a postauricular approach for removal of upper neck masses. Our objective is to report our experience with removal of an upper neck branchial cleft cyst, discuss surgical anatomy, and a relevant literature review. **Study Design:** Case report. **Methods:** Postauricular approach to the upper neck was performed as described by Roh JL. Clinical, pathological, radiologic data and followup information was recorded. In addition, an internet based literature search was performed with key words, “post auricular approach, surgical management of brachial cleft cyst”. **Results:** A 44 year old woman presented to our service with a history of upper neck swelling. A CT scan demonstrated a 6 cm well circumscribed cystic lesion lateral to the carotid sheath. An informed consent for a postauricular surgical approach was obtained. Surgical removal was uneventful and curative. Pathology confirmed a branchial cleft cyst. Operative time was 120 minutes. Perioperative course and recovery was uneventful. At 2 month followup, the postauricular scar was well concealed and the patient was satisfied with the outcome. **Conclusions:** The postauricular approach to upper neck branchial cleft cyst is safe and satisfied both surgeon and patient expectations. Specific anatomic considerations to the approach include dissection of the greater auricular nerve and external jugular vein, obtaining a subplatysmal plane of dissection, and preventing excessive manual traction to the marginal mandibular nerve.

## **S37. Management of Transitional Cell Carcinoma of the Lacrimal Sac: A Multidisciplinary Approach to Orbit Sparing Treatment**

Linda N. Lee, MD, Boston, MA; Andrew R. Scott, MD, Boston, MA; Robert A. Frankenthaler, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the clinical presentation, workup, and new treatment modalities available for transitional cell carcinoma of the lacrimal sac, an exceedingly rare tumor. Participants will also understand how combining surgical techniques of otolaryngologists and ophthalmologists with advances in proton-beam radiation and chemotherapy by radiation oncologists and oncologists provides the optimal chance at orbit sparing treatment and long term survival.

**Objectives:** To present a case of lacrimal sac transitional cell carcinoma, and to perform a literature review with a focus on new multidisciplinary treatment advances for this exceedingly rare tumor. **Study Design:** Case report and literature review. **Methods:** Retrospective review of a case of lacrimal sac and nasolacrimal duct transitional cell carcinoma. Surgical and chemoradiation treatment advances are reviewed. **Results:** A 56 year old man presented with a six month history of a painless medial canthal mass and epiphora. A biopsy was initially reviewed as inverted papilloma, and ultimately transitional cell carcinoma. Otolaryngology and ophthalmology performed orbit sparing en-bloc excision of the mass and lacrimal system with medial maxillectomy, total ethmoidectomy and resection of periorbital contents. Postoperatively, he received proton beam radiation and carboplatin/Taxol chemotherapy. He is currently being followed with serial imaging. Advances in proton beam therapy have made orbit sparing surgery a more feasible option for all lacrimal sac tumors; pre-operative involvement of radiation oncology and oncology helps determine the extent of surgery needed. Postoperatively, chemoradiation is important for maximizing locoregional control. **Conclusions:** Transitional cell tumors of the lacrimal sac are very rare but potentially fatal. Multimodality treatment advances now enable more orbit sparing resections and greater survival chances. Treatment should include a multidisciplinary team of otolaryngologists, ophthalmologists, oncologists and radiation oncologists. There are very limited reports of lacrimal sac transitional cell carcinoma in the otolaryngology literature, however, it is important to be aware of the diagnosis and management of this rare condition, as otolaryngology participation is a critical portion of the management of this disease.

## **S38. Ex vivo High Resolution Imaging with a Miniaturized Endoscopic Microscope to Discriminate Benign and Malignant Mucosa in the Larynx**

Lauren L. Levy, BA, New York, NY; Claris E. Smith, BA, New York, NY; Vivek V. Gurudutt, MD, New York, NY; Eric M. Genden, MD\*, New York, NY; Rebecca R. Richards-Kortum, PhD, Houston, TX; Andrew G. Sikora, MD PhD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the potential benefits of optical imaging in the diagnosis and management of squamous cell carcinoma of the larynx.

**Objectives:** To describe the use of a high resolution microendoscope (HRME) to discriminate between nonneoplastic and neoplastic mucosa of the larynx. **Study Design:** This study evaluates the feasibility of optical imaging to enhance the discrimination between normal, dysplastic, and cancerous mucosa of the larynx by comparing HRME images to standard histopathologic examination. **Methods:** Following resection for biopsy-proven squamous cell carcinoma of the larynx, sites of both grossly "normal" and suspicious mucosa were imaged with the fiberoptic endoscope after surface staining of nuclei with proflavin. Imaged areas were marked with India ink to allow correlation with conventional histologic analysis, performed following HRME. **Results:** We observed that areas of histopathologically confirmed carcinoma had increased density of nuclei, and greater disorganization, when compared to the confirmed normal mucosa. In some cases, lesion margins could be visualized by moving the probe across the transition zone from normal to cancerous mucosa. In some heavily keratinized specimens, autofluorescence artifact limited the ability to view cell nuclei. **Conclusions:** Optical imaging provides noninvasive visualization of the epithelium in real time. Previous studies report the use of optical imaging in the oral cavity. This study demonstrates that the use of high resolution optical imaging of the human larynx can potentially complement existing techniques by identifying areas of abnormal mucosa suitable for biopsy, or assisting in intraoperative margin determination. Limitations include keratinization artifact and the potential for submucosal tumor spread below the imaging depth. These results justify continued refinement of optical imaging technology for application to the larynx and other sites in the upper aerodigestive tract.

## **S39. Follicular Variant of Papillary Thyroid Carcinoma: Presentation and Survival**

Harrison W. Lin, MD, Boston, MA; Neil Bhattacharyya, MD FACS\*, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the similarities and differences in the presentations, durations of survival and factors influencing survival of patients with classical and follicular variant histopathologic subtypes of papillary thyroid carcinoma.

**Objectives:** To determine the prevalence and extent of disease characteristics of the follicular variant of papillary thyroid carcinoma (FV-PTC) and the survival impact of this histopathologic diagnosis compared to classical papillary thyroid carcinoma (C-PTC). **Study Design:** Cross-sectional population analysis of national cancer database. **Methods:** Cases of C-PTC and FV-PTC were extracted from the Surveillance, Epidemiology and End Results database for 1988-2006 and staged. Surgical extent and radioactive iodine (RAI) use were determined. Demographic and staging parameters were statistically compared according to tumor histology. Survival differences according to histology were determined with a Cox proportional hazards model, adjusting for age, sex, T stage, N stage, surgical therapy and RAI. **Results:** 46,699 patients were identified (68.4% C-PTC and 31.6% FV-PTC). Age at presentation and sex distribution were similar between FV-PTC (47.9 years; 79.3% female) and C-PTC patients (46.2 years; 77.3% female). Although nodal disease prevalence was significantly lower in FV-PTC compared to C-PTC (14.8% versus 27.8%, respectively,  $p < 0.001$ ), T stage was not significantly different ( $p = 0.450$ ). Mean overall survivals for patients with FV-PTC (204.5 months) and C-PTC (205.3 months) were not significantly different ( $p = 0.373$ ). Cox regression analysis revealed that advanced age ( $p < 0.001$ ), male sex ( $p < 0.001$ ), advanced T stage ( $p < 0.001$ ), and positive nodal disease ( $p < 0.001$ ) were associated with reduced overall survival, while histopathologic subtype was not ( $p = 0.360$ ). **Conclusions:** Disease presentation (with exception of nodal metastasis) and survival in patients with FV-PTC are statistically similar to that of C-PTC and accordingly these patients carry very similar prognoses.

## **S40. Parascapular Free Flaps in Skin Malignancies**

Kristin K. Marcum, MD, Winston Salem, NC; James D. Browne, MD, Winston Salem, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the indications, benefits, and complications of using parascapular free flaps for reconstruction of head and neck skin cancer

defects.

**Objectives:** A retrospective case series at a single institution involving the use of the parascapular fasciocutaneous free flap in reconstruction of head and neck skin cancer defects. **Study Design:** Case series. **Methods:** Retrospective review of a series of eight patients, aged 40-83 years, presenting with head and neck cutaneous squamous cell carcinoma or basal cell carcinoma requiring reconstruction after surgical resection. All patients underwent parascapular free flap reconstruction. **Results:** Eight parascapular fasciocutaneous free flaps were performed for reconstruction of head and neck skin cancer defects. All flaps were successful. Complications included one seroma, two hematomas—one which required surgical exploration. **Conclusions:** Parascapular fasciocutaneous free flaps are a safe, reliable, and cosmetically effective choice for reconstruction of head and neck skin cancer defects. An advantage of this donor tissue is that it is free of sun damage and excessive hair in most individuals; it provides a reliable choice of soft tissue, without the risk of transferring skin prone to malignant changes in this population of patients. In contrast to a scapular cutaneous flap, when using a parascapular donor site, the difficulty with patient positioning is minimized, especially when choosing the donor flap side ipsilateral to the defect.

## S41. Marginal Zone B Cell Lymphoma of the Head and Neck: A Rare Case and Review

Megan E. McLellan, MD, Boston, MA; Kevin S. Emerick, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the general subtypes of lymphoma presenting in the head and neck and describe the most common sites of occurrence. Participants should demonstrate basic knowledge of marginal zone B cell lymphoma and the considerations that are involved in treatment decision making. Most importantly, they should demonstrate understanding of the diversity of lymphoma presentation and the implications for creating differential diagnoses for the head and neck patient.

**Objectives:** To present a rare case report of a recently recognized, indolent form of non-Hodgkin's lymphoma of the infratemporal fossa, and to discuss the presentation, diagnosis, staging and treatment. **Study Design:** Case report and literature review. **Methods:** Report of an extranodal marginal zone B cell lymphoma in the infratemporal fossa. We reviewed and summarized the relevant literature. **Results:** NHL accounts for 5% of head and neck cancers, and 20-30% of NHL is extranodal. The majority of extranodal NHL of the head and neck is located in Waldeyer's ring, the thyroid, paranasal sinuses, salivary glands, ocular adnexa, and larynx. Only 4 case reports in the literature report primary extranodal NHL arising in the temporal/infratemporal region, none of which represent the subtype presented in this report. This subtype is most commonly of gastric origin and has distinct, site specific associations with infectious and chronic inflammatory processes. **Conclusions:** Lymphoma represents the second most common malignancy of the head and neck and is quite diverse in its presentation. Current knowledge of basic subtypes and their prognosis is important for providing appropriate counseling, referral and workup to the newly diagnosed patient. The indolent nature and infectious and inflammatory associations of the marginal zone B cell NHL in this case highlight a discussion on the difficulties of diagnosis and the wide range of treatment options available.

## S42. Novel Use of Unilateral Galeo-Pericranial Flaps for Closure of Sino-Orbital Cutaneous Fistulas

Vikas Mehta, MD, New York, NY; Eran E. Alon, MD, New York, NY; Daniel Buchbinder, DMD, MD, New York, NY; Mark L. Urken, MD FACS, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe a novel approach for closure of sino-orbital cutaneous fistulas using a galeo-pericranial rotational flap. To identify challenges and aesthetically favorable operative techniques for closure of these complex craniofacial defects.

**Objectives:** To describe a novel approach for closure of sino-orbital-cutaneous fistulas using a galeo-pericranial rotational flap. To identify challenges and aesthetically favorable operative techniques for closure of these complex craniofacial defects. **Study Design:** Retrospective chart review. **Methods:** Two patients with a history of prior sinonasal carcinoma, irradiation and orbital exenteration who developed postoperative sino-orbital cutaneous fistulas are identified and discussed. **Results:** The galeo-pericranial flap was used to successfully repair each complex defect. Both patients' fistulas have remained closed at long term followup with excellent cosmetic results. **Conclusions:** Sino-orbital cutaneous fistulas are a well documented complication of orbital exenteration and sinonasal carcinoma resection. These defects remain difficult to close due to persistent mucopurulent drainage and prior irradiation. The galeo-pericranial flap is ideal due to its

thin, pliable nature and predictable, abundant vascularity. Additionally, the novel use of this flap obviates the need for a more cosmetically disfiguring closure.

## **S43. An Unusual Presentation of NK/T Cell Lymphoma of the Nose**

Danny M. Meslemani, MD, Detroit, MI; Lamont R. Jones, MD, Detroit, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the presentation of the NK/T cell lymphoma and demonstrate a high index of suspicion for malignancy in the setting of an infection.

**Objectives:** Case report of a male with an unusual NK/T cell lymphoma of the nose that presented with an aggressive nasal infection superimposed with squamous and basal cell carcinoma and a review of diagnosis, management, and prognosis. **Study Design:** Case report and literature review. **Methods:** Review of the literature to assess cases of NK/T cell lymphoma, with particular attention to cases involving the nasal skin and presentation of patients. **Results:** Differential diagnosis includes aggressive infection of the nasal skin, carcinoma, and lymphoma. **Conclusions:** No cases in the literature of NK/T cell lymphoma have been reported that presented with an aggressive infection with initial biopsies that revealed squamous cell and basal cell carcinoma, which led to surgical management and a definitive diagnosis of NK/T cell lymphoma of the nasal skin and soft tissues.

## **S44. Progressive Transformation of Germinal Centers (PTGC) in the Head and Neck**

Matthew W. Miller, MD, Portland, OR; Ken M. Gatter, MD, Portland, OR; Steven B. Cannady, MD, Portland, OR; Mark K. Wax, MD, Portland, OR

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the differences in histologic features between progressive transformation of germinal centers and nodular lymphocyte predominant Hodgkin's disease. In addition, they will be able to demonstrate the appropriate steps and tests necessary for diagnosing progressive transformation of germinal centers.

**Objectives:** PTGC is a benign cause of lymph node enlargement present in 3.5-10% of chronic lymphadenopathy. PTGC may present in the head and neck in a manner similar to that of nodular lymphocyte predominant Hodgkin's disease (NLHD) and must be differentiated based on histologic, immunologic, and in situ hybridization analysis. This study and literature review evaluates the presentation and diagnosis of PTGC in the head and neck. **Study Design:** Case study with literature review. **Methods:** Retrospective chart review was performed. Pathologic specimen images were provided by the diagnosing pathologist. A Medline search for keyword terms "progressive transformation of germinal centers" and "PTGC" was used. **Results:** The patient is a 75 year old man with a history of reactive lymphoid hyperplasia of the right orbit treated with radiation therapy. He presented with a one month history of asymptomatic right cervical and parotid lymphadenopathy. Imaging demonstrated diffuse cervical adenopathy. Fine needle aspirate of a cervical and parotid node showed reactive lymphoid hyperplasia. An excisional biopsy was performed, followed by immunologic analysis and in situ hybridization. The results of the studies confirmed a diagnosis of PTGC. **Conclusions:** Persistent lymphadenopathy of the head and neck requires imaging and tissue diagnosis to exclude malignant etiologies. PTGC consists of follicular structures that are at least two to three times the diameter of a reactive follicle. The absence of Reed-Sternberg cell and lymphohistiocytic (LH) cells differentiates PTGC from NLHD. Following the diagnosis of PTGC, management is expectant with close followup and additional investigation warranted should new symptoms or lymphadenopathy develop.

## **S45. Verrucous Carcinoma of the Temporal Bone: Clinical Course and Treatment Controversy**

Mia E. Miller, MD, Los Angeles, CA; Akira Ishiyama, MD, Los Angeles, CA; Claudia Kirsch, MD, Los Angeles, CA; Guy F. Juillard, MD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize a very rare presentation of verrucous carcinoma arising in the external auditory canal and extending to the skull base, including associated histopathology, radiologic analysis and treatment recommendations.

**Objectives:** Verrucous carcinoma is a rare tumor that presents in the head and neck, most commonly in the larynx and oral cavity. Twelve cases of verrucous carcinoma of the temporal bone have been described in the literature. This report

aims to describe a case of verrucous carcinoma of the temporal bone extending through the tegmen and to discuss the treatment controversy surrounding postoperative radiation. **Study Design:** A case report in the setting of a tertiary care medical center. **Methods:** Presentation of a single patient report including history, physical findings, treatment and gross, histologic, and radiologic analyses. **Results:** A 51 year old man with a many year history of otitis externa and intravenous drug use presented with a fungating external auditory canal mass. Biopsy was suggestive of verrucous carcinoma. Temporal bone CT revealed a soft tissue density with extension from the right external auditory canal into the middle ear with dehiscence of the overlying tegmen. The surgical team scheduled the patient for temporal bone resection and consulted with radiation oncology for possible postoperative radiation. **Conclusions:** Verrucous carcinoma is a variant of squamous cell carcinoma which rarely presents in the temporal bone. Although its histology is seemingly benign with “pushing” borders, it follows an insidious clinical course with aggressive local invasion and lymph node metastasis. Surgery is widely accepted as first line treatment; however, postoperative radiation remains a topic of debate. Prospective studies are needed to better define the post-treatment course of verrucous carcinoma of the temporal bone.

## S46. Head and Neck Cancer Screening in Underserved Communities

Charles E. Moore, MD, Atlanta, GA; Ajani Nugent, MD, Atlanta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate knowledge of factors contributing to lack of access and delayed diagnosis of head and neck cancer in underserved populations.

**Objectives:** To determine if outcome disparities (related to stage at diagnosis and treatment) are related to access to health care information and services. To determine if the use of mobile clinics to underserved areas offer an effective way to provide health resources to a highly migrant and often noncompliant patient base. **Study Design:** Survey analysis coordinated with community screening. **Methods:** Participants were evaluated during screening visits by medical history questionnaire and a head and neck exam. No medical therapy was given at the screenings. Participants were referred to health care facilities based on findings. **Results:** 41.4% (106/256) of respondents reported at least one otolaryngologic problem. 11.3% (29/256) had a lesion requiring further evaluation. Given the highly migrant nature of this population, surprisingly 75% (22/29) followed up in our otolaryngology clinic. Of those lesions identified, 9% (2/22) were found to be malignant. 57.8% (148/256) of the respondents reported at least one form of tobacco use. Interestingly, 75% (192/256) did not recognize tobacco as a risk factor for head and neck cancer. In addition, 28.9% (74/256) reported one untreated medical illness. **Conclusions:** There is a need for improved education concerning head and neck cancer. In addition, increased awareness of all the ramifications of the use of tobacco products is warranted. Outreach clinics are an effective means to address health issues in underserved populations.

## S47. Multispectral Imaging Analysis of HSP27 Expression in Head and Neck Squamous Cell Carcinoma

Julien A. Norton, BS, Augusta, GA; Paul M. Weinberger, MD, Augusta, GA; Mark A. Merkley, PhD, Augusta, GA; Sunny S. Khichi, BS, Augusta, GA; Lana L. Jackson, MD, Augusta, GA; William S. Dynan, PhD, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate an understanding of HSP27 in the setting of head and neck squamous cell carcinoma (HNSCC).

**Objectives:** HSP27, a member of the heat shock protein (HSP) family, functions to prevent stress-induced cellular damage. This coupled with previous findings of elevated HSP expression in many tumors suggests that these proteins could play a role in tumorigenesis. The aim of this study was to assess HSP27 expression in a cohort of HNSCC patients using a novel quantitative protein expression analysis system based on multispectral imaging. **Study Design:** Retrospective laboratory study of HNSCC patients treated at tertiary care academic medical center. **Methods:** Archival tissues from 47 patients with HNSCC were subjected to immunohistochemistry using primary antibody to HSP27 and queried using multispectral imaging to quantify HSP27 expression. Expression was correlated with clinical and pathologic variables. Nonparametric Wilcoxon rank sums and Mantel-Haensel Chi Square. **Results:** HSP27 expression was increased in advanced stage (TNM stage III/IV) versus early stage (TNM stage I/II) cancers. Multispectral analysis yields both overall and percent positive expression data. By overall expression, early stage cancers had median HSP27 expression of 2664 OD compared to advanced stage cancers (median 5231 OD,  $p=0.017$ ). By percent positive cells, 58.6% of cells in early stage cancers compared to 84.6% of cells in advanced stage cancers displayed elevated HSP27 expression,  $p=0.0008$ . HSP27 expression was dramatically elevated in tumor (80.2%) compared to stroma (0.0%,  $p<0.0001$ ). There was no asso-

ciation between HSP27 expression and nodal status, tumor differentiation, or demographic variables. **Conclusions:** This study confirmed that the expression of HSP27 is increased in patients with advanced HNSCC and warrants further investigations as a potential biomarker for HNSCC.

## **S48. Significance of HSP27 Expression in Head and Neck Squamous Cell Carcinoma: A Meta-Analysis of Published Literatures**

Julien A. Norton, BS, Augusta, GA; Paul M. Weinberger, MD, Augusta, GA; Jennifer L. Waller, PhD, Augusta, GA; Mark A. Merkley, PhD, Augusta, GA; Lana L. Jackson, MD, Augusta, GA; William S. Dynan, PhD, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate an understanding of Hsp27 in the setting of head and neck squamous cell carcinoma (HNSCC).

**Objectives:** Hsp27 functions to prevent stress induced cellular damage and has is elevated in multiple cancer types. The significance of Hsp27 in HNSCC remains controversial. We sought to perform a meta-analysis of Hsp27 expression to clarify previous findings. **Study Design:** Meta-analysis of all published studies of Hsp27 in HNSCC patients using IHC techniques. **Methods:** A literature review was performed on PubMed and Google Scholar search engines using terms HSP27, HSPB1, heat shock proteins, cancer, head and neck squamous cell carcinoma. Additional studies were added by review of manuscript bibliographies. Means and standard deviations for continuous data were obtained for overall Hsp27 expression (in cancer, normal and dysplasia), nodal status and TNM stage. Chi-square and Cochran's Q test were used to test statistical significance. **Results:** There were 77 studies identified in the context of Hsp27 and cancer in general. Of these, 7 studies (total patients n=347) met inclusion criteria and reported findings in HNSCC using IHC scoring techniques. There were 347 patients with Hsp27 expression for cancer and 64 for dysplastic epithelium, 273 patients stratified by nodal status, 250 patients by TNM stage. For the mean difference in Hsp27 expression; cancer vs. normal, cancer vs. dysplasia, and dysplasia vs. normal all showed significance ( $p < 0.0001$ ) however the difference was not homogeneous across studies for cancer vs. dysplasia and normal. The difference was homogeneous for dysplasia vs. normal. There was no difference between Hsp27 expression in node positive and node negative HNSCC patients ( $p = 0.31$ ). **Conclusions:** Hsp27 is elevated in HNSCC and may be a useful biomarker for this disease.

## **S49. Prognostic Factors for Patients with Sinonasal Undifferentiated Carcinoma**

Ashley G. O'Reilly, MD, Rochester, MN; Eric J. Moore, MD\*, Rochester, MN; David J. Schembri Wismayer, MD, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss factors that affect the disease free and overall survival of patients diagnosed with sinonasal undifferentiated carcinoma.

**Objectives:** This study was designed to determine factors that affect disease free and overall survival in patients diagnosed with sinonasal undifferentiated carcinoma (SNUC). **Study Design:** Retrospective review of 12 patients treated for SNUC from 1980 to 2006. **Methods:** Hospital charts were reviewed, collecting information regarding location and extent of tumor via radiographic and surgical findings, treatment modality, and followup. A pathologist also reviewed histologic slides from each patient to confirm the diagnosis of SNUC. **Results:** Patients presenting with neither orbital nor dural involvement have a longer disease free and overall survival when compared with patients presenting with orbital and/or dural involvement. There does not appear to be a difference in disease free and overall survival for patients presenting with both orbital and dural involvement or either orbital or dural involvement. Both groups of patients have an equally poor prognosis. Cribriform plate involvement and intracranial invasion at the time of presentation do not correlate with disease free or overall survival. **Conclusions:** Dural invasion and/or orbital involvement at the time of diagnosis indicate a poor prognosis for patients with SNUC. Cribriform plate involvement and intracranial invasion do not appear to predict prognosis in this patient cohort.

## **S50. Thyroid Hemiagenesis: Report of a Case and Review of Literature**

Sarah Pena, BSc, New Orleans, LA; Bridget Loehn, MD, New Orleans, LA; Hugh Robertson, MD, New Orleans, LA; Rohan R. Walvekar, MD, New Orleans, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the manage-

ment of a patient diagnosed with an incidental finding of a thyroid lobe agenesis.

**Objectives:** Thyroid hemiagenesis is a rare congenital anomaly. Our objective was to report our experience with an incidental finding of thyroid hemiagenesis in a patient who presented with a left neck mass and to review existing literature to develop an algorithm for management of this diagnosis. **Study Design:** Case report and review of literature. **Methods:** An internet based literature search was performed via PubMed with key words, "hemithyroid agenesis, thyroid hemiagenesis, absent thyroid gland". Clinical, pathological, radiologic data and followup information is reported. **Results:** A 55 year old woman with a left neck mass presented to our service. A diagnostic CT scan of the head and neck revealed an absent left thyroid lobe. A review of the CT imaging did not reveal ectopic thyroid tissue. A complete physical examination including a flexible laryngoscopy to assess the left neck mass also did not reveal any evidence of ectopic thyroid tissue. The neck mass was pathologically a granulomatous lesion on surgical pathology. Thyroid function tests were within normal limits. In followup, patient remains asymptomatic. **Conclusions:** Hemithyroid agenesis is most commonly associated with hyperthyroidism, although, hypothyroidism has been reported. Other diseases that can be associated in the remaining lobe include adenocarcinoma, adenoma, multinodular goiter, and chronic thyroiditis. In counseling patients, it is important to educate them regarding these associated conditions and offer appropriate workup. Incidental thyroid agenesis with a negative workup can then be observed.

## **S51. Skull Base Osteomyelitis and Bisphosphonate Use in Multiple Myeloma: Report of Two Cases and Literature Review**

Jeffrey M. Phillips, MD, Shreveport, LA; Joel Thibodeaux, MD, Shreveport, LA; Cherie-Ann O. Nathan, MD FACS\*, Shreveport, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify an uncommon disease entity in patients undergoing bisphosphonate use who present with a mass at the skull base. Discuss the presentation, clinical findings and treatment alternatives in osteomyelitis of the skull base.

**Objectives:** Although osteoradionecrosis of the mandible is a well known entity, skull base osteomyelitis involving the temporal bone unrelated to otitis externa in patients with multiple myeloma using bisphosphonates has not been reported. We describe a new entity of skull base erosion resulting from osteonecrosis, presenting with malignant features in patients using bisphosphonates for multiple myeloma. **Study Design:** Chart review of two patients presenting with skull base osteomyelitis. **Methods:** Two patients with multiple myeloma and prior zoledronic acid use were referred to our cancer center for management of maxillary and temporal bone masses with skull base erosion. Both patients were in remission and not immunocompromised. Clinical symptoms included pain, cranial nerve deficits, and vertigo. An oroantral fistula developed in the maxillary patient. In both cases, repeat CT and MRI revealed an eroding mass consistent with malignancy. After repeated biopsies, however, no malignancy was seen, and pathology revealed chronic inflammation with bacterial colonization. **Results:** Imaging with technetium and gallium revealed osteomyelitis of the skull base in both cases. Biopsy cultures demonstrated staphylococcus in the temporal bone patient and actinomyces in the maxillary patient. Prolonged intravenous antibiotics resulted in significant improvement in symptoms and imaging after eight weeks of treatment. **Conclusions:** Bisphosphonate associated osteomyelitis and necrosis of the mandible has been described in recent literature as a diagnostic and management dilemma. However, skull base osteomyelitis from the temporal bone has not been reported, and few cases from the maxilla have been reported. Early recognition and differentiation from similarly presenting malignant disease may prevent intracranial complications resulting from delayed treatment.

## **S52. Carcinoma in the Contralateral Tonsil in Patients Treated for Tonsillar Carcinoma**

Krishna Pokala, BS, Oklahoma City, OK; Gregory A. Krempf, MD\*, Oklahoma City, OK; Jesus E. Medina, MD\*, Oklahoma City, OK; Raymond O. Smith, MD, Oklahoma City, OK

**Educational Objective:** At the conclusion of this presentation, the participants should be able to be aware that concomitant or subsequent primary carcinoma of the contralateral tonsil has occurred in patients who have been treated for tonsillar carcinoma.

**Objectives:** We report a series of patients treated for carcinoma of the tonsil who either presented with bilateral carcinomas or later developed a second primary carcinoma of the contralateral tonsil. This report raises awareness of this occurrence, and a review of the literature is performed. **Study Design:** Case series. **Methods:** Four cases have been identified of either concomitant or subsequent carcinoma of the contralateral tonsil in patients treated for tonsillar carcinoma

from the practices of three head and neck surgeons in a single demographic area over a 35 year span. A Medline literature search and review was performed. **Results:** Four patients were identified who were treated for tonsillar carcinoma with concomitant or subsequent carcinoma of the contralateral tonsil: One patient with bilateral metastatic carcinoma in cervical lymph nodes was found to have bilateral occult tonsillar primaries. Three patients who were treated for tonsillar primary carcinomas subsequently developed carcinoma of the contralateral tonsil. **Conclusions:** A small population of patients with unilateral tonsil carcinoma will develop a second in the contralateral tonsil. This raises the question of whether removal of the contralateral tonsil at the time of initial treatment might have spared the morbidity/mortality of the subsequent contralateral tonsil cancer.

## **S53. Case Report of Periocular Merkel Cell Carcinoma Treated with Primary Concomitant Chemotherapy and Radiation, and Review of the Literature Regarding Its Use**

John Drew Prosser, MD, Augusta, GA; Nishant Bhatt, MD, Augusta, GA; Lana Jackson, MD, Augusta, GA; Teresa Coleman, MD, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be familiar with the clinical and pathological features and literature on the nonsurgical options for treatment of Merkel cell carcinoma.

**Objectives:** To report a rare case of periocular Merkel cell carcinoma treated with concomitant chemotherapy and radiation and review the literature on nonsurgical treatments of Merkel cell carcinoma. **Study Design:** Case report and literature review. **Methods:** A retrospective chart review was performed to include clinical presentation, photographic documentation, radiologic studies, pathologic slides and treatment course. A literature review was completed using PubMed. **Results:** A 74 year old white female presented to a tertiary center multidisciplinary head and neck tumor board with a one month history of a rapidly enlarging infraorbital lesion. CT scan showed a left periorbital mass measuring 6 x 2 cm. Biopsy of the lesion revealed Merkel cell carcinoma. Surgical excision was recommended, however the patient chose to undergo concomitant chemoradiation. After cisplatin chemotherapy and electron beam radiation, there was no detectable disease on exam or on repeat biopsies. **Conclusions:** Merkel cell carcinoma is a rare but often aggressive primary cutaneous malignancy of neuroendocrine origin. The most common site of occurrence is in the head and neck. Due to its aggressive nature many patients have poor outcomes with disease specific death occurring in 25-50% of patients. Surgery remains the initial treatment of choice, however in many patients whom are not surgical candidates or those who do not desire surgical resection, radiation and/or chemotherapy may play a role.

## **S54. Combined Approach for Extensive Maxillectomy: Technique Development and Cadaveric Dissection**

Carlos M. Rivera-Serrano, MD, Pittsburgh, PA; Ramon Terre-Falcon, MD, Barcelona, Spain; Umamaheswar Duvvuri, MD, Pittsburgh, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the advantages of performing a maxillectomy via a combined transoral and endoscopically assisted transnasal technique.

**Objectives:** To describe a combined open and endoscopic technique for total and subtotal maxillectomy in an attempt to decrease the morbidity of open traditional approaches. **Study Design:** Cadaveric dissection. **Methods:** Cadaveric dissection in five human specimens. **Results:** Using an endonasal endoscopic technique and an ipsilateral gingivobuccal incision, five maxillectomies were performed in human specimens without the need of cutaneous incisions. Both total and subtotal maxillectomies were performed. The infraorbital nerve was preserved in all subtotal cases. The contents of the infratemporal fossa were dissected by endoscopic transnasal and transoral microscopic approaches (not described in technical note). **Conclusions:** A combined approach can be used in selected patients when the minimally endoscopic techniques are not indicated or feasible and a more extensive maxillectomy is warranted. These benefits of no cutaneous incisions, visual magnification and better control of bleeding can potentially decrease the morbidity of traditional open approaches.

## **S55. Mediastinal Hematoma Secondary to Hypertension, Presenting as a Retropharyngeal Space Abscess**

Natalie N. Rizk, PhD, Detroit, MI; Thomas C. Spalla, MD, Detroit, MI; Samer M. Al-Khudari, MD, Detroit, MI; Tamer A. Ghanem, MD PhD, Detroit, MI

**Educational Objective:** First case report to demonstrate uncontrolled chronic hypertension as the etiology of a spon-

taneous mediastinal venous hematoma with presentation as a retropharyngeal space fluid collection.

**Objectives:** The majority of retropharyngeal hematomas described in the literature have been associated with anticoagulation therapy, tumors, aneurysm, infection or cervical spine injury. We present a case of a 55 year old African American female with acute chest pain, sore throat, and dysphagia. Her past medical history was significant for uncontrolled hypertension and cervical spine arthritis. Physical exam was significant for posterior pharyngeal edema and her labs indicated mild leukocytosis. Contrast enhanced CT scan of the neck demonstrated an extensive retropharyngeal fluid collection with mediastinal extension, concerning for an abscess. **Study Design:** Case report. **Methods:** Surgical intervention: A transoral and transcervical incision and drainage of the presumed abscess revealed clotted blood and venous ooze. Penrose drains were placed in the retropharyngeal space to allow for spontaneous drainage over the next two days. The patient was kept intubated for 8 days to ensure a secure airway while venous ooze was allowed to self-tamponade. Antihypertensive medications were utilized to control her labile blood pressures. **Results:** Resolution of symptoms (chest pain, sore throat, and dysphagia) and control blood pressure. **Conclusions:** To our knowledge this is the first case report to demonstrate uncontrolled chronic hypertension as the etiology of a spontaneous mediastinal venous hematoma with presentation as a retropharyngeal space fluid collection. When evaluating retropharyngeal space occupying lesion with mediastinal extension, consideration should be given to mediastinal venous plexus bleeding. Treatment involves securing the airway, drainage, and control of blood pressure.

## **S56. Giant Cell Tumors of the Temporal Bone and Infratemporal Fossa: A Case Report and Review of the Literature**

Daniel S. Roberts, MD PhD, Boston, MA; Daniel G. Deschler, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the clinical, radiologic, and pathologic features of giant cell tumors of the temporal bone with infratemporal bone extension and to understand the surgical management of these patients.

**Objectives:** To report a giant cell tumor (GCT) of temporal bone and infratemporal fossa and to review the literature pertinent to the care of such patients. **Study Design:** Case report and review of the literature. **Methods:** A review of the literature was conducted using PubMed and the key words temporal bone, GCT, infratemporal fossa, and recurrent GCT. Medical records from an index case were analyzed and presented in the context of the available literature. **Results:** Six case reports over 23 years illustrate that these benign locally destructive lesions may originate in the temporal bone with extension into the infratemporal fossa. More commonly, GCTs involve the distal ends of long bones. We present a 30 year old male who developed a temporal bone GCT with infratemporal fossa extension 12 years after undergoing successful surgical treatment of a GCT of the femur. Our index case differs from prior reported cases by surgical approach and by the occurrence of an infratemporal fossa GCT as well as a previous GCT at a separate anatomical location. Complete removal was achieved but required resection of the zygomatic arch and dissection of all upper facial nerve branches. This was tolerated well with acceptable functional and cosmetic results. The patient is disease free after 18 months without facial nerve deficits. **Conclusions:** Due to the risk for recurrence, complete resection of GCTs of the temporal bone and infratemporal fossa is advocated. Surgical techniques that allow for visualization of the facial nerve and increase surgical access can enhance overall clinical success with limited postoperative morbidity.

## **S57. Synchronous Bilateral Tonsil Squamous Cell Carcinoma**

Michelle M. Roeser, MD, Rochester, MN; Kerry D. Olsen, MD\*, Rochester, MN; Eric J. Moore, MD\*, Rochester, MN; David J. Schembri Wismayer, MD, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the treatment and pathology of simultaneous bilateral metastatic palatine tonsil carcinoma. They will be familiar with the current literature on the diagnosis and management of unknown primary oropharyngeal neoplasms including the role of positron emission tomography (PET) imaging.

**Objectives:** 1) Discuss the treatment and pathology of simultaneous bilateral metastatic palatine tonsil carcinoma; and 2) discuss the current literature on the diagnosis and management of unknown primary oropharyngeal neoplasms, including the role of positron emission tomography (PET) imaging. **Study Design:** Squamous cell carcinoma (SCCA) of the palatine tonsil typically presents as a unilateral mass in the oropharynx or as a mass in the ipsilateral neck indicating a lymph node involved with metastasis. The carcinoma rarely presents with involvement of the contralateral lymph nodes,

and this situation typically is present only in very advanced local disease. Simultaneous discontinuous disease involving both palatine tonsils is exceedingly rare with less than five cases reported in the medical literature. **Methods:** Case report and literature review. **Results:** This case report involves a 51 year old male with bilateral palatine tonsil squamous cell carcinoma and bilateral metastatic neck disease. He presented with a left cystic neck mass diagnosed as squamous cell carcinoma by fine needle aspiration. On exam, the site of the primary tumor was suspected to be ipsilateral tonsil. Positron emission tomography (PET) scanning demonstrated asymmetric FDG activity in the contralateral palatine tonsil and neck. The patient underwent bilateral transoral robotic-assisted partial oropharyngectomy demonstrating separate tonsillar carcinomas, both of which were HPV positive. Bilateral neck dissections demonstrated metastatic involvement of one right and two left cervical nodes. **Conclusions:** We describe an exceedingly rare case of bilateral simultaneous metastatic palatine tonsil SCCA. This finding raises the question regarding the need for bilateral tonsillectomy in the case of the unknown primary or proven tonsil carcinoma with HPV positivity.

## **S58. Robotic Axillary Thyroidectomy: Multi-Institutional Clinical Experience with the daVinci**

Melanie W. Seybt, MD, Augusta, GA; Ronald B. Koppersmith, MD, Texas Station, TX; F. Christopher Holsinger, MD, Houston, TX; David J. Terris, MD\*, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the indications and limitations of robotic thyroid surgery.

**Objectives:** Progress in minimally invasive and remote access thyroid surgery has become limited by technological and instrumentation constraints. Implementation of robotic technology (daVinci) was a natural solution to the challenges posed by the confined space of the central compartment. We sought to describe our early experience with this approach. **Study Design:** Planned analysis of prospectively maintained patient data at three academic institutions. **Methods:** Demographic and surgical data were obtained and analyzed with attention to age, gender, pathology, surgical times and complications. **Results:** Eight consecutive thyroidectomies were accomplished using the daVinci robotic system through an axillary approach (with a small presternal portal). There were 6 females and 2 males, and the mean age was  $49.4 \pm 12.1$  years. Seven were hemithyroidectomies and one was a total thyroidectomy; all had benign pathology. One obese patient suffered small pulmonary emboli which were treated without sequelae. There were no laryngeal nerve injuries, hypoparathyroidism, or other complications, and all patients were operated without need for a cervical neck scar. **Conclusions:** Robotic axillary thyroidectomy has proven to be feasible in this small series of patients. Further study is justified to confirm the safety and to determine the appropriate role of this procedure in patients with thyroid disease.

## **S59. Follicular Dendritic Cell Tumor Presenting in the Submandibular Region in an 11 Year Old**

Amanda L. Silver, MD, Boston, MA; Daniel G. Deschler, MD FACS, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to develop a management approach to the uncommon extranodal follicular dendritic cell sarcoma of the head and neck.

**Objectives:** Follicular dendritic cell sarcoma (FDCS) is a rare malignancy of the dendritic reticulum cells of lymph nodes. Extranodal cases are rare, with just under 70 cases reported in the head and neck, most often involving the tonsil. This report will highlight key features differentiating FDCS from other poorly differentiated neoplasms to enable prompt diagnosis and appropriate treatment. **Study Design:** Case report. **Methods:** An 11 year old boy presented for evaluation following resection of a submandibular mass, thought to be a salivary gland cyst, at an outside institution. Initial histology was thought to be an inflammatory mass. Final pathology demonstrated a follicular cell dendritic sarcoma. He was closely followed for a year until he developed fullness of the right submandibular space and underwent exenteration of the right submandibular space with removal of facial lymph nodes. The marginal mandibular, hypoglossal, and lingual nerves were preserved. Pathology again was consistent with follicular cell dendritic sarcoma. He was treated postoperatively with proton beam radiotherapy. Over two years following salvage treatment, he continues to have no evidence of recurrence. **Results:** N/A. **Conclusions:** FDCS is a rare, often misdiagnosed malignancy of antigen presenting cells that may present in nodal and extranodal sites, most commonly of the head and neck. Although FDCS typically affects middle aged patients, we present the third reported head and neck case involving a patient under the age of 16. Recurrence and metastasis are common, requiring close followup and possible salvage surgery and postoperative radiation therapy.

## **S60. Silencing of SPK Enhances Radiation Induced Apoptosis through Stimulating Reactive Oxygen Species in HNSCC**

Uttam K. Sinha, MD\*, Los Angeles, CA; Rizwan Masood, PhD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand 1) cellular effects of ionizing radiation for low energy transfer; and 2) methods of enhancing radiation sensitization of head and neck squamous cell carcinoma.

**Objectives:** To demonstrate that sphingosine kinase (SPK) inhibition leads to higher levels of ceramide, cytochrome C and reactive oxygen species (ROS) in HNSCC cells, and thus enhances radiation induced apoptosis and also inhibits the growth of HNSCC cells and migration. **Study Design:** We have identified a specific SPK siRNA which specifically blocked the expression of SPK-1 in HNSCC. Expression of SPK was determined by Western blot, real time PCR (RT-PCR) and immunohistochemical staining from surgical specimens, and HNSCC cell lines. Measurement of ceramide and cytochrome C levels were studied in radiation induced squamous cell carcinoma (SCC) in vitro. Blocking of SPK expression increased the levels of ceramide and cytochrome C and further enhances radiation induced apoptosis. **Methods:** 1) Process sample tissue for analysis of SPK-1 expression by IHC, protein and mRNA analyses; 2) establish cell lines from tumor samples; and 3) study SPK-1 and ceramide related radiation biology. **Results:** Higher levels of SPK expression were detected in all SCC cell lines and primary tumors. In SCC cell lines, SPK siRNA specifically blocked the expression of SPK and thus increased the ceramide and cytochrome C levels. SCC cells inhibiting SPK-1 were also showed radiation induced apoptosis compared to SCC cells without blocking SPK-1 expression. Blocking of SPK resulted in inhibition of cell growth, migration, invasion and radiation induced apoptosis in a dose dependent manner. **Conclusions:** This data demonstrates the mechanism of action of tumor suppressor lipid ceramide during radiation.

## **S61. Prevention of Radiation Induced Xerostomia by Minimally Invasive Submandibular Gland Transfer**

Natalka D. Stachiw, MD, Charleston, SC; M. Boyd Gillespie, MD, Charleston, SC; Joshua D. Hornig, MD, Charleston, SC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss ways of decreasing xerostomia secondary to radiation therapy including transference of the submandibular gland.

**Objectives:** To develop a minimally invasive intraoral technique to transfer the submandibular gland into the submental space. **Study Design:** Case series. **Methods:** Five cephalus specimen, a total of 10 submandibular glands, underwent this intraoral approach. Primary outcome measures included operative time, length of gland transfer, adequate ligation of facial vessels, and preservation of lingual nerve, hypoglossal nerve, and submandibular duct. **Results:** All glands were successfully transferred. Operative times ranged from 60-120 minutes, mean = 77 minutes. Length of gland repositioning ranged from 2.5 to 4 cm, mean length 3.35 cm. Both nerves and duct remained intact. Facial vessels were adequately visualized and ligated successfully for gland repositioning. **Conclusions:** The submandibular gland can be transferred to the submental space through an intraoral incision without damaging the duct or neighboring nerves. The major advantage of this approach is the avoidance of an external scar.

## **S62. Human Papillomavirus and Nasopharyngeal Carcinoma: An Association for WHO Type I**

Erich M. Sturgis, MD MPH\*, Houston, TX; Emily J. Lo, BA, Houston, TX (Presenter); Diana Bell, MD, Houston, TX; Guojun Li, MD PhD MS, Houston, TX; Jason S. Woo, BA, Dallas, TX; Ehab Y. Hanna, MD, Houston, TX; Adel K. El-Naggar, MD PhD, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the epidemiology of nasopharyngeal carcinoma in the U.S., the viral etiologies of the disease, and the implications of an association with human papillomavirus.

**Objectives:** Nasopharyngeal carcinoma (NPC) is a rare cancer in the U.S. that has a well established association with Epstein-Barr virus (EBV). Given the rise in oropharyngeal tumors positive for high risk human papillomavirus (HPV), we chose to examine the relationship between HPV and WHO type I NPC, which has clinical features that suggest a disease process different from that of WHO types II/III. **Study Design:** Retrospective case comparison study. **Methods:** A search of a large multidisciplinary cancer center tumor registry identified 187 patients seen from January 1999 to July 2009 with

incident NPC and no history of prior cancer. Available paraffin embedded tumor specimens (N=28) were analyzed for HPV status by in situ hybridization (ISH) and polymerase chain reaction (PCR) for HPV 16 and 18, EBV status by ISH, and p16 expression by immunohistochemistry. Demographic parameters, including race, smoking, and alcohol exposure were obtained from the medical records. **Results:** Patients with incident WHO-I NPC (N=17) tended to be smokers (65%) and 2 were of Asian heritage, while for patients with incident WHO-II/III NPC (N=170), 48% were smokers and 24% were Asian. For WHO-I NPC patients with available paraffin blocks (N=7), 2 of 4 had HPV identified by ISH and 4 of 6 were HPV 16/18+ by PCR, while two were EBV+. However, for WHO-II/III NPC patients with available archival tissue (N=21), 69% were EBV+ and none HPV positive by ISH. **Conclusions:** These results suggest that WHO type I NPC may be associated with oncogenic HPV, though larger studies are needed to verify these findings.

## **S63. PET-CT Staging of the Neck in Cancers of the Oropharynx: Patterns of Regional and Retropharyngeal Nodal Metastasis**

Marcie Tauzin, MD, New Orleans, LA; Amy Rabalais, MD, New Orleans, LA; Joseph L. Hagan, PhD, New Orleans, LA; Charles G. Wood, MD, Baton Rouge, LA; Robert L. Ferris, MD PhD, Pittsburgh, PA; Rohan R. Walvekar, MD, New Orleans, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss incidence and relevance of retropharyngeal lymph node metastasis and utility of PET-CT scanning in evaluation of retropharyngeal lymph node metastasis.

**Objectives:** Surgery or radiation to the retropharynx (RP) can affect swallowing function by generating scarring within the pharyngeal constrictors. Our objective was to study the distribution of regional lymphadenopathy and retropharyngeal lymph node status (RPLN) by pretreatment PET-CT imaging to assist in management by either surgery or radiation. **Study Design:** Retrospective chart review. **Methods:** Eighty-eight patients treated between September 2002 and March 2008, with biopsy proven squamous cell carcinoma of the oropharynx (OPSCC), were identified. Fifty-three patients meeting inclusion criteria were further analyzed. Demographic data, clinical data, and pretreatment staging PET-CT data were reviewed. The Wilcoxon-Mann-Whitney test, Fisher's Exact test, chi-square tests, and odds ratios were used for comparative statistics. **Results:** The frequency of RPLN was 20.8% (11/53). Advanced T stage was associated with a higher odds of RPLN positivity by PET-CT (OR = 5.6250, 95% CI: 1.06—29.80, p = 0.0410). There was also a significant association ( $\chi^2 = 25.9535$ , df = 10 p=0.0045) between RPLN positivity and N stage. Subjects with higher clinical N stage (i.e. N2+) showed a trend toward being more likely to demonstrate RPLN positivity (OR = 3.9773, 95% CI: 0.9628—16.4291) versus N0/1 patients. **Conclusions:** Rates of RPLN metastasis by pretreatment PET-CT imaging criteria are consistent with those reported in the literature. Advanced T and N stage are associated with a greater probability of RPLN positivity by PET-CT. Patients with early/intermediate (T1/2; N0/1) OPSCC may be spared elective RPLN dissection or radiation at the time of surgical staging or definitive treatment.

## **S64. Surgical Management of Cervical Chyloma following Parathyroidectomy**

Hien T. Tierney, MD, Boston, MA; Dunia Abdul-Aziz, MD, Boston, MA; Daniel G. Deschler, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the surgical management of a rare case of cervical chyloma following parathyroid adenoma excision.

**Objectives:** Chylomas are rare cystic formations of the thoracic duct or its tributaries which arise as an unusual complication following open neck surgery. In the few cases of cervical chyloma reported in the literature, management has varied from watchful waiting to thoracic duct ligation. This report describes the first case of postoperative cervical chyloma following parathyroidectomy and illustrates a successful surgical treatment plan for this infrequent entity. **Study Design:** Case report and review of the literature. **Methods:** N/A. **Results:** A 56 year old female underwent a left inferior parathyroidectomy for a parathyroid adenoma at an outside institution. The adenoma was located deep to the recurrent laryngeal nerve and necessitated complex dissection along the inferior paratracheal region for its removal. Postoperatively, the patient developed a cystic central neck swelling. The cyst was aspirated, revealing chylous fluid. Despite numerous efforts at decompression with needle aspiration, the chyle filled cyst recurred. On presentation to our institution, a 3 x 3 cm cystic mass was noted inferior to the previous suprasternal incision. The decision was made to pursue surgical exploration, which demonstrated a well circumscribed lesion filled with chylous fluid emanating from the previous surgical bed. The cyst was removed after its attachments were carefully ligated. Pathology was consistent with a chylous lymphocele.

Postoperatively, the patient was maintained on a medium chain triglyceride diet for one week and had no evidence of chyloma recurrence. **Conclusions:** Cervical chyloma formation is a rare complication following open neck surgery that can be successfully treated by cyst excision and ligation of any identifiable feeding lymphatic channels.

## **S65. Prognostic Implications of Survivin Expression in Squamous Cell Carcinoma of the Larynx**

Creighton C. Vaught, MD, Augusta, GA; Paul M. Weinberger, MD, Augusta, GA; Timothy P. Seybt, MD, Augusta, GA; Roni J. Bollag, MD, Augusta, GA; Lana L. Jackson, MD, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the role of and potential impact on prognosis of survivin in patients with squamous cell carcinoma of the larynx of expression in head and neck cancers.

**Objectives:** To determine the significance of survivin expression on prognosis in patients with squamous cell carcinoma of the larynx. **Study Design:** Laboratory based study of 40 patients with squamous cell carcinoma of the larynx enrolled in prospective tumor bank from 2004 to 2006. **Methods:** Demographic and prognostic information were determined through chart review. Tumor survivin levels were determined through use of immunohistochemical staining for survivin in laryngeal squamous cell tumor specimens. Serum survivin levels were determined using enzyme linked immunosorbent assay (ELISA). **Results:** Forty patients met inclusion criteria and were evaluated for survivin expression. This population was 82.5% male, 70% Caucasian, and had an average age of 60.7 years. All patients had history of tobacco abuse and 72.5% had a history of alcohol abuse. Survivin immunohistochemical staining was significantly positive in 62.5% of the tumor specimens with vast majority (86%) showing primarily cytoplasmic staining. No difference was seen in survival in patients with positive immunohistochemical staining than those without. Serum survivin levels were significantly related to increased tumor stage at presentation. There was no difference in overall survival related to survivin expression. **Conclusions:** Survivin expression in our patient population with squamous cell carcinoma of the larynx did not affect patient prognosis. Serum survivin expression, however, was significantly different in patients presenting with advanced tumor stage than those with early tumor stage. Survivin expression may play a key role in future screening and treatment of squamous cell carcinomas of the head and neck.

## **S66. Excision of Laryngocele via Transcervical Midline Approach**

Gennadiy Vengerovich, MD, Brooklyn, NY; Edward D. McCoul, MD, Brooklyn, NY; David H. Burstein, MD, Brooklyn, NY; Francisca B. Yao, MD, Brooklyn, NY; Jessica W. Lim, MD, Brooklyn, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the presentation and differential diagnosis of adult laryngocele and discuss options for surgical management.

**Objectives:** 1) Illustrate the pathogenesis of benign laryngeal anomalies in an adult; 2) present an unusual case of a non-malignant cyst with intra- and extralaryngeal components; and 3) describe an alternative approach for surgical management. **Study Design:** Case report with literature review. **Methods:** Case report of a laryngocele in an elderly man presenting with acute airway obstruction. **Results:** The patient initially presented for evaluation of dysphagia and weight loss of 2 months duration. Physical examination revealed an anterior infrahyoid neck mass. FOE revealed a submucosal mass involving left aryepiglottic fold and lateral epiglottis with partial glottic obstruction. CT scan demonstrated a large cystic structure in the preepiglottic space with extension superficially through the thyroid notch. Awake tracheotomy was performed and transcervical needle decompression was attempted with removal of frank purulent material. The diagnosis of laryngopyocele was made and the patient underwent a course of broad spectrum antibiotics with subsequent resolution of infection. Eight weeks later the patient underwent elective excision of the laryngeal cyst via midline transcervical approach. Intraoperatively, significant attachments in the preepiglottic and left paraglottic spaces were noted, resection of thyroid cartilage was not required, and laryngeal mucosa remained intact. Pathological examination was consistent with combined laryngocele with histiocytic reaction without evidence of malignancy. The patient subsequently underwent decannulation and has remained asymptomatic. **Conclusions:** Following airway stabilization, transcervical midline approach for complete excision of laryngocele presenting with acute airway obstruction appears to be a safe and effective procedure, which avoids potential complications of lateral cervical approach.

## **S67. Functional Outcomes of Fibula and Osteocutaneous Forearm Free Flap Reconstruction for Segmental Mandibular Defects**

Frank W. Virgin, MD, Birmingham, AL; Tim A. Iseli, MBBS, Birmingham, AL; Claire E. Iseli, MBBS, Melbourne, VIC Australia; William R. Carroll, MD, Birmingham, AL; Jeffery S. Magnuson, MD\*, Birmingham, AL; Eben L. Rosenthal, MD\*, Birmingham, AL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the indications for mandible reconstruction, options for reconstruction, functional outcomes as related to fibula versus osteocutaneous forearm reconstruction, and complications related to reconstruction.

**Objectives:** The fibula free flap and osteocutaneous radial forearm free flap are frequently used to repair segmental mandibular defects. The purpose of this study is to compare functional outcomes and morbidity between the two methods. **Study Design:** Retrospective review. **Methods:** There were 168 patients requiring free flap reconstruction of segmental mandibular defects between January 2001 and December 2008. Mean followup was 31.0 months for fibula free flap (FFF) (69.5%) and 20.4 months for osteocutaneous radial forearm free flaps (OCRFFF) (30.5%), reflecting increasing use of forearms. **Results:** OCRFFF are more commonly used in older patients (mean 63.7 vs. 59 years,  $p=0.03$ ). The majority (96.2%) of reconstruction was for malignant pathology and most (79.5%) had T4 lesions. Flap failure was low in both groups (3.4% for the fibula group and 3.9% in the forearm group). Malunion was infrequent (2.0% OCRFFF, 6.0% FFF,  $p=0.26$ ). Donor site complications were higher in the FFF group 4.3% vs. 0 in the OCRFF group ( $p=0.13$ ). Despite a high rate of long term survival in this patient population (75% at 5 years for carcinoma), dental implants were rarely placed (2.3% patients) and were more common in forearm (5.8%) compared to fibula (1.0%) free flaps. Functional outcomes demonstrated no significant difference between groups with respect to oral diet (FFF 72.6% vs. OCRFFF 79.1%,  $p=0.49$ ) or retained enterogastric feeding tube (20.9% OCRFFF vs. 27.4% FFF,  $p=0.49$ ). **Conclusions:** Osteocutaneous radial forearm flaps provide comparable functional outcomes with less morbidity compared to fibular free flaps for selected segmental mandibulectomy defects. The overall dental implantation rate was low and more commonly performed in osteocutaneous radial forearm flaps compared to fibula flaps.

## S68. Thyroid Hemiogenesis with Multinodular Goiter: A Case Presentation and Review of Literature

Yi-Hsuan Emmy Wu, MD, Boston, MA; Richard O. Wein, MD FACS, Boston, MA; Barbara L. Carter, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the disorders seen with normal thyroid development that may present within a hemithyroid remnant.

**Objectives:** To present a rare case of absent left thyroid lobe with multinodular goiter in the remaining right lobe and discuss and review the literature on thyroid hemiogenesis. **Study Design:** Case report and literature review. **Methods:** 1) Retrospective review of a case record of a patient; and 2) Medline search for medical literature pertinent to thyroid hemiogenesis. **Results:** A 48 year old asymptomatic female with no history of prior thyroid surgery presented for evaluation of an enlarged right thyroid lobe that was found on a CT scan of the chest, which was obtained after she sustained a motor vehicle accident. Her past medical history is significant for asthma and an esophageal leiomyoma that was removed via a left thoracotomy. Ultrasound demonstrated left thyroid hemiogenesis with 2 small hypodensities within the remaining right lobe. Laboratory values revealed a mildly decreased TSH (0.23 ng/dl; normal 0.35-5.50 ng/dl). Total T3, total T4, free T3, and free T4 were within normal limits. In a review of literature on thyroid hemiogenesis, hyperthyroidism was the most commonly found associated pathology in the remaining thyroid lobe. Multinodular goiter, adenoma, chronic thyroiditis, and papillary thyroid carcinoma have also been described in case reports. Compensatory hypertrophy occurs in most thyroid remnants. **Conclusions:** Thyroid hemiogenesis is an uncommon presentation that is frequently asymptomatic and detected incidentally when imaging for another condition demonstrates the lack of one thyroid lobe in a patient without a history of prior thyroid lobectomy.

## S69. Serum PTH and Ionized Calcium Levels as Predictors of Symptomatic Hypocalcemia after Parathyroidectomy

Kashif A. Zuberi, MBBCh, Marshfield, WI; Andrew C. Urquhart, MD, Marshfield, WI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate no appreciable correlation between perioperative PTH levels and ionized calcium levels as markers for symptomatic hypocalcemia after discharge from hospital. Participants should be able to explain and discuss limitations of this study and possible confounders and hypothesize possible other etiologies behind the occurrence of symptomatic hypocalcemia in certain patient

populations. Participants will compare the results of this current study with that of other studies examining similar variables in this postoperative complication that could be potentially life threatening if not treated urgently.

**Objectives:** To evaluate whether perioperative PTH levels or ionized calcium levels are associated with symptomatic hypocalcemia in patients undergoing parathyroidectomy, for primary hyperparathyroidism. **Study Design:** Prospective noncontrolled study of a cohort of 100 patients undergoing parathyroidectomy at a single tertiary care medical center. **Methods:** Prospectively collected data from January 2002 to April 2008 on 100 unique patients undergoing parathyroidectomy for primary hyperparathyroidism were evaluated for age, sex, preoperative and intraoperative PTH levels, and preoperative and postoperative ionized calcium levels, extent of operation, final pathology, tissue weight and postoperative symptomatic hypocalcemia. Comparisons of those with and without symptomatic hypocalcemia were made with Fisher's exact test for binary characteristics and with the Wilcoxon test for continuous characteristics. Results were deemed statistically significant at the 5% level ( $p < 0.05$ ) with no correction for multiple comparisons. **Results:** Twelve patients (12%) developed symptomatic hypocalcemia in the postoperative period. Neither initial levels nor subsequent changes in PTH or ionized calcium were found to be associated with symptomatic postoperative hypocalcemia. Patients developing hypocalcemia tended to be older ( $p = 0.057$ ) and showed a significantly higher percentage when multiple glands were removed ( $p = 0.026$ ). **Conclusions:** Initial levels or subsequent changes in PTH or ionized calcium were not found to be associated with symptomatic hypocalcemia. The removal of more than one gland did correlate with symptomatic postoperative hypocalcemia.

## **Laryngology-Bronchoesophagology**

### **S70. Tracheocele: An Unusual Cause of Dysphonia**

Jeremiah A. Alt, MD PhD, Gainesville, FL; Neil N. Chheda, MD, Gainesville, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe and explain the clinical presentation and management of tracheoceles.

**Objectives:** Describe the clinical presentation and management of tracheoceles. **Study Design:** Retrospective case review. **Methods:** Review the medical records and radiographic imaging in a patient who presented with dysphonia and benign thyroid nodules. Compare the presentation and treatment to the literature pertaining to tracheoceles in regards to clinical presentation and treatment. **Results:** Patient presented with progressive dysphonia and history of benign thyroid nodules. Flexible laryngoscopy revealed a paretic right true vocal cord. Computed tomography revealed a right sided air filled sac in the tracheoesophageal groove suspicious for causing compression of the right recurrent laryngeal nerve. The patient underwent an elective right hemithyroidectomy and resection of the air filled sac with injection of voice gel in the right true vocal cord. Postoperative pathology was consistent with a tracheocele. Patient's postop flexible laryngoscopy demonstrated a small increase in right cord function. **Conclusions:** Tracheoceles are a rare entity first described in 1846 by Rokitansky with only a handful of case reports in the literature describing the surgical management and treatment of this disease. Herein we report a patient who presented with dysphonia from a tracheocele in the right tracheoesophageal groove who subsequently underwent surgical resection ultimately improving vocal cord function.

### **S71. Vocal Fold Polyp Resulting from Calcium Hydroxylapatite Injection**

Davin Chark, MD MS, Irvine, CA; Jonathan W. Boyd, MD, Irvine, CA (Presenter); Roger L. Crumley, MD MBA\*, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify the potential for polyp formation secondary to calcium hydroxylapatite injection.

**Objectives:** Calcium hydroxylapatite has been used as a semipermanent injectable filler for vocal cord insufficiency. Local reactions to this filler are rare and have only been reported as granulation reactions. In this case, calcium hydroxylapatite formed a noninflammatory polyp, exacerbating dysphonia. **Study Design:** Case report. **Methods:** Single patient case report of polyp resulting from calcium hydroxylapatite injection laryngoplasty for iatrogenic vocal cord paralysis secondary to thyroidectomy. Patient was evaluated by videostroboscopy and intraoperative laryngoscopy with subsequent polyp excision with carbon dioxide laser. **Results:** Intraoperative findings demonstrated frank extrusion of injectable material from the vocal polyp. Histological evaluation confirmed hydroxylapatite within the polyp without evidence of granulation. Control was based on a microscopic evaluation of a commercial calcium hydroxylapatite based injectable.

**Conclusions:** Calcium hydroxylapatite used for vocal cord insufficiency may lead to polyp formation, without inflammatory reaction.

## **S72. Aquaporins in the Human Larynx**

Michael A. Goodier, MD MPH, Jackson, MS; Aimee P. Goodier, MD, Jackson, MS; Alexandra S. Brown, MD, Jackson, MS; John M. Schweinfurth, MD\*, Jackson, MS

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the disparity in the presence and location of aquaporins -1, -2, and -3 in the fetal and adult larynx as well as to understand the hypothesis behind why such a disparity exists.

**Objectives:** The objective of this study is to analyze the presence and location of aquaporins -1, -2, and -3 in the fetal and adult larynx using immunohistochemistry. **Study Design:** Immunohistochemical analysis of fetal and adult true vocal fold specimens. **Methods:** The true vocal cords from 10 fetal and 10 adult intact cadaveric larynges were harvested. Immunohistochemical staining was then performed on paraffin-embedded specimens fixed in 10% neutral, buffered formalin. Three sections for immunohistochemical analysis (1 for each antibody) were obtained per specimen for a total of 60 slides. Rat kidney was used as a positive control and human lymph node (nonepithelial tissue) was used as the negative control. The presence and location of aquaporins -1, -2 and -3 in the fetal specimens were determined by a pathologist and compared to the adult specimens. **Results:** Immunohistochemical analysis revealed a homogenous distribution of aquaporin -2 in the adult lamina propria with a significantly higher concentration in the superficial layer. No evidence of aquaporin -2 was identified in the fetal lamina propria. Aquaporin -1 and -3 were not identified in either the adult or fetal lamina propria. **Conclusions:** The potentially deleterious effects of use related water translocation predicates a conservative distribution of aquaporins in the infant larynx compared to the adult. To our knowledge, this is the first study to investigate and identify the presence of aquaporins in the human larynx.

## **S73. Quality of Life and Self-Image in Patients Undergoing Tracheostomy**

Nazish K. Hashmi, MD, Philadelphia, PA; Heather Nardone, MD, Philadelphia, PA; Evan Ransom, MD, Philadelphia, PA; Natasha Mirza, MD\*, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand that patients with benign laryngotracheal pathologies requiring a tracheostomy experience an improvement in their physical health.

**Objectives:** The objective of this study is to understand trends in the quality of life and self-image in patients undergoing an elective tracheostomy for nonmalignant laryngotracheal pathologies. We will also discuss the relationship between quality of life and patient demographics. **Study Design:** A prospective, IRB approved cohort study was conducted in a tertiary referral center. The SF-12 was used to assess the mental and physical health of patients. The 12 questions on this tool were scored to generate a physical composite score (PCS) and a mental composite score (MCS). A higher score indicates better health. **Methods:** Patients were recruited for 12 months. The questionnaire was administered one to seven days preoperatively and one to three weeks postoperatively. Other variables included age, gender, marital status, education, occupation and other comorbidities. **Results:** Preliminary results of data analysis from 7 patient surveys are presented. Our patient population included two males and five females. There is an increase in mean PCS after the tracheostomy ( $38.2 \pm 6.9$  vs  $35.4 \pm 11.5$ ), indicating improvement in physical health. However, there is a decrease in mental health ( $55.4 \pm 7.3$  vs  $49 \pm 8.5$ ). These differences are trending towards significance. There is no correlation of the physical and mental scores with existing comorbidities. **Conclusions:** Tracheostomy is a beneficial intervention for patients with benign airway pathologies, since they experience an improvement in their physical health and the ability to perform activities of daily living. There is a decline in mental health, which we attribute to worsening self-esteem. We recommend perioperative psychological assessment to improve mental health in patients undergoing elective tracheostomies.

## **S74. Nasopharyngeal Amyloidosis**

Kian Karimi, MD, Gainesville, FL; Neil N. Chheda, MD, Gainesville, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to review the clinical findings, histopathology, and management of nasopharyngeal amyloidosis.

**Objectives:** To review the clinical findings, histopathology, and management of nasopharyngeal amyloidosis. **Study Design:** Case report and review of literature. **Methods:** A 56 year old male presented with a several week history of persistent right sided otalgia. His social history was significant for alcohol abuse. Physical examination of the oral cavity, oropharynx, hypopharynx, and larynx demonstrated no focal abnormalities, and the otologic examination was normal. Fiberoptic nasopharyngeal endoscopic examination revealed the presence of a right sided nasopharyngeal lesion immediately adjacent to the medial aspect of the torus tubarius. An endoscopically guided biopsy was performed. **Results:** Histological assessment demonstrated dense aggregates of amorphous eosinophilic deposits. When these deposits were evaluated with a polarizing lens after Congo red staining, the deposits demonstrated apple-green birefringence, which is most characteristic of amyloid. **Conclusions:** Nasopharyngeal amyloidosis is a rare disease process that should be considered in the differential diagnosis of nasopharyngeal masses.

## S75. Utility of the Tracheotomy Punch for Urgent Tracheotomy

Ryan M. Mitchell, PhD, Hershey, PA; David W. Eisele, MD\*, San Francisco, CA; David Goldenberg, MD, Hershey, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the indications for and be aware of new available techniques for an urgent awake tracheotomy.

**Objectives:** To describe the use of a tracheotomy punch in the urgent setting to ensure rapid airway access. **Study Design:** Retrospective case series using a novel surgical instrument. **Methods:** We describe five illustrative cases in which the tracheotomy punch was used successfully in the urgent setting to ensure rapid airway access. **Results:** In all 5 cases patients were cannulated swiftly and successfully using the tracheotomy punch. **Conclusions:** The indications for urgent awake tracheotomy imply the necessity of fast and simple techniques which may be easily learned and performed with minimal assistance. Use of the tracheotomy punch for the performance of tracheotomy allows quick and effective tracheal opening and facilitates rapid airway access.

## S76. Voice Outcomes after Endoscopic Injection Laryngoplasty with Hyaluronic Acid Stabilized Gels

Phillip C. Song, MD, Boston, MA; Kwang C. Sung, MD, Boston, MA; Ramon A. Franco, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the safety and efficacy of using crosslinked hyaluronic acid gels for vocal fold augmentation in an office based setting.

**Objectives:** Injection medialization of the larynx for the unilateral immobile vocal cord has been used for many years with variable success. There have been two significant gains in recent years that have greatly advanced our ability to carry out injection laryngoplasty. The first is the development of distal chip camera technology that makes transnasal flexible visualization rival the view available in the operating room. This has enabled better accuracy of percutaneous injections for the larynx. The second advance is the variety of materials available for injection. There has been an explosion of different materials available for vocal cord augmentation, spurred on in large part because of the demand in the cosmetic industry. These products have better biocompatibility, producing little inflammation and scar than previous injectables. Recently, crosslinked hyaluronic acid gels have become available that demonstrate many of the characteristics of an ideal biocompatible material. Hypothesis: Transnasal flexible endoscopic injection laryngoplasty with HA improves voice outcomes. **Study Design:** Retrospective chart review. **Methods:** Chart review of 3 year enrollment of patients with unilateral vocal fold immobility treated with a crosslinked hyaluronic acid via a transcutaneous endoscopic approach under local anesthesia. Preoperative and postoperative examinations, QOL surveys (voice outcome survey and VRQL) were recorded and examined. **Results:** 37 patients were found to have undergone the procedure for unilateral vocal fold immobility. QOL and acoustical measurements demonstrated statistically significant improvement. Pre- and postoperative stroboscopic evaluation was available for 7 of the patients. There were no major complications. Minor complications included short term postoperative dysphonia, need for reinjection, and bruising at the injection site. **Conclusions:** Crosslinked hyaluronic acid gels are useful and safe materials for the short term treatment of unilateral vocal fold immobility.

## S77. Microglossia in a Newborn: A Case Report and Review of the Literature

Stanley Voigt, MD, Boston, MA; Aric K. Park, MD, Boston, MA (Presenter); Mark Vecchiotti, MD,

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the embryology and anatomy associated with congenital microglossia in a newborn. Additionally the prognosis and treatment of the condition will be discussed.

**Objectives:** To present an extremely rare case of congenital microglossia in a newborn. The embryology, anatomy, diagnosis, workup and treatment will be reviewed. **Study Design:** Retrospective case report. **Methods:** Case presentation with review of the literature. **Results:** We present a case of an ex 35 week premature male seen for microglossia in the neonatal intensive care unit. He was delivered via caesarian section secondary to fetal distress and polyhydramnios. There were no respiratory events in the postnatal period. On physical exam, the tongue was deflected posteriorly with a normal appearance to the posterior third of the tongue. The anterior two thirds of the tongue, circumvallate, and filiform papillae were not present. CT imaging demonstrated a saber tooth appearance to his trachea. Direct laryngoscopy revealed mild laryngomalacia. During an evaluation of the patient's feeding and swallow it was noted that he was unable to formulate an adequate bolus and swallow for safe feeding putting him at risk for aspiration. A gastrostomy tube was placed for enteral nutrition. No tracheostomy or intubation was required, a common finding in the small number of documented microglossia cases. **Conclusions:** Microglossia is an extremely rare congenital anomaly. Most often it presents in association with limb abnormalities and is grouped as a hypoglossia-hypodactylia syndrome. Our patient has an extremely rare constellation of signs and symptoms as he lacks any limb abnormalities. The workup, anatomy, embryology, diagnosis, and treatment will be reviewed in the management of this rare disorder.

## **S78. Does HPV Have a Presence in Diffuse High Grade Premalignant Lesions of the Larynx?**

Heather H. Waters, MD, Cleveland, OH; Rahul Seth, MD, Cleveland, OH; Michael S. Benninger, MD\*, Cleveland, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the correlation between human papilloma virus (HPV) infection and diffuse precancerous laryngeal lesions.

**Objectives:** To describe the incidence of HPV in diffuse high grade precancerous lesions affecting the larynx. **Study Design:** Retrospective chart review was performed of a single surgeon experience at an academic center. **Methods:** Patient charts were searched for those who presented between October 2008 and June 2009 with diffuse vocal fold leukoplakia. Cases of biopsy proven laryngeal lesions with high grade dysplasia or carcinoma in situ (CIS) were examined for patient characteristics and for presence of high risk type HPV detected by in situ hybridization technique. **Results:** Ten patients with precancerous laryngeal lesions were identified. The average age was 63 years, and 9 patients (90%) were male. Six patients had bilateral vocal fold lesions with CIS and 4 patients had diffuse high grade dysplasia, all lesions were negative for high risk HPV. Four (66%) patients with CIS and 2 (50%) with high grade dysplasia received a complete course of postoperative radiation therapy. Nine patients (90%) had at least one prior surgical excision, while two (20%) had been previously treated with radiation. Seven patients were either former or current smokers. Average followup time was 3.2 years from date of presentation at our institution. At current followup, no patient has demonstrated progression to invasive carcinoma. **Conclusions:** Diffuse high grade premalignant lesions of the larynx represent a unique pathology that can clinically behave unlike invasive carcinoma. We demonstrate that our preliminary assessment of this expanding patient population did not exhibit the presence of high risk HPV and lacked progression of their disease. Therefore, HPV may not play a role in nonprogressing diffuse high grade lesions of the larynx.

## **Otology**

## **S79. Benign Osteonecrosis of the Temporal Bone: Case Series and Review of the Literature**

Nishant Bhatt, MD, Augusta, GA; Brian John McKinnon, MD MBA, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should have an understanding of the pathophysiology, natural history, diagnosis and management of benign osteonecrosis (BON) of the temporal bone.

**Objectives:** To review an academic medical center's experience with benign osteonecrosis (BON) of the temporal bone, as well as to review the existing literature about this rare condition. **Study Design:** Retrospective chart review.

**Methods:** Two patients with BON were treated at our institution. These patients had no history of head and neck radiation. The initial evaluation, treatment and outcomes of these patients are outlined in this study. **Results:** Two patients were evaluated and treated for BON. Both patients presented with vague symptoms including otorrhea, itching and otalgia. One patient underwent surgical intervention which included biopsy, perichondrial grafting and reconstruction of the external auditory canal. The surgical pathology was consistent with reactive fibrosis. Resolution of symptoms and healing of the defect were noted after surgical intervention. The second patient deferred on surgical intervention and was lost to followup for a period of two years. However, on followup, the patient suffered no sequelae with good healing of the defect. **Conclusions:** BON is a rare phenomenon which has very little mention in the literature. It is a unique inflammatory reaction of an obscure cause which involves either small foci or large segments of the tympanic plate, with rare involvement of the middle ear. It exhibits nonspecific inflammatory features characteristic of reactive fibrosis. A “wait and see” approach is appropriate for asymptomatic patients following confirmation of the diagnosis, though debridement may accelerate the recovery process. Hyperbaric oxygen therapy may be indicated with middle ear involvement.

## **S80. Block Method of Human Temporal Bone Removal: A Technical Modification to Permit Rapid Temporal Bone Removal**

Matthew A. Bowen, MD, New Orleans, LA; Bridget C. Loehn, MD, New Orleans, LA; William Swartz, PhD, New Orleans, LA; Rohan R. Walvekar, MD, New Orleans, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the steps involved in performing temporal bone removal in human cadavers consented for head autopsy by the block method and also by implementing a proposed technical modification. The participants should also be able to describe the other methods used for temporal bone removal.

**Objectives:** Temporal bones are extremely important for training medical students, postgraduate students, and residents in the areas of surgical anatomy and otologic surgery. Our objectives are to describe a technical modification of the block resection method of harvesting human cadaveric temporal bones for otolaryngology resident education, contrast it to existing techniques, and provide a relevant review of the literature. **Study Design:** Human cadaveric study. **Methods:** Human cadavers previously dissected by students in a professional health student program were identified as potential candidate specimens for temporal bone removal to establish a repository of temporal bones to be used for resident education and otologic surgical training. The calvarium was removed using an oscillating saw via standard techniques. The brain was elevated and removed with sharp release of cranial nerves (including the VII and VIII nerve). A modified “block” method using a reciprocating saw was used to make four bone cuts to harvest temporal bones. All temporal bones harvested were examined for adequacy for otologic surgical training. **Results:** Temporal bones could be harvested using only four bone cuts to release both temporal bones as opposed to four bone cuts for a single temporal bone per the traditional block method. All temporal bones were found to be satisfactory for resident education and temporal bone laboratory. **Conclusions:** The modified “block” method for temporal bone resection and removal is an efficient way of harvesting temporal bones.

## **S81. Activation of Serotonergic Neurons during Salicylate Induced Tinnitus**

Kimberly K. Caperton, MD, Oklahoma City, OK; Ann M. Thompson, PhD, Oklahoma City, OK

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the different proposed mechanisms by which serotonin plays a role in central tinnitus.

**Objectives:** In gerbils in which tinnitus was induced by salicylate, neurons in the dorsal raphe nucleus were activated. Since about half the neurons in this region are serotonergic, this indicates that serotonin (5-HT) might play a role in the mechanisms of central tinnitus. The goal of this study was to determine if serotonergic neurons are activated during salicylate induced tinnitus. Further, to determine if the same neurons might modulate the cochlea during tinnitus, neuroanatomical tract tracing with 5-HT immunohistochemistry was used to determine if serotonergic neurons project to the gerbil cochlea. **Study Design:** Randomized, prospective, gerbils. **Methods:** Six gerbils were injected with salicylate (saline for controls). Four hours later, the gerbils were euthanized, perfused, and their brains collected for immunohistochemical labeling of 5-HT and c-fos. For the tract tracing, FluoroGold was injected into the cochleae of 3 gerbils. The gerbils were euthanized and perfused 4-11 days later and the brains immunohistochemically processed for 5-HT. **Results:** More serotonergic neurons expressed c-fos in the salicylate injected animals compared to controls. The increase was significant for 3 of the 8 major serotonergic cell groups including B7, B9, and the caudal linear nucleus. Despite robust labeling of olivo-

cochlear and vestibular efferents with FluoroGold, 5-HT labeled neurons containing FluoroGold were lacking. **Conclusions:** Salicylate induced tinnitus activates serotonergic neurons in rostral cell groups. Activation of these neurons is not likely to influence cochlear function directly, but is likely to influence a number of auditory and nonauditory regions known to be involved with tinnitus.

## S82. Hemorrhagic Vestibular Schwannoma Presenting with Rapid Neurologic Decline

Matthew L. Carlson, MD, Rochester, MN; Colin L. Driscoll, MD, Rochester, MN; Brian A. Neff, MD, Rochester, MN; Michael J. Link, MD, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the differential diagnosis of cerebellopontine angle lesions with intratumoral hemorrhage.

**Objectives:** Vestibular schwannomas (VS) account for approximately 8% of all intracranial neoplasms and nearly 80% of all cerebellopontine angle tumors. Hemorrhagic VSs remain a rare entity with only 14 published reports existing in the international literature. In the present case, we discuss the clinical presentation, radiographic evaluation and management of a 66 year old male with a histologically confirmed spontaneous hemorrhagic VS. **Study Design:** Case report. **Methods:** Chart review. **Results:** A 66 year old male with a history of prodromal left sided sensorineural hearing loss presented for evaluation after experiencing a rapid onset severe left sided headache, projectile vomiting and vertigo that woke him from sleep. Computed tomography (CT) and magnetic resonance imaging (MRI) revealed a left sided 2X2 cm cerebellopontine angle mass consistent with a VS. Local mass effect resulted in 4th ventricle effacement and hydrocephalus. Areas of T2 hypointensity and corresponding increased attenuation on CT confirmed an acute intratumoral hemorrhage. Hematology and coagulation laboratory studies were normal. The patient subsequently underwent a left suboccipital craniotomy with complete resection of a histologically confirmed hemorrhagic VS. **Conclusions:** Spontaneous hemorrhage into a VS is an extremely rare event. In contrast to the insidious progression typified by non-hemorrhagic VSs, those with gross intratumoral bleeding most often present with acute cranial neuropathies and symptoms of subarachnoid hemorrhage. In surgically fit patients, we advocate urgent microsurgical resection. Simple observation with serial radiography may risk repeated hemorrhage while the role of radiosurgery is not yet defined.

## S83. The Use of Micro-CT to Evaluate Cochlear Implant Electrode Position and Intracochlear Damage

Anthony F. Fama, MD, Rochester, MN; Colin L. Driscoll, MD, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the role of hearing preservation in cochlear implantation and compare traditional cochleostomy to round window insertion.

**Objectives:** Use micro-CT to evaluate cochlear implant position and insertional trauma. Compare traditional cochleostomy and round window insertion techniques. **Study Design:** Prospective laboratory study. **Methods:** Ten cadaveric human temporal bones were implanted with the Hybrid-L electrode array. Half of the insertions were done through the round window, while the other half were inserted through a traditional cochleostomy. A micro-CT scanner was then used to evaluate electrode position and intracochlear trauma. **Results:** All of the implants were inserted into the scala tympani and never broke through the basilar membrane. The round window insertions required drilling the lip of the round window to improve exposure. Micro-CT images showed the round window implants were directed toward the modiolus, while the cochleostomy implants were directed toward the lateral wall. All the round window implants were abutting the modiolus, while in the cochleostomy group only one implant briefly came into contact with the modiolus. **Conclusions:** Cochlear implants are used to restore hearing and improve functioning in people all around the world. There has been a trend to preserve as much residual hearing as possible by manipulating the electrode designs and insertion techniques. If residual hearing significantly improves patients' outcomes, long term consequences of insertion trauma will be very important. Damage caused by insertion can lead to scarring, bleeding, and degeneration of the neuronal elements. Insertion through the round window directs the implant toward the modiolus and potentially causes more trauma. A traditional cochleostomy directs the implant toward the lateral wall, causing less trauma and potentially leads to greater hearing preservation.

## S84. Processed Allograft: Novel Use in Facial Nerve Repair after Resection of a Rare Racial Nerve Paraganglioma

Stacey H. Gunn, BS, New York, NY; Maura K. Cosetti, MD, New York, NY; John T. Roland, MD\*, New

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) recognize and discuss the differential diagnosis of a) progressive facial palsy, b) otologic masses associated with the facial nerve canal; 2) identify the unique pathology and treatment challenges associated with facial nerve paragangliomas; and 3) explain the advantages and disadvantages associated with various reconstructive options for facial nerve repair, including a novel method using processed allograft.

**Objectives:** To present a rare case of facial nerve paraganglioma and novel use of a processed allograft for facial nerve reconstruction. **Study Design:** Case report and review of the literature. **Methods:** A 34 year old female presented with progressive onset right sided facial palsy for 5 months. CT and MRI demonstrated an irregular mass in the right facial nerve canal from the tympanic segment to the stylomastoid foramen. **Results:** Following transmastoid resection, the defect was repaired using processed allograft. Pathologic analysis was consistent with a paraganglioma. Facial nerve paraganglioma is a rare entity that has been reported only 10 times in the literature. **Conclusions:** Traditional methods of facial nerve reconstruction, including autologous and cadaveric grafting, can lead to significant patient morbidity. Autologous nerve grafts are the “gold standard” for superior regenerative capability, but are limited by the length and potential neuroma formation at the donor site. Allogenic grafts from donors or cadavers have shown some efficacy, but can require immunosuppression. The Avance nerve graft is a cadaveric graft, processed and decellularized to maintain an extracellular matrix with laminin and intact endoneural tubes, thus providing support for the growing axon without generating an immune response. Initial studies of the Avance graft in animals and humans have examined repair of peripheral nerves, but this is the first reported case of human facial nerve reconstruction.

## **S85. Errors in the Diagnosis and Management of Necrotizing Otitis Externa**

Laura M. Jacobsen, BS, Gainesville, FL; Patrick J. Antonelli, MD\*, Gainesville, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the optimal approach to the diagnosis and treatment of necrotizing otitis externa.

**Objectives:** Necrotizing otitis externa (NOE) is a life threatening condition that may be difficult to distinguish from other clinical entities. Diagnostic and treatment errors may lead to significant patient morbidity. The purpose of this study is to assess the effectiveness and pitfalls associated with contemporary diagnosis and management of NOE. **Study Design:** Retrospective chart review. **Methods:** Patients given the diagnosis of NOE or one of its typical presenting complaints over the past 14 years were identified by diagnostic and radiology codes. Charts were reviewed for comorbidities, prior ear conditions, symptoms, examination findings, laboratory and radiologic evaluation, treatment, and outcomes. **Results:** Forty-six of 52 patients with NOE had a known risk factor. A positive gallium SPECT study was an accurate marker for the presence (44 of 47 patients) and resolution of disease. Prolonged systemic antimicrobial therapy (mean 15 weeks, range 4-59) was required. Microbial cultures influenced therapy in only 50%. Two patients with brittle diabetes died with disease. Delay in NOE diagnosis by otolaryngologists (54% of referrals) occurred in 57% of cases and was due to clinical presentations or nonspecific radiographic findings suggestive of chronic suppurative otitis media, acute otitis externa, or mastoiditis. **Conclusions:** NOE remains a life threatening condition that may present similar to other conditions. Prolonged antimicrobial therapy is often necessary. A high degree of suspicion must be maintained in all at-risk patients and those that fail to improve with more conservative measures. Radiographic imaging, particularly gallium SPECT, must be used in conjunction with clinical judgment to ensure optimal care.

## **S86. Neuromonics Tinnitus Treatment: Preliminary Experience in a Private Practice Setting**

David W. Jang, MD, New York, NY; Erika Johnson, AuD, New York, NY; Sujana S. Chandrasekhar, MD\*, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify the principles behind the Neuromonics Tinnitus Treatment (NTT) and understand its strengths and potential shortfalls.

**Objectives:** To describe the preliminary experience and efficacy of the NTT in an independent, non-industry sponsored private otology practice. **Study Design:** Retrospective chart review and post-intervention questionnaire. **Methods:** Twenty-six patients seeking treatment for tinnitus in a private otology practice met the published treatment criteria and were

offered the Neuromonics Tinnitus Treatment. Eleven patients had completed the six month program at the time of the study. Tinnitus Reaction Questionnaire (TRQ) scores, and awareness and disturbance scores, were obtained pre- and post-treatment. A post-treatment questionnaire based on the Glasgow Benefit Inventory (GBI) was conducted over the telephone. **Results:** Eight of the eleven patients completing therapy were considered "highly suitable". TRQ scores were universally improved (ranging from a 3 to 78% decrease in the TRQ score). However, only two of the seven (29%) had achieved a decrease in the TRQ score by 40% or more. Seven of ten patients (70%), and four of ten (40%) patients reported a reduction in the percentage of the time they were aware of and disturbed by their tinnitus, respectively. Eight of ten patients (80%) exhibited positive scores on the GBI (mean 17.39, median 7.81, range -3.1 to 67.6). When asked whether they thought the device was worth the cost, responses were divided equally between positive and negative responses. **Conclusions:** NTT appears to be a practical and promising treatment for tinnitus. Proper patient selection criteria remain to be established with further studies. Cost may be a factor influencing patient satisfaction.

## **S87. CO2 Laser Assisted Posterior Semicircular Canal Ablation for Benign Paroxysmal Positional Vertigo** Glenn W. Knox, MD JD\*, Jacksonville, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) discuss the diagnosis of BPPV; 2) compare medical treatments such as the Epley maneuver and surgery; 3) discuss indications for surgical treatment; and 4) explain CO2 laser assisted posterior semicircular canal ablation.

**Objectives:** The objective of this study was to analyze a new technique, CO2 laser assisted posterior semicircular canal ablation (LAPSCCA), in the treatment of refractory benign paroxysmal positional vertigo. **Study Design:** Prospective study of patients with disabling BPPV who failed conservative therapy. **Methods:** Patients noted to have been treated with at least three Epley maneuvers without success and continuing to have disabling symptoms were enrolled in the study. Patients underwent pre- and postoperative electronystagmography. The surgical technique is modified from Parnes and involves plugging each end of the fenestrated canal with bone grafts and fibrin glue. The CO2 fiberoptic (Omniguide) laser is then used at a setting of 2 watts to incise between the cut ends of the canal to completely section the membranous labyrinth. **Results:** All six patients had excellent relief of positional vertigo symptoms. **Conclusions:** LAPSCCA is an excellent treatment option for patients with intractable BPPV.

## **S88. Hurricane Katrina and Its Effects on a Regional Cochlear Implant Program** Michael D. Lupa, MD, New Orleans, LA; Timothy B. Molony, MD, New Orleans, LA; Ronald G. Amedee, MD\*, New Orleans, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to see how the patient displacement, economic disturbance and damage to the healthcare system, caused by Hurricane Katrina, impacted a major cochlear implantation program.

**Objectives:** The purpose of this study was to analyze the effects Hurricane Katrina had on the demographics and outcomes of patients receiving cochlear implantation at our institution. **Study Design:** This was a retrospective review of 179 patients (190 ears) receiving cochlear implantation from January 2003 to December 2007. Data was divided by Hurricane Katrina (August 29, 2005), into pre- or post-K. Patient age, payment modality, pre- and postoperative PTA, and presence of complications were reviewed. **Methods:** Paper records and outcome database were reviewed. Statistical analysis was performed utilizing Chi-square and t-tests. **Results:** The number of implants performed pre-K was 68 (2.1 per month), post-K the number increased to 122 (4.3 per month). The percentage of implants performed in children below age 18 was 50% pre-K and 51% post-K. The percentage of patients paying primarily with public funds (Medicare, Medicaid) was 41.2% pre-K and increased to 55.7% post-K ( $p=0.067$ ). Average postoperative pure tone averages were 24.3 ( $\pm 11.05$ ) dB pre-K and 23.7 ( $\pm 11.93$ ) dB post-K ( $p=0.7272$ ). Finally the number of complications encountered pre-K was 10 (2 major and 8 minor). Post-K the total number of complications encountered was 9 (3 major and 6 minor). **Conclusions:** Despite the damage and displacement Hurricane Katrina caused we saw an increase in the number of patients receiving implants. Our patient population's payment means following Katrina trended toward a greater percentage utilizing public funds. We saw no change in our hearing outcomes as evidenced by PTA. Finally, we saw a relative decrease in complications following surgery after Hurricane Katrina.

## S89. Effect of Low Dose Gabapentin Tinnitus Patients Less than Two Months Duration

Bulent Mamikoglu, MD, Peru, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to use of gabapentin for tinnitus patients.

**Objectives:** Subjective tinnitus is a human perception caused by activation of pathways in central nervous system. Subjective tinnitus without presence of change in hearing is challenging problem. If subjective tinnitus is only a perception, it may have a learning curve. Patient might actually memorizing and learning to hear these sounds. Therefore may be early usage of medications which affects patients' decrease their alerts level may prevent this learning process to complete by disabling the memory. **Study Design:** Retrospective, none placebo controlled, chart review. **Methods:** Personal histories were used to categorize tinnitus either subchronic (3 to 10 weeks) or chronic (between 3 to 12 months). Participants were restricted to those with moderate to severe tinnitus. All participants received gabapentin in a graduated ascending-descending dose series extending over 4 weeks (peak dose of 600 mg/d). Effect of gabapentin doses on the loudness and intrusiveness of tinnitus in two populations of adults is compared. **Results:** Twelve patients identified whose pre- and post-gabapentin tinnitus evaluations and hearing tests available. Chronic group: patients in this group did not report improvement in their tinnitus. The total scores of the severity of the tinnitus have not changed and individual comparison of pre- and post-treatment scores did not show statistical improvement ( $p>0.05$ ). Subchronic group: patients in this group report improvement in their tinnitus. The total scores of the severity of the tinnitus improved ( $p<0.05$ ). **Conclusions:** Low dose gabapentin tinnitus is helpful for improving patient's discomfort if the symptoms started less than two months.

## S90. Postauricular Incision for BAHA

Bulent Mamikoglu, MD, Peru, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to perform BAHA procedure faster with minimal complication rates.

**Objectives:** Linear for BAHA received a wide acceptance. This paper presents a modification of linear surgery technique to separate skin incision site from abutment to decrease complication rate and increase the efficacy from BAHA. **Study Design:** A retrograde analysis of solo practitioner at private office/hospital settings. **Methods:** All patients operated with modification of linear incision. Incision is place 1-2 cm behind postauricular line; a thin (2-3 mm in thickness) and 2.5 to 3 cm in diameter skin flap elevated. Soft tissues which includes attachments of upper and lower of sternocleidomastoid, splenius and temporal muscles are removed to achieve 5x5 cm bony square. Incision patients are allowed to use their devices 3 months after surgery. **Results:** 13 patients operated with this technique. Average followup is 10 months. No major complication occurred but one patient developed skin necrosis and required to wait additional 2 months before start using abutment. **Conclusions:** This method separates skin incision from abutment which improved healing and cosmetic appearance after surgery. It is easier compared other methods and surgery time decreased.

## S91. ~~Withdrawn~~--Localized Osteoradionecrosis of the External Auditory Canal and Temporal Bone

Sam J. Marzo, MD, Maywood, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to diagnose ORN of the temporal bone, explain the pathophysiology of the disease, and describe current management of this disease.

**Objectives:** The objectives of this presentation are to describe a cohort of patients with localized osteoradionecrosis of the temporal bone, the presentation of the disorder, symptoms, pathophysiology, hearing results and current treatment options. **Study Design:** Retrospective. **Methods:** A retrospective analysis of patients seen in a tertiary referral otological practice was performed from July 1999 to July 2009. Patients with a history of malignancy of the head and neck as well as radiotherapy and no prior history of otological disease were selected. **Results:** Four patients were identified. The average age was 75.25 years. Each patient was managed with frequent office debridements and topical treatment with gentian violet. No patients were able to wear hearing aids in the affected ears. **Conclusions:** Localized osteoradionecrosis is an uncommon complication of radiotherapy. However, the disease can result in significant morbidity and requires lifelong followup and frequent office debridements.

## S92. Bezold's Abscess in the Setting of Radiation Induced Mastoiditis

Christopher Apostol Mascarinas, MD, Brooklyn, NY; Michael C. Singer, MD, Brooklyn, NY; Matthew B. Hanson, MD, Brooklyn, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss a rare complication of radiation therapy in a patient treated for palate carcinoma.

**Objectives:** To describe a rare complication of radiation therapy in a patient treated for palate carcinoma. **Study Design:** Case report and literature review. **Methods:** Case report and literature review. **Results:** A 77 year old woman received concurrent chemotherapy and radiation for a T4aN2aM0, stage IVa, palate squamous cell carcinoma. The patient had been treated thirteen years earlier with a partial palatotomy and a supraomohyoid neck dissection for a prior palate carcinoma. Subsequent to the radiation treatment the patient developed osteoradionecrosis of her mandible, which was managed with hyperbaric oxygen therapy. The patient then presented complaining of left sided otalgia, facial and jaw pain, swelling of the left side of the neck and fevers for several days. A computer tomography scan revealed coalescent mastoiditis and an abscess within the superior aspect of the sternocleidomastoid muscle - consistent with the diagnosis of a Bezold's abscess. The patient underwent an incision and drainage of the abscess. During the procedure sequestrum was removed from the mastoid tip. The patient responded well to antibiotics and local wound care. **Conclusions:** Bezold's abscess is a rarely seen suppurative complication of mastoiditis of mastoid tip. This is the first report of a Bezold's abscess developing in the setting of radiation induced mastoiditis.

## S93. HENRY WILLIAMS RESIDENT RESEARCH AWARD (Middle Section) In vivo Assessment of Migration and Engraftment of Stem Cells in the Cochlea Using a High Resolution Microscopic Endoscope

Akihiro J. Matsuoka, MD PhD, Indianapolis, IN; Michael H. Fritsch, MD\*, Indianapolis, IN; Karl R. Koehler, BS, Indianapolis, IN; Eri Hashino, PhD, Indianapolis, IN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss migratory capability of transplanted mesenchymal stem cells as well as embryonic stem cells in the cochlea.

**Objectives:** Monitoring transplanted stem cell delivery is of the utmost importance for developing translational strategies. Success of cell based therapy depends upon the ability of stem cells to repair damaged tissues, but also fundamentally relies on the proper migration of transplanted stem cells to damaged areas in the cochlea. The goal of this study was to document and compare the migratory pathway of embryonic stem cells (ESCs) and mesenchymal stem cells (MSCs) to areas of degenerated spiral ganglion neurons in the cochlea. A high resolution microscopic endoscope was used to examine real time movements of stem cells that had been transplanted into the modiolus of deafened Mongolian gerbils. **Study Design:** Four Mongolian gerbils were used as recipient animals. **Methods:** The animals were deafened by ouabain. After four weeks of recovery, the animals received an intra-modiolar transplantation of green fluorescent positive (GFP-positive) MSCs and ESCs. Both MSCs and ESCs were subjected to partial differentiation prior to transplantation. Three days after the transplantation, the localization of GFP-positive stem cells was evaluated using a high resolution microscopic endoscope (Karl-Storz, model 7215AA). After imaging, the temporal bone of the animals was fixed and processed for immunofluorescence. **Results:** Our preliminary data revealed clusters of GFP-positive MSCs and ESCs in the vicinity of the spiral ganglion in the first cochlear turn at 3 days post-transplantation. **Conclusions:** Further development of the endoscopic system in the surgical procedures may lead to an establishment of a novel cell imaging system that will allow minimally invasive, in vivo monitoring of stem cell migration in the human cochlea.

## S94. The Evolution of Mastoidectomy and Tympanoplasty

Aaron C. Moberly, MD, Indianapolis, IN; Michael H. Fritsch, MD FACS\*, Indianapolis, IN

**Educational Objective:** At the conclusion of this presentation, the participants should have an understanding and appreciation of the evolution of surgical thought and technique in mastoidectomy and tympanoplasty.

**Objectives:** A detailed study of the evolution of mastoidectomy and tympanoplasty provides a fascinating review of the fundamental procedures of surgical otology. The objective of this study was to review the historical development of mastoidectomy and tympanoplasty. **Study Design:** Comprehensive literature review of early sources documenting the devel-

opment of mastoidectomy and tympanoplasty. **Methods:** A review of the chronological development of mastoidectomy and tympanoplasty was performed with a focus on the evolution of surgical thought, technique, and instrumentation. **Results:** The history of mastoidectomy and tympanoplasty is tumultuous and enlightening, from primitive mastoid trephination for acute infections through the development of today's sophisticated instruments and techniques for chronic disease eradication and hearing reconstruction. **Conclusions:** Understanding the evolution of the surgical techniques of mastoidectomy and tympanoplasty provides a basis for understanding surgical otology. Current otologists in training take for granted the techniques and technology they use on a daily basis and can benefit from a review of this history.

## **S95. Management and Outcomes of Facial Paralysis from Intratemporal Trauma: A Systematic Review**

John J. Nash, MD, Milwaukee, WI; John S. Rhee, MD MPH\*, Milwaukee, WI; Keren J. Boorsma, BS, Milwaukee, WI; David R. Friedland, MD PhD\*, Milwaukee, WI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss and provide evidence based recommendations regarding the management of traumatic, nonpenetrating facial paralysis.

**Objectives:** To develop an evidence based treatment algorithm for facial paralysis resulting from intratemporal trauma. **Study Design:** Systematic review of the literature. **Methods:** A comprehensive literature review identified twenty-eight articles meeting our inclusion criteria. In total, 613 cases of traumatic, intratemporal, nonpenetrating facial weakness in 607 patients (six with bilateral injuries) were analyzed. Correlations were made among variables including severity of paralysis, time of onset of paralysis, surgical or nonsurgical management, and final facial nerve function. **Results:** The majority of cases presented as complete (78%) and immediate (70%) facial paralysis. For all presentations, 189 cases were observed, with 66% achieving an outcome equivalent to House-Brackmann (HB) I, 25% achieving HB II-V, and two patients a HB VI score. Among 83 patients treated with steroids, 67% achieved HB I, 30% HB II-V, and no patients with HB VI. Surgery was performed in 87% of those with immediate and 67% of those with complete paralysis. In 337 patients treated surgically, only 23% achieved HB I postoperatively, 58% were graded as HB II-V, and 9% with HB grade VI postoperatively. A combined surgical approach was most often performed (42%). No patient presenting with partial paralysis had a HB VI outcome. **Conclusions:** Immediate and complete facial paralysis carries the worst prognosis. Observed cases of immediate and complete paralysis demonstrate the most favorable outcomes. The natural history of delayed and partial paralysis is quite favorable and surgery appears to offer little benefit. This manuscript offers an algorithm for management of traumatic, intratemporal facial paralysis.

## **S96. Exostoses and Osteomas of the Internal Auditory Canal: Case Series and Review of the Literature**

Linda T. Nguyen, BS, La Jolla, CA; Joni K. Doherty, MD PhD, La Jolla, CA; Jeffrey P. Harris, MD PhD\*, La Jolla, CA; Mahmood F. Mafee, MD, La Jolla, CA; Quyen T. Nguyen, MD PhD, La Jolla, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to distinguish between these rare lesions of the internal auditory canal (IAC) based upon imaging and histology (when available).

**Objectives:** 1) Describe time course of symptom resolution after surgical management of IAC exostosis; 2) define radiologic and histologic criteria to differentiate exostoses from osteomas of the IAC. **Study Design:** Case series and literature review. **Methods:** Three patients with IAC bony growths were studied. Clinical history, audiometric and vestibular tests, and imaging studies were reviewed. **Results:** Patient 1 presented with disabling vertigo and was found to have bilateral exostoses with nerve impingement on the right. Following exostosis removal via retrosigmoid craniotomy, the patient had complete resolution of her symptoms. However, this occurred over a protracted time course of one year. Patient 2 presented with bilateral pulsatile tinnitus and occasional vertigo and was found to have bilateral IAC exostoses. Patient 3 had unilateral IAC exostosis and presented with hearing loss and tinnitus. Due to the mild nature of their symptoms, these patients were managed nonsurgically. We also describe radiologic and histologic criteria to differentiate exostoses from osteomas of the IAC. **Conclusions:** In our patient with severe vertigo due to IAC exostoses, surgical removal resulted in complete symptom resolution, although over a protracted time course. We found that IAC osteomas can be differentiated from exostoses by the presence of bone marrow (radiographically) or the presence of fibrovascular channels (histologically).

## **S97. Middle Ear Endoscopy and Transtympanic Drug Delivery Using an Interventional Sialendoscope: A Feasibility Study in Human Cadaveric Temporal Bones**

Geoffrey Peters, MD, New Orleans, LA; Rohan R. Walvekar, MD, New Orleans, LA (Presenter); James Lin, MD, New Orleans, LA; Moises A. Arriaga, MD\*, New Orleans, LA; Daniel W. Nuss, MD, New Orleans, LA; Barry Schaitkin, MD, Pittsburgh, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss current concepts and available technology on intratympanic injections. The participants will also be able to understand and compare the capabilities of the interventional sialendoscope to current endoscopes available for middle ear endoscopy.

**Objectives:** The aim of our study was to assess feasibility of using a 1.3mm semi-rigid interventional salivary endoscope for middle ear endoscope and as a route transtympanic delivery of medication in human cadaveric temporal bones. **Study Design:** Human cadaveric study. **Methods:** Five temporal bones harvested from human cadavers were examined. 1.3 mm interventional sialendoscope was used to make endoscopy assisted myringotomy incisions in the posteroinferior quadrant (N=5) and anteroinferior quadrant (N=3). **Results:** Middle ear examination was successful in all specimens (N= 5). Access to the round window niche (RWN) and adequate visualization of the round window (RW) was obtained in all five temporal bones (100%). A guidewire could be navigated to the RWN without difficulty. Other structures identified in all specimens included the incudostapedial joint, stapedius tendon, pyramidal eminence, and facial nerve via an extended myringotomy incision. The anterior middle ear space was also successfully examined through an endoscopic guided anterior myringotomy. The opening to the ET was visualized and could be cannulated with a guidewire in all patients where it was attempted (N=3). **Conclusions:** The 1.3 mm interventional sialendoscope allowed adequate visualization of the ET, middle ear space, and the RWN with interventional capabilities in a cadaveric model. Our result validates the feasibility of its use for transtympanic drug delivery.

## S98.

### Systemic Side Effects of Transtympanic Steroids

Ashley B. Robey, MD, Omaha, NE; Trish E. Morrow, AuD, Omaha, NE; Gary F. Moore, MD\*, Omaha, NE

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify systemic side effects of steroid use and recognize the potential for systemic steroid side effects for patients undergoing transtympanic, round window niche administration of dexamethasone.

**Objectives:** 1) Report first cases of systemic side effects from transtympanic steroids; and 2) recognize the potential for systemic steroid side effects for patients undergoing transtympanic, round window niche administration of dexamethasone. **Study Design:** Retrospective case series. **Methods:** A retrospective review of patients undergoing transtympanic, round window niche application of dexamethasone for treatment of cochleovestibular symptoms was performed. Between 2003 and 2009, 149 patients were identified at a private otology practice that underwent placement of micro-otowick for inner ear perfusion of steroids. Patient age, diagnosis, procedure date, steroid dosing regimen, duration of treatment and any associated symptoms were recorded. **Results:** Three out of 149 (2.0%) patients were identified with systemic side effects of corticosteroid administration. Noted systemic side effects included weight gain, emotional lability, cortisol suppression, compulsive behavior, moon faces and buffalo hump development, increased appetite and insomnia. One patient reported tasting the steroid drops after administration. Dosage of dexamethasone associated with the development of systemic side effects ranged from 4-20 mg/ml and duration of treatment ranged from 4-8 weeks. **Conclusions:** Although perfusion of the inner ear with steroids via placement of a transtympanic micro-otowick allows directed administration of steroid therapy, systemic side effects can occur and should be considered during followup evaluations.

## S99.

### Traumatic Wound Breakdown in BAHA Osseointegrated Cochlear Conducting Device Implant

Ian M. Sambur, MD, New York, NY; Sujana S. Chandrasekhar, MD FACS\*, New York, NY; Satish Govindaraj, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize and manage severe scalp perioperative and postoperative complications of BAHA osseointegrated implants, and recognize that even severe soft tissue complications may not compromise the implant itself.

**Objectives:** To discuss a patient with severe post-traumatic perioperative and postoperative scalp complications following BAHA surgery, including management options. **Study Design:** Case report and literature review of postoperative complications of BAHA osseointegrated implants. **Methods:** A patient is presented with a severe right sided mixed hear-

ing loss who was managed surgically with a BAHA osseointegrated implant and split thickness pedicled skin graft. Two weeks following surgery, the patient suffered a head trauma and consequently developed a severe wound infection over the device that extended to the occiput. This went unrecognized at the local hospital. He was subsequently managed on an outpatient basis with meticulous local wound care and oral antibiotics. **Results:** The patient healed completely and did not require revision surgery. He now has serviceable hearing after benefiting from the BAHA implant. **Conclusions:** Complications following BAHA implantation are rare. Management with local wound care, antibiotics and possibly revision surgery offer the best outcome.

## **S100. Radiologic Comparison of Density of Mastoid Obliteration vs. Cortical Bone and Otic Capsule**

Ravi N. Samy, MD, Cincinnati, OH; Nael M. Shoman, MD, Cincinnati, OH; Rebecca S. Cornelius, MD, Cincinnati, OH; Myles L. Pensak, MD\*, Cincinnati, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) demonstrate the differences in density between obliterated mastoid using bone pate and surrounding otic capsule and cortical bone; 2) explain how density is evaluated by CT using Hounsfield units; and 3) discuss the clinical relevance of the reduced bone pate density and possible preferential involvement by cholesteatoma.

**Objectives:** Mastoid obliterations are often performed for various indications, including chronic otitis media with cholesteatoma. One risk is of masking cholesteatomatous debris that may subsequently proceed medially and cause suppurative complications. This study hypothesizes that autologous cranial bone graft used as a bone pate (BP) in mastoid obliteration is of a lower density than surrounding native bone. This would support the common observation that mastoid obliteration with BP does not have a higher incidence of complications compared to other closed mastoidectomy approaches. **Study Design:** Retrospective chart review. **Methods:** From 2005-2009, 210 patients underwent mastoidectomies. Of these, 101 (48%) had mastoid obliterations. Postoperatively, CT scans were performed on 13 patients (14 mastoids) for a variety of indications, including otalgia, headache, or trauma. Radiologic density determination in Hounsfield units (HU) was performed of the BP, the lateral semicircular canal (LSCC), and the posterior fossa dural plate (DP) in the axial plane. **Results:** The average HU measurements of the 3 regions was: 1) BP- 572 HU (range 352-850); 2) LSCC- 1671 (range 1527-1913); and 3) DP- 1276 (range of 1036-1714). The difference in the average HU measurement of the BP was significantly less compared to that of the DP or LSCC ( $P < 0.05$ ). **Conclusions:** The density of bone pate as used to obliterate mastoid cavities is significantly less than that of the surrounding cortical bone and otic capsule. This reduced density may allow recidivistic cholesteatoma to preferentially affect the obliterated bone rather than surrounding native bone, potentially reducing the risk of suppurative complications.

## **S101. Concomitant, Contralateral Vestibular Schwannoma and Epidermoid Cyst**

Alice S. Zhao, BA, Newark, NJ; Huey-Jen Lee, MD, Newark, NJ; Robert W. Jyung, MD, Newark, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to appreciate the rarity of concurrent intracranial tumors of different cell types on opposite sides, specifically a vestibular schwannoma in the right internal auditory canal and a contralateral epidermoid cyst in the left cerebellopontine angle.

**Objectives:** To report on the coexistence of a vestibular schwannoma and epidermoid cyst on opposite sides. **Study Design:** A 61 year old woman presented with complaints of severe intermittent headache for 6 months that radiated from the occiput to the frontal region, multiple episodes of vertigo lasting 10-15 minutes in duration, and 3 episodes of syncope within one month. The patient also reported decreased hearing bilaterally (right greater than left), facial pain in the right V2 distribution of the trigeminal nerve, and bilateral visual changes described as flashes of light. **Methods:** Examination of her ears, nose, and throat showed only occipital tenderness. An audiogram was within normal limits with the exception of a mild sensorineural hearing loss at 2000 Hz in the right ear. **Results:** An MRI showed a mass in the left cerebellopontine angle which extended inferior to the left cerebellomedullary angle. This mass predominantly demonstrated cerebrospinal fluid signal intensity on T1 and T2 weighted imaging and showed areas of restricted diffusion weighted images without contrast enhancement, compatible with an epidermoid cyst. It measured approximately 2.5 cm (AP) x 1.0 cm (transverse) x 1.5 cm (craniocaudal) and likely involved the cisternal portion of the left trigeminal nerve, which was not visualized. Additionally, there was a well defined enhancing mass in the right internal auditory canal measuring 4 x 4 x 3 mm, compatible with a vestibular schwannoma. **Conclusions:** Although exceedingly rare, there have been two reported cases of a vestibular schwannoma coexisting with an epidermoid cyst as a single cerebellopontine angle mass. Additionally, two

cases of contralateral coexisting schwannoma and epidermoid cyst or cholesterol granuloma have been reported. However, this represents the first known case of the coexistence of a vestibular schwannoma and an epidermoid cyst on the contralateral side.

## **Pediatrics**

### **S102. The Impact of Adenotonsillectomy on Children with Asthma**

Rowley S. Busino, MD, Newark, NJ; Huma A. Quraishi, MD, Newark, NJ; Patricia E. Connelly, PhD, Newark, NJ; Helen A. Aguila, MD, Newark, NJ; Evelyn M. Montalvo Stanton, MD, Newark, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify the outcome measures of asthma control used in the pediatric population and to assess if there is improvement in asthma severity after adenotonsillectomy.

**Objectives:** To determine whether adenotonsillectomy improves asthma control in the pediatric population. **Study Design:** Retrospective chart review. **Methods:** All children who underwent adenotonsillectomy at our institution from 2002-2007 were identified from a medical records database. The exclusion criteria consisted of age less than three, cardiac disease, subglottic stenosis, prematurity, craniofacial abnormalities, Down syndrome, and neuromuscular disorders. After exclusion criteria were applied, 93 children with the diagnosis of asthma, which was made by a pediatric pulmonologist, and 372 children without asthma who underwent adenotonsillectomy were retrospectively studied. Outcome measures of asthma control obtained from pediatric pulmonology clinic charts were analyzed one year preoperatively and one year postoperatively and included: hospital visits, systemic steroid use, asthma medication use, and asthma control test scores. Postoperative complications and length of hospital stay postoperatively were assessed in both groups. **Results:** There was statistically significant improvement in postoperative asthma severity in all measures including mean hospital visits, systemic steroid administration, asthma medication use, asthma control test scores ( $p < .01$ ). Additionally, children with asthma did not have an increase in postoperative complications when compared with their peers without asthma. **Conclusions:** Children who underwent adenotonsillectomy had significant improvement in their asthma control postoperatively. Children with asthma may not be at an increased risk for postoperative complications.

### **S103. Cat Scratch Disease Presenting as Acute Mastoiditis**

Veronique Wan Fook Cheung, MD CM, Vancouver, BC Canada; J. Paul Moxham, MD\*, Vancouver, BC Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the relevant otolaryngologic presentations of cat scratch disease as well as this unusual presentation and its management.

**Objectives:** To present the first English language literature report of cat scratch disease presenting as acute mastoiditis and review the relevant literature to discuss the otolaryngologic manifestations of this disease and its treatment. **Study Design:** A case report and literature review of the otolaryngologic manifestations of cat scratch disease. **Methods:** A case report of a clinical scenario followed by a standard literature review. PubMed, EMBASE, and Cochrane database were used to find articles related to the otolaryngologic manifestations of cat scratch disease. **Results:** A 6 year old female presented to the otolaryngologist with the typical appearance of acute mastoiditis. CT scan confirmed breakdown of the osseous septae of the mastoid and mastoidectomy was undertaken. Granulation tissue and infected lymph nodes adjacent to the mastoid cortex were positive for cat scratch disease. The patient was treated expectantly and recovered uneventfully. **Conclusions:** This is the first literature report of cat scratch disease presenting as an acute mastoiditis.

### **S104. Use of Intraoperative Computerized Tomography for Endoscopic Resection of an Aggressive Juvenile Ossifying Fibroma**

Kimberly Ann Donnellan, MD, Jackson, MS; Jeffrey D. Carron, MD, Jackson, MS

**Educational Objective:** At the conclusion of this presentation, the participants should be able to define and discuss aggressive juvenile ossifying fibroma.

**Objectives:** The clinical history and management of a child with a juvenile aggressive ossifying fibroma of the left max-

illary sinus will be reviewed. **Study Design:** Case report. **Methods:** Case report and limited review of the literature on the topic of juvenile aggressive ossifying fibroma will be presented. **Results:** Surgical intervention after initial biopsy included endoscopic transantral resection with use of image guidance and intraoperative computerized tomography (IOCT). Limited branches of the left external carotid were ligated at the start of the case given history of severe bleeding. The tumor was removed in its entirety, confirmed by IOCT. Debridement and postoperative biopsies revealed no evidence of residual or recurrent tumor yet. Other than mild nasal complaints, patient is symptom free and the proptosis has resolved. Cranial nerves are intact. **Conclusions:** Juvenile aggressive ossifying fibroma is an uncommon tumor requiring aggressive surgical treatment. Endoscopic resection in this case was safe and effective. The use of IOCT provided further assurance that the entire tumor was removed at the time of surgery.

## **S105. A Novel Case of a Pediatric Patient with a Central Mandibular Incisor and a Midline Neck Mass**

Alison M. Maresh, MD, New York, NY; Tali Lando, MD, New York, NY; Max M. April, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the presentation of an unusual physical finding and to compare and contrast the clinical scenario to a previously described syndrome.

**Objectives:** We describe the interesting case of an 11 year old male patient with a midline neck mass and three mandibular incisors. **Study Design:** He initially presented with a one month history of an enlarging neck mass. He was otherwise healthy. Examination revealed a 5 cm midline suprahyoid neck mass as well as three mandibular incisors with a single central incisor in the midline of his mandible. MRI imaging confirmed a midline mass above the mylohyoid muscle consistent with a maldevelopmental lesion such as a dermoid or cystic teratoma. MRI also confirmed his three mandibular incisors and showed no other abnormalities. **Methods:** He underwent uncomplicated surgical excision, and final pathology revealed a 3.5 cm dermoid cyst. **Results:** Solitary median maxillary central incisor (SMMCI) syndrome is a well described congenital abnormality consisting of a single maxillary central incisor that is located exactly in the middle of the upper jaw. It occurs in approximately 1:50,000 live births and its etiology remains unknown. It is associated with other midline anatomical anomalies most notably nasal malformations such as choanal atresia, midnasal stenosis, or pyriform aperture stenosis, as well as holoprosencephaly. This is the first known report of a single central mandibular incisor as opposed to the previously described maxillary incisor seen in SMMCI syndrome. However, similar to SMMCI patients, our patient also presented with an additional congenital midline anomaly, his cervical dermoid cyst. **Conclusions:** We suspect this may be a new syndrome and encourage other pediatric otolaryngologists to report similar findings.

## **S106. Intracranial Extension Associated with Nasal Dermoid Cyst and Nasal Glioma: Case Reports and Review of the Literature**

Rajanya S. Petersson, MD, Rochester, MN; Matthew L. Carlson, MD, Rochester, MN; Nicholas M. Wetjen, MD, Rochester, MN; Laura J. Orvidas, MD\*, Rochester, MN; Dana M. Thompson, MD\*, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to: 1) demonstrate knowledge of the three most common forms of congenital nasal masses; 2) discuss evaluation of these masses; and 3) discuss the significance of intracranial extension.

**Objectives:** Report two cases of intracranial extension associated with congenital midline nasal masses. **Study Design:** Retrospective chart review. **Methods:** Case reports and review of the literature. **Results:** A 3 year old boy presented with a congenital right paramedian nasal mass extending from the nasal frontal suture to the nasal tip. Magnetic resonance imaging (MRI) revealed a 3 x 1.1cm nasal mass with an intracranial component measuring 1.2cm extending through the foramen cecum. This was completely surgically resected through a frontal craniotomy approach combined with a midline dorsal nasal incision. Pathology revealed a nasal dermoid cyst. At 4 month followup, the patient was doing well with no evidence of recurrence. A newborn boy presented with a 2 cm mass overlying the nasal dorsum and left nasal bone. Although MRI at birth was not definitive for intracranial extension, repeat MRI at 3 months of age more clearly demonstrated extension of the mass deep to the nasal bone with a soft tissue stalk extending to the dura in the midline. This was also completely surgically resected through a frontal craniotomy approach combined with an extranasal incision and intranasal endoscopic approach. Pathology revealed a nasal glioma. At 3 month followup, the patient was doing well with no evidence of recurrence. **Conclusions:** Congenital midline nasal masses are rare entities, with intracranial extension rarer still. Radiographic evaluation is invaluable in determining intracranial extension in order to allow for proper pre-

operative planning. A combined surgical approach between otorhinolaryngology and neurosurgery is recommended for complete resection.

## **S107. Thymopharyngeal Duct Cyst: A Case Presentation and Literature Review**

Huma A. Quraishi, MD, Newark, NJ; Arjuna M. Kuperan, MD, Newark, NJ (Presenter); Anup J. Shah, BA, Newark, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the embryology, clinical presentation, radiologic and pathologic findings, and surgical management of a thymopharyngeal duct cyst.

**Objectives:** To review the embryology, clinical presentation, radiologic and pathologic findings, and surgical management of a thymopharyngeal duct cyst. **Study Design:** Case report. **Methods:** Review of literature. **Results:** The differential diagnosis of a lateral cystic neck mass includes branchial cleft cysts and lymphangiomas. Cervical thymic cysts are rare, and thymopharyngeal duct cysts, which maintain a connection to pharynx, are rarer still. We present an interesting case of a 4 year old male who developed acute onset of a left sided neck mass. CT and MRI findings revealed a multiloculated cyst closely associated with the left lobe of the thyroid gland with a tract extending up along the carotid sheath to the pyriform sinus. Complete surgical excision was performed. The anatomic location and pathology were consistent with a thymopharyngeal duct cyst. The embryology, clinical presentation, radiologic and pathologic findings, and surgical management of thymopharyngeal duct cysts will be discussed. **Conclusions:** Thymopharyngeal duct cyst is a rare entity but must be considered in the differential diagnosis of a lateral cystic neck mass.

## **S108. Early Surgical Intervention Leads to Favorable Outcomes in Bacterial Tracheitis**

Josef Shargorodsky, MD, Boston, MA; Gi Soo Lee, MD, Boston, MA; Kenneth R. Whittemore, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss approaches to improving outcomes in children with bacterial tracheitis.

**Objectives:** Bacterial tracheitis is an acute, potentially life threatening infectious condition of the pediatric airway. Historically, patients have often required urgent invasive ventilatory support in addition to broad spectrum antibiotics and a formal airway evaluation. This review of the management of bacterial tracheitis at a tertiary care pediatric hospital analyzes the recent changes in the approach to this condition. **Study Design:** A case series of bacterial tracheitis at a tertiary care pediatric hospital. **Methods:** Six patients (ages 16 months to 16 years; median 8 years) were diagnosed and treated for bacterial tracheitis during the winter of 2009 (11/08 to 3/09). All patients underwent urgent direct laryngoscopy and bronchoscopy for debridement of mucopurulent debris and tissue culture. Broad spectrum intravenous antibiotics were administered, and patients were kept on cardiopulmonary monitoring for 48-72 hours, after which time the airway was reevaluated by repeat direct laryngoscopy and bronchoscopy (5 patients), and by fiberoptic nasolaryngoscopy (1 patient). All of the patients were transitioned to oral antibiotic therapy for 10-14 days after discharge. **Results:** The mean time from initial evaluation to operating room was 4.2 hours (2-7 hours). None of the patients required urgent intubation, although one patient (16 months old) was kept on ventilator support postoperatively for 48 hours until disease resolution was confirmed. No patients required tracheotomy and there were no cardiopulmonary arrests. All patients demonstrated complete recovery, with mean hospital length of stay of 4.8 days (range 3-8 days). **Conclusions:** This study highlights the importance of early disease identification and urgent surgical intervention in improving outcomes in patients with bacterial tracheitis.

## **S109. Rosai Dorfman in the Submandibular Salivary Glands of a Pediatric Patient**

Shankar K. Sridhara, MD, Washington, DC; Rahul K. Shah, MD, Washington, DC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize a unique presentation of sinus histiocytosis with massive lymphadenopathy, better understand the management of this rare disease, and broaden their differential of pediatric lymphadenopathy.

**Objectives:** To describe a unique presentation of sinus histiocytosis with massive lymphadenopathy (SHML, or Rosai

Dorfman disease) in bilateral submandibular salivary glands of a pediatric patient and review the pertinent literature. **Study Design:** Case report. **Methods:** An 11 year old otherwise healthy African American boy presents with a 12 month history of painless firm bilateral level II neck swelling without constitutional symptoms. After proper workup, unilateral submandibular gland excision was performed with pathology consistent with SHML. The contralateral gland was subsequently excised due to compressive symptoms. **Results:** There are four papers in the English literature describing salivary gland involvement of SHML. The pathologic diagnosis is described in these papers, however, management has not been addressed in the literature in the past three decades. **Conclusions:** SHML is a benign rare clinical entity with associated morbidity and mortality generally resulting from compressive symptoms of lymphadenopathy. A case of pediatric bilateral submandibular gland involvement is presented, with an update on management and surgical indication for this potentially lethal disease process.

## **S110. Anatomical Limitations for Endoscopic Endonasal Skull Base Surgery in Pediatric Patients**

Jason R. Tatreau, BS, Chapel Hill, NC; Mihir R. Patel, MD, Chapel Hill, NC; Rupali N. Shah, MD, Chapel Hill, NC; Kibwei A. McKinney, MD, Chapel Hill, NC; Adam M. Zanation, MD, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the important age specific anatomical limitations to transsphenoidal skull base approaches in pediatric patients.

**Objectives:** Pediatric skull base surgery is limited by several bony sinonasal landmarks that must be overcome prior to tumor dissection. When approaching a sellar or parasellar tumor, the piriform aperture, sphenoid sinus pneumatization, and intercarotid distances are areas of potential limitation. Quantitative anatomical measurements relevant to pediatric skull base approaches are lacking. Our goal was to use radioanatomic analysis of computed tomography (CT) scans to determine anatomical limitations for transsphenoidal approaches in pediatric skull base procedures. **Study Design:** A retrospective radioanatomic analysis. **Methods:** Measurements included piriform aperture, sphenoid sinus pneumatization patterns, and intercarotid distances on axial scans and coronal and sagittal reconstructions. Fifty pediatric (<18 years of age) and 10 adult patients were equally subdivided into 7 age groups, and compared to determine temporal relationships among sphenoid sinus pneumatization, sphenoid bone thicknesses, and intercarotid distances. **Results:** Piriform aperture width was 29% greater in adults than in patients under 2. Three-fourths of the planum and sellar face and half of the sellar floor were pneumatized by ages 6-7. Superior clival pneumatization was not evident until 12 years of age. Clival intercarotid distances were not different among groups. Drilling distances for trans-planar, trans-sellar, and transclival approaches are described. **Conclusions:** Several potential anatomic limits must be considered in pediatric skull base surgery and these vary according to age. Piriform aperture is likely a limit only in the youngest patients (under 2 years). Sphenoid pneumatization to the planum and sella start at 3 years and complete by age 10. Clival intercarotid distances are not prohibitively narrow in any age group.

## **S111. Bilateral Congenital Lacrimal Fistulae**

Lei Zhuang, MD, Pittsburgh, PA; Christin L. Sylvester, MD, Pittsburgh, PA; Jeffrey P. Simons, MD, Pittsburgh, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand the embryology of nasolacrimal system; 2) discuss typical presentation and treatment modalities of lacrimal fistulae; 3) recognize possible underlying systemic and ocular abnormalities.

**Objectives:** The lacrimal system is comprised of lacrimal glands for tear production and the lacrimal drainage system for draining tears away from the eyes. Congenital lacrimal system anomalies other than nasolacrimal duct obstruction are uncommon. Congenital lacrimal fistulae are a rare developmental anomaly, and when they occur, they are usually unilateral. Fistulae and diverticula can originate from the canaliculus, lacrimal sac, or nasolacrimal duct. They can be seen externally as small orifices or pits located inferior and/or medial to the medial canthi. These anomalies are often asymptomatic and may go undetected. However, they can also present with epiphora or discharge. **Study Design:** Case report. **Methods:** Clinical evaluation and literature review. **Results:** We report the case of a 4 year old male with bilateral congenital lacrimal fistulae. The patient presented to our clinic after his parents discovered bilateral pits located inferior and medial to the medial canthi. The pits had first been noticed only a few weeks prior to presentation. There was no history of drainage or infection. The diagnosis of bilateral congenital lacrimal fistulae was confirmed with computed tomographic imaging. No other systemic, nasal, or ocular anomalies were found. The patient was referred to pediatric ophthalmology and because the lacrimal fistulae have been asymptomatic to this point, it was decided to proceed with a course of obser-

vation. **Conclusions:** We will discuss the embryologic basis for congenital lacrimal fistulae, as well as the typical presentation and possible treatment modalities. The presence of lacrimal fistulae is an indicator to search for a variety of underlying systemic and ocular anomalies.

## **Plastics-Aesthetics**

### **S112. Lymphocytoma Cutis of the Face Treated Successfully with Topical and Intralesional Corticosteroids**

Ryan C. Case, MD, Jackson, MS; Nancye K. McCowan, MS MD, Jackson, MS; J. Randall Jordan, MD, Jackson, MS

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the presentation, etiology, and treatment of lymphocytoma cutis.

**Objectives:** Illustrate the presentation, treatment and outcome of a case of lymphocytoma cutis. Review recent literature on the topic as it relates to pathophysiology and treatment of the lesion. **Study Design:** Case report and literature review. **Methods:** A 67 year old female was referred to our dermatology clinic for complaints related to a cutaneous lesion of the temporal region, biopsy confirmed lymphocytoma cutis, a benign condition amendable to steroid treatment. We detail her case presentation and give a brief review of the literature on lymphocytoma cutis. **Results:** The mainstay of treatment of CBPL is topical corticosteroids, intralesional injections may also be considered for lesions that do not completely resolve with topical injections. **Conclusions:** Cutaneous lymphoid hyperplasia (CLH) is a broad term that refers to a group of skin disorders that are characterized by lymphoproliferation, primarily of T and B cell populations. These lesions are also referred to as pseudolymphoma by many authorities to distinguish these benign lesions from malignant cutaneous lymphomas. There have been many causes proposed for the development of cutaneous B cell pseudolymphoma (CBPL). Causes for this lymphoproliferative reaction can include *Borrelia burgdorferi*, insect bites, trauma, acupuncture, tattooing, vaccinations, and piercings. The presentation of CBPL includes a solitary red nodule or plaque in about 90% of patients, however about 10% of patients will present with multifocal diseases. Pruritus, edema and inflammation of the involved area is also common. The skin of the head and neck seems to be affected more than other parts of the body.

### **S113. Antibiotic Prophylaxis in the Surgical Management of Facial Trauma**

Alexander Lauder, BS, Boston, MA; Anand K. Devaiah, MD, Boston, MA (Presenter)

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) explain strategies for antibiotic prophylaxis in surgical management; 2) discuss the use or abstention of antibiotic use in facial trauma surgical patients; and 3) demonstrate understanding of recommendations regarding antibiotic prophylaxis in facial trauma.

**Objectives:** Since there is no standard for use of pre- and postoperative antibiotics in facial trauma patients, we sought to determine whether antibiotic strategies have an effect on the risk of surgical site infection or related outcomes. **Study Design:** Retrospective chart review and cohort analysis. **Methods:** Patients seen by the otolaryngology service for traumatic facial injuries at our tertiary care center between January 1, 2003 and January 1, 2009 were included in a retrospective cohort analysis (n=243) to determine if pre- or postoperative antibiotic prophylaxis was correlated to infection rate. All patients received perioperative antibiotic coverage. Isolated mandible fractures were excluded, having been studied before. **Results:** The most common cause of trauma was assault (39%) followed by motor vehicle accidents (27%) and falls (10%) for the 243 patients (74% male, 26% female) with an average age of 35 years (range 8-81 years). The overall infection rate was 9%. There was no significant difference between infection rates for patients in each prophylaxis timing group (p=0.215): group A (patients who received pre- and perioperative antibiotics, n=6) 33±21%, B (patients who received only perioperative antibiotics, n=46) 9±4%, C (patients who received peri- and postoperative antibiotics, n=112) 8±3%, and D (patients who received pre-, peri-, and postoperative antibiotics, n=70) 9±3%. There were also no significant differences between patients who received only perioperative antibiotics and those who received antibiotic treatment combinations in addition to the perioperative treatment (p=0.914). **Conclusions:** The use of additional antibiotics, outside of the perioperative timeframe, does not appear to have a significant advantage in decreasing infection rate post-surgery or related sequelae.

### **S114. Assessment of Microvascular Anastomosis Training in Otolaryngology Residencies: Survey of US Program Directors**

Adam J. Luginbuhl, MD, Philadelphia, PA; Michael R. Savino, BS, Philadelphia, PA; Ryan N. Heffelfinger, MD, Philadelphia, PA; Edmund A. Pribitkin, MD\*, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the current state of microvascular training amongst our residency programs.

**Objectives:** Assess current strategies being used in otolaryngology residency programs regarding microvascular training. **Study Design:** A survey was distributed to all US allopathic otolaryngology program directors. **Methods:** The survey was sent to 104 program directors inquiring about program size, presence of fellowship training in microvascular surgery, number of microvascular cases per month and if residents, fellows or co-attending assist in the anastomosis. Also information was collected on formal training activities including the use of animal models. **Results:** We had a 51% response rate. Of these 54 programs that responded, 78% reported no fellowship positions in plastics or head and neck reconstruction. Amongst the programs without fellowships only 12% perform  $\geq 8$  surgeries per month and 52% perform 1-3 microvascular cases/month. During the anastomosis, 67% of programs report that residents assist in at least three-quarters of cases. Of the programs where residents assist  $\geq 75\%$  of the time a vast majority has formal training in microvascular technique ranging from demonstrating lab competencies to multi-day courses. 56% of the programs reported the use of an animal microvascular laboratory. All animal laboratories used the rat as their model. **Conclusions:** Programs find value in providing residents with microvascular training both in the operating room and in the laboratory. A small minority of programs that do not have fellows actually perform microvascular surgery on a regular basis ( $\geq 8$  surgeries per month). The animal microvascular model not only provides the resident with the opportunity to improve fine motor skills, but also allows for independent research and career development opportunities.

## S115. Axial Facial Buccinator Flap: A New Flap for Reconstruction of Skull Base Defects

Carlos M. Rivera-Serrano, MD, Pittsburgh, PA; Oliver Christopher, MD, Pittsburgh, PA; Carl H. Snyderman, MD, Pittsburgh, PA; Daniel Prevedello, MD, Pittsburgh, PA; Amin B. Kassam, MD, Pittsburgh, PA; Ricardo L. Carrau, MD, Pittsburgh, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain and discuss the indications, technique, advantages and disadvantages of the axial facial buccinator flap in anterior skull base reconstruction.

**Objectives:** The ability to reconstruct defects has been a major challenge in the extension of expanded endonasal approaches. Novel vascularized flaps have been recently developed and significantly decreased the incidence of CSF leaks. However, these new flaps cannot be used in certain circumstances, which warrants the design of different reconstructive options. Using knowledge generated from similar concepts, we designed a novel flap for reconstruction of anterior skull base defects. **Study Design:** Feasibility. Cadaveric study. **Methods:** Using cadaver dissections and measurements, we investigated the feasibility of transposing pedicled buccinator flaps into the nasal cavity and skull base. Two fresh and six preserved human specimens were dissected. **Results:** Pedicled facial buccinator flaps were transposed into the nasal cavity using two different approaches. It was demonstrated that the flaps reach the anterior skull base and planum sphenoidale. **Conclusions:** The transposition of pedicled buccinator muscle with and without mucosa into the nasal cavity could reach the anterior skull base and planum sphenoidale, if the appropriate surgical technique is used, and could be a suitable option for vascularized reconstruction in selected patients.

## S116. Occipital Galeopericranial Flap: A New Flap for Skull Base Reconstruction

Carlos M. Rivera-Serrano, MD, Pittsburgh, PA; Ricardo L. Carrau, MD, Pittsburgh, PA; Daniel Prevedello, MD, Pittsburgh, PA; Amin B. Kassam, MD, Pittsburgh, PA; Carl H. Snyderman, MD, Pittsburgh, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the potential role, advantages, and disadvantages of the occipital galeopericranial flap in skull base reconstruction.

**Objectives:** The expansion of endoscopic endonasal skull base surgery has resulted in an increased demand for reconstructive options. Free tissue grafting is a reliable technique to reconstruct small defects that communicate the arachnoid space and the nasal cavity. However, their use for the reconstruction of larger defects resulted in an unacceptable incidence

of postoperative cerebrospinal fluid (CSF) leaks at our institution. Reconstruction with vascularized tissue has proven indispensable for reliably separating the cranial contents from the paranasal sinuses following extended endoscopic endonasal approaches (EEA). The introduction of the Hadad-Bassagasteguy flap (vascular pedicle nasoseptal flap, HBF) at our institution decreased our postoperative CSF leak rates from >20% to <5%. The HBF is not always available as the nasoseptal area or its vascular supply can be compromised by tumor or prior surgery. In an attempt to keep pace with rapidly expanding reconstructive requirements, our group has focused on developing alternative reconstructive techniques, several of which have been recently reported. **Study Design:** Feasibility. Cadaveric human dissection. **Methods:** Using cadaveric dissections and measurements, we investigated the feasibility of transposing pedicled buccinator flaps into the nasal cavity and skull base. Two fresh and five preserved human specimens were dissected. **Results:** Pedicled occipital flaps were transposed into the nasal cavity via a corridor into the nasopharynx. It was demonstrated that this flap reach the anterior skull base. **Conclusions:** The transposition of pedicled occipital flap into the nasal cavity could reach the anterior skull base, if the appropriate surgical technique is used, and could be suitable option for vascularized reconstruction in selected patients.

## **S117. Vascularized Bone Graft Reconstruction of the Temporomandibular Joint Using the Tunneled, Anchor Suture Technique**

Rahul Seth, MD, Cleveland, OH; Heather H. Waters, MD, Cleveland, OH; Phillip D. Knott, MD, Cleveland, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe a technique that allows for secure vascularized bone graft reconstruction of the temporomandibular joint (TMJ) and compare it to previously described techniques.

**Objectives:** To describe a novel technique that provides a simple, flexible and safe method to approximate and secure the neo-condyle into the glenoid fossa in reconstruction of hemimandibulectomy defects. **Study Design:** Retrospective chart review of a case series was performed at an academic center. **Methods:** Patients (n=3) undergoing composite resection of the hemimandible with condylectomy were evaluated. Surgical indications included osteoradionecrosis, bisphosphonate induced osteonecrosis, and penetrating trauma. A minimally invasive, tunneled suture was used to approximate the neo-condyle into the glenoid fossa. A miniplate screwed to the zygomatic root was used to securely anchor the stitch. Postoperative outcomes were assessed with clinical and radiographic measures. **Results:** The median patient age was 64 years. Median followup was 11 months. All patients reported improved facial symmetry, jaw opening, and acceptable dental occlusion. Postoperative CT and Panorex imaging revealed sustained approximation within the TMJ without evidence of jaw drift. **Conclusions:** Vascularized hemimandibulectomy reconstruction poses challenges for appropriate osseous free flap realignment and resuspension. The described approach introduces a simple, safe, flexible, and effective technique for neocondylar suspension during mandibular reconstruction.

## **Sinus-Rhinology**

## **S118. Repair of CSF Leaks in the Area of the Paranasal Sinuses and Clivus**

Stephen P. Becker, MD\*, Chicago, IL; Gail L. Rosseau, MD, Chicago, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain how to identify the site of the CSF leak and plan the successful repair of the leak. The participant will be able to discuss the correct steps in obtaining the tissue that will properly seal the leak.

**Objectives:** To demonstrate how to correctly find the site of the leak using Omnipaque cisternograms combined with thin section CT scans and MRIs of the skull base with gadolinium. This is followed by development of a plan to repair the CSF leak. **Study Design:** The patients were evaluated to be sure an active CSF leak was present using clinical exam including sinus endoscopy and radiologic techniques. Endoscopic repairs in association with a microneurosurgical approaches were employed to close the leak. In-depth intraoperative video and still photographs will demonstrate the techniques. **Methods:** 7 patients who presented with CSF leaks between the years 2004-2009 were evaluated according to the etiology of the leak. An active CSF leak was confirmed in all the patients and the site identified. A repair was planned using either vascularized pedicled septal mucosal flaps or free grafts of nasal mucosa. Preparation of graft recipient site was meticulous using a diamond drill and standard burrs to be sure the bony surface was flat. A tissue especially Duraseal in the majority of cases held the graft in place and assisted in sealing the leak. The patients were followed for 1 to 4 years to

determine if the repair was successful. **Results:** The patients were followed using office exam including sinus endoscopy and maneuvers to stress the repair site. All 7 CSF leaks were closed successfully. **Conclusions:** The combined use of nasal mucosa either as vascularized pedicled flap or as a free graft both held in place by Duraseal can successfully close the majority of skull base CSF leaks.

## **S119. Radiation Induced Malignancy in Retinoblastoma: New Pathology in a Case Report**

Clara Draf, MD, New York, NY; Madeleine R. Schaberg, MD, New York, NY; Vijay K. Anand, MD\*, New York, NY; Theodore H. Schwartz, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss retinoblastoma and to describe the otolaryngological manifestations of retinoblastoma and risk of secondary malignancies.

**Objectives:** Patients with heritable retinoblastoma have an increased risk of developing a second neoplasm. When these secondary malignancies occur in the previously irradiated field of the primary tumor they are most commonly osteosarcomas, fibrosarcomas, and squamous cell carcinomas. We present the first case of a radiation induced adenocarcinoma in a patient after treatment for retinoblastoma. **Study Design:** A case report of one patient. **Methods:** This patient underwent a chart review, comprehensive history, physical exam, flexible nasolaryngoscopy, and radiographic imaging. A literature review of the Medline database 1966-2009 using key words retinoblastoma, radiation, and second malignancy was performed. **Results:** Our case is a 29 year old man with a past medical history significant for surgical resection followed by irradiation at age 1 for retinoblastoma who presented with right sided epistaxis and nasal obstruction. Endoscopy revealed a mass in the right nasal cavity. MRI and CT revealed a mass filling the right nasal cavity and ethmoids with erosion through the cribriform plate. The patient underwent endoscopic surgical resection and pathology revealed an adenocarcinoma. **Conclusions:** Second malignancies in patients with retinoblastoma tend to occur in the previously irradiated field of the primary tumor and contribute significantly to long term morbidity and mortality rates. This is the first case of a sinonasal adenocarcinoma occurring in the previously irradiated field. The head and neck surgeon plays a vital role as patient survival depends on the diagnosis and surgical management.

## **S120. Ultrasonic Bone Aspiration Turbinoplasty**

Jewel D. Greywoode, MD, Philadelphia, PA; Edmund A. Pribitkin, MD\*, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the principle of ultrasonic bone aspiration and describe its application to inferior turbinate bone removal.

**Objectives:** Turbinate reduction via microdebrider assisted turbinoplasty or radiofrequency assisted turbinoplasty fails to address nasal obstruction caused by bony deformities of the inferior turbinate. Procedures such as Mabry's turbinoplasty, although effective, are challenging to perform. Other procedures such as partial or total turbinectomies may result in prolonged crusting and atrophic rhinitis. We demonstrate the safety and efficacy of inferior turbinate bone removal with an ultrasonic bone aspirator. **Study Design:** Prospective case series with patient questionnaire. **Methods:** The SONOPET ultrasonic bone aspirator (MIWATEC Co., Ltd.) utilizes ultrasonic waves to emulsify bone while concurrent irrigation and microsuction of the bone particles produce a clean surgical field. This enables precise, graded removal of the inferior turbinate bone under direct visualization without thermal or mechanical injury to the surrounding soft tissue or mucosa. We describe the first application of this technology to turbinate bone reduction. **Results:** No individuals experienced delayed healing, infection, scarring or other complications. Improvements in nasal obstruction varied depending upon the procedures being concurrently performed such as septoplasty, functional endoscopic sinus surgery, nasal valve repair and rhinoplasty. **Conclusions:** Ultrasonic bone aspiration turbinoplasty is a safe and effective addition to the techniques employed for inferior turbinate reduction. Moreover, this technique addresses actual deformities in the turbinate bone which cannot be effectively treated through microdebrider or radiofrequency assisted turbinoplasty. The technique is simpler than conventional turbinoplasty and avoids the complications associated with turbinate resection.

## **S121. High Yield Technique to Diagnose Immotile Cilia Syndrome: A Suggested Algorithm**

Gary D. Josephson, MD, Jacksonville, FL; Sapna A. Patel, BA, Jacksonville, FL (Presenter); Laurie J. Duckworth, PhD, Jacksonville, FL; Jeffrey D. Goldstein, MD, Jacksonville, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss nasal brush

biopsy technique for diagnosing ciliary dysmotility.

**Objectives:** To determine the efficacy of our nasal brush biopsy technique to diagnose ciliary dysmotility. **Study Design:** Retrospective chart review at an urban children's hospital. **Methods:** We obtained medical records of all patients who underwent an endoscopic guided ciliary biopsy from January 2000 to June 2008. Data recorded included the procedure date, biopsy location, doctor performing the procedure, presence of motility on light microscopy, whether specimen was sent for electron microscopy, and those results if applicable. **Results:** Sixty pediatric patients between the ages of 1.4 years and 17.3 years with chronic sinusitis (35 males, 25 females) were identified. Three were excluded because biopsies were taken from a non-nasal location. Forty-seven specimens had light microscopy evaluation only, as normal motile cilia were identified. Ten required further evaluation with electron microscopy. Three of these noted motile cilia but were still sent. The other seven noted haphazard or absent motility. Electron microscopy ruled out defects for three samples and was nondiagnostic for five. Reports for the remaining two could not be found. Overall, in 47/57 (82%) cases, light microscopy alone ruled out ciliary dysmotility. Using both methods, there was a 91.2% success rate in ruling out ciliary dyskinesia. **Conclusions:** Obtaining a biopsy endoscopically with a cytosoft cytology brush (Camarillo California) from the posterior portion of the inferior turbinate successfully ruled out ciliary dyskinesia in 91.2% of patients tested. Due to the greater success in confirming the diagnosis compared to other reported biopsy techniques, we suggest using this algorithm as a standard for the diagnosis of ciliary dysmotility.

## S122. The PK-UPPP Flap

Yi H. Kao, MD, State College, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand the basic technique and flaps used for PK-UPPP; 2) recognize the advantages of preserving the uvula; and 3) understand how the flap technique prevents pharyngeal stenosis.

**Objectives:** To present a mucosal preserving, uvula sparing technique of uvulopalatopharyngoplasty (UPPP) for obstructive sleep apnea (OSA). **Study Design:** IRB approved prospective study for OSA patients with polysomnographic (PSG) evaluation pre- and postoperatively. **Methods:** Plasma knife (PK) assisted UPPP is a modification of the procedure originally described by Fujita for snoring. PK is used for tonsillectomy and hemostasis. Cold knife resection of uvula is limited to the anterior mucosa and submucosa, preserving the muscularis uvulae and posterior mucosa. The palatopharyngeus to palatoglossus rotation flaps widen the pharynx and shifts the vector forces of scar contracture superiorly and laterally preventing pharyngeal stenosis preserving the uvula and soft palate decreases risk of nasopharyngeal insufficiency or regurgitation. **Results:** Out of 181 total patients, 145 patients complete pre- and postoperative PSG and were available for analysis. 94 patients (65%) were successfully treated. There were no incidences of nasal regurgitation or pharyngeal stenosis. **Conclusions:** PK-UPPP utilizes the rotation flap techniques to prevent pharyngeal stenosis and nasal regurgitation. A video will be shown.

## S123. Endoscopic Management of Transnasal Intracranial Penetrating Foreign Bodies

Helen E. Perakis, MD, Augusta, GA; Troy D. Woodard, MD, Cleveland, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the benefits of removing transnasal intracranial foreign bodies endoscopically, as well as the risks in comparison to craniotomy, and demonstrate an understanding as to when this minimally invasive technique would be useful.

**Objectives:** To evaluate the effectiveness and the risk of removing a transnasal intracranial foreign body endoscopically versus removal by a craniotomy. **Study Design:** Case report with literature search. **Methods:** One patient following a motor vehicle accident presented with a transnasal intracranial penetrating organic foreign body which was removed endoscopically and the resulting cerebrospinal fluid leak was repaired at the same time. A literature search was performed for similar cases that had been managed endoscopically. Postoperative outcomes for these patients were analyzed. **Results:** Three other patients with transnasal intracranial penetrating foreign bodies removed endoscopically have been described in the literature. Of the four patients, two organic substances present while the other half had metallic foreign bodies. Endoscopic removal was successful in all patients and the CSF leak was repaired with a multilayered closure in all patients following retrieval of foreign body. Only one patient had a lumbar drain placed and only one patient had endoscopic removal with the assistance of image guidance. None of the patients suffered complication including meningitis, CSF leak, brain abscess, hydrocephalus, neural/vascular injury or death, which are all associated with craniotomy. **Conclusions:**

Endoscopic management of transnasal intracranial foreign bodies can be successfully performed in selected patients and yields an improved cosmetic outcome and a decreased risk in complication rate.

## **S124. Microbiology and Antibiotic Resistance of Chronic Rhinosinusitis (CRS) in Patients Undergoing Primary Versus Revision Functional Endoscopic Sinus Surgery (FESS)**

Scott M. Rickert, MD, New York, NY; Tara Rachakonda, MD, New York, NY; Ashutosh Kacker, MD\*, New York, NY; David H. Hiltzik, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the difference in microbiology and antibiotic resistance in patients with CRS undergoing primary sinus surgery versus revision sinus surgery.

**Objectives:** To examine the differences in microbiology of CRS in patients receiving initial vs. revision FESS. To examine antibiotic resistance of the microbiology of CRS patients receiving initial vs. revision FESS. **Study Design:** Prospective analysis of cultures in ninety-eight consecutive patients undergoing FESS. **Methods:** Patient demographics, culture results, and presence of polyps were noted. The organisms in the primary and revision FESS groups were compared. Sensitivities and antibiotic resistance of the organisms were compared between the groups. **Results:** Primary FESS and twenty-eight revision FESS were performed with a total of 180. Ninety-eight patients received 100 surgeries. There were fifty men and forty-eight women with a mean age of 45.0 years (range 18-81 years old). Seventy-two isolates (132 primary, 48 revision). Coagulase negative. Staphylococcus (CNS) was cultured most commonly in both groups, 39.4% vs. 35.4%. The revision FESS cultures demonstrated a statistically higher percentage of positive cultures for pseudomonas (8.33% vs. 0.8%) and statistically lower percentage of streptococcus viridans (0.0% vs. 7.6%). There was a higher but not statistically significant percentage of anaerobes (39.6% vs. 30.3%), fungi (4.2% vs. 2.2%), and MRSA (4.2% vs. 0.8%) in the revision FESS group versus the primary group. The percentage of patients with polyps was similar in both groups (54.2% vs. 57.1%) and polyp cases did not show any predominant organisms. 71 of the 180 cultures were evaluated for antibiotic resistance and sensitivities. A total of 88.7% cultures showed some level of antibiotic resistance with a significant difference between primary FESS and revision FESS (84.8% of primary FESS vs. 96.0% of revision FESS,  $p=0.011$ ). 39.4% of the overall cultures were resistance to more than 2 antibiotics. **Conclusions:** In the revision FESS groups, there was a significantly higher percentage of pseudomonas cultures and there was a significantly lower percentage of streptococcus viridans versus the primary FESS group. CNS was the predominant organism in both groups. However, the revision group demonstrated a nonsignificant higher percentage of anaerobic microorganisms, as well as fungus. There was a significant higher rate of antibiotic resistance in the revision FESS group versus the primary FESS group.

## **S125. Endoscopic Dissection of the Cranial Base: Pterygopalatine Fossa, Infratemporal Fossa Post-Styloid Compartment—Anatomical Relationships and Importance of Eustachian Tube**

Carlos M. Rivera-Serrano, MD, Pittsburgh, PA; Ramon Terre-Falcon, MD, Barcelona, Spain; Carl H. Snyderman, MD, Pittsburgh, PA; Daniel Prevedello, MD, Pittsburgh, PA; Amin B. Kassam, MD, Pittsburgh, PA; Ricardo L. Carrau, MD, Pittsburgh, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the accessibility of the infratemporal fossa and post-styloid space, its anatomical relations, and the importance of the eustachian from the perspective of the transnasal endoscopic approach.

**Objectives:** Endoscopic approach to pterygopalatine fossa, infratemporal fossa and post-styloid space is technically challenging due to its complex anatomy. The aim of this project is to develop an anatomical and technical model to access these areas based on the transnasal endoscopic perspective. **Study Design:** Ten pterygopalatine and infratemporal fossas were dissected in five adult cadaveric heads injected with colored latex. Rigid endoscopes and microsurgical endoscopic instruments were used for dissection. Inferior turbinectomy transantral and transpterygoid approaches were performed. **Methods:** Inferior turbinectomy transantral and transpterygoid approaches allowed dissection of all pterygopalatine and infratemporal structures. Dissection and resection of the sphenopalatine artery and detachment of the external and internal pterygoid muscles were essential to gain access to deeper structures. The lateral pterygoid plate was the most useful landmark for location of foramen ovale and the mandibular branch of the trigeminal nerve. The eustachian tube, medial pterygoid plate and styloid process were the most useful landmarks used to locate post-styloid anatomic structures (internal parapharyngeal carotid artery, internal jugular vein, CN IX and X). **Results:** Inferior turbinectomy transantral and transpterygoid endoscopic approaches provide good access to the pterygopalatine fossa and to the infratemporal fossa

and post-styloid space, respectively. **Conclusions:** The eustachian tube is the most important landmark in the endoscopic approach to the post-styloid space due to its location and relationships. Cranial nerves XI and XII are not accessible due to the nasal/maxillary sinus floor limitation and very posterior location.

## S126. Hyperostotic Chronic Sinusitis as an Indication for Outpatient Intravenous Antibiotics

Madeleine R. Schaberg, MD, New York, NY; Vijay K. Anand, MD\*, New York, NY; Ameet Singh, MD, Washington, DC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the clinical entity of hyperostotic sinusitis and the efficacy of its treatment with intravenous antibiotics.

**Objectives:** There is a subset of patients with chronic rhinosinusitis (CRS) that demonstrate osteitis of the sinuses. Osteitic bone is evident on computed tomography (CT) as hyperostosis. We propose treatment of this entity with a six week course of outpatient intravenous antibiotics in an approach similar to that used in the orthopedic literature for long bone osteomyelitis. This group of patients can be identified based on symptoms, unremitting course of disease, and imaging criteria. Although indications for the use of outpatient intravenous antibiotics must be determined judiciously in CRS we believe that hyperostotic sinusitis is an additional indication. **Study Design:** A retrospective chart review. **Methods:** A retrospective chart review of ten patients with hyperostotic sinusitis treated over a three year period (1/2007-8/2009). **Results:** Ten patients (age range, 25-85) with hyperostotic sinusitis were identified and quality of life was evaluated with SNOT 22. All patients underwent CT, nasal endoscopy both preoperatively and post-treatment. All patients underwent revision surgery by the senior author. Five patients were treated with 6 weeks of intravenous antibiotics. Antibiotic choices were culture directed and antibiotics administered included cefazolin, clindamycin, ertapenem, Maxipime, and vancomycin. Minor complications were encountered during therapy including: paresthesias and elevated liver enzymes. Five patients (serving as the control group), were treated with traditional therapy involving intermittent courses of prolonged oral antibiotics. **Conclusions:** Prolonged intravenous antibiotics may achieve adequate serum levels that cannot be achieved with oral antibiotics. Symptomatic relief in patients with hyperostotic sinusitis appears to be superior with intravenous antibiotics versus traditional oral therapy. Indications for intravenous antibiotics should include hyperostotic sinusitis.

## S127. Relationship between Septal Body Size and Septal Deviation

Jennifer Setlur, MD, Syracuse, NY; Parul Goyal, MD, Syracuse, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) describe the septal body; 2) identify the presence of the septal body on endoscopic and radiographic images; and 3) discuss the impact of this structure on nasal airflow.

**Objectives:** Previous studies have described inferior turbinate hypertrophy on the side contralateral to a septal deviation. The goal of this study was to compare the size of the septal body to the laterality of septal deviation. The aim was to determine whether there is a correlation between the laterality of septal deviation and laterality of septal body prominence. **Study Design:** Retrospective review. **Methods:** Measurements were obtained from fifty-seven sinus computerized tomography scans. The degree of septal deviation, the size of the septal body, and the correlation between these measurements were assessed. **Results:** The mean septal body width was 9.23 mm. The degree of septal deviation was classified as mild in 16 cases, moderate in 21 cases, and severe in 17 cases. In 56 of 57 cases, the septal body was larger on the side opposite the nasal septal deviation. Based on an independent t-test, this was found to be statistically significant ( $p < .05$ ). The difference in septal body thickness ipsilateral and contralateral to the septal deviation was found to correlate with the degree of septal deviation. Mean difference in septal body size was 3.66 mm in cases with severe septal deviation, 1.79 mm in cases with moderate deviation, and .97 mm in cases with mild septal deviation. **Conclusions:** The septal body is more prominent on the side opposite that of a septal deviation. These findings are similar to the findings seen with inferior turbinate hypertrophy. These results indicate that septal body hypertrophy may contribute to nasal obstruction.

## S128. Temporal Lobe Abscess in a Patient with Isolated Fungal Sphenoiditis

Thomas A. Stewart, MD, Loma Linda, CA; Cody S. Carter, BS, Loma Linda, CA; Kristen A. Seiberling, MD, Loma Linda, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the clinical findings in a patient with suspected sinusitis complicated by a brain abscess as well as the management of the disease.

**Objectives:** Intracranial infection is a rare complication of sphenoiditis, but can lead to significant morbidity and even death. The objective is to present a rare case of temporal lobe abscess secondary to isolated fungal sphenoiditis. Other objectives include a literature review as well as discussion regarding management of this disease. **Study Design:** Case report. **Methods:** A 74 year old male was admitted with severe retroorbital headache. A CT scan revealed isolated sphenoiditis. The patient was subsequently scheduled for sinus surgery as an outpatient. At the time of surgery, the patient presented with mild obtundation. The wife also reported some recent confusion and possible signs of receptive aphasia. The patient was subsequently transferred to the university hospital for further workup. **Results:** A head CT with contrast revealed a temporal lobe abscess. A joint case with neurosurgery was scheduled and the patient underwent a left temporal craniectomy for drainage of the abscess. Concurrently the patient underwent bilateral sphenoid sinusotomy and ethmoidectomy via endoscopic transnasal approach using image guided navigation. The sphenoid sinus was found to be impacted with gross fungal debris. A wide sphenoidotomy with complete ethmoidectomy established adequate sinus drainage. The patient made a full recovery postoperatively, with resolution of abscess and sinus findings on subsequent imaging. **Conclusions:** Although rare, suspicion for intracranial infection should be raised in any sinus patient who presents with neurologic changes. Early diagnosis with imaging studies is extremely important in order for timely surgical drainage prior to permanent neurologic sequela. Modern image guidance facilitated speed and safety in treatment of this rare complication of sinusitis.

## **S129. Primary Chronic Lymphocytic Leukemia, Small Lymphocytic Lymphoma of the Nasolacrimal Duct and Ethmoid Labyrinth**

Kathryn M. Van Abel, BA, Philadelphia, PA; Edmund A. Pribitkin, MD\*, Philadelphia, PA; Jurij R. Bilyk, MD, Philadelphia, PA; Scott E. Bourne, MD, Philadelphia, PA; Waleed H. Ezzat, MD, Philadelphia, PA; Steven G. Finden, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the clinical, radiographic, and pathologic findings in CLL/SLL of the nasolacrimal drainage system and ethmoid labyrinth.

**Objectives:** To underscore significance of routine microscopic pathological review of all intranasal surgical specimens and describe the pathology of chronic lymphocytic leukemia, small lymphocytic lymphoma (CLL/SLL), involving the ethmoid bone and the nasolacrimal drainage system (NDS). **Study Design:** Case report and literature review. **Methods:** The clinical and pathological features of CLL/SLL involving the sinus and nasolacrimal duct mucosa and bone are described. **Results:** Physical examination revealed tearing, increased tear lake, and poor dye disappearance in the left eye. Nasal endoscopy showed a left septal spur and bilateral ostiomeatal complex crowding with mildly enlarged turbinates. Computed tomography of the sinuses demonstrated scattered sinus disease, a soft tissue prominence in the left medial canthus, and multiple enlarged lymph nodes throughout the neck bilaterally. The patient underwent a left endoscopic anterior ethmoidectomy and dacryocystorhinostomy. Routine surgical pathology of a sample of left sinus contents and septal cartilage revealed CLL/SLL involving the upper respiratory tract mucosa and associated cancellous bone, confirmed by immunohistochemical studies. **Conclusions:** Initial presentation of CLL/SLL within the NDS and ethmoid labyrinth is rare and reflects a systemic lymphoreticular malignancy. While CLL/SLL is generally an indolent illness, early detection permits accurate clinical staging and appropriate therapy. Involvement of the ethmoid labyrinth and nasolacrimal duct system with illnesses such as CLL/SLL underscores the need for routine microscopic pathological review of all intranasal surgical specimens.

## **S130. The Bioflavonoid Compound, Sinupret®, Stimulates Transepithelial Chloride Transport in vitro and in vivo**

Frank Wadsworth Virgin, MD, Birmingham, AL; Shaoyan Zhang, PhD, Birmingham, AL; Christopher H. Azbell, BS, Birmingham, AL; James A. Fortenberry, BS, Birmingham, AL; Eric J. Sorscher, MD, Birmingham, AL; Bradford A. Woodworth, MD, Birmingham, AL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the effects of Sinupret® on transepithelial Cl<sup>-</sup> transport and the potential therapeutic implications.

**Objectives:** Dehydration of airway surface liquid (ASL) disrupts normal mucociliary clearance (MCC) in sinonasal epithelium leading to chronic rhinosinusitis (CRS). Abnormal chloride (Cl<sup>-</sup>) transport is one such mechanism that contributes to

this disorder, as demonstrated by the disease cystic fibrosis. Identifying safe compounds that stimulate transepithelial  $\text{Cl}^-$  transport is critical to improving hydration of the ASL and promoting mucociliary transport. Sinupret® is a popular treatment for respiratory ailments in Europe and is a combination of naturally occurring bioflavonoids. However, the effects of Sinupret® on target respiratory epithelium have yet to be fully investigated. The present study evaluates stimulation of transepithelial  $\text{Cl}^-$  transport in respiratory epithelium exposed to this bioflavonoid therapeutic. **Study Design:** In vitro and in vivo investigation. **Methods:** Well characterized murine nasal septa epithelial (MNSE) cultures and murine nasal potential difference (NPD) techniques were used to evaluate the effects of Sinupret® on  $\text{Cl}^-$  secretion. **Results:** The change in Sinupret® stimulated current ( $\Delta I_{\text{sc}}$  - expressed as  $\mu\text{A}/\text{cm}^2$ ) in MNSE, representing  $\text{Cl}^-$  secretion, was significantly increased when compared to controls  $\{(n=21; 10.2 \pm 1.05 \text{ vs. } 1.8 \pm 0.35, \text{ respectively}) p=0.005\}$ . Transepithelial  $\text{Cl}^-$  transport measured in the murine NPD in vivo assay ( $n=33$ ) was also significantly enhanced when compared to controls ( $-3.8\text{mV vs. } -0.9\text{mV}, p=0.003$ ). Importantly, Sinupret® stimulated  $\text{Cl}^-$  transport was significantly more robust in vivo than forskolin—the strongest known CFTR activator ( $-3.8\text{mV vs. } -1.65\text{mV}, p=0.04$ ). **Conclusions:** Sinupret® robustly stimulates transepithelial  $\text{Cl}^-$  secretion, which should hydrate the ASL of respiratory epithelium. This is one of the potential mechanisms by which it may exert therapeutic effects.

## S131. Bilateral Vascular Supply in Juvenile Nasopharyngeal Angiofibromas

Arthur W. Wu, MD, Los Angeles, CA; Sarah E. Mowry, MD, Los Angeles, CA; Fernando Vinuela, MD, Los Angeles, CA; Elliot Abemayor, MD PhD\*, Los Angeles, CA; Marilene B. Wang, MD\*, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the normal vascular supply of juvenile nasopharyngeal angiofibromas as well as the frequency and clinical importance of less common anatomical variants.

**Objectives:** To present a series of patients with juvenile nasopharyngeal angiofibroma (JNA) with bilateral blood supplies. To review the literature documenting frequency of JNAs with bilateral vascular supply. **Study Design:** Case series. **Methods:** Three patients with JNA in a two year period from a tertiary care center are presented. A review of the literature regarding the vascular supply of JNAs is done. **Results:** Preoperative angiograms from two of the patients demonstrated bilateral vascular supply. Embolization and endoscopic resection was successful in both cases. The third patient's preoperative angiogram demonstrated blood supply from the right ascending pharyngeal artery with no tumor blush from the left carotid system. However, during surgery significant bleeding was encountered, and an intraoperative angiogram showed significant new vascularization from the left ascending pharyngeal artery, which was embolized. The surgery continued via a Caldwell-Luc approach and was completed successfully without further significant hemorrhage. Review of the literature demonstrates that bilateral vascular supply is not commonly documented, but may be more frequent than previously thought. Relatively few studies document bilateral vascular supply in JNAs, with rates ranging from 0 to 69%. **Conclusions:** The blood supply of JNAs is typically unilateral, with the ascending pharyngeal and internal maxillary arteries being the most common feeding vessels. However, this case series demonstrates the importance of preoperative identification of bilateral vascular supply in these tumors, which is helpful for planning the surgical approach.