

# **TRIOLOGICAL SOCIETY ANNUAL PROGRAM**

**FRIDAY, MAY 19, 2006**

**7:00 BUSINESS MEETING (MEMBERS ONLY) - *Grand C&D***  
**NEW FELLOW INDUCTION AND RECEPTION**

## **8:00 - 9:50 INTRODUCTION OF GUESTS AND SCIENTIFIC SESSION** **Grand C&D**

**8:00 Welcome and Remarks by President**  
Stanley M. Shapshay, MD\*, New York, NY

**8:10 INTRODUCTION OF GUEST OF HONOR**  
Gerald B. Healy, MD\*, Boston, MA

**8:20 PRESIDENTIAL CITATIONS**  
William Lawson, MD DDS\*, New York, NY  
Paul A. Levine, MD\*, Charlottesville, VA  
Robert H. Ossoff, MD DMD\*, Nashville, TN  
Mark S. Persky, MD\*, New York, NY  
Peak Woo, MD\*, New York, NY  
Eiji Yanagisawa, MD\*, New Haven, CT

**8:35 PRESIDENTIAL SPEAKER**  
**Emerging Paradigms in Infectious Diseases**  
W. Ian Lipkin, MD, New York, NY

**MODERATORS: CLARENCE T. SASAKI, MD\*, NEW HAVEN, CT**  
**HAROLD C. PILLSBURY, MD\*, CHAPEL HILL, NC**

**8:55 MOSHER AWARD PRESENTATION -**  
**TRIOLOGICAL THESIS**  
**Laryngeal Cancer in the United States: Changes in Demographics, Patterns of Care and Survival**  
Henry T. Hoffman, MD, Iowa City, IA

**EDUCATIONAL OBJECTIVE:** At the conclusion of the presentation the participants should be able to identify the value and the shortcomings of the National Cancer Database (NCDB) as a tool to describe demographics, management, and outcomes of cancer in the United States. The information provided will help the participant to broadly identify both the standard (most common) care in the United States and the outcome of this care for laryngeal cancer. The participants should apply the information provided to improve their counseling and management of patients with laryngeal cancer.

**BACKGROUND:** Survival has decreased among patients with laryngeal cancer during the past two decades in the United States. During this same period, there has been an increase in the nonsurgical treatment of laryngeal cancer. **OBJECTIVES:** To identify trends in the demographics, management, and outcome of laryngeal cancer in the United States and to analyze factors contributing to the decreased survival. **STUDY DESIGN:** A retrospective, observational study of laryngeal cancer cases. **METHODS:** Review of the National Cancer Data Base (NCDB) revealed 158,426 cases of laryngeal squamous cell carcinoma (excluding verrucous carcinoma) diagnosed between the years 1985 and 2001. Analysis of these data addressed demographics, management, and survival for cases grouped according to stage, site, and specific TNM classifications. **RESULTS:** This NCDB analysis confirms the previously identified trend toward decreasing survival among patients with laryngeal cancer from the mid-1980s to mid-1990s. Patterns of initial management across this same period indicated an increase in the use of chemoradiation with a decrease in the use of surgery (despite

an increase in the use of endoscopic resection). The most notable decline in the five year relative survival between the 1985-90 period and the 1994-96 period occurred among advanced stage glottic cancer, early stage supraglottic cancers, and supraglottic cancers classified as T3N0M0. Initial treatment of T3N0M0 laryngeal cancer (all sites) in 1994-96 resulted in worse five year relative survival for those receiving either chemoradiation (59.2%) or irradiation alone (42.7%) and the best survival following surgery with irradiation (65.2%) and surgery alone (63.3%). In contrast, identical five year relative survival (65.6%) rates occurred during this same period for the subset of T3N0M0 glottic cancers initially treated with either chemoradiation or surgery with irradiation.

**CONCLUSIONS:** The decreased survival recorded for patients with laryngeal cancer in the mid-1990s may be related to changes in patterns of management. Further analysis of data both within the NCDB and through systematic review of individual patient charts through a separate national survey mechanism is currently under design to further evaluate these associations.

**9:05 MOSHER AWARD PRESENTATION -  
TRIOLOGICAL THESIS**

**Abnormal Sensorimotor Integrative Function of the Larynx in Congenital Laryngomalacia: A Novel New Theory of Etiology**

**Dana M. Thompson, MD, Cincinnati, OH**

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to 1) understand what factors influence the varying degrees of symptoms and disease severity in infants with laryngomalacia; 2) understand the role of laryngeal reflexes in laryngeal tone and how and why they are altered in infants with laryngomalacia; and 3) learn the role of laryngopharyngeal reflux in the symptoms of laryngomalacia and why infants benefit from treatment.

**OBJECTIVES:** Laryngomalacia is an enigmatic disease. Sensorimotor integrative function of the brainstem and peripheral reflexes are responsible for laryngeal tone. The **goal** was to elucidate the etiology of decreased laryngeal tone in infants with laryngomalacia through evaluating the sensorimotor integrative function of the larynx. The **secondary goal** was to evaluate factors that contribute to the wide spectrum symptoms and outcomes. **METHODS:** 201 infants with laryngomalacia were divided into 3 groups based on disease severity (mild, moderate, severe) were followed prospectively until symptoms resolved or lost to follow-up. Sensorimotor integrative function of the larynx was evaluated by laryngopharyngeal sensory testing (LPST) of the laryngeal adductor reflex (LAR) by delivering a duration (50 msec) and intensity (2.5-10 mmHg) controlled air pulse to the aryepiglottic fold to induce LAR. Medical records were retrospectively reviewed for comorbidities. **RESULTS:** The LPST was higher ( $p < 0.001$ ) in infants with moderate (6.8 mmHg) and severe disease (7.4 mmHg) than those with mild disease (4.1 mmHg). At 1, 3, and 6 months the LPST in infants with moderate and severe disease was significantly higher than those with mild disease. At 9 months the LPST decreased in all (3.1- 3.5 mmHg,  $p = 0.14$ ), which also correlated with symptom resolution. Neurologic, genetic and cardiac disease were more common in infants with severe disease ( $p < 0.001$ ). GERD and feeding problems were more common in those with moderate and severe disease ( $p < 0.001$ ). Apgar scores were lower in those with severe disease ( $p < 0.001$ ). Most symptoms resolved within 12 months of presentation. Those with GERD benefited from treatment. Supraglottoplasty resulted in few complications and significant benefit. Multiple comorbidities ( $> 3$ ) influenced the need for tracheotomy. **CONCLUSIONS:** Laryngeal tone and sensorimotor integrative function of the larynx is altered. The degree of alteration correlated with disease severity, indicating factors that alter the peripheral and central reflexes of the LAR have a role in the etiology of laryngomalacia. GERD, neurologic disease, and low Apgar scores influenced severity and clinical course explaining the spectrum of disease symptoms and outcomes. Sensorimotor integrative function improved as symptoms resolved.

**9:15 FOWLER AWARD PRESENTATION -  
TRIOLOGICAL THESIS**

**Electrical Resistivity Measurements in the Mammalian Cochlea after Neural Degeneration**

**Alan G. Micco, MD, Chicago, IL**

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to 1) discuss techniques to determine the electrical resistivity of mammalian cochlear structures; 2) understand the effects of neural degeneration on the electrical resistivity of the mammalian cochlea; 3) discuss the possible effects these changes in resistivity may have on cochlear implant function.

**OBJECTIVES:** In the present series of experiments, the effect of neural degeneration on the cochlear structure electrical resistivities was evaluated to test if it alters the current flow in the cochlea and if increased current levels are needed to stimulate the impaired cochlea. In cochlear implants, frequency information is encoded in part by stimulating discrete populations of spiral ganglion cells along the cochlea. However, electrical properties of the cochlear structures result in shunting of the current away from the auditory neurons. This consumes energy, makes cochlear implants less efficient, and drastically reduces battery life. Models of the electri-

cally stimulated cochlea serve to make predictions on current paths using modified and improved cochlear implant electrodes. However, one of the model's shortcomings is that most of the values for tissue impedances are not direct measurements. They are derived from bulk impedance measurements, which are fitted to lumped element models. **STUDY DESIGN:** The four-electrode reflection coefficient technique was used to measure resistivities in the gerbil cochlea. *In vivo* and *in vitro* (the hemicochlea) models were used. Measurements were made in normal and in deafened animals. Cochlear damage was induced by neomycin injection into the animals' middle ears. Neural degeneration was allowed to occur over two months prior to the performing the measurements in the deafened animals. **RESULTS:** The resistivity values in deafened animals were smaller than the normal hearing animals, thus altering the current flow within the cochlea. **CONCLUSIONS:** Resistivity changes and subsequent changes in current path should be considered in future designs of cochlear implants.

**9:25 HONORABLE MENTION FOR CLINICAL RESEARCH - TRIOLOGICAL THESIS**  
**Clinical and Symptom Criteria for the Accurate Diagnosis of Chronic Rhinosinusitis**  
Neil Bhattacharyya, MD, Boston, MA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand and discuss the complex relationships between symptom based diagnostic criteria for CRS and objective endoscopic and computed tomography findings.

**OBJECTIVES:** Explore the relationship between patients' reported symptoms of chronic rhinosinusitis (CRS) and radiographic findings. **STUDY DESIGN:** Prospective, double-blind diagnostic cohort study. Methods: A series of adult patients evaluated for potential CRS was studied. Symptoms, medications and resource utilization were tabulated with the Rhinosinusitis Symptom Inventory (RSI). Lund score was obtained from sinus computed tomography. Patients were classified as normal or true CRS according to published radiographic criteria. In Analysis 1, Lund scores  $\leq 1$  were considered non-diseased and scores  $\geq 2$  were considered as representing true CRS. In Analysis 2, the cut-off was 3-4. Classification and regression trees were used to segregate patients according to clinical criteria for the diagnosis of CRS. **RESULTS:** 703 adult patients were enrolled (mean age, 43.1 years). The nasal symptom domain was most severe (51.8), followed by the facial domain (47.3). Patients missed substantial workdays (3.8/year) and incurred significant physician visits (3.5/year) due to CRS. In Analysis 1, 144 (20.5%) patients were classified as normal and 559 (79.5%) as true CRS. Only polyp presence ( $p < 0.001$ ) and dysosmia ( $p = 0.008$ ) distinguished between normal and diseased patients. Classification analysis revealed that polyps, absence of dental pain, low congestion/obstruction scores with dental pain and a history of extended antibiotic courses predicted for true CRS. Analysis 2 identified 243 (34.6%) normals versus 460 (65.4%) with CRS. Only polyp presence and dysosmia statistically distinguished between groups ( $p < 0.001$ ). Mean RSI nasal domain was higher for CRS patients ( $p = 0.01$ ). Classification analysis identified that polyps or dysosmia score  $> 2$  effectively predicted CRS. Fatigue  $\leq 2$ , discharge  $\leq 4$  and obstruction  $\leq 3$  further predicted for CRS. Symptoms despite a  $\geq 5.5$  week trial of nasal steroids also predicted for CRS. **CONCLUSIONS:** Establishing symptom based criteria for the diagnosis of CRS is difficult. Corroborating radiographic evidence is needed before significant intervention for CRS.

**9:33 HONORABLE MENTION FOR BASIC RESEARCH - TRIOLOGICAL THESIS**  
**EMMPRIN Stimulates Fibroblast-Mediated Collagenolysis in Vitro and Tumor Section Growth in Vivo**  
Eben Rosenthal, MD, Birmingham, AL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participant should understand the role of tumor cell derived EMMPRIN in tumor-stromal interactions in head and neck cancer.

**OBJECTIVES:** Extracellular matrix metalloprotease inducer (EMMPRIN) is a molecule expressed on the cell surface of tumor cells that has been shown to induce both tumor cells and fibroblasts to express matrix metalloproteases (MMPs) *in vitro*. We hypothesize that fibroblasts are stimulated EMMPRIN to create a microenvironment favorable to tumor growth. **STUDY DESIGN:** Case series review of laryngeal cancer and assessment of tumor cell lines *in vivo*. **METHODS:** EMMPRIN immunoreactivity in 33 pathological specimens from patients with supraglottic laryngeal cancer was correlated with clinicopathological features and survival. The CAL 27 cell line was transfected with EMMPRIN (CAL 27E) or a control vector (CAL 27). Cells were xenografted into the flank of SCID mice with or without a coinjection of normal dermal fibroblasts (NDFs). **RESULTS:** Immunohistochemical detection of EMMPRIN in laryngeal cancer specimens demonstrated expression in all the tumors, but not in adjacent, histologically normal mucosa. EMMPRIN membrane immunoreactivity (Transmembrane EMMPRIN score or Tmem) was associated with nodal positivity ( $p = 0.07$ ) and it was associated with poorer survival (HR = 2.4, 95% CI 0.88, 6.55). As a categorical variable, higher EMMPRIN expression positively correlates with higher mortality. To determine if EMMPRIN mediates tumor growth *in vivo* through fibroblast stimulation, EMMPRIN expressing CAL 27 (CAL 27E) xenografted ( $n = 20$ ) onto the flank of SCID mice developed larger tumors than CAL 27 control vector transfected cells alone ( $n = 20$ ), but not significantly larger ( $p = 0.17$ ). However, when CAL 27E cells

were coinjected with NDFs, there was a statistically significant increase in tumor growth compared to the CAL 27 cells coinjected with NDFs (n=10, p = 0.0038). **CONCLUSIONS:** As a cell surface expressed protein that promotes tumor growth and high expression in HNSCC but not in normal tissue, EMMPRIN may be a good target for directed molecular therapy.

#### **9:41 HONORABLE MENTION FOR BASIC RESEARCH - TRIOLOGICAL THESIS**

##### **The Role of Nitric Oxide in the Development of Distant Metastasis from Squamous Cell Carcinoma**

**Richard L. Scher, MD, Durham, NC**

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss 1) the role of *in vivo* videomicroscopy (IVVM) in the study of distant metastasis from squamous cell carcinoma of the head and neck; 2) the potential role of nitric oxide (NO) in the generation of distant metastasis from squamous cell carcinoma of the head and neck through its affect on intravascular arrest of circulating squamous carcinoma cells in the microcirculation; and 3) the possible role of other inflammatory cytokines, such as interleukin-1 (IL-1), in the interaction between circulating squamous carcinoma cells and the microcirculation, and their effect on the development of distant metastasis.

**BACKGROUND:** Metastasis, the dissemination of malignant cells to distant sites, remains one of the most significant factors responsible for death from cancer. Recent studies have shown some improvement in the rate of distant metastasis with the addition of chemotherapy to surgery and radiation for treatment of head and neck squamous cell carcinoma (HNSCC). However, diagnosis and treatment at an early stage ultimately leads to a better prognosis. The prediction of which patients will develop metastasis and the selection of treatment most effective at preventing and treating metastasis remains dependent on an incomplete understanding of prognostic factors and the biologic and molecular basis for metastatic development. This study was undertaken using an *in vivo* model to investigate the possible role of nitric oxide in the development of metastasis from HNSCC. The findings will result in better understanding of the metastatic process for HNSCC, with the potential to develop and implement therapies that would prevent and treat metastasis in patients. **OBJECTIVES:** 1) To analyze whether *in vivo* videomicroscopy (IVVM) is useful for the study of distant metastasis from squamous cell carcinoma of the head and neck; and 2) using IVVM, investigate the effect of the biologic mediators nitric oxide (NO) and interleukin-1 (IL-1) on the adhesion of circulating human HNSCC cells in the hepatic microcirculation. **STUDY DESIGN:** Prospective study using an animal model. **METHODS:** Phase 1: Athymic nude rats and mice were used for IVVM experiments. The cremaster muscle and liver, used as arterial and venous flow models, were tested to determine whether IVVM was useful for the study of human HNSCC interactions with the microcirculation. A human squamous cell carcinoma cell line (FaDu) labeled with the intracytoplasmic fluorescent marker BCECF-AM, was used for all experiments. Videomicroscopic images of FaDu cells in the microcirculation were analyzed for cell adhesion, morphology, deformation, circulation, location of adhesion within the microcirculation, and alteration of microvascular circulation. Phase 2: The effect of IL-1, NO and NO inhibitors on HNSCC cell adhesion in the hepatic microcirculation of nude mice was analyzed by IVVM. This was followed by histologic determination of the ratio of FaDu cells present for liver area analyzed. Nude mice were treated with 1) IL-1; 2) L-arginine (an NO substrate); or 3) L-N-monomethyl-L-arginine (L-NMMA, a NO synthase inhibitor) alone or in combination. These data were analyzed statistically to determine the effect on cell adhesion in the liver. **RESULTS:** IVVM provided a method for the study of circulating HNSCC with the microcirculation in both the cremaster and liver models. FaDu cells were arrested at the inflow side of the circulation, with maintenance of cell integrity. L-arginine and IL-1 both increased FaDu cell arrest in the liver above baseline (p=.00008 and p=.003), and the combination of these agents potentiated the effect (p=.000009). **CONCLUSIONS:** IVVM allows direct assessment of circulating HNSCC with the microcirculation and is a powerful model for the study of DM. NO and IL-1 play a role in increasing the arrest of HNSCC in the liver and are important in the generation of DM in patients with squamous cell carcinoma of the head and neck.

**9:50 - Break in Exhibit Hall - Riverside Center East**

**10:15**

### **10:15 - 11:15 CONCURRENT PANELS**

#### **COLUMBUS C&D**

##### **PANEL: COCHLEAR IMPLANTS IN ADULTS AND CHILDREN: CURRENT STANDARDS AND LATEST DEVELOPMENTS**

**Moderator:** Thomas J. Balkany, MD\*, Miami, FL

**Panelists:** Douglas D. Backous, MD\*, Seattle, WA  
William Luxford, MD, Los Angeles, CA  
Julian M. Nedzelski, MD\*, Toronto, ON  
Peter S. Roland, MD\*, Dallas, TX

*GRAND C&D*

**PANEL: MALPRACTICE OR BAD OUTCOME IN ENDOSCOPIC SINUS SURGERY**

**Moderator:** David W. Kennedy, MD\*, Philadelphia, PA

**Panelists:** James A. Stankiewicz, MD, Maywood, IL  
Donald C. Lanza, MD, St. Petersburg, FL  
Rodney P. Lusk, MD\*, Omaha, NE  
Douglas E. Mattox, MD\*, Atlanta, GA  
Patricia J. Foltz, JD, Chicago, IL  
Andrew N. Goldberg, MD\*, San Francisco, CA

**11:20 - 12:00 TRIO/ALA GUEST LECTURES  
Grand C&D**

**11:20 OGURA LECTURE**

**Challenges We Must Confront**

Jonas T. Johnson, MD\*, Pittsburgh, PA

**11:40 DANIEL C. BAKER JR. LECTURE**

**Otolaryngology Teaching: Teaching Otolaryngology**

Harvey M. Tucker, MD\*, Cleveland, OH

**12:00 Lunch in Exhibit Hall - *Riverside Center East***

**SATURDAY, MAY 20, 2006**

**6:30 - 7:45 WINE TASTING RECEPTION**

**Crystal B - West Tower-Green level**

**All COSM attendees are invited to attend.**

**Business casual dress.**

**Tickets may be purchased for \$50 at [www.cosm.md](http://www.cosm.md) or onsite**

# **SUNDAY, MAY 21, 2006**

## **7:00 - 7:50 CONCURRENT MINISEMINARS**

### ***COLUMBUS E&F***

#### **PEDIATRIC OTOLARYNGOLOGY: COMMON CASES GONE BAD**

Ellen M. Friedman, MD\*, Houston, TX

### ***COLUMBUS I&J***

#### **VOCAL DECOMPENSATION: WHO, WHY AND WHEN?**

Jamie Koufman, MD\*, Winston-Salem, NC

### ***COLUMBUS K&L***

#### **RHINOPLASTY: ESSENTIAL PEARLS AND CASES**

Stephen S. Park, MD\*, Charlottesville, VA

## **8:05 - 9:45 CONCURRENT SESSIONS**

### **Session I: Head & Neck - Grand C&D**

### **Session II: Plastic, General & Peds - Grand E&F**

## **CONCURRENT SESSION I: HEAD AND NECK Grand C&D**

**MODERATORS: DAVID W. EISELE, MD\*, SAN FRANCISCO, CA  
GADY HAR-EL, MD\*, BROOKLYN, NY**

### **8:05 Clinical Implementation of Endoscopic Thyroidectomy in Selected Patients**

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

Edward A. Chin, MD, Augusta, GA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss appropriate indications and outcomes for endoscopic thyroidectomy.

**OBJECTIVES:** Systematic investigation of minimal access thyroid compartment surgery combined with the advent of several key new technologies has culminated in the implementation of endoscopic thyroidectomy in specific clinical situations. **STUDY DESIGN:** Prospective, nonrandomized analysis of a consecutive cohort of surgical patients at an academic health center. **METHODS:** A series of patients meeting specific criteria underwent thyroid surgery with the intention of performing endoscopic thyroidectomy. Demographic and clinical data were prospectively collected and included age, gender, indications for surgery, time of surgery, length of incision, need for conversion, and pathology. **RESULTS:** Twenty-two patients successfully underwent endoscopic thyroidectomy between February and October of 2005 (representing 31% of the 71 thyroidectomies done during that period of time). There were 21 females and 1 male, with a mean age of  $43.8 \pm 10.9$  years. Four patients had total thyroidectomy, 18 underwent hemi-thyroidectomies. The mean incision length was  $24.1 \pm 0.5$  mm. There were no cases of permanent hypocalcemia or recurrent laryngeal nerve paralysis. Three patients in whom an endoscopic approach was planned required conversion to a nonendoscopic procedure (a conversion rate of 3/25 or 12%). Factors that made endoscopic surgery more challenging included obesity, the presence of thyroiditis, and nodules >2.5 cm. **CONCLUSIONS:** The combination of new technology and careful experimental investigation has spawned a new era of thyroidectomy in which definitive management of thyroid pathology may be accomplished through an incision of <1 inch. This approach is feasible in the hands of surgeons with high volume thyroidectomy practices who are comfortable with endoscopic principles. The cosmetic advantages are self-evident.

### **8:13 Planned Post-Radiotherapy Neck Dissection: Rationale and Clinical Outcomes**

Gregory K. Sewall, MD, Madison, WI

Kerrin Churas, MPH, Madison, WI

Gregory M. Richards, MD, Madison, WI

Glen E. Levenson, PhD, Madison, WI  
Gregory K. Hartig, MD, Madison, WI  
Paul M. Harari, MD, Madison, WI

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to identify management strategies for the management of advanced regional nodal metastases in patients with primary squamous cell carcinomas of the head and neck, treated with primary chemoradiotherapy. In addition, participants should be able to discuss the use of planned, post-radiotherapy neck dissections in this group of patients, including outcomes (recurrence, survival) and morbidity.

**OBJECTIVES:** Optimal management of the neck in patients with locoregionally advanced squamous cell carcinoma of the head and neck (SCCHN) is controversial. In this study, we examine pathology results and clinical outcome for patients with locoregionally advanced SCCHN who present with N2/N3 neck disease and undergo planned post-radiotherapy neck dissection. **STUDY DESIGN:** Retrospective chart review of IRB approved SCCHN tumor registry. **METHODS:** Review of all SCCHN patients treated with primary radiation (or chemoradiation) and post-radiotherapy neck dissection between 1992-2005 was performed. One hundred seven neck dissections were identified in 93 patients; 79 unilateral and 14 bilateral. All major treatment and outcome parameters were examined with particular emphasis on the post-radiotherapy neck dissection. **RESULTS:** Thirty of 107 neck dissection specimens (28%) showed evidence of residual carcinoma on pathological review. The average for the entire cohort was 21 lymph nodes identified per neck dissection specimen (range 1-60), with 1.3 nodes demonstrating residual carcinoma per positive neck dissection. Imaging studies (CT, MRI, PET) were not consistently performed in the post-radiotherapy treatment setting over the 13 years of this study, nor were they used to guide specific neck dissection recommendations. No correlation was found between the type of neck dissection performed and the presence of residual nodal disease. Eighty-two evaluable patients (93%) remain free of regional disease recurrence, whereas 6 patients have subsequently manifested neck recurrence. Four of the six patients who developed regional recurrence showed viable carcinoma in their neck dissection specimen. Five of these patients underwent comprehensive neck dissection (CND, Levels I-V), one underwent selective neck dissection (SND, < Levels I-V). There was no difference in the 1 and 2 year disease specific survival for patients undergoing CND (88% vs 70%) vs. SND (96% versus 90%). Nine postoperative complications requiring secondary procedures were identified in this series (10%). There was no significant correlation between postoperative complications and the extent of neck dissection performed (CND=11%, SND=7%). Increased age correlated with diminished survival (p=0.1). There was no association between T-stage, addition of chemotherapy, or era (1992-2000, 2001-2005) in which treatment occurred and neck dissection pathology, regional recurrence, and survival. **CONCLUSIONS:** Just over one-quarter of the patients in this series showed residual carcinoma in the neck at the time of post-radiotherapy (or chemoradiotherapy) neck dissection. Several of these patients had experienced complete clinical regression of their neck disease following radiation (or chemoradiation). These findings, combined with the modest overall morbidity of selective neck dissection, suggest that planned post-radiotherapy neck dissection should be strongly considered for patients presenting with N2/N3 neck disease. This remains the prevailing clinical practice at our institution.

## **8:21 Sialoendoscopic Intervention for Salivary Duct Obstructions: Strategies for Difficult and Staged Cases**

Michael H. Fritsch, MD\*, Indianapolis, IN

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand how and when to treat salivary duct obstructions beyond the conventional “small, accessible stone” indications; thereby saving the patient an open sialadenectomy in many cases.

**OBJECTIVES:** To review a series of complex salivary duct obstruction cases and understand how to undertake treatment of difficult pathologic presentations and when to stage endoscopic treatment. **STUDY DESIGN:** Retrospective video and chart review of difficult clinical cases. **METHODS:** Various combinations of laser-fiber, basket-snare, micro-forceps, and balloon dilators were used in certain difficult sialoendoscopic cases to treat the obstructed ducts. Specifically, the patients fell outside of the conventional indications for endoscopic treatment. **RESULTS:** Complicated salivary duct obstructions beyond the usual indications may be successfully treated endoscopically by careful attention to prognostic signs within each individual case which help to determine intraoperative decisions and possible staging of procedures or triage to open sialadenectomy. **CONCLUSIONS:** Clinical experience shows that conventional indications for sialoendoscopy underestimate the effectiveness of endoscopic intervention for large ductal stones and complex pathologies of multiple large polyps and stones. The case for an early triage of all cases that challenge the upper limits of endoscopic indications towards conventional sialadenectomy is probably not indicated. Rather, the surgeon should first be willing to attempt outright single stage removal of larger stones through laser fracturing and micro-instrumentation or use a staged endoscopic effort to relieve symptoms followed by removal of the obstruction and preservation of the duct and gland. Whether stones, polyps, stenoses, strictures, ductal kinking, or combinations thereof are involved, persistence at gentle but thorough endoscopic technique often results in a successful outcome and avoids sialectomy. Some cases clearly are beyond endoscopic treatment and should receive an open gland removal procedure.

### **8:29 Oncologic Outcomes of Transoral Laser Microsurgery for Cancer of the Tongue Base Part 1: Previously Untreated Patients**

David G. Grant, MD, Jacksonville, FL  
John R. Salassa, MD, Jacksonville, FL  
Michael L. Hinni, MD, Scottsdale, AZ  
Bruce W. Pearson, MD\*, Jacksonville, FL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the role of transoral laser microsurgery in the treatment of primary tongue base cancer.

**OBJECTIVES:** To report the oncologic outcomes of transoral laser microsurgery (TLM) in the treatment of previously untreated squamous cell carcinoma of the tongue base. **STUDY DESIGN:** A two center retrospective review of TLM in the treatment of tongue base carcinoma. **METHODS:** Fifty-nine patients with previously untreated squamous cell carcinoma of the tongue base were treated with transoral laser microsurgery between 1996 and 2005. T stage distribution was: T1, 16; T2, 23; T3, 12 and T4, 8. Neck dissections were performed in 48 patients (81%). Twenty-eight patients (47%) underwent adjuvant radiotherapy. Follow-up ranged from 1-106 months with a median of 23 months and a mean of 30 months. **RESULTS:** In patients with a minimum of 12 months follow up undergoing TLM for primary tongue base cancer the 5 year Kaplan-Meier local control rate was 92%. Five year overall and recurrence free survival estimates for all patients were 84% and 86% respectively. The average length of hospital visit for TLM alone was 3 days. Three patients (5%) suffered minor postoperative hemorrhage. **CONCLUSIONS:** Transoral laser surgery is a safe and effective treatment for early and advanced previously untreated cancer of the tongue base. Long-term oncological results compare more than favorably with conventional open surgical techniques.

### **8:37 Changing Patterns of Care for Oropharyngeal Carcinoma: Implications for the Future**

Amy Y. Chen, MD MPH, Atlanta, GA  
Nicole M. Schrag, MSPH, Atlanta, GA  
Andrew Stewart, Chicago, IL  
Elizabeth Ward, PhD, Atlanta, GA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the patterns of care and changing trends in treatment for squamous cell carcinoma of the oropharynx.

**OBJECTIVES:** The aim of this study is to describe patterns of care of oropharyngeal cancer using the National Cancer Database, a community cancer treatment and outcomes database jointly sponsored by the Commission on Cancer of the American College of Surgeons and the American Cancer Society. **STUDY DESIGN:** Retrospective, observational study. **METHODS:** 108,913 cases of squamous cell oropharyngeal cancer were extracted from the NCDB from 1985-2001. 54,548 cases were available for analysis. Type of treatment, type of facility, stage of tumor, treatment volume of facility, payor status, and demographic variables were collected. Frequencies and chi-square analysis were used to compare relationships. Weighted least squares regression analysis was used to analyze treatment trends over time and F-tests were done to test for significance in trends. **RESULTS:** Teaching/research facilities treated a disproportionately higher number of advanced stage cancers ( $p < 0.001$ ). In addition, these facilities treat a higher percentage of uninsured, Medicaid, and non-white patients ( $p < 0.001$ ). During the period of 1985-2001, the use of organ preservation protocols of chemoradiation increased (11% to 30%,  $p < 0.05$ ) among all hospital types and the use of radiation alone is decreasing (53% to 24%,  $p < 0.05$ ). **CONCLUSIONS:** Our results suggest that chemoradiation is increasingly becoming more prevalent at all facility types. Teaching facilities are overly burdened with the most challenging clinical and social cases. Studies comparing outcomes for HN cases by hospital type should control for clinical and nonclinical factors. Resource allocation and staffing needs of academic centers should reflect the greater need of their patients for healthcare and social services.

### **8:45 Quality of Life Outcomes in Patients With Advanced Oropharyngeal Carcinoma Following Chemoradiation Versus Surgery and Radiation**

Sarah E. Mowry, MD, Los Angeles, CA  
Allen S. Ho, BS, Los Angeles, CA  
Ahmad Sadeghi, MD, Los Angeles, CA  
Keith E. Blackwell, MD, Los Angeles, CA  
Marilene B. Wang, MD\*, Los Angeles, CA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to explain why site specific quality of life studies are important to patient care and be able to provide their patients' outcome information on specific domains after

either treatment protocol.

**OBJECTIVES:** To identify any differences in patients' perceived quality of life following either chemoradiation or surgery and radiation for advanced stage oropharyngeal carcinoma. **STUDY DESIGN:** Cohort study from a tertiary academic university practice. **METHODS:** Thirty-five patients were identified who had undergone either primary chemoradiation or primary surgery and postoperative radiation for advanced oropharyngeal cancer (stage II-IV) from an institutional database. Patients voluntarily responded via mail using the University of Washington quality of life instrument version 4 (UW-QOL). Collected data was analyzed using the chi-squared and Wilcoxon tests. **RESULTS:** There were 17 patients who underwent chemoradiation and 18 patients who underwent surgery and postoperative radiation. All surgical patients had undergone free flap reconstruction. Patients completed the UW-QOL an average of 25 months following treatment. There was no statistically significant difference between the two groups with regard to any specific domain including pain, appearance, swallowing, chewing, speech, saliva or mood. There was a trend toward significance for taste ( $p = 0.07$ ), with chemoradiation patients reporting poorer taste function. The lack of difference in the patients' perception of appearance and swallowing was rather surprising, given the vastly different treatment modalities. Respondents reported equivalent overall quality of life in response to global quality of life questions. **CONCLUSIONS:** Most patients with advanced oropharyngeal carcinoma report good quality of life following treatment, regardless of treatment modality. Although the short-term side effects of treatment may be different between the groups, long-term quality of life is remarkably similar whether the patients choose primary chemoradiation or surgery with postoperative radiation.

## 8:53 Discussion

### 8:59 Benefit of Medical Nutrition Therapy (MNT) on Weight Loss and Mucositis in Head and Neck Squamous Cell Carcinoma (HNSCC) Patients Treated With Radiation Therapy

Carol M. Bier-Laning, MD, Maywood, IL  
Nancy Thompson, BBA, Maywood, IL  
Shannon K. Webster, BS, Maywood, IL  
Sharon Foley, MS RD, Maywood, IL  
Carrie Hintzke, RD, Maywood, IL  
Siobhan Wallner, RD, Maywood, IL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the effect of MNT in HNSCC patients undergoing radiation therapy.

**OBJECTIVES:** Patients with head and neck squamous cell carcinoma (HNSCC) often present with weight loss and malnutrition that may worsen with therapy and impact treatment. In a 4 year retrospective analysis of HNSCC patients receiving radiation therapy, we found an association between weight loss and severity of mucositis and weight loss and interruptions in treatment. Based on those findings, this study was designed with the hypothesis that medical nutrition therapy (MNT) administered to HNSCC patients undergoing radiation therapy will decrease weight loss, mucositis and treatment interruptions. **STUDY DESIGN:** Prospective cohort study with historical controls. **METHODS:** 15 patients undergoing radiation therapy for HNSCC received standardized MNT which included weekly meetings with a dietetics professional, education and manipulation of dietary supplements and tube feeds. Data was collected on weight loss, mucositis, treatment interruptions and patient satisfaction by survey. Matched historical controls were used. **RESULTS:** Weight loss in the MNT group averaged 7.6 +/- 8.6 lbs. and 10.8 +/- 11.8 lbs. in the comparison group. Results did not reach statistical significance. There was no significant association with mucositis or treatment interruptions between groups. 85% of patients felt they could not have managed their nutritional care without a dietitian. The cost of providing MNT was estimated at less than \$100 per patient. **CONCLUSIONS:** MNT is an economical, well tolerated therapy that shows promise in decreasing weight loss and possibly mucositis and treatment interruptions in HNSCC patients undergoing radiation therapy. These positive results, though not statistically significant, support our next phase that will examine the effect of specific nutritional supplements in this patient population.

### 9:07 A Safe and Cost Effective Short Hospital Stay Protocol to Identify Patients at Low Risk for the Development of Significant Hypocalcemia Following Total Thyroidectomy

Tarik Y. Farrag, MD, Baltimore, MD  
Zayna S. Nahas, BS, Baltimore, MD  
Frank R. Lin, MD, Baltimore, MD  
Ruth M. Belin, MD, Baltimore, MD  
Ralph P. Tufano, MD, Baltimore, MD

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand and apply an algorithm to determine which patients are least likely to develop significant hypocalcemia following total thyroidectomy, and therefore may be safely discharged after a short stay hospitalization.

**OBJECTIVES:** Significant hypocalcemia after bilateral thyroid surgery can be life threatening and might not manifest until after patient discharge. In this study, we evaluate the utility of the rate of change of early postoperative serum calcium levels for predicting significant hypocalcemia, and propose a cost effective management algorithm that safely minimizes hospital stay following total thyroidectomy. **STUDY DESIGN:** A retrospective chart review of 135 patients who underwent total thyroidectomy. **METHODS:** The calcium level for each patient at 6 and 12 hours after surgery was compared. Patients were categorized as having a positive slope or non-positive slope. The number of patients who experienced significant hypocalcemia was then compared between the two groups in order to assess if rate of change of calcium level over time could predict significant hypocalcemia postoperatively. **RESULTS:** Nineteen percent of our patients developed significant hypocalcemia (26/135). Of the 50 patients who had a positive slope, none experienced significant hypocalcemia. Patients who developed significant hypocalcemia had a non-positive slope 100% of the time (26/26). **CONCLUSIONS:** Patients with a non-positive slope and a serum calcium level greater than 8mg/dl at 12h postoperatively can be safely discharged with patient education and oral calcium supplementation. The slope of postoperative serum calcium levels is therefore an easy, cost effective, and reliable predictor of who will develop significant hypocalcemia following thyroid surgery. Our management algorithm safely identifies those patients that can be confidently sent home within a twenty-four hour period after surgery. It also identifies those that need further hospitalization and are at risk for significant hypocalcemia.

### **9:15 Interleukin-12 Expression Enhances Vesicular Stomatitis Virus Oncolytic Therapy in Murine Squamous Cell Carcinoma**

Edward J. Shin, MD, New York, NY  
Georges B. Wanna, MD, New York, NY (Presenter)  
Bryan Choi, MS, New York, NY  
Oliver Ebert, MD, New York, NY  
Eric Genden, MD, New York, NY  
Savio Woo, PhD, New York, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to demonstrate rVSV-IL-12 is an effective and safe oncolytic agent against squamous cell carcinomas (SCC) in immunocompetent mice.

**OBJECTIVES:** Replication competent vesicular stomatitis virus (VSV) has been demonstrated to be an effective oncolytic agent in a variety of malignant tumors. Cytokine gene transfer has also been used as immunomodulatory therapy for cancer. To test the utility of combining these two approaches an oncolytic VSV vector (rVSV-IL-12) was designed to express the murine IL-12 gene. This cytokine carrying oncolytic virus was compared with an analogous non-cytokine carrying fusogenic virus (rVSV-F) in the treatment of murine SCC VII squamous cell carcinoma. **STUDY DESIGN:** In vitro testing of recombinant VSV-F and recombinant VSV-IL-12 in SCC cell lines. In vivo testing of multiple direct intratumoral injections of rVSV-F or rVSV-IL-12 in an orthotopic floor of mouth murine model. **METHODS:** Each cell line was tested using rVSV-F or rVSV-IL-12 at MOI of .01. The ability of each virus to replicate was tested by real time RT-PCR over 48 hours to determine viral copies of RNA. Cell survival was determined by MTT assay over 72 hours. Morphology of cells was observed via light microscopy. IL-12 expression by rVSV-IL-12 treated cells was determined by ELISA. **RESULTS:** Both viruses demonstrated similar infection efficiency, viral replication, and cytotoxicity in vitro. SCC VII cells infected by rVSV-F and rVSV-IL-12 effectively produced syncytia or IL-12, respectively. In an SCC VII orthotopic floor of mouth model in immunocompetent C3H/HeJ mice, multiple intratumoral injections with each virus caused a significant reduction in tumor volume when compared with saline injections alone. The rVSV-IL-12 treated tumors showed a striking reduction in tumor volume when compared with rVSV-F and saline treated tumors ( $p < .04$ ). This reduction in tumor volume translated into a substantial survival benefit in rVSV-IL-12 treated animals ( $p < .01$ ). No treatment related toxicity was observed in either group. **CONCLUSIONS:** rVSV-IL-12 is a novel oncolytic vesicular stomatitis virus that effectively expresses IL-12 and significantly enhances the treatment of head and neck murine carcinoma. Such combined oncolytic and immunomodulatory strategies hold promise in the treatment of head and neck cancers.

### **9:23 The Use of Immunofluorescent Labeled Antibodies in Head and Neck Cancer Detection**

Brian D. Kulbersh, MD, Birmingham, AL  
Eben L. Rosenthal, MD, Birmingham, AL (Presenter)  
Kurt R. Zinn, PhD DVM, Birmingham, AL  
Tandra R. Chaduri, PhD, Birmingham, AL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the ability of fluorescent labeled antibodies to localize tumor growth and its use in assessment of disease in head and neck cancer patients.

**OBJECTIVES:** Current methods for detecting local and regional spread of head and neck cancer are limited to anatomic and metabolic imaging. We sought to exploit epidermal growth factor (EGFR) overexpression in head and neck squamous cell carcinoma to image human tumors in vivo. **STUDY DESIGN:** In vivo imaging of human tumor xenografts and skin grafts. **METHODS:** SCID mice were implanted with either human squamous cell carcinoma explants or injected with tumor cell line (UM-SCC-1) on the right flank and had human skin grafted onto the left flank. Anti-EGFR antibody (Erbix) was labeled with a fluorescent probe (Cy5.5) and injected systemically into six mice; three uninjected mice served as a control group. The mice underwent in vivo fluorescent imaging at day 0, 2, 7, and 9. Samples were then processed for histology to assess uptake of the fluorescent probe by confocal microscopy. **RESULTS:** Mice injected with the Cy5.5-Erbix conjugate showed significantly higher fluorescence in the tumors (avg 2.3 mm<sup>2</sup> in size, p=.0258) and skin grafts (avg 8.5 mm<sup>2</sup> p=.0072) at all time points compared to uninjected controls, with the largest difference occurring at day 2. Furthermore, xenografted and SCC-1 tumors also showed significantly higher fluorescence (p=.05) when compared to skin graft in the same mice, most notably 2 hours after injection. **CONCLUSIONS:** Fluorescently labeled anti-EGFR antibody linked had a higher affinity for tumor xenografts than skin xenografts in immunodeficient mice. Fluorescent imaging using an endoscope or microscope may improve assessment of local and regional disease in head and neck cancer patients.

### **9:31 Changes in Cellular Fluorescence Caused by Treatment of Human Papillary Thyroid Cancer Cells With Diindolylmethane (DIM)**

Marc A. Stiefel, MD, New York, NY  
Kiranmayi Tadi, MD, Valhalla, NY  
Moshen Nasir, BA, Valhalla, NY  
Howard E. Savage, PhD, New York, NY  
Raj Tiwari, PhD, Valhalla, NY  
Stimson P. Schantz, MD\*, New York, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the effects that diindolylmethane (DIM) has on proliferating cells, specifically papillary thyroid carcinoma cells. Participants will also be able to discuss the fluoroscopic changes due to treatment with DIM that can be measured via spectroscopy and explain the possible causes for these changes at a cellular level.

**OBJECTIVES:** Diindolylmethane (DIM), an acid catalyzed dimer of indole 3 carbinol present in cruciferous vegetables has anticancer activity in breast, prostate and thyroid cancers and is being tested as a chemopreventive agent in a clinical setting. Since examination of proliferative activity in the thyroid is currently indicated by FNAC, there is a need to develop noninvasive diagnostic procedures. We used fluorescence spectroscopy to measure DIM mediated antiproliferative activity in papillary thyroid cancer. **STUDY DESIGN:** Experimental. **METHODS:** Human papillary thyroid cancer cell lines, 8505-C and B-CPAP were grown in RPMI supplemented with 10% fetal bovine serum and treated with 50µM DIM for 24 hours. The treated cells along with untreated controls were then harvested, spun down in a centrifuge and scanned using a fluorescence spectrometer. The spectral patterns for the two cell lines of papillary carcinoma were compared both before and after treatment with DIM. **RESULTS:** The fluorescence spectra scanned at excitation wavelengths in the range of 250-500nm and emission wavelengths of 360-600nm correlated well with antiproliferative activity of DIM. The 300nm emission scan and the 340nm and 380nm excitation scans showed shifts in their peak intensity indicative of defective cellular proteins that are modulators of cellular proliferation. **CONCLUSIONS:** Treatment with DIM does appear to have an effect on the fluoroscopic pattern of papillary carcinoma cells, and our experiments may lead to the development of a noninvasive method to evaluate thyroid proliferative disease and assess response to therapeutic interventions.

### **9:39 Discussion**

**9:45 - Break in Exhibit Hall/Visit Posters - Riverside Center East**  
**10:15**

## **8:05 - 9:45 CONCURRENT SESSION II: PLASTIC & RECONSTRUCTIVE, PEDIATRIC & GENERAL Grand E&F**

**MODERATORS: KENNETH M. GRUNDFAST, MD\*, BOSTON, MA**

**8:05 The Use of Bilateral Facial Artery Musculomucosal (FAMM) Flaps for Palatal Lengthening**

Samuel J. Lin, MD, Chicago, IL

Bruce S. Bauer, MD, Chicago, IL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand an alternate method of palatal lengthening in the patient with a deficient cleft palate repair.

**OBJECTIVES:** In the uncomplicated cleft palate, the Furlow double opposing Z-palatoplasty, the V-Y pushback and the two flap palatoplasty techniques have been used for palatal lengthening. However, the amount of lengthening that is achievable is limited by the amount of palatal tissue available. The facial artery musculomucosal (FAMM) flap described by Pribaz may be harvested in a retrograde or anterograde fashion and has been used to reconstruct areas of the oral cavity and nasal area. We describe the use of bilateral FAMM flaps in lengthening the palate. **STUDY DESIGN:** We have performed this procedure in 5 patients at our institution. Each patient had undergone prior palatal surgery including cleft repair and lengthening procedures. However, each of these patients continued to exhibit velopharyngeal incompetence. This procedure was chosen for 3 patients whose pharyngeal vascular contraindicated a more standard pharyngoplasty, and the additional patients had atypical palatal clefts with marked hypoplasia of the palate. **METHODS:** First, the hard and soft palates are completely separated. Bilateral FAMM flaps are designed utilizing both buccal areas as donor sites. One FAMM flap serves as the muscle/nasal mucosal surface and the other FAMM flap provides the muscle/oral mucosal layer. Effectively, the palate may be lengthened to a greater extent than by native palatal tissue alone. **RESULTS:** No patients had perioperative complications and follow-up has averaged 2 years. While 3 of the 5 patients have compounding problems of apraxia and learning delays, necessitating ongoing intensive speech therapy, these and the remaining 2 patients have all shown improvement in velopharyngeal closure with the palatal elongation. **CONCLUSIONS:** This additional indication of the FAMM flap may be a useful adjunct in palatal lengthening procedures.

**8:13 Microvascular Submandibular Gland Transfer for Severe Xerophthalmia**

Randal C. Paniello, MD\*, St. Louis, MO

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the role of microvascular submandibular gland transfer in the restoration of moisture to the surface of the eye in patients with severe xerophthalmia (dry eye).

**OBJECTIVES:** To report early clinical experience with a new microvascular reconstructive procedure for patients with severe xerophthalmia. Reconstructive microsurgeons are uniquely positioned to help this very unfortunate group of patients who are often blind and are unable to undergo vision restorative surgery because of the severe dryness of their eyes. Experience with this procedure has been reported by groups from other countries, but not from the United States. **STUDY DESIGN:** Retrospective clinical series.

**METHODS:** Patients with severe xerophthalmia were referred for evaluation by their ophthalmologist after having exhausted all conventional means of treatment. The ipsilateral submandibular gland was transferred to the temporal fossa, as described by Macleod et al. The gland was revascularized using the superficial temporal artery and appropriate vein(s), often requiring a vein graft. The salivary duct was directed to the superior lateral fornix, so that the saliva produced served to replace the missing tears and moisten the eye. Results and complications were reviewed. **RESULTS:** Four patients underwent the procedure as described. The etiology of severe xerophthalmia was Stevens-Johnson syndrome in 3 and chemical burn in one. All patients had a pretreatment Schirmer's test score of <5 (normal, 10-15). Successful transfer with revascularization was achieved in all cases. All patients experienced symptomatic relief within one month. One patient has already undergone successful eye surgery, with restoration of his vision; the others are being evaluated for the same. There were no major complications. \*\*\*Note: Additional patients will be reported.\*\*\*

**CONCLUSIONS:** Microvascular submandibular gland transfer is an effective approach for correcting severe xerophthalmia. The procedure should be within the skills of any reconstructive microsurgeon. This procedure offers a unique opportunity for otolaryngologist head and neck surgeons to help restore vision to this unfortunate group of patients.

**8:21 Pediatric Malignant Melanoma of the Head and Neck: A Retrospective Review of Management and Review of Evolving Treatment Options**

James C. French, MD, Loma Linda, CA

Mark R. Rowe, MD, Loma Linda, CA

Jonathan E. Zwart, MD, Loma Linda, CA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to identify the pertinent risk fac-

tors and clinical presentation of pediatric melanoma in the head and neck. Furthermore, participants will be able to explain current staging and compare evolving treatment options from a discussion of our experience with this disease.

**OBJECTIVES:** To review our experience with pediatric melanoma of the head and neck, and educate healthcare providers on risk factors, proper diagnostic protocol, and emerging treatment options. **STUDY DESIGN:** We describe our experience with pediatric melanoma of the head and neck over the past 25 years and review current literature on prevalence, diagnosis and treatment options. **METHODS:** A retrospective chart review was conducted for all pediatric head and neck melanoma patients over the past 25 years at our institution. Data on gender, race, location, treatment rendered, staging, and disease free survival was collected on all patients. **RESULTS:** In the past 25 years, all cases of pediatric melanoma were identified at our institution. Patients were treated with wide local excision. Sentinel lymph node biopsies were performed in cases in which the original diagnosis was ambiguous or depth of invasion could not be determined. In this review, pediatric melanoma seemed to have a predilection for the auricle and occurred in Caucasian children. Age and gender did not appear to have a significant predictive role in this disease. **CONCLUSIONS:** Pediatric melanoma of the head and neck is a rare and deadly disease. An aggressive diagnostic protocol is critical to improving survival. The use of sentinel lymph node biopsy is recommended when the depth of invasion cannot be determined from original biopsy or the original pathologic diagnosis is ambiguous. Education and awareness of the disease is vital to early diagnosis and treatment initiation.

### **8:29 Evaluation of Factors in Recurrent Juvenile Nasopharyngeal Angiofibromas**

Mark S. Persky, MD\*, New York, NY  
Dilip Madnani, MD, Bronx, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss factors that are or are not important for recurrent juvenile nasopharyngeal angiofibromas.

**OBJECTIVES:** To conduct a review of a single surgeon's experience in the management of patients presenting with juvenile nasopharyngeal angiofibromas (JNA's). **STUDY DESIGN:** A retrospective chart review of 16 patients undergoing JNA resection by the senior author between 1991 and 2003. **METHODS:** We present data reviewing the patients' age, sex, presenting symptoms, physical examination, radiological findings, angiography and embolization results, operative findings and follow-up course. **RESULTS:** Four of the 16 patients had recurrent tumor. The mean age of the 12 patients without recurrent tumor was 16 years (range 13-23) and the mean age of the 4 patients with recurrence was 14 years (range 11-18). Sixty percent (3 patients) of the patients with stage III disease and 33% of patients with stage IIB disease developed recurrent tumor. Five of eleven patients with retrievable data who had primary curative resection demonstrated bilateral external carotid blood supply whereas this was present in two of the four patients with recurrent tumor. Eight of the 11 primarily cured patients had internal carotid artery supply with one patient demonstrating bilateral supply. All 4 patients with recurrent tumor had internal carotid artery supply, also with one patient showing bilateral supply. Ten of the 12 patients without recurrent disease and 3 of the 4 patients with recurrence underwent a midfacial degloving approach and one in each group had a Weber-Ferguson approach. The additional patient without recurrence underwent a transpalatal resection. The mean disease free follow-up was 40.5 months (range 17-97 months) for the 12 patients without recurrences. The average time to first recurrence was 25 months (range 12-38 months). Three of the 4 patients with recurrences recurred only once and have subsequently been free of disease for an average of 110 months (range 75-144 months). **CONCLUSIONS:** The only factor approaching significance for recurrent JNA's in our series was advanced stage of tumor at presentation (p value 0.06). There was no significant difference in age, sex, presenting symptoms, blood supply or surgical approach.

### **8:37 Reduction of Complication Rate in Percutaneous Dilation Tracheotomy**

David Goldenberg, MD, Hershey, PA  
Marek Mirski, MD, Baltimore, MD  
Arzu Tatlipinar, MD, Baltimore, MD  
Nasir I. Bhatti, MD, Baltimore, MD

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to better understand the impact of correct patient selection and set protocols on the increased safety of percutaneous dilation tracheotomy.

**OBJECTIVES:** Percutaneous dilation tracheotomy (PDT) is now an accepted alternative to surgical tracheotomy in certain patients. We began performing these procedures in 2000 and use it regularly in select intensive care unit (ICU) patients requiring prolonged intubation and mechanical ventilation. We found that over time with strict protocols in patient selection and operative procedure we were able to clearly show a significant decrease in the frequency and severity of complications with this technique. **STUDY DESIGN:** A retrospective study of 318 percutaneous dilation tracheotomies was performed. **METHODS:** A retrospective chart review of consec-

utive PDTs performed in our institution between the years 2002 and 2005 was undertaken. Procedural and postoperative complications in an earlier group were compared to those in the later group for both frequency and severity. **RESULTS:** 318 PDTs were performed on intensive care patients during this time period. All were performed using the Ciaglia method and the Cook Blue Rhino set® under direct bronchoscopic visualization. In Group A, the first 159 PDTs performed, there were a total of 12 complications (7.5%) including 6 cases of perioperative hemorrhage while in group B, the second 159 PDTs there were a total of 7 complications (4.4%) with no cases of perioperative hemorrhage. **CONCLUSIONS:** PDT provides an easy and convenient alternative to OT and should be added to the otolaryngologist's armamentarium of surgical airway procedures. The complication rate of PDT is low and similar to that of open operative tracheotomy. However with experience and the use of strict protocols in both patient selection and PDT procedure, the complication rate can be significantly reduced both in frequency and severity making it as safe an open operative tracheotomy.

## 8:45 Discussion

### 8:51 Alar Base Flap and Suspending Suture (ABFSs): A Strategy to Restore Symmetry to the Nasal Alar Contour in Primary Cleft Lip Rhinoplasty

Usama Hamdan, MD, Boston, MA

William Numa, MD, Boston, MA (Presenter)

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to recognize, compare and discuss the mechanism and importance of different surgical techniques to restore alar symmetry in primary cleft rhinoplasty. Participants may be able to include the ABFSs techniques as a standard approach to primary cleft lip rhinoplasty.

**OBJECTIVES:** At the conclusion of this presentation, the participants should be able to recognize, compare and discuss the mechanism and importance of different surgical techniques to restore alar symmetry in primary cleft rhinoplasty. Participants may be able to include the ABFSs techniques as a standard approach to primary cleft lip rhinoplasty. **STUDY DESIGN:** We describe a surgical technique designed to restore symmetry to the nasal alae in patients undergoing primary cleft lip rhinoplasty. **METHODS:** We report a series of patients presenting with varying degrees of nasal and cleft lip deformity. All patients underwent cleft lip repair with concurrent primary cleft rhinoplasty. Patients in the group with the newly described technique were selected consecutively, as reflected in a change in the senior author's surgical technique. Control group was matched for age, gender, degree of clefting, and laterality. One surgeon operated on all patients over a period of ten years. A panel including nonmedical and healthcare independent observers evaluated photographic results postoperatively. **RESULTS:** Thirty patient records were reviewed. Seventeen patients underwent the alar base flap and suspending suture technique. The patients in whom the described technique was carried out was easily identified by the panel of independent observers on the basis of the perceived postoperative alar symmetry. **CONCLUSIONS:** Patients presenting with cleft lip deformity usually present with a characteristic nasal deformity. Execution of the described surgical techniques restores nasal alar symmetry in patients undergoing primary cleft rhinoplasty.

### 8:59 Electroporated Gene Delivery in Porcine Laser Burns

Peter J. Killian, MD, San Diego, CA

Craig C. Cupp, MD, San Diego, CA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to evaluate the effectiveness of delivering genes to laser injured skin in a large animal using in vivo electroporation. They will understand that if this is practical in laser injured skin, potential clinical benefits for this type of gene therapy are treatment of skin injuries using growth factor genes.

**OBJECTIVES:** The vast majority of in vivo gene delivery methods are based on viral vectors. While effective, viral vectors have significant drawbacks. These include cost, availability and human safety issues. The purpose of this study was to evaluate the effectiveness of delivering genes to laser injured skin in an animal using in vivo electroporation. Electroporation is a means of physical gene transfer using an electric field. **STUDY DESIGN:** There were four experimental groups, 32 burn sites per group. 1) laser burn with dermal DNA injection; 2) laser burn with topical application of DNA; 3) laser burn with injection of marker gene and electroporation; and 4) laser burn with topical application and electroporation. **METHODS:** The DNA marker gene was luciferase. Punch biopsies were taken from the treated sites on day 4 and 14 and luciferase was measured. **RESULTS:** Group 1 had the highest delivery of plasmid DNA to the dermis. No electroporation was used in this group. Additionally, the highest delivery was found on day 4 vs. 14. There was a statistically significant difference between group 1 and group 2 on day 4 with a P value of 0.05. **CONCLUSIONS:** Based on prior studies we anticipated that group 2 would have the highest protein expression. However, in every paired group, electroporation resulted in lower gene expression. This may be explained by new electroporation studies demonstrating optimal electroporation settings. Voltage studies that were too high resulted in detrimental gene delivery. The settings used in this study were the

same as for non-burned skin indicating that the voltage was too high in damaged skin.

### **9:07 Spectrum of Temporal Bone Abnormalities in Trisomy 21 Includes Inner Ear Dysplasias**

Susan I. Blaser, MD, Toronto, ON Canada  
Adrian L. James, MA, Toronto, ON Canada  
Evan J. Propst, MD, Toronto, ON Canada  
Blake C. Papsin, MD\*, Toronto, ON Canada

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to demonstrate a greater knowledge of the inner anomalies associated with trisomy 21 (Down syndrome).

**OBJECTIVES:** Middle and external ear anomalies are well recognized in trisomy 21 (Down syndrome). Inner ear anomalies are much less frequently described. This study reviews the morphology of the inner ear to determine the prevalence of cochlear and vestibular anomalies in trisomy 21. **STUDY DESIGN:** Retrospective review. **METHODS:** Sequential patients with trisomy 21 and CT examinations were identified via a radiology report text search program. Biometric assessment of the inner ear was made on patients with high resolution CT images of the petrous bone. Measurements were compared with normative data. **RESULTS:** 24 patients were identified with either petrous CT examinations ordered for otologic indications (n = 8) or CT examinations ordered for brain or spinal indications, but including high resolution images of the petrous bone (n = 16). Inner ear dysplasias were seen in 23 of 24 patients (96%). These included small bony island of the lateral semicircular (n = 15; 63%), fusion of the lateral semicircular canal and vestibule into a single cavity (n = 4; 17%), vestibular aqueduct enlargement (n = 5; 21%), cochlear nerve canal hypoplasia (n = 4; 17%). Stenosis of the external meatus, poor mastoid pneumatization, middle ear and mastoid opacification and cholesteatoma were common, as expected. **CONCLUSIONS:** Inner ear dysplasias are much more common in trisomy 21 than previously reported. Vestibular malformations are particularly common and small bony island of the lateral semicircular canal (<3mm diameter) appears highly typical. These findings suggest the possibility of previously unrecognized deficits in vestibular function in trisomy 21.

### **9:15 Montelukast Sodium as a Treatment Modality for Pediatric Otitis Media With Effusion and Eustachian Tube Dysfunction**

Mark J. Burstein, MD, Albany, NY  
Jason S. Mouzakes, MD, Albany, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the role of montelukast sodium in the treatment of chronic otitis media and eustachian tube dysfunction in pediatric patients.

**OBJECTIVES:** The objective of this investigation is to evaluate the efficacy of montelukast sodium, a selective leukotriene receptor antagonist, in the treatment of pediatric otitis media with effusion (OME) and eustachian tube dysfunction (ETD). **STUDY DESIGN:** This pilot study, conducted at a pediatric otolaryngology practice associated with a tertiary care facility, consisted of a retrospective chart review. **METHODS:** Inclusion criteria were a recent history of recurrent or persistent OME, physical exam or tympanometric findings consistent with either OME or ETD, initiation of a course of oral montelukast sodium at that visit, and availability of follow-up at approximately 30 days. Outcomes including the presence of middle ear effusion, persistent negative middle ear pressure, or complete resolution were determined by physical examination or tympanometry. **RESULTS:** OME was noted in 25 ears at presentation. At follow-up, OME was noted in 6 (24%), and clearance of middle ear effusion was observed in 19 ears (76%). Of these 19, ETD without effusion was noted in 7 (28%), and complete resolution was noted in 12 (48%). ETD without effusion was noted in 18 ears. At follow-up, none were noted to have OME, 4 (22%) were noted to have persistent ETD, and 14 (78%) were noted to have complete resolution. No complications were noted. **CONCLUSIONS:** The preliminary results of this pilot study support the hypothesis that montelukast sodium is an effective therapeutic option for pediatric otitis media with effusion and eustachian tube dysfunction. We hope to gather conclusive data through a randomized, double blinded, placebo controlled investigation.

### **9:23 A New Anti-Stuttering Device: Treatment of Stuttering Using Bone Conduction Stimulation With Delayed Temporal Feedback**

Katrina R. Stidham, MD, San Ramon, CA  
Peter Howell, PhD, London, England  
Lisa Olson, CCC-A, Palo Alto, CA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the concept and effects of a new prototype device using a modification of a bone conduction hearing device with temporal delay feedback on adult stutterers.

**OBJECTIVES:** Stuttering is a communication disorder affecting approximately 1% of the adult population, some with severe manifestations. Speech therapy improves stuttering, but many do not receive enough benefit to communicate fluently. Anti-stuttering devices have been available for several years, but available technology has been limited in long-term success and reliability. The current study evaluates the effects of a prototype device using a modification of a currently used bone conduction hearing device with temporal delay feedback on adult patients with significant stuttering problems. **STUDY DESIGN:** A prospective nonrandomized study evaluating effects of a prototype device on stuttering in adult subjects. **METHODS:** Twenty stutterers  $\geq 16$  years of age were fit with a bone conduction device on a headband, with temporal feedback delayed according to patient preference between 20 and 200 msec. Patients were asked to wear the device at least 4 hours/day for 4 weeks. Stuttering Severity Index-3 (SSI-3) tests were completed at pre-fit, immediate post-fit, 2 week, 4 week and 6 week intervals. Questionnaires were also completed at each visit. **RESULTS:** A statistically significant decline in SSI-3 scores was documented from pre-fit compared to all other time intervals ( $p < .001$ ) using the Holm-Sidak method and Tukey Test method. Patients subjectively noted improvement in their speech and confidence using the device. **CONCLUSIONS:** A new anti-stuttering prototype using a modification of a bone conduction device with delayed temporal feedback is effective in decreasing stuttering in patients over a short time course. Further studies need to be completed to evaluate the long-term effects of the device.

### **9:31 Analysis of Efficiency and Resident Impact in an Academic Otolaryngology Clinic**

Alan L. Cowan, MD, Galveston, TX  
Shawn D. Newlands, MD PhD MBA\*, Galveston, TX

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to identify strategies for increasing productivity and patient volume in a resident based clinic.

**OBJECTIVES:** Process modeling is a standard method used for analyzing complex procedures and work flows in manufacturing or distribution environments. Although this technique is common and well documented in the business environment, few studies have analyzed the healthcare delivery model and how changes may affect the efficiency of patient care and access. We analyze our current clinic strategy, and determine if changes in faculty, resident, or scheduling methods can improve overall clinic efficiency. **STUDY DESIGN:** Prospective modeling analysis of an academic outpatient clinic. **METHODS:** A representative model was designed based on the current outpatient faculty and resident clinics. Data for patient interaction was obtained by video surveillance. Stat::Fit® software then identified statistical distributions to simulate variability for each activity. Patient evaluation procedures were elicited from videos, questionnaires, and direct interviews. Models of current and prospective clinics were created using MedModel® software. Data regarding patient volumes, resource usage, and wait times were collected for each scenario. **RESULTS:** We analyzed four modifications of patient flow; prioritization of patient types, resident supervision level, faculty involvement in patient evaluation, and proactive scheduling of complex patient exams. Of these, resident supervision level and faculty involvement both resulted in significant changes in clinic efficiency. Patient prioritization showed only small changes, and no benefit was found with prescheduling of complex patients. **CONCLUSIONS:** In an academic otolaryngology clinic, increasing resident independence and primary evaluation of patients by faculty will likely result in improved clinic flows, decreased wait times, and increased clinic volumes.

### **9:39 Discussion**

**9:45 - Break in Exhibit Hall/Visit Posters - Riverside Center East**

**10:15**

## **10:15 - 12:00 - PANELS Grand C&D**

**10:15 - PANEL: EXPERT WITNESS TESTIMONY**

**11:10 Moderator:** Gerald B. Healy, MD\*, Boston, MA

**Panelists:** L. D. Britt, MD, Norfolk, VA  
Edward Hinchey, Esq, Boston, MA  
Roger M. Rose, MD, South Salem, NY  
Sandra L. Shapshay, PhD, Bloomington, IN

**11:10 - PANEL: THE ELUSIVE STANDARD OF CARE**

**12:00 Moderator:** Mark S. Persky, MD\*, New York, NY

**Panelists:** Daniel G. Deschler, MD, Boston, MA

Paul J. Donald, MD\*, Sacramento, CA  
W. Jarrard Goodwin, MD\*, Miami, FL  
Gady Har-El, MD\*, Brooklyn, NY  
Richard V. Smith, MD, Bronx, NY

12:00 Lunch in Exhibit Hall/Visit Posters - *Riverside Center East*

**5:30 - 7:00 MEET THE AUTHORS POSTER RECEPTION**  
**Riverside Center East**

## **MONDAY, MAY 22, 2006**

7:00 - BUSINESS MEETING - MEMBERS ONLY *Grand C&D*  
7:45

### **7:45 - 8:30 CONCURRENT MINISEMINARS**

#### *COLUMBUS A&B*

WHAT DO I DO WITH THIS? SURGICAL DILEMMAS NOT COVERED IN THE TEXTBOOK  
Richard E. Hayden, MD\*, Scottsdale, AZ

#### *COLUMBUS I&J*

FIXING CSF LEAKS AND ENCEPHALOCELES—A NO-BRAINER  
Ralph B. Metson, MD\*, Boston, MA

#### *COLUMBUS K&L*

COCHLEAR IMPLANTS—WHAT'S NEW???  
Harold C. Pillsbury, MD\*, Chapel Hill, NC  
Craig A. Buchman, MD\*, Chapel Hill, NC  
Peter S. Roland, MD\*, Dallas, TX

### **8:30 - 9:45 CONCURRENT SESSIONS**

**Session I: Panel and State of the Art Invited Lectures - Grand C&D**

**Session II: Otology - Columbus C&D**

### **CONCURRENT SESSION I: PANEL AND STATE OF THE ART INVITED LECTURES Grand C&D**

8:30 - PANEL: PRESURGICAL EVALUATION AND TREATMENT

9:20 OF SLEEP DISORDERED BREATHING

Moderator: B. Tucker Woodson, MD\*, Milwaukee, WI  
Panelists: Michael Friedman, MD\*, Chicago, IL  
Regina P. Walker, MD, Hinsdale, IL  
Brent A. Senior, MD, Chapel Hill, NC

9:20 - STATE OF THE ART LECTURE - ENDOSCOPIC SINUS

9:32 SURGERY SIMULATION

SURGICAL SIMULATION: AN OTOLARYNGOLOGIST'S PERSPECTIVE  
Marvin P. Fried, MD\*, Bronx, NY

9:32 - STATE OF THE ART LECTURE - ROBOTICS IN

9:45 OTOLARYNGOLOGY

TRANSORAL ROBOTIC SURGERY  
Bert W. O'Malley Jr., MD\*, Philadelphia, PA

9:45 - Break in Exhibit Hall/Visit Posters - *Riverside Center East*

10:15

### **8:30 - 9:45 CONCURRENT SESSION II: OTOTOLOGY Columbus C&D**

MODERATORS: THOMAS J. BALKANY, MD\*, MIAMI, FL

**DENNIS G. PAPPAS JR., MD\*, BIRMINGHAM, AL**

**8:30 Outcomes of Conservative Management in Traumatic Conductive Hearing Loss**

Jonathan R. Grant, MD, Milwaukee, WI

David R. Friedland, MD PhD, Milwaukee, WI

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to evaluate the natural history of conductive hearing loss resulting from temporal bone trauma.

**OBJECTIVES:** To evaluate the natural history of conductive hearing loss resulting from temporal bone trauma. **STUDY DESIGN:** Retrospective chart review of 102 subjects with traumatic hearing loss. **METHODS:** Audiometric evaluations in the early post-traumatic phase were compared to audiograms at follow-up (average 7.1 months). Analyses included classification of type of hearing loss and an assessment of the changes in air bone gaps, pure tone averages and hearing loss class. **RESULTS:** Of 102 temporal bone trauma patients, 68% had purely conductive loss with an additional 28% with mixed loss. 42 ears with conductive hearing loss were followed for an average of 7 months. 74% of ears showed an improvement in pure tone averages with air bone gaps closing from an average of 24 dB to 13 dB. Only 12% demonstrated a decrease in pure tone averages and 14% showed no change in thresholds. Approximately 75% of patients had class B or worse hearing on initial evaluation compared to 60% with class A hearing on follow-up. Only 4 patients had significant air bone gaps or persistent perforations that required surgical intervention. Etiologies of the conductive hearing loss were correlated with outcomes. **CONCLUSIONS:** The majority of patients with conductive hearing loss subsequent to temporal bone trauma can be managed conservatively, with procedures reserved for those showing no improvement after 6 months.

**8:38 Composite Ossicular Chain Reconstruction Prosthesis Outcomes: Titanium Compared to HAPEX**

Kevin S. Hadley, MD, Farmington Hills, MI

Dennis I. Bojrab, MD, Farmington Hills, MI

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to appreciate the potential improved hearing outcomes of newer composite material ossicular chain reconstruction prostheses compared to baseline historic implants.

**OBJECTIVES:** To compare the hearing outcomes and complication rates of two newer composite ossicular chain reconstruction prostheses. Both prostheses have hydroxyapatite heads and can be used in partial and total configurations. One has a HAPEX (hydroxyapatite polyethylene composite) shaft that can be easily modified. The other is a lightweight adjustable length titanium implant that can be cut to a wide range of lengths and adjusted even after cut. **STUDY DESIGN:** Retrospective chart review. **METHODS:** Charts were reviewed for diagnosis, current and previous types of surgery, immediate failure rate, complication rate, and pre- and postoperative audiologic data. Following the 1995 Academy guidelines, the key result was the postoperative four frequency air bone gap. **RESULTS:** Adequate data in patients who underwent ossicular chain reconstruction was available for 75 with the HAPEX prosthesis and 85 with the titanium prosthesis. Immediate failures and extrusion rates were low in both groups. The postoperative air bone gap using the HAPEX partial, total, and overall was 13.8, 13.1, and 13.6 respectively. The air bone gap using the titanium partial, total, and overall was 9.7, 12.7, and 11.3 respectively. Air bone gap closure less than 20dB was obtained with 84% of the HAPEX implants and with 89% of the titanium implants. **CONCLUSIONS:** Newer composite ossicular chain reconstruction prostheses offer improved hearing outcomes compared to baseline historic prostheses, such as standard hydroxyapatite. They also have the added benefit of easy modification at the time of implantation. The hydroxyapatite head maintains the biocompatibility and allows placement without a cartilage graft.

**8:46 Use of a Novel Agent in the Reduction of Cerebrospinal Fluid Leaks**

Kumaresh Krishnamoorthy, MD, Cincinnati, OH

Ravi N. Samy, MD, Cincinnati, OH

Myles L. Pensak, MD\*, Cincinnati, OH

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the use of an alternative product (Dura Seal) for dural closure with sutures or biomaterials such as fibrin glue.

**OBJECTIVES:** To prevent postoperative CSF leaks, watertight closure is important in procedures in which the dura has been violated. In the present study the clinical outcomes pertaining to the safety and efficacy of a novel absorbable hydrogel material for neurotoxicological approaches was investigated. **STUDY DESIGN:** Retrospective review. **METHODS:** Twenty consecutive patients who under-

went neurotological procedures in which Dura Seal was employed were studied. All patients who participated in this study were from the neuroscience division. **RESULTS:** The clinical follow-up period for the patients ranged from one to three months. No patient had an adverse reaction to the Dura Seal. Nineteen patients had no postoperative CSF leak, one patient experienced transient wound leak that resolved with bedside suture closure with no further sequela, giving the product an efficacy rate of 95%. **CONCLUSIONS:** Efficacy of an absorbable hydrogel product to aid in dural closure has been demonstrated. Our results indicate a high success rate with no evidence of complications. Dura Seal is an alternative to current methods employed in providing an optimal seal for the closure of dura.

#### **8:54 Bone Regeneration: A 12 Year Analysis of Skull Base Reconstruction With Hydroxyapatite Cement**

Daniel H. Coelho, MD, New Haven, CT

John F. Kveton, MD, New Haven, CT

Craig D. Friedman, MD, Westport, CT

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the mechanisms by which hydroxyapatite cement integrates into bone and recognize the indications and contraindications for the use of this biomaterial in skull base surgery.

**OBJECTIVES:** The long-term fate of hydroxyapatite cement implants in skull base surgery has never been evaluated. This study will investigate radiologically the changes that have taken place at the site of hydroxyapatite cement implantation in patients enrolled in an FDA-IDE study conducted between 1991 and 1993. **STUDY DESIGN:** Nine of 47 patients who had enrolled in an FDA-IDE study to evaluate the effectiveness of hydroxyapatite cement in the reconstruction of skull base defects returned for radiological evaluation of the site of implantation. The patients had no complications associated with the use of the hydroxyapatite cement during the 12 year period. **METHODS:** High resolution CT scans of the skull base were performed on 9 patients. Three patients had reconstruction of suboccipital defects, one translabyrinthine defect, one temporal bone fracture, one parietal craniectomy defect, and 3 sphenoid sinus defects. The defect that contained hydroxyapatite cement was evaluated by a neuroradiologist by noting changes in cortical area of the defect compared to initial reconstruction and bone density in Hounsfield units. **RESULTS:** The amount of hydroxyapatite cement remaining in the reconstructed defects diminished in the lateral skull base applications, with clear changes consistent with osteointegration noted at margins of implantation. Reduction in cortical area of the suboccipital and translabyrinthine defects measured up to 64% and 34% respectively. Likewise, reduction in Hounsfield units from approximately 1800 to 1100 (normal skull density) was demonstrated. Osteointegration within the sphenoid sinus was difficult to establish. **CONCLUSIONS:** Hydroxyapatite cement is a stable biomaterial and appears to slowly become replaced by host bone in skull base defects.

#### **9:02 Discussion**

#### **9:08 Sensorineural Hearing Loss Associated With Hydrocodone Use**

Tang D. Ho, MD MSc, Houston, TX

Jeffrey T. Vrabec, MD\*, Houston, TX

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to recognize the association between hydrocodone use and rapidly progressive sensorineural hearing loss.

**OBJECTIVES:** In this study, we describe the clinical characteristics of patients presenting with progressive hearing loss and history of chronic hydrocodone use. **STUDY DESIGN:** Retrospective case review. **METHODS:** The presentation, audiologic findings, associated comorbidities, and treatment outcomes were reviewed in six individuals with rapidly progressive sensorineural hearing loss and a history of hydrocodone use. **RESULTS:** The use of hydrocodone was associated with rapidly progressive sensorineural hearing loss without vestibular symptoms in all patients. Hearing loss was asymmetric in 50% of the patients at initial presentation, but progressed to profound loss in 5 months or less. Steroid treatment has no effect on progression of the hearing loss. The admitted quantity of hydrocodone consumed ranged from 20 to 600 mg per day. Hepatitis C was the most common comorbidity, present in 50% of the patients. Five patients underwent cochlear implantation and good results were achieved in all. **CONCLUSIONS:** The chronic use of hydrocodone can be associated with progressive sensorineural hearing loss. Onset of hearing loss shows some correlation with cumulative dosage. Associated comorbidities such as hepatitis C infection may also be significant in the development of hydrocodone ototoxicity, though additional investigations are necessary.

#### **9:16 Congenital Cytomegalovirus Infection Diagnosed by Polymerase Chain Reaction With the Use of Preserved Umbilical Cord in Sensorineural Hearing Loss Children**

Hiroshi Ogawa, MD, Fukushima, Japan

Yoko Baba, MD, Fukushima, Japan  
Tatsuo Suzutani, MD, Fukushima, Japan  
Naoki Inoue, MD PhD, Tokyo, Japan  
Shin Koyano, MD, Asahikawa, Japan  
Koichi Omori, MD, Fukushima, Japan

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the new method which explains relations between the sensorineural hearing loss and the congenital cytomegalovirus infections.

**OBJECTIVES:** Congenital cytomegalovirus (CMV) infection is believed to account for 30% of hearing impairment cases. The part of children with CMV related hearing loss present progressive and fluctuating sensorineural hearing loss (SNHL). Universal screening of hearing in neonates will detect less than half of all SNHL caused by congenital CMV infection. We tried retrospective diagnosis of congenital CMV infection in SNHL children. **STUDY DESIGN:** Focus group study. **METHODS:** We developed a PCR based technique to determine whether infants diagnosed with hearing loss had been infected with CMV at the embryonic stage by using dried umbilical cords. Our obstetric hospitals provide dried cords to every mother as a symbol of the bond between mother and child. Samples of dried umbilical cords from 31 patients were analyzed by PCR for the presence of CMV DNA. **RESULTS:** Seven of the 31 patients tested positive for CMV DNA by PCR analysis. Of these, congenital CMV infection had been confirmed in one patient at birth. Computed tomographic scans revealed intracranial calcification suggesting congenital CMV infection in four of the seven infants. Six of the seven patients exhibited severe bilateral sensorineural hearing loss, while the seventh had severe sensorineural hearing loss in the right ear and a hearing ability of 25 dB in the left ear in auditory brain stem response and auditory steady state response. **CONCLUSIONS:** The PCR based method allows investigation of the involvement of congenital CMV infection in SNHL patients. This technique provides rapid detection of infection and enables the powerful tool of retrospective diagnosis of congenital CMV infection.

#### **9:24 Use of a Novel Ultrasonic Surgical System for Decompression of the Facial Nerve**

Ravi N. Samy, MD, Cincinnati, OH  
Kumaresh Krishnamoorthy, MD, Cincinnati, OH  
Myles L. Pensak, MD\*, Cincinnati, OH

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the mechanisms of an ultrasonic surgical aspirator (Sonopet) for the removal of bone (as an alternative to the surgical drill). We will explain how this device may revolutionize otologic/neurotologic procedures. This device has never been reported before in the otolaryngology literature.

**OBJECTIVES:** The middle cranial fossa approach has been used to explore and decompress the facial nerve in patients with Bell's palsy and facial nerve tumors. Unfortunately, this approach is technically challenging and has a significant risk of injury to the facial nerve and the cochleovestibular organs. One way to minimize the risk may be with the use of an ultrasonic aspirator instead of an otologic drill. **STUDY DESIGN:** Prospective cadaveric temporal bone study. **METHODS:** Seven cadaveric temporal bones were used (4 left, 3 right). The average time to decompress the facial nerve from the geniculate ganglion to the internal auditory canal (i.e., labyrinthine segment) was measured. The temporal bones were then examined for evidence of any injury. **RESULTS:** None of the seven temporal bones showed any sign of injury to the superior semicircular canal or the cochlea. One specimen did have penetration of the internal auditory canal dura; another specimen did have penetration of the epineurium of the facial nerve. However, in neither case was there any evidence of injury to the facial nerve itself. Average time for decompression of the labyrinthine segment was 10.2 minutes. **CONCLUSIONS:** The ultrasonic surgical system (Sonopet) may be used as an alternative to the surgical drill for decompression of the facial nerve. Although a learning curve does exist, our results indicate the device can be used safely and in a reasonable amount of time. However, before recommending intraoperative use of this device for otologic/neurotologic procedures, further cadaveric and intraoperative study is needed.

#### **9:32 Global Assessment of Outcomes Following Varying Reinnervation Techniques for Patients With Facial Paralysis Subsequent to Acoustic Neuroma Excision**

Vincent Y.W. Lin, MD, Toronto, ON Canada  
Andrew H. Marshall, MBBS, Toronto, ON Canada  
Joanne Dorion, PT, Toronto, ON Canada  
Marlene C. Jacobson, PhD, 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 understand the various reinnervation options for patients with facial nerve paralysis after acoustic neuroma excision as well as the associated influence on facial function, oral-pharyngeal function and quality of life.

**OBJECTIVES:** To determine whether there are objective and/or subjective differences in facial function, tongue function and quality of life in patients who have undergone: 1) direct facial to facial; 2) direct facial to hypoglossal; and 3) end to side facial to hypoglossal nerve anastomoses following acoustic neuroma excision. **STUDY DESIGN:** Case series. **METHODS:** Twenty patients with complete facial paralysis after acoustic neuroma surgery who have also undergone one of three types of facial musculature reinnervation volunteered for the study. The mean duration of follow-up was 11.5 years (range 1-25 years). Each patient was globally assessed using the Sunnybrook Facial Grading Scale (objective), House-Brackmann Facial Grading Scale (objective), Facial Disability Index (subjective), Oral-Pharyngeal Disability Scale (subjective), Tongue Mobility Scale (objective) and SF-36 Quality of Life Index (subjective). **RESULTS:** Patients who underwent a direct facial to hypoglossal anastomosis had statistically worse ( $p < 0.05$ ) outcomes in both objective and subjective oral pharyngeal function when compared to all other patients. There was no statistical difference in subjective facial function assessments. There was no significant difference in quality of life in patients who have undergone the varying reinnervation techniques. Measured outcomes did not statistically correlate with the following: 1) age at the time of the initial acoustic neuroma surgery; 2) time elapsed between the ablative and reinnervation (1-78 weeks) procedure; and 3) tumor size at excision. **CONCLUSIONS:** Patients who underwent end to end facial to hypoglossal anastomosis scored statistically poorer in oral pharyngeal function. Quality of life and facial function measurements were similar for all groups. The former was a surprising finding in view of significantly compromised oral pharyngeal function in several patients.

**9:40 Discussion**

**9:45 - Break in Exhibit Hall/Visit Posters - Riverside Center East**  
**10:15**

**10:15 - 12:00 RHINOLOGY & LARYNGOLOGY**  
**Grand C&D**

**MODERATORS: DAVID W. KENNEDY, MD\*, PHILADELPHIA, PA**  
**PEAK WOO, MD\*, NEW YORK, NY**

**10:15 Intracranial Complications of Sinusitis: A Five Year Review**

Shatul L. Parikh, MD, Atlanta, GA  
Steven E. Sobol, MD, Atlanta, GA  
John M. DelGaudio, MD\*, Atlanta, GA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the diagnosis and treatment of intracranial complications of sinusitis.

**OBJECTIVES:** Sinusitis is a common medical problem in the adult and pediatric populations. Intracranial complications of sinusitis (ICS) are clearly the most life threatening potential sequelae of sinusitis. We reviewed our experience with patients with ICS to identify factors that may aid in diagnosis and treatment and therefore affect patient morbidity and mortality. **STUDY DESIGN:** Retrospective chart review. **METHODS:** We retrospectively reviewed the medical records of patients treated for ICS between January 2000 and January 2005 at three tertiary care referral hospitals. **RESULTS:** Twenty-two patients were identified accounting for a total of 30 cases of ICS. The male to female ratio was 5:1. Of the 22 patients identified, 17 were children under the age of 18 and 5 were adults. All patients presented with altered mental status at time of diagnosis. CT scan was used for initial diagnosis in all patients. Five patients had negative CT scans for ICS and diagnosis was made by MRI. Complications included 12 cases of epidural abscess, 9 subdural abscess, 4 intracerebral abscesses, and 5 meningitis. Meningitis was always present with either epidural or subdural abscess. Frontal sinus opacification was seen on the same side as the intracranial complication in all patients. All surviving patients (21) had neurosurgical procedures to treat ICS. Sixteen patients also had endoscopic sinus procedures during their hospital stay. Long-term neurologic sequelae included sensorineural hearing loss (1/22), cognitive neurologic deficits (2/22), and seizure disorder (1/22). One patient died of ICS. All patients were treated with long-term antibiotics. **CONCLUSIONS:** ICS is a rare complication of sinusitis, but requires early diagnosis and intervention. There should be a high index of suspicion for ICS in patients who present with altered mental status and frontal sinus opacification on CT scan. MRI may sometimes be necessary to definitively diagnose ICS. Surgical

evacuation of intracranial infection and eventual drainage of the affected sinus is almost uniformly required.

### **10:23 Can Severe Maxillary Sinusitis Be Completely Cured Using Only an Endoscopic Endonasal Approach?**

Yasuyuki Y. Hinohira, MD, Matsuyama, Ehime Japan

Eiji E. Yumoto, MD, Kumamoto, Japan

Kiyofumi K. Gyo, MD, Toon, Ehime Japan

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to demonstrate the usefulness of the submucous conchotomy on treating the severe maxillary sinusitis in ESS.

**OBJECTIVES:** This study examined how severe maxillary sinus diseases such as fungal sinusitis and multiple polyps should be treated to obtain complete recovery using only an endoscopic endonasal approach. **STUDY DESIGN:** Retrospective study. **METHODS:** Between 1999 and 2005, we operated on 34 patients (34 sides) with severe maxillary sinusitis. Underlying pathology was multiple polyps (n=18), fungal sinusitis (n=13), and others (n=3). To treat sinus diseases completely using only endoscopic sinus surgery (ESS) methods, submucous conchotomy was supplemented in all patients. Submucous conchotomy used in this study involved subtotal resection of the inferior turbinate bone and uncinate process, preserving the turbinate mucosa. This adjunctive procedure provided an excellent surgical view and easy operations in the maxillary sinus via opening of both the middle and inferior nasal meatus. The endoscope is usually inserted from the middle nasal meatus to observe the maxillary sinus lesion and an operating instrument is inserted from the inferior nasal meatus to treat the diseased mucosa. **RESULTS:** An extranasal approach was unnecessary for all patients. Surgical complications such as damage of the nasolacrimal duct were not encountered. Postoperatively, no recurrent disease was seen in any patient. **CONCLUSIONS:** This combined approach via the middle and the inferior nasal meatus using submucous conchotomy contributes to the expansion of surgical adaptations for severe maxillary sinus diseases in ESS.

### **10:31 Endoscopic Management of Juvenile Nasopharyngeal Angiofibroma as the Treatment of Choice for Small, Medium and Large Size Tumors**

Sabina Omerhodzic, MD, New York, NY

Michael R. Shohet, MD, New York City, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss endoscopic approach in treatment of small, medium and large sizes of juvenile nasopharyngeal angiofibroma. The participants should get the insight into the advantages of the described technique over alternative treatment approach currently used for the same clinical conditions and incorporate the new findings into everyday clinical practice.

**OBJECTIVES:** Juvenile nasopharyngeal angiofibroma (JNA) is a benign nasopharyngeal tumor of prepubertal and adolescent males, with high tendency to bleed. The tumor starts adjacent to the sphenopalatine foramen. Large tumors are frequently filling the nasopharynx extending to the pterygopalatine and infratemporal fossa. Surgical approaches used to excise these tumors in the past were open, while endoscopic resection was reserved for small size tumors limited to the nasal cavity and paranasal sinuses. We hypothesize that endoscopic approach is the treatment of choice for small, medium and large size JNA tumors. **STUDY DESIGN:** Our retrospective study analyzes 6 patients who were operated in our institution for JNA tumors between 2000 and 2004. All patients underwent preoperative embolization followed by endoscopic resection of small, medium and large size tumors with minimum of 18 months follow-up. **METHODS:** The medical records of patients who underwent endoscopic resection of JNA were reviewed retrospectively. The main outcome measures were postoperative complications, length of hospital stay and recurrence. **RESULTS:** Postoperative complications were minimal with short hospital stay and no recurrent disease has been detected in the study group until present. Results, complications and surgical highlights will be further discussed in this study. **CONCLUSIONS:** Size of juvenile nasopharyngeal angiofibroma may not be limiting factor in using endoscopic approach in treatment of this entity. Large size tumors with intracranial extension may need alternative treatments/postoperative radiation.

### **10:39 Software Enabled Computed Tomography Analysis of the Cribriform Plate Lateral Lamella**

Clementino Arturo Solares, MD, Cleveland, OH

Walter T. Lee, MD, Cleveland, OH

Pete S. Batra, MD, Cleveland, OH

Martin J. Citardi, MD, Cleveland, OH

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the anatomy of the ethmoid roof and its variations.

**OBJECTIVES:** The cribriform plate lateral lamella (CPLL) is the thinnest, most vulnerable anatomic structure of the skull base. This study presents a quantitative analysis of the CPLL using computed tomography (CT) images. **STUDY DESIGN:** Software enabled review of archived high resolution sinus CTs. **METHODS:** High resolution images obtained with a Siemens VolumeZoom CT scanner were reviewed with CBYON Suite version 2.7. Patient images were included if there was 1) no evidence of massive polyposis or tumors; 2) no history of CSF leak or trauma; and 3) minimal or no rhinosinusitis by CT criteria. Surgical planning tools were used to develop and implement a system for quantitative assessment of CPLL height. **RESULTS:** One hundred sides in CT scans from 50 patients were analyzed. The median height of the CPLL in the anterior ethmoid region was 2.4 mm. The CPLL height was less than 4 mm in 83 sides, 4-7 mm in 15 sides, and greater than 7 mm in 2 sides. The CPLL height was greater on the right side in 28 patients and on the left side in 22 patients. The difference between sides was 0-1.9 mm in 39 patients, 2.0-3.9 mm in 9 patients, and greater than 4 mm in 2 patients. **CONCLUSIONS:** Computer aided CT scan analysis facilitates quantitative analysis of the ethmoid roof anatomy. Asymmetry of the ethmoid roof was common. During sinus surgery, the surgeon must exercise extreme caution to prevent iatrogenic injury to CPLL.

#### **10:47 Duodenogastroesophageal Reflux (DGER) and Its Effect on Extraesophageal Tissues**

Joel H. Blumin, MD, Milwaukee, WI  
Albert L. Merati, MD, Milwaukee, WI  
Robert J. Toohill, MD\*, Milwaukee, WI

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand all elements of DGER and their interactions with extraesophageal structures.

**OBJECTIVES:** To identify elements of DGER, namely pancreatic fluids, hydrochloric acid (HCL), pepsin and bile as to the effects each has when refluxed to extraesophageal structures. To acquaint clinicians with the possibilities that in addition to the effects related to HCL the other components of DGER are likewise contributing to disease in the extraesophageal areas. **STUDY DESIGN:** Literature review. **METHODS:** A review of basic and clinical studies that have indicated reflux of the above mentioned components of DGER to the pharynx, larynx, tracheobronchial tree, oral cavity, nasopharynx, nose and sinuses, the eustachian tube and middle ear. **RESULTS:** There is little study available as to the effects of pancreatic fluids on the mucosa of the esophagus or extraesophageal structures. Ultrastructural changes have been identified in rat buccal epithelium induced by trypsin. HCL reflux to the pharynx has been widely demonstrated by 24 hour ambulatory pH study. The studies to support this element of extraesophageal reflux have been quite consistent and reliable and in many incidences the HCL portion is well controlled by acid suppression. Pepsin has been identified in the tracheobronchial tree, larynx, pharynx, middle ear cavities and nasosinus. The presence of bile in refluxate has been demonstrated by Bilitex and in experimental studies has been shown to cause considerable inflammation in the larynx. To date there have not been good medications to relieve patients of the effects of pepsin and bile. When these components of DGER are present early laparoscopic Nissen fundoplication may be the best treatment. **CONCLUSIONS:** Patients with incomplete response to acid suppression may have significant involvement from pepsin, bile or both. Future studies are needed to clarify the importance of these elements as well as to suggest specific treatments.

#### **10:55 The Correlation Between a Fluoroscopic Estimation of Pharyngeal Constriction (The Pharyngeal Constriction Ratio) and Pharyngeal Pressure on Manometry**

Rebecca J. Leonard, PhD, Sacramento, CA  
Catherine J. Rees, MD, Winston-Salem, NC (Presenter)  
Peter C. Belafsky, MD PhD, Sacramento, CA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the correlation between the pharyngeal constriction ratio and pharyngeal pressures on manometry.

**OBJECTIVES:** Recent investigations suggest that intact pharyngeal constriction is essential in airway protection during deglutition. We have developed an objective fluoroscopic measure of pharyngeal constriction. The pharyngeal constriction ratio (PCR) is defined as the ratio of pharyngeal area at the point of maximum pharyngeal constriction during the swallow to the pharyngeal area with the bolus held in the oral cavity. An elevated PCR suggests decreased pharyngeal constriction. Recent data has shown that an elevated PCR is associated with the presence of aspiration. The purpose of this investigation is to evaluate the correlation between the PCR and peak contraction pressures on pharyngeal manometry. **STUDY DESIGN:** Retrospective chart review. **METHODS:** The charts of all individuals who had undergone a fluoroscopic swallow evaluation and solid state pharyngeal manometry between 06/01/05 and 09/30/05 were reviewed. Information regarding patient diagnosis, demographics, measurement of PCR and pharyngeal peak pressures was abstracted. The correlation between the PCR and peak pharyngeal pressures on manometry was evaluated with the Pearson correlation coefficient. **RESULTS:** The charts of 15 individuals who had undergone both fluoroscopy and manometry were reviewed.

The mean age of the cohort was 64 (+/-11) years. 20 percent was female. The most common diagnoses were CVA (4/15), aerodigestive tract neoplasm (4/15), and reflux (4/15). The mean pharyngeal pressure was 42 (+/-9) mmHg for individuals with a PCR greater than 0.25 and 98 (+/- 13) mmHg for individuals with a PCR less than 0.25 ( $P < 0.01$ ). An elevated PCR was highly correlated with diminished pharyngeal pressures on manometry (Pearson correlation coefficient = -0.691,  $P < 0.01$ ). **CONCLUSIONS:** The pharyngeal constriction ratio is highly correlated with pharyngeal peak pressures on manometry. An elevated PCR indicates weak pharyngeal contraction. These data suggest that the PCR is an accurate surrogate measure of pharyngeal constriction. These findings have major implications for the interpretation of fluoroscopic swallow studies.

### 11:03 Discussion

#### 11:10 The Histological Analysis of the Nerve Muscle Pedicle Technique in the Denervated Rat Thyroarytenoid Muscle

Yoshihiko Kumai, MD, Kumamoto City, Japan  
Takaaki Ito, MD, Kumamoto, Japan  
Eiji Yumoto, MD, Kumamoto, Japan

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to confirm that the nerve muscle pedicle (NMP) technique is effective for laryngeal reinnervation quantitatively with immunohistochemistry in the rat thyroarytenoid (TA) muscle which had not been done in the previous reports.

**OBJECTIVES:** To evaluate the effects of nerve muscle pedicle (NMP) technique on the denervated rat thyroarytenoid (TA) muscle. **STUDY DESIGN:** Quantitative assessment to monitor the status of reinnervation. **METHODS:** Thirty-six Wistar rats were treated with transection of the left recurrent laryngeal nerve (RLN) and divided into two groups: 1) animals treated with transection of the left RLN alone (DNV group), 2) animals treated with transection of the left RLN followed by immediate transplantation of the NMP flap (NMP group). Animals were sacrificed at 2, 4, 10 weeks after the treatment (each group; n=6). Hematoxylin and eosin stain was used to evaluate muscle area. The nerve terminals, acetylcholine receptors (AChRs) and the muscle fiber phenotype were evaluated quantitatively with immunohistochemistry. **RESULTS:** In the NMP group, the atrophied treated TA muscle fiber recovered to the almost normal at 10 weeks ( $101.1 \pm 18.5\%$  compared to the control  $p < 0.01$ ). The ratio of the numbers of synaptophysin positive nerve terminals to the numbers of  $\pm$  Bungarotoxin positive AChRs at 2 week was  $12.6 \pm 31.2\%$  ( $p < 0.05$ ), and at 10 weeks, the ratio reached  $79.8 \pm 11.8\%$  ( $p < 0.05$ ). The number of myosin heavy chain type2A fibers which could not be detected in the normal and denervated TA muscle significantly increased during 4 to 10 weeks ( $1.9 \pm 0.4\%$  to  $14.3 \pm 0.8\%$  of all fibers  $p < 0.05$ ). **CONCLUSIONS:** The NMP technique is effective on recovering the atrophic changes of the denervated TA muscle. This could be attributed to the successful reinnervation by reconstruction of the neuromuscular junction (NMJ) which might induce the changes of the muscle phenotype.

#### 11:18 Effect of an Immediate Reconstruction of the Recurrent Laryngeal Nerve During Thyroid Cancer Extirpation on Postoperative Phonatory Functions

Eiji Yumoto, MD PhD, Kumamoto, Japan  
Yoshihiko Kumai, MD, Kumamoto, Japan

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to explain usefulness of an immediate reconstruction of the recurrent laryngeal nerve when it is severed at the time of thyroid cancer extirpation.

**OBJECTIVES:** To assess the long-term effects of immediate reconstruction of the recurrent laryngeal nerve (RLN) during thyroid cancer extirpation on postoperative phonatory function. **STUDY DESIGN:** Prospective study. **METHODS:** Subjects consisted of 22 patients with thyroid cancer who underwent resection of the RLN. RLN paralysis was seen in 12 of them prior to surgery and cancer clinically invaded the RLN in the remaining 10. An immediate reconstruction of the RLN was performed in eight patients using the great auricular nerve and one patient underwent direct anastomosis of the RLN stumps. (Group 1) Nine patients did not want to have any phonosurgical procedures. (Group 2) The remaining four patients had arytenoid adduction at the time of cancer extirpation. (Group 3) Phonatory functions (stroboscopy, maximum phonation time (MPT), mean airflow rate (MFR), harmonics to noise ratio (HNR), jitter, and shimmer) were examined more than one year after surgery and were compared among the three groups. **RESULTS:** There was little glottal gap during phonation in Group 1 patients. Group 3 patients showed a small gap along the membranous vocal fold, while Group 2 patients showed a large gap along the entire fold. MPT, MFR and HNR of Group 1 ( $15.6 \pm 7.2s$ ,  $97.4 \pm 23.7mL/s$ , and  $19.6 \pm 3.9dB$ , respectively) were significantly better than those of Group 2 ( $5.4 \pm 3.1s$ ,  $430 \pm 207mL/s$ , and  $12.1 \pm 2.9dB$ , respectively). Phonatory functions of Group 3 patients were located between those of Groups 1 and 2. **CONCLUSIONS:** An immediate RLN reconstruction at the time of thyroid cancer extirpation can provide excellent postoperative phonatory functions.

## 11:26 Effects of Pulsed KTP Laser Parameters on Vessel Ablation in the Avian Chorioallantoic Membrane (CAM): Implications for Vocal Fold Mucosa Photoangiolytic

Matthew S. Broadhurst, MD FRACS, Boston, MA  
James E. Kobler, PhD, Boston, MA  
Lee M. Akst, MD, Boston, MA  
James A. Burns, MD, Boston, MA  
Rox R. Anderson, MD, Boston, MA  
Steven M. Zeitels, MD\*, Boston, MA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to appreciate the potential application of pulsed KTP laser for photoangiolytic with laryngeal mucosal lesions.

**OBJECTIVES:** Selective laser photoangiolytic is a valuable treatment strategy for many vocal fold lesions. However, vessel rupture with extravasation of blood during laser irradiation reduces selectivity for vessels. The pulsed KTP (potassium-titanyl-phosphate) 532nm laser appears to provide vascular ablation (photoangiolytic) with minimal extraluminal bleeding, although the effect of pulsed KTP laser on vocal folds has not been reported. To optimize laser parameters, the effects of fluence, pulse width, and fiber to tissue distance were studied. **STUDY DESIGN:** Chick CAM vessels were observed and imaged with an operating microscope at 13x magnification while irradiated using a prototype pulsed KTP laser. Parameters for laser irradiation were varied to determine optimal settings for photoangiolytic without vessel rupture and extravasation. **METHODS:** Third order vessels within the CAM were irradiated. Fluence (Joules/cm<sup>2</sup>), pulse width (ms), and fiber to tissue distance (mm) were varied systematically. **RESULTS:** Five to twelve vessels averaging 0.07mm diameter were tested independently in each egg (17 eggs, 105 vessel segments). Increasing fiber to tissue distance diminished extravasation. At 0.5mm, 1mm or 3mm, ablation without rupture occurred in 37%, 75% and 100% of vessels respectively (70J/cm<sup>2</sup>, 10ms pulse width). Longer pulse widths increased extravasation. At pulse widths of 10, 15, 20 and 30ms, ablation without rupture occurred in 75%, 30%, 25% and 10% of vessels respectively (70J/cm<sup>2</sup>, 1mm fiber to tissue distance). **CONCLUSIONS:** Optimal settings for the pulsed KTP laser for photoangiolytic with a fluence of 70J/cm<sup>2</sup> appear to be a pulse width of <20ms and a fiber to tissue distance of ~3mm. Fine tuning these parameters in this model will assist efficient translation of this technology to microlaryngeal surgery.

## 11:34 Office Interventional Laryngoscopy: Worth a Revisit

Peak Woo, MD\*, New York, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the new role of office laryngology interventional procedures such as: laryngeal steroid injection, brush biopsy, injection laryngoplasty, and office laser surgery in the management of benign, malignant, and neurological disorders affecting the larynx.

**OBJECTIVES:** Office intervention for laryngeal pathology is well described. Its popularity has waned this century due to better precision from operative interventions. Such interventions require general anesthesia. With newer drugs, instrumentation, changing demographics and reimbursement, office based laryngeal procedures is worth a revisit. This study reviews one surgeon's experience with interventional laryngoscopy under topical anesthesia. **STUDY DESIGN:** Retrospective case series review. **METHODS:** Retrospective chart and operative video review of 209 office laryngeal procedures performed in 155 patients over 9 years. Success and failure was judged based on whether the procedure could be prosecuted. **RESULTS:** There were 209 procedures performed on 155 patients. Eleven patients were considered as either procedure or anesthesia failures. The procedures were 1) office steroid injection (n= 56), 2) cidofovir injection (n= 55), 3) brush biopsy of lesion (n= 47), 4) injection laryngoplasty (n= 36), 5) cup biopsy (n= 11), and 6) office laser ablation (n= 4). All the procedures were performed using topical anesthesia by spray and/or direct application by brush. The techniques were by: indirect 70 degree rigid endoscope control with transoral instruments (n=155), flexible endoscope with operating channel (n=18), or by external transcervical approach with flexible endoscope visualization (n=36). There were no adverse events other than failure in 7%. The largest cause of failure was inadequate volume injection in patients undergoing injection laryngoplasty. **CONCLUSIONS:** Good topical laryngeal anesthesia will allow office based interventional laryngoscopy using different techniques. With additional progress in instrumentation such as laser fibers and drug delivery, office based intervention will become even more effective.

## 11:42 Operative Versus Office Based Vocal Fold Injection—A Cost Analysis

Michiel Jan Bove, MD, Pittsburgh, PA  
Pryia D. Krishna, MD, Pittsburgh, PA  
Kathy Flaherty, MBA, Pittsburgh, PA  
Robert J. Wunar, MBA, Pittsburgh, PA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the relative benefits of office based vocal fold injection as compared to the more traditional, time consuming, and costly alternative of performing the same procedure in an operation room setting.

**OBJECTIVES:** To compare the cost of office based and operative VFI. **STUDY DESIGN:** Retrospective office chart and hospital record review. **METHODS:** We performed a retrospective review of hospital records of patients having undergone VFI at our institution from July 2003 through March 2005. Total reimbursement for office based (Group I) and operative procedures (Group II) was compared. The cost analysis was based on reimbursements for surgeon fees, anesthesia, and hospital charges, when applicable. A sub-analysis was also performed comparing Medicare reimbursement to reimbursement from various commercial insurance products. **RESULTS:** We identified a total of 315 patients, 253 of which underwent the procedure in the operating room (Group I) and 62 who underwent office based VFI (Group II). Analysis of the subgroup of Medicare carriers revealed an average reimbursement of \$1,570 for Group I (n= 9) versus \$263 for Group II (n=10) ( $p < 0.001$ ). This represents an 83% cost savings. These cost savings were preserved across various commercial insurance products, with savings for office based VFI ranging from 68% for a PPO product to 89% for an HMO product. Moreover, there was no significant difference in Voice Handicap Index-10 score change after surgery between Group I and II. **CONCLUSIONS:** Office based VFI is, therefore, a less expensive but equally effective alternative to operative VFI.

**11:50 Discussion**

**11:59 Introduction of President-Elect**

**12:00 Adjourn**

# TRIOLOGICAL SOCIETY 2006 POSTER PROGRAM

## General

### 69. Disinfection of Flexible Fiberoptic Laryngoscopes After in Vitro Contamination With Staphylococcal Aureus and Candida Albicans

Andrew S. Florea, MD, Loma Linda, CA

Dennis F. Chang, MD, Loma Linda, CA

Mark D. Rowe, MD, Loma Linda, CA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the principles behind disinfection of flexible fiberoptic laryngoscopes after patient use. Understand the different cleaning and disinfection methods studied under experimental conditions. Understand that further research is needed in establishing a disinfection protocol specific to a non-channel containing flexible fiberoptic laryngoscope not necessarily obtained from the channel containing gastroenterology endoscopes and bronchoscopes.

**OBJECTIVES:** Previous studies on both experimental and clinical recovery of microorganisms from non-channel containing flexible fiberoptic laryngoscopes (FFL) have demonstrated a considerable bioload, and in an office setting have determined that immersion in glutaraldehyde for 20 minutes, with or without previous immersion in an enzymatic soap solution for five minutes, is adequate to prevent non-mycobacterial, non-viral cross-contamination between uses. Additionally, previous studies on experimental exposure of FFLs to microorganisms have determined that both staphylococcal aureus and candida albicans are infectious organisms with adherence which persists after rinsing with tap water. To our knowledge, no studies have been performed as of yet to determine if other shorter duration cleaning and disinfection methods may be adequate in preventing non-mycobacterial and nonviral cross-contamination, as may be applicable in an emergency or hospital based setting with a potential need for rapid reuse of a FFL. **STUDY DESIGN:** Experimental laboratory study of in vitro contamination and disinfection of non-channel containing flexible fiberoptic laryngoscopes. **METHODS:** We present an experimental model in which *S. aureus* and *C. albicans* contamination was separately induced on FFL, which were then disinfected with different protocols: 20, 15, 10, 5 minute soaks in Cidex OPA, presoaking in an enzymatic soap solution for five minutes, isolated five minute soak in an enzymatic soap solution, 30 second wipe with antibacterial soap (ABS) and water, 30 second wipe with isopropyl alcohol, 30 second wipe with ABS followed by 30 second scrub with IA, and 30 second wipe with germicidal cloth, all accompanied by previous rinsing with 30 seconds of running tap water. **RESULTS:** All protocols were successful in completely disinfecting the FFL after experimental contamination with *S. aureus* or *C. albicans*. **CONCLUSIONS:** All protocols were successful in completely disinfecting the FFL after experimental contamination with *S. aureus* or *C. albicans*. Further research is needed to create a disinfection protocol of non-channel containing FFL, particularly of contamination with bacterial organisms with greater adherence such as pseudomonas, mycobacteria, or nonbacterial organisms such as viruses.

### 70. Allergen Specific IgE Testing Trends and Results at an Academic Institution

Chad S. Kessler, MD, Winston-Salem, NC

Michael R. Goins, MD, Winston-Salem, NC

Dimitri Z. Pitovski, MD, Winston-Salem, NC

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to identify the methodology of allergen testing at the academic institution and identify the pattern of sensitivity to multiple inhalent allergens in the southeastern United States.

**OBJECTIVES:** The purpose is to report our methodology of allergy testing and review the pattern of sensitivity to multiple inhalent allergens in the southeastern United States over a one year period. **STUDY DESIGN:** A retrospective chart review utilizing allergy testing data from the academic institution's allergy reference laboratory from June 2001 to June 2002. **METHODS:** A total of 575 patients were tested using 3rd generation RAST testing (Pharmacia ImmunoCAP System) via a seven mix screen. These included grass pollen, weed pollen, house dust, animal epidermal, and food mixes. All screen positive patients were then further tested for allergen specific IgE via various in depth allergy panels to determine specific allergen sensitivities. **RESULTS:** The most common allergen in our regional panel was *D. pteronyssinus*, found in 64% of patients testing positive for inhalent allergens via the seven mix screen and was 98% positive in patients positive for house dust mix. Timothy, hickory, ragweed and *Alternaria alternata* were the most common inhalent allergens found in the grass, tree, weed, and mold groups respectively. Total IgE was measured in 436 individuals and was found to be significantly ( $p < 0.05$ ) elevated in atopic ( $274 \pm 137 \text{ kU/l}$ ) versus nonatopic individuals ( $39 \pm 18 \text{ kU/l}$ ). **CONCLUSIONS:** Forty percent of patients that underwent RAST testing were screen positive and 100% of screen positive patients

had a class II or greater allergy to a specific inhalent allergen. Total IgE was significantly higher in atopic versus nonatopic individuals and may prove to be an important tool in the diagnosis and management of allergy in the future.

### 71. **The Role of Free Radical Antioxidants in Congenital Hearing Loss**

Vishnu V. Reddy, MS DNB PhD, Hyderabad, AP India

Hima Bindu, MSC PhD, Hyderabad, AP India

P. P. Reddy, PhD, Hyderabad, AP India

**EDUCATIONAL OBJECTIVE:** If the antioxidant system is impaired, free oxygen radicals can initiate lipid peroxidation and cause DNA damage leading to cell injury in the brain causing permanent childhood hearing loss. Therefore the levels of antioxidant enzymes and free oxygen radicals should be balanced in every individual.

**OBJECTIVES:** The present study was carried out to determine the prevalence of oxidative stress in children with childhood hearing loss. **STUDY DESIGN:** A retrospective biochemical antioxidant free radical analysis of 30 children with congenital hearing loss attending tertiary hospital. **METHODS:** In the present study 30 children with bilateral severe sensorineural congenital hearing impairment below 14 years of age attending government ENT hospital were tested for plasma malondialdehyde levels (MDA), red cell copper zinc superoxide dismutase (Cu-ZnSOD) and glutathione peroxidase (GPx) levels were compared with the control levels. Statistical analysis was done using SPSS package. Statistical significance was assessed by the student's t-test. **RESULTS:** The activity of LPO was significantly less in the hearing handicap (2.05 +/- 1.244) compared to the controls (6.89 +/- 1.902). Levels of glutathione peroxidase were also less in the subjects (1993 +/- 401.9) compared to the levels in the control samples (2076 +/- 499.6). Whereas the levels of super oxide dismutase in the subjects (1465 +/- 215.9) were comparable to those of controls (1409 +/- 133.9). Statistical analysis indicated the results to be insignificant. **CONCLUSIONS:** The results of the present study indicated that the levels of free oxygen radicals were less in the subjects, and the levels of antioxidants (GPx and SOD) were stable indicating that the threat of reactive oxygen species was not significant in these children. The children in this study were not subjected to any detectable levels of oxidative stress.

### 72. **The Effectiveness of Autologous Bone Marrow Derived Stromal Cell Implantation on Palatal Bone Regeneration**

Yoshihiro Tamura, MD, Kyoto, Japan

Shin-ichi Kanemaru, MD PhD, Kyoto, Japan

Masaru Yamashita, MD, Kyoto, Japan

Hiroo Umeda, MD, Kyoto, Japan

Ryo Asato, MD, Kyoto, Japan

Juichi Ito, MD PhD, Kyoto, Japan

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the necessity of cells as well as scaffolds for the palatal bone regeneration.

**OBJECTIVES:** To assess the effectiveness of autologous bone marrow derived stromal cell implantation on palatal bone regeneration. **STUDY DESIGN:** In vivo animal study with controls. **METHODS:** Six adult beagle dogs were used. One fenestration bone defect (10x7mm) was surgically made on the left side of hard palate under the mucoperiosteum. Bone defects were filled with in two ways. Then, all dogs were divided into two groups, beta-tricalciumphosphate (b-TCP)/collagen composite implanted group (n=3) and b-TCP/collagen composite with autologous bone marrow derived stromal cells (BSCs) implanted group (n=3). B-TCP, biocompatible and osteoconductive ceramic, is biodegradable bone substitute. Collagen, major component of bone, has good ability of cell attachment. BSCs contain mesenchymal stem cells (MSCs). MSC is a pluripotent cell that has a potency to differentiate into various cells. After harvesting bone marrow from the humeri of dogs, adherent cells were cultivated, amplified selectively, and used as BSCs. Three months after the operation, operated sites were examined histologically. **RESULTS:** In both groups, the process of bone regeneration and newly formed bone were observed around b-TCP, though bone defect was partially still remained. Bone tissue regenerated in b-TCP/collagen with BSCs implanted group was more than that in b-TCP/collagen without BSCs implanted group. **CONCLUSIONS:** Bone tissue regeneration was promoted in the BSCs implanted group. Therefore, BSCs are considered to be useful for the bone regeneration of the hard palate and might be clinically used with b-TCP/collagen in future.

### 73. **Facilitating Tracheotomy in the Morbidly Obese**

Cecilia V. Tran, MD, Houston, TX

Scott M. Kaszuba, MD, Houston, TX

Don T. Donovan, MD\*, Houston, TX

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to explain different techniques to facilitate tracheotomy and minimize complications in the morbidly obese patient.

**OBJECTIVES:** Tracheotomy is one of the most common procedures performed by otolaryngologists. This procedure has multiple possible complications, particularly in the morbidly obese. We sought to review our experience in performing tracheotomy in this patient population. **STUDY DESIGN:** Retrospective review at three different hospitals at large urban tertiary care medical center over past ten years. **METHODS:** The study included all patients meeting the AHA criteria for morbid obesity. Different surgical techniques used and the rate of complications were reviewed. **RESULTS:** The rate of complications was not significantly higher in the morbidly obese patient population. Almost all of these procedures were done in the operating room, rather than at the bedside. Almost all of these patients tolerated insertion and use of extra long rather than custom made tracheal tubes. **CONCLUSIONS:** Our experience suggests that tracheotomy can be successfully performed in the morbidly obese, especially if certain techniques are used.

#### **74. Construct Validity for the Health Utilities Index in Patients With Sleep Disorders**

Kevin C. Welch, MD, Baltimore, MD  
Steven S. Scharf, MD, Baltimore, MD

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to see that the Health Utilities Index (HUI) is a valid health related quality of life survey to use in a patient population with sleep disorders.

**OBJECTIVES:** To determine the face validity of the HUI Mark 2 and HUI Mark 3 in patients with sleep disorders against commonly used quality of life surveys and generic assessments of excessive daytime sleepiness. **STUDY DESIGN:** A prospective study involving questionnaires completed in an outpatient sleep disorders center. **METHODS:** A cross-sectional survey was performed in 86 patients (67 with sleep apnea and 19 with other sleep disorders), and results of the Health Utilities Index (Mark 2 and Mark 3) were compared to the results of the SF-12, Epworth Sleepiness Scale, and the Functional Outcomes of Sleep Questionnaire. Linear regression and multiple linear regression models were used to analyze response data. **RESULTS:** Age: 50.7+14.2 y. RDI (for OSA): 32.6 +29.1, BMI: 32.9+7.6, HUI2: .73+.23, HUI3: .6 +.35 (p=.0066 for difference from HUI2), SF12 physical components (PC): 43.6+12.1, SF12 mental components (MC): 49.8=40.1, ESS: 10.5 +5.2, FOSQ: 16.4+3.5. Significant bivariate correlations were found between HUI2 and HUI3, as well as between both of these and age, SF12PC, ESS, and FOSQ. Stepwise multivariate regression revealed significant independent correlations between HUI2 and age, SF12PC and FOSQ, and between HUI3 and age, SF12PC, ESS, and FOSQ. There were no differences in QOL between OSA and non-OSA patients. **CONCLUSIONS:** The Health Utilities Index is a valid tool for measuring quality of life in patients with sleep disorders.

### **Head And Neck**

#### **75. Skull Base Regeneration by Polypropylene Mesh Coated With Collagen + beta-TCP**

Ryo Asato, MD, Kyoto, Japan  
Shin-ichi Kanemaru, MD, Kyoto, Japan  
Masaru Yamashita, MD, Kyoto, Japan  
Koichi Omori, MD, Fukushima, Japan  
Tatsuo Nakamura, MD, Kyoto, Japan  
Juichi Ito, MD, Kyoto, Japan

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to know tissue engineering technique brings safety reconstruction method to head and neck surgery.

**OBJECTIVES:** Skull base surgery for malignant tumors with skull base invasion is a useful method to improve the survival rate. However, a postoperative complication such as infection would make patient fatal. The large defect after resection of the skull base needs the bony reconstruction, but no ideal materials to repair the defect have been found. We have reported success in regenerations of the trachea, larynx and skull base using artificial materials, specifically polypropylene-mesh + collagen +. Tricalciumphosphate (beta-TCP) is the material which induced bone remodeling. The aim of this study is to investigate whether polypropylene-mesh + collagen + beta-TCP can be utilized for skull base reconstruction. **STUDY DESIGN:** Animal experiment. **METHODS:** Ten guinea pigs were used as experimental animals. A part of the temporal bone in five guinea pigs was resected and its defect was reconstructed with polypropylene-mesh + collagen + beta-TCP and in five guinea pigs without beta-TCP. They were sacrificed 3-10 weeks after. The specimen of reconstructed portion of each animal was collected and provided for histological examination. **RESULTS:** 1) Connective tissues invaded into the polypropylene-mesh without the occurrence of foreign body reactions; 2) vascularization and bone neogenesis were identified in all reconstructed portions; 3) more bone neogenesis were identified in the guinea pigs recon-

structed with beta-TCP than in that without beta-TCP. **CONCLUSIONS:** Polypropylene-mesh + collagen + beta-TCP is a useful artificial material that fills up the defect in skull base surgery. This tissue engineering technique will be possible regenerative treatment for the skull base surgery.

## 76. **Image Guided Transoral Approach to the Pterygopalatine Fossa**

Benjamin S. Bleier, MD, Philadelphia, PA  
Natasha Mirza, MD, Philadelphia, PA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to explain the anatomy of the pterygopalatine fossa, demonstrate an understanding of the various approaches to this space and compare the advantages of a transoral approach utilizing image guidance to the traditional methods.

**OBJECTIVES:** Lesions within the pterygopalatine fossa are difficult to access secondary to their depth and bony encasement. Traditional approaches such as the Caldwell-Luc and lateral rhinotomy have been largely replaced by less invasive transnasal endoscopic approaches. We present an alternative transoral approach utilizing image guidance to access inferiorly based lesions of the pterygopalatine fossa. **STUDY DESIGN:** Case report. **METHODS:** 49 year old male presenting with a benign cyst of the inferior pterygopalatine fossa. The presentation, workup, and management utilizing image guided transoral surgery are discussed. **RESULTS:** The patient underwent a high resolution CT scan that confirmed the location of the lesion in the inferior aspect of the left pterygopalatine fossa. The patient was taken to the operating room and an image guidance system was used to localize the lesion and affect a complete transoral resection of the benign cyst. **CONCLUSIONS:** Benign lesions based in the inferior aspect of the pterygopalatine fossa may be successfully accessed utilizing a transoral approach which minimizes local tissue destruction and postoperative morbidity. Image guidance is a useful adjunct in this setting to facilitate lesion localization and surgical navigation within this complex anatomic space.

## 77. **Lemierre's Syndrome: What Are the Roles for Anticoagulation and Long-Term Antibiotic Therapy?**

Peter C. Bondy, MD, Portsmouth, VA  
Thomas R. Grant, MD, Portsmouth, VA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to demonstrate knowledge and discuss the recognition, diagnosis and treatment of Lemierre's syndrome (postanginal septicemia), as well as potential factors leading to increased prevalence of this rare but potentially fatal disorder.

**OBJECTIVES:** To present a case study of Lemierre's syndrome from our institution and a review of the current literature to determine if there is an increasing incidence and what causal factors, if any, may be involved. To provide evidence to support or refute the use of anticoagulation in these cases and whether there is a role for long-term antibiotic therapy in these patients. **STUDY DESIGN:** Retrospective review of current and past literature. **METHODS:** Comprehensive review of all otolaryngology literature regarding Lemierre's syndrome as well as a review of the obstetrics/gynecology, orthopedics and general surgery literature looking at both anticoagulation and long-term antibiotic treatment for septic thrombosis. **RESULTS:** Lemierre's syndrome is a rare but potentially fatal disease usually resulting from an acute pharyngitis followed by septic thrombophlebitis of the internal jugular vein with subsequent metastases of septic emboli to multiple distant sites. The vast majority of patients in the post-antibiotic era are successfully treated nonsurgically with antibiotics and often, anticoagulation as well. Surgical intervention is reserved for those cases with persistent showering of septic emboli or continued propagation of the thrombosis. Although anticoagulation is commonly used in other specialties for similar septic thromboses, its role in Lemierre's is unclear at the present. **CONCLUSIONS:** Because Lemierre's syndrome is so rare it is difficult to ascertain absolutely the need for either anticoagulation or long-term antibiotic therapy. At this time, the risks and benefits of providing either therapy must be weighed against the potential complications of incompletely treating septic thrombosis.

## 78. **Unusual Facial Presentation of Renal Osteodystrophy**

Jaime I. Chang, MD, New York, NY  
Peter M. Som, MD, New York, NY  
William Lawson, MD DDS\*, New York, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to identify characteristic radiographic findings of facial skeletal changes in secondary hyperparathyroidism, to better understand the associated nomenclature, and to develop clinical suspicion for renal osteodystrophy when presented with similar facial changes.

**OBJECTIVES:** To report and illustrate clinically and radiographically an unusual case of maxillary and mandibular bony growth as a

consequence of hyperparathyroidism in a hemodialysis-dependent, end stage renal disease patient. To determine the characteristic patterns of radiographic findings of facial skeletal changes in secondary hyperparathyroidism. To clarify the confusing nomenclature of associated with these facial radiographs and renal osteodystrophy. **STUDY DESIGN:** Case report and literature review. **METHODS:** Literature review in MEDLINE for cases of facial skeletal changes in secondary hyperparathyroidism. **RESULTS:** Pathognomonic body skeletal changes as a sequelae of hyperparathyroidism have been well described in the literature; however, less commonly recognized are the associated facial skeletal changes. MEDLINE literature search found 3 radiographic findings of such facial deformities: 1) osteopenic bone with multiple cystic spaces (the classic osteitis fibrosa cystica with brown tumors); 2) fibrous dysplasia; and 3) serpentine tunneling within the bone. Our case presented with unusual computed tomography findings that had a biopsy diagnosis of fibrous dysplasia. Given the inconsistency of the pathology and the computed tomography findings, further investigation of the patient's overall metabolic status revealed that the patient had a previously undiagnosed secondary hyperparathyroidism. **CONCLUSIONS:** Facial skeletal changes must be evaluated not only by characteristic radiographic and pathologic findings, but also in context of the clinical history and the general metabolic state. As described, these changes appear in three forms. Even though hyperparathyroidism is an infrequent entity in the modern era, such bony sequelae of secondary hyperparathyroidism still occur.

## 79. Differences in the Heat Shock Response and NF Kappa B Dependent Gene Activation in Squamous and Adenoid Cystic Cancer

Thomas A. Christenson, MD, Philadelphia, PA

Tim A. King, MD, Dubuque, IA

Frank G. Ondrey, MD PhD, Minneapolis, MN

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand that heat shock protein modulation can occur in squamous carcinoma and that it may be manipulated for potential novel therapy.

**OBJECTIVES:** We explored the relationship between HSP70, NF kappa B and the proangiogenic genes interleukin 8 (IL-8) and VEGF in squamous and adenoid cystic cancer. **STUDY DESIGN:** In vitro cell lines. **METHODS:** Oral cavity CA-9-22 and adenoid cystic ACC-3 cells were exposed to standardized heat stress (42 degrees for 1 hour) to induce HSP70. Control and heat shocked cells were then exposed to the NF kappa B activators phorbol myristate acetate (PMA) and tumor necrosis factor alpha (TNF). Internally standardized luciferase reporter gene assays were then conducted for NF kappa B, IL-8 and VEGF. **RESULTS:** In squamous cell carcinoma, the expected heat shock response downregulating NF kappa B activation was confirmed following stimulation with PMA and TNF. The inducible IL-8 reporter gene was also significantly decreased while VEGF reporter gene activity was unchanged by the heat shock response. The expected heat shock response was not present in ACC-3 cells and paradoxically NF kappa B was upregulated. **CONCLUSIONS:** HSP70 induction downregulates NF kappa B activation and its downstream proangiogenic gene IL-8 in SCC. The expected heat shock response was not observed in ACC however, therefore the effect is not a generalized phenomenon across epithelial malignancies in the head and neck. VEGF is not NF kappa B dependent, therefore, the negative results to heat shock response seems to be NF kappa B restricted. HSP 70 modulation may decrease IL-8 mediated angiogenesis in SCC. Finally, the lack of heat shock response in adenoid cystic cancer suggests that chemotherapy drugs that modulate HSPs, like arsenites, might not be effective in adenoid cystic carcinoma.

## 80. Five Year Survival Rates and Time Trends of Laryngeal Cancer in the U.S. Population

Maura K. Cosetti, MD, New York, NY

Guo Pei Yu, MD MPH, New York, NY

Stimson P. Schantz, MD\*, New York, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss and analyze survival trends of laryngeal cancer in the last three decades using information from the SEER database.

**OBJECTIVES:** 1) To provide comprehensive temporal trend analysis of five year relative survival rates of laryngeal cancer using the SEER database; 2) to expand on prior reports through inclusion of laryngeal tumor location, stage, age at diagnosis, treatment strategy and histological grade. **STUDY DESIGN:** SEER database analysis. **METHODS:** Data from the 1973-2001 database of the Surveillance, Epidemiology, and End Results Program of the National Cancer Institute was used to design four patient cohorts, 1977-1978, 1983-1984, 1989-1990, and 1995-1996. Data on incidence and 5 year relative survival rates of laryngeal cancer was extracted and analyzed. **RESULTS:** Among patients with supraglottic cancer, 5 year relative survival rates did not change significantly over time. Similarly, relative survival rates for localized glottic cancer have also remained stable from 1977-78 to 1995-95. However, patients with regional glottic cancer demonstrated a significant decrease in survival from 79% to 60% ( $p < 0.001$ ). The decline of survival in regional disease was seen especially for patients aged 50-64-years ( $p < 0.05$ ). This trend was particularly associated with the birth cohort of individuals 55-59 years of age born after 1924 ( $p < 0.05$ ) and was independent of treatment strategy. In addition, a

histopathologic trend toward less differentiated tumors among was observed among regional glottic cancer patients;  $X^2(1)$  for trend=7.76,  $p=0.005$ .) **CONCLUSIONS:** A decreasing 5 year survival trend was found among glottic cancer patients with regional disease. This trend may reflect the effect of birth cohorts and implicate the complex interaction of carcinogenic exposure, specifically tobacco and host factors, rather than the influence of treatment.

### **81. Vagus Nerve Stimulation for the Treatment of Refractory Depression: A Promising New Treatment Option**

James K. Fortson, MD MPH MBA, East Point, GA

Vijaykumar G. Patel, MD, Atlanta, GA

Kibwe K. Weaver, MD, Atlanta, GA

Frederick C. Durden, MD, Atlanta, GA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the indications for surgical treatment of refractory epilepsy and depression.

**OBJECTIVES:** Vagus nerve stimulation (VNS) is since the 1990 a clinically useful anticonvulsant therapy for treatment resistant epilepsy. Open acute and longer term data suggest the potential clinical utility of VNS as an antidepressant therapy especially in treatment refractory depression. The vagus nerve has connections to the limbic system and other brain structures which modulate affect. VNS builds on a long history of investigating the relationship of autonomic signals to limbic and cortical function and is one of the newest methods to physically alter brain function. VNS is a clinically useful anticonvulsant therapy in treatment resistant patients with epilepsy, and pilot data suggest that it has potential as an antidepressant therapy. The known anatomic projections of the vagus nerve suggest that VNS also might have other neuropsychiatric applications. Additional research is needed to clarify the mechanisms of action of VNS and the potential clinical utility of this intriguing new somatic portal into the CNS. The purpose of this presentation is to look at the results of VNS stimulation in patients with treatment refractory depression. **STUDY DESIGN:** Retrospective and prospective cohort study. **METHODS:** Patients with refractory depression and patients with epilepsy and depression were studied both retrospectively and prospectively. Quality of life issues were studied including improvement in mood and alertness. **RESULTS:** Patients who underwent VNS therapy improved their overall quality of life after implantation. Of note is that symptoms decreased over time while quality of life issues improved. **CONCLUSIONS:** Vagus nerve stimulation (VNS) is since the 1990 a clinically useful anticonvulsant therapy for treatment resistant epilepsy. Open acute and longer term data suggest the potential clinical utility of VNS as an antidepressant therapy especially in treatment refractory depression.

### **82. Palatal Stiffening for Patients With Recurrent Symptoms After Uvulopharyngopalatoplasty**

Michael Friedman, MD\*, Chicago, IL

Paul Schalch, MD, Chicago, IL

Ninos J. Joseph, MD, Chicago, IL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to explain and discuss that palatal stiffening with restore pillar implant system has a reasonable success rate in reducing symptoms of snoring with minimum morbidity in patients who have previous UP3.

**OBJECTIVES:** The purpose of this study was to assess the value of palatal stiffening with the Restore® system to treat snoring and obstructive sleep apnea in patients who have recurrent symptoms after initial successful UPPP. **STUDY DESIGN:** A prospective, IRB approved, nonrandomized study on twenty patients selected for treatment with the Restore® system. **METHODS:** Twenty patients who met inclusion criteria were enrolled for treatment. The patients served as their own control and pretreatment symptoms and polysomnographic data were compared to post-treatment data. Pretreatment and post-treatment quality of life surveys were also compared. Inclusion criteria included the following: previous UP3; temporary improvement of symptoms with recurrence; absence of nasopharyngeal stenosis; polysomnogram indicating AHI >5 and <40; residual soft palate longer than 2 cm. **RESULTS:** 11 patients (55%) had significant improvement in snoring. 14 patients (70%) had significant improvement in at least one domain of their quality of life survey. Overall AHI was lower post-treatment, but no patients achieved classical cure with a 50% reduction of AHI. **CONCLUSIONS:** Palatal stiffening with the Restore® pillar implant system has a reasonable success rate in reducing symptoms of snoring with minimum morbidity in patients who have previous UP3.

### **83. Hemangiopericytoma of the Head and Neck, a 25 Year Experience**

Douglas K. Henstrom, MD, Rochester, MN

Eric J. Moore, MD, Rochester, MN

Kerry D. Olsen, MD, Rochester, MN

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the importance of surgical removal and extended long-term follow-up of patients with head and neck hemangiopericytoma. They should also be able to compare the differences between sinonasal hemangiopericytoma-like tumors and their recommended surgical resection vs. that of hemangiopericytoma involving other regions of the head and neck.

**OBJECTIVES:** Hemangiopericytoma (HPC) is a rare vascular tumor of the head and neck treated primarily by wide local excision and diligent postoperative follow-up. This paper reviews the surgical management of HPC of the head and neck, including sinonasal HPC and evaluates the functional and cosmetic outcomes of those patients. We review the potential of treating purely intranasal and paranasal sinus HPC with endoscopic excision. **STUDY DESIGN:** Retrospective chart review of those patients who underwent surgical resection of HPC of the head or neck at our institution from 1980 to 2005. Surgical outcomes were evaluated. **METHODS:** The charts of patients who underwent surgical treatment of head or neck hemangiopericytoma were retrospectively reviewed. The presenting signs/symptoms, radiographic and pathologic evidence for disease extent, as well as extent of surgical resection and adjuvant therapy were evaluated. The functional and long-term outcomes following surgical resection and reconstruction are presented and evaluated. **RESULTS:** Twenty patients were treated surgically for HPC of the head and neck between 1980 and 2005. Postoperative monitoring involving a combination of clinical exam and MRI were found to be most reliable. Patients with strictly sinonasal HPC showed the lowest local recurrence rate, the best long-term follow-up outcomes, and best overall prognosis. **CONCLUSIONS:** Current recommendations for treatment of HPC, in the head or neck, are wide local excision for complete tumor resection with or without subsequent reconstruction and long-term follow-up; but when the tumor is purely sinonasal, it may be successfully removed via an endonasal endoscopic approach. The use of adjuvant chemo or radiation therapy is still under debate.

#### **84. Association of XRCC1 Polymorphisms and Risk of Thyroid and Salivary Gland Carcinomas: A Case Control Analysis**

Tang D. Ho, MD MSc, Houston, TX  
Chong C. Zhao, PhD, Houston, TX  
Guojun Li, PhD, Houston, TX  
Qingyi Wei, MD PhD, Houston, TX  
Erich M. Sturgis, MD MPH\*, Houston, TX

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to demonstrate a better understanding of the relationship between the presence of XRCC1 polymorphisms and risk of thyroid and salivary gland carcinomas.

**OBJECTIVES:** To determine if single nucleotide polymorphisms (SNPs) of the DNA repair gene XRCC1 are associated with risk of differentiated thyroid carcinoma (DTC) and salivary gland carcinoma (SGC). **STUDY DESIGN:** A hospital based case control study. **METHODS:** 130 DTC subjects, 95 SGC subjects, 149 subjects with benign thyroid or salivary tumors, and 163 cancer free control subjects were frequency matched on age and sex. To reduce racial confounding, only non-Hispanic whites were included. PCR-RFLP assays were utilized for genotyping of 6 SNPs (3 each in the promoter and coding regions). Multivariate logistic regression analysis was performed to calculate adjusted odds ratios (OR) and 95% confidence intervals (CI). Haplotype distributions were analyzed using Bayesian statistical methods. **RESULTS:** The genotype distributions were similar between DTC cases and controls for the 6 SNPs. For XRCC1 P2 multivariate analysis suggested a borderline significant increased risk of DTC for the homozygous variant (TT) genotype (OR = 3.8, 95% CI = 0.9—16.2, P = 0.071). Similarly, the genotype distributions were comparable between SGC cases and controls. For XRCC1 P4 multivariate analysis suggested a borderline significant increased risk of SGC for the heterozygous variant (TC) genotype (OR = 1.6, 95% CI = 0.9—2.8, p = 0.125). No significant risk association was evident for benign thyroid and salivary gland tumors. Haplotype distributions will also be presented. **CONCLUSIONS:** Despite their possible association with altered DNA base excision repair capacity, the 6 XRCC1 SNPs investigated do not appear to be significant predisposing risk factors for DTC or SGC. However, larger studies are needed to verify these findings.

#### **85. Assessment of Intraoperative Safety in Transoral Robotic Surgery (TORS)**

Neil G. Hockstein, MD, Wilmington, DE  
Bert W. O'Malley, Jr., MD\*, Philadelphia, PA  
Gregory S. Weinstein, MD\*, Philadelphia, PA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss issues related to patient safety in transoral robotic surgery.

**OBJECTIVES:** Robotic technology has been safely integrated into thoracic and abdominopelvic surgery, and the early experience has been very promising with very rare complications related to robotic device failure. Recently, several reports have documented the

technical feasibility of transoral robotic surgery (TORS) with the da Vinci Surgical System. Proposed pharyngeal and laryngeal applications include: radical tonsillectomy, base of tongue resection, supraglottic laryngectomy, and phonomicrosurgery. The safety of transoral placement of the robotic endoscope and instruments has not been established. Potential risks specific to the transoral use of the surgical robot include: facial skin laceration, tooth injury, mucosal laceration, mandible fracture, cervical spine fracture, and ocular injury. We hypothesize that these particular risks of transoral surgery are similar with robotic assistance compared to conventional transoral surgery. **STUDY DESIGN:** Prospective laboratory study. **METHODS:** To test this hypothesis, we attempted to intentionally injure a human cadaver with the da Vinci Surgical System by impaling the facial skin and pharyngeal and laryngeal mucosa with the robotic instruments and endoscope. We also attempted to extract or fracture teeth and fracture the cadaver's mandible and cervical spine by applying maximal pressure and torque with the robotic arms. Each experiment was repeated at least five times. **RESULTS:** Impaling the cadaver's skin and mucosa resulted in only superficial lacerations. Neither tooth, mandible, nor cervical spine fracture could be achieved. Additionally, we discuss several strategies to increase patient safety in TORS. **CONCLUSIONS:** The safety profile of the da Vinci Surgical System in transoral robotic surgery appears to be comparable to conventional surgery in a cadaver model.

## **86. Inositol Hexaphosphate and Paclitaxel as Symbiotic Partners in the Treatment of Oral Cavity Squamous Cell Carcinoma**

Seth C. Janus, MD, Minneapolis, MN  
Beverly R. Wuertz, BS, Minneapolis, MN  
Frank G. Ondrey, MD PhD, Minneapolis, MN

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to 1) demonstrate an understanding of the role of NF- $\kappa$ B in oral cavity squamous cell carcinoma (OCSCC); 2) explain how paclitaxel, inositol hexaphosphate, and a combination of the two, affect NF- $\kappa$ B activity in OCSCC; and 3) discuss how inositol hexaphosphate is able to increase paclitaxel induced cell death and apoptosis in an OCSCC cell line.

**OBJECTIVES:** NF- $\kappa$ B is an early response gene that has been associated with squamous cell cancer progression and is induced by paclitaxel. Inositol hexaphosphate (IP6) is a naturally occurring polyphosphorylated carbohydrate. We examined if IP6 could abrogate paclitaxel induced NF- $\kappa$ B activation in oral cavity squamous cell carcinoma (OCSCC), and if furthermore, they could work synergistically in OCSCC treatment. **STUDY DESIGN:** NF- $\kappa$ B levels were evaluated in OCSCC cell lines after treatment with paclitaxel, IP6 and these two agents combined. Resulting levels of cell death and apoptosis were assessed, and conclusions are drawn regarding a possible synergistic relationship between paclitaxel and IP6. **METHODS:** NF- $\kappa$ B activation in cancer cells treated with paclitaxel, IP6, and combinations of the two were measured by transient transfection using the pIkBa Luc reporter construct. Cell proliferation of treated cells was measured by MTT assay. Cell viability and apoptosis of cancer cells treated with paclitaxel and IP6 combinations were quantitated by trypan blue staining and Caspase-Glo 3/7 assay, respectively. **RESULTS:** IP6 was observed to downregulate NF- $\kappa$ B activation in NA and CA-9-22 OCSCC cell lines. Paclitaxel treatments caused increased NF- $\kappa$ B activation in the same cell lines. IP6 was observed to mitigate paclitaxel induced NF- $\kappa$ B activation in the CA-9-22 cell line. IP6, when combined with paclitaxel, reduces CA-9-22 cell proliferation, increases cell death, and increases apoptosis, when compared to treatment with paclitaxel alone. **CONCLUSIONS:** IP6 reduces paclitaxel induced NF- $\kappa$ B activation and increases paclitaxel mediated cell killing and apoptosis. As a well tolerated and safe supplement, IP6 deserves further study in the treatment of oral cavity squamous cell carcinoma.

## **87. Chromosomal Aberrations Detected by Comparative Genomic Hybridization in Head and Neck Squamous Cell Carcinoma From Tobacco and Alcohol Use**

Edward S. Kwak, MD, New York, NY  
Guo Pei Yu, MD PhD, New York, NY  
Qiang Huang, PhD, New York, NY  
Stimson P. Schantz, MD\*, New York, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss specific genomic changes in head and neck squamous cell carcinoma associated with tobacco and alcohol use.

**OBJECTIVES:** In head and neck squamous cell carcinoma (HNSCC), the specific genomic changes associated with tobacco and alcohol use have not been clearly delineated. The objective of this study is to determine specific genomic changes in HNSCC associated with tobacco and alcohol use by using comparative genomic hybridization (CGH). **STUDY DESIGN:** Prospective study. **METHODS:** 45 patients with HNSCC were enrolled in the study. Tumor specimens obtained underwent CGH analysis. Statistical analysis was performed, incorporated each patient's smoking and alcohol use history with the results from CGH results. **RESULTS:** Smoking more than one pack per day (1ppd) was associated with >9 copy number aberrations (CNAs) ( $p=0.003$ ) and with >9 losses ( $p=0.009$ )

within a genome. A history of heavy smoking and drinking was associated with >9 CNAs ( $p=0.015$ ), >9 gains ( $p=0.023$ ), and >9 losses ( $p=0.022$ ) within a genome. A drinking history was associated with >9 gains within a genome ( $p=0.04$ ). Gains at 3q was associated with smoking greater than 1ppd ( $p=0.03$ ) along with the combination of tobacco and alcohol use ( $p=0.044$ ). Losses at 13q was associated with smoking more than one 1ppd ( $p=0.004$ ) along with a heavy smoking and drinking history ( $p=0.013$ ). Gains in both 3q and a loss in 13q were associated with smoking more than 1ppd ( $p=0.022$ ) and having a history of heavy smoking and drinking ( $p=0.04$ ). **CONCLUSIONS:** There are increased chromosomal aberrations in patients with HNSCC and who have a history of heavy smoking and drinking.

## 88. Use of the Ultrasonic Dissector in Partial Thyroidectomy

David S. Leonard, AFRCSI, St. James' Gate, Dublin Ireland

C. V. Timon, FRCSI, St. James' Gate, Dublin Ireland

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to assess the role of the ultrasonic dissector in thyroid surgery when compared with conventional surgical techniques.

**OBJECTIVES:** Use of the ultrasonic dissector in thyroid surgery is becoming more prevalent. A number of advantages have been posited in the surgical literature, specifically reduced operative time and incision size. We sought to assess the value of the harmonic scalpel in routine partial thyroidectomy. **STUDY DESIGN:** Prospective randomized trial. **METHODS:** We studied 178 patients presenting for thyroid surgery over 18 months and selected a homogeneous group of 52 requiring partial thyroidectomy. The main inclusion criterion was suitability for resection through a 4cm incision. Patients were randomized into two groups. In Group I ( $n=31$ ) the thyroid gland was mobilized using sharp and blunt dissection, and major vessels were secured with metal ligature clips before being divided. In Group II ( $n=21$ ) the ultrasonic dissector was used to mobilize the thyroid and divide major vessels. Peri- and postoperative parameters were compared between the two patient groups including operative time, final incision size, need for postoperative drains, postoperative stay and complications. **RESULTS:** Studied outcomes for the two patient groups were comparable. Specifically, there was no significant difference in operative time or incision size. One patient in Group II suffered a transient vocal cord palsy, which resolved spontaneously. **CONCLUSIONS:** Use of the ultrasonic dissector in partial thyroidectomy does not appear to confer any quantifiable benefit when compared with conventional surgical techniques. We found no advantage with regard to operative time or incision size. However, surgical convenience and confidence in the instrument has lead to use of the ultrasonic dissector becoming the technique of choice in our institution.

## 89. Expression and Function of the Antiapoptotic Protein Survivin in Medullary Thyroid Carcinoma

Timothy L. Lindemann, MD, Danville, PA

Phillip K. Pellitteri, DO\*, Danville, PA

David J. Carey, PhD, Danville, PA

Patrick C. Barth, MD, Danville, PA

Catherine L. Noel, DO, Danville, PA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the treatment dilemmas of medullary thyroid carcinoma and the role of survivin in proapoptotic pathways.

**OBJECTIVES:** Medullary thyroid carcinoma (MTC) has shown resistance to both chemotherapy and radiotherapy treatments. The aim of this study was to investigate the level of expression of survivin in MTC cell lines and then modulate its expression to explore the hypothesis that survivin protects MTC cells from cell death by blocking activation of proapoptotic pathways. An understanding of survivin and its effect on these pathways could have important clinical implications. **STUDY DESIGN:** Human MTC cell lines DRO-81-1 and TT were investigated for their levels of expression of survivin mRNA and protein through the use of RT-PCR amplification and Western blot techniques. **METHODS:** siRNA mediated suppression of endogenous MTC survivin expression was accomplished using a 20 bp double stranded siRNA that targets a region of exon 3 in human survivin. Upregulation of survivin was achieved via transfection of MTC cell lines with human survivin cDNA using an adenoviral vector system (Adeasy Stratagene Corporation). **RESULTS:** RT-PCR amplification with survivin specific primers produced the expected 300 bp mRNA product in human MTC cell lines DRO-81-1 and TT. Survivin protein expression was confirmed in the same cell lines at variable levels using Western blot analysis. Transfection of MTC DRO81-1 cells with survivin siRNA resulted in an 86% reduction in survivin levels vs. controls. Upregulation of survivin was demonstrated in MTC cell lines using the Adeasy adenoviral vector. **CONCLUSIONS:** Our work demonstrates the expression of the antiapoptotic protein, survivin, in medullary thyroid carcinoma. Manipulation of survivin's effect on MTC apoptotic pathways could have important therapeutic implications.

## 90. Comparison of Micro-PET to Bioluminescence for In Vivo Imaging of Minimal Residual Disease in

## **HNSCC**

Cherie-Ann O. Nathan, MD\*, Shreveport, LA  
Nazanin Amirghahari, BS, Shreveport, LA  
Xiaohua Rong, BS, Shreveport, LA  
Anthony Giordano, PhD, Shreveport, LA  
Donald Sibley, PhD, Shreveport, LA  
John Sunderland, PhD, Shreveport, LA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to compare and contrast two exciting in vivo imaging modalities bioluminescence and micro-PET in assessing tumor growth even in a model of minimal residual disease.

**OBJECTIVES:** To compare bioluminescence imaging (BLI) to micro-PET for serial assessment of neoplastic growth in a model of minimal residual disease (MRD). We hypothesized that BLI would be more sensitive and efficacious in spatiotemporal evaluation of HNSCC cells. **STUDY DESIGN:** Animal study. **METHODS:** FaDu cells transfected with the reporter gene luciferase produce visible light from luciferin which is injected systemically, following which an ATP and O<sub>2</sub> dependent photochemical reaction occurs, resulting in the release of photons by living cells containing luciferase. This emission is detected and quantified by a cooled charge coupled device camera, minutes after the administration of luciferin. 1x 10<sup>6</sup> cells of FaDu9000 the clone that expressed the highest level of active luciferase was implanted subcutaneously in the dorsal flank of nude mice. Mice were imaged by both micro-PET and BLI twice a week and compared to caliper measurements at varying time intervals. **RESULTS:** Bioluminescence was the only modality that could both temporally and spatially measure tumor growth when 1x10<sup>6</sup> cells were implanted, although no tumor was visible or palpable. Micro-PET was able to pick up activity only when the tumors were measurable due to the high background activity. There was significant correlation between photon counts and tumor measurements as tumors became measurable ( $p < 0.05$ ).

**CONCLUSIONS:** BLI is a sensitive, noninvasive method of detecting and quantifying minimal tumor cells. It allows for longitudinal evaluation of response of HNSCC in a model of minimal residual disease, thus offering an exciting preclinical strategy to assess tumor response to novel molecular inhibitors.

### **91. Distant Metastatic Disease to the Parotid Gland**

Francisco G. Pernas, BS, Miami, FL  
Lee P. Smith, MD, Miami, FL  
Frank C. Astor, MD, Miami, FL  
Elizabeth J. Franzmann, MD, Miami, FL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to better understand distant metastases to the parotid gland.

**OBJECTIVES:** To discuss distant metastases to the parotid gland and present the third known case of colonic adenocarcinoma metastatic to the parotid gland. **STUDY DESIGN:** Retrospective case report. **METHODS:** A historical review of the English language literature from 1975 until the present evaluating all reported cases of distant metastatic disease to the parotid gland was performed. A case of colonic adenocarcinoma metastatic to the parotid gland is presented. **RESULTS:** A review of the English language literature revealed two cases of colonic adenocarcinoma metastatic to the parotid gland. We report a patient who presented with a history of metastatic colonic adenocarcinoma and an enlarging parotid mass. Cytological evaluation of a fine needle aspirate revealed evidence of carcinoma which stained positive for CDX2, a marker for intestinal tissue. This represents the third known case of colonic adenocarcinoma metastatic to the parotid gland. **CONCLUSIONS:** Although distant metastatic disease is responsible for a small fraction of parotid masses, the presence of a parotid mass in a patient with a known history of malignancy should alert the clinician to the possibility of metastatic disease. Cytological evaluation of fine needle aspirates with staining for relevant biomarkers may differentiate metastatic lesions from primary parotid tumors, obviating the need for open surgical resection.

### **92. Enhanced Xeloda Based Chemotherapy With Upregulated Thymidine Phosphorylase Transgene Expression for Human Head and Neck Cancer**

Koichiro Saito, MD, Philadelphia, PA  
JianPing Wang, Philadelphia, PA  
Bert W. O'Malley, Jr., MD\*, Philadelphia, PA  
Daqing Li, MD, Philadelphia, PA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to explain the importance of

thymidine phosphorylase (TP) and dihydropyrimidine dehydrogenase (DPD) expression level to predict and improve the therapeutic outcome of Xeloda based chemotherapy for the treatment of human head and neck squamous cell carcinoma (HNSCC).

**OBJECTIVES:** Data recently accumulated suggest that TP and DPD play an important role for Xeloda (capecitabine) based chemotherapy. The present study is to utilize upregulated TP transgene expression in tumor cells and therefore to enhance the therapeutic outcome of Xeloda based chemotherapy for the treatment of human HNSCC in a murine model. **STUDY DESIGN:** Two types of mouse models with HNSCC were used. One model demonstrated with low endogenous TP and DPD expression whereas another had high endogenous TP and low endogenous DPD in the tumor cells. Recombinant adenoviral TP vector was constructed. Mice were divided into control, Xeloda alone, adenoviral TP gene (Ad-TP) transfer alone and Xeloda+Ad-TP gene transfer groups. Post-treatment tumor volume change was evaluated. The correlation between tumor volume change and TP/DPD ratio were examined. **METHODS:** Xeloda was administered through gastrogavage for 5 days and Ad-TP transfer was performed on the first day of the treatment. Tumor size was measured up to 30 days. Tumor samples were immunohistochemically studied for TP and DPD expression and a Nikon microscope digital image system was used to digitally assess the immunohistochemical staining obtained. **RESULTS:** Upregulated TP transgene expression significantly improved the therapeutic outcome of Xeloda based chemotherapy in low endogenous TP and DPD expression group. Increased level of TP transgene expression demonstrated no therapeutical benefit in high endogenous TP and low endogenous DPD expression group. **CONCLUSIONS:** Intratumoral adenoviral TP gene transfer significantly enhances therapeutical outcome of Xeloda based chemotherapy against human HNSCC tumors with low endogenous TP which consistently demonstrate poor therapeutical results after Xeloda treatment.

### 93. Killian-Jamieson Diverticulum Presenting as a Thyroid Mass: A Case Report and Literature Review

Henry D. Sandel, MD, Washington, DC  
Nora Malaisrie, BS, Washington, DC  
Bruce Davidson, MD, Washington, DC

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the difference between a Zenker's diverticulum and a Killian-Jamieson diverticulum. One should be able to describe the diagnostic workup of dysphagia and explain the differential diagnosis and treatment options based on the findings. The participant should also be able to describe the ultrasound characteristics and pathology of upper cervical esophageal diverticula.

**OBJECTIVES:** Our objectives are to present an unusual finding of a Killian-Jamieson diverticulum presenting as a thyroid mass. We will describe the diagnostic process and treatment options of these lesions. **STUDY DESIGN:** A case presentation and review of the literature. **METHODS:** A patient was identified who presented to our outpatient clinic with an unusual thyroid mass that was found to be a Killian-Jamieson diverticulum. A review of the literature was performed where its etiology, clinical presentation, diagnosis was reviewed as well as their differentiation from the more common Zenker's diverticula. **RESULTS:** A 37 year old female was referred to our clinic for an unusual 2cm thyroid mass identified by clinical exam and ultrasound and causing dysphagia. She had normal thyroid function studies and a heterogenous pattern of uptake on thyroid scan. A fine needle aspiration was performed revealing mucosal type squamous cells, rare follicular cells, and fragments of skeletal muscle. CT scan revealed a displacement of the cervical esophagus and a cystic lesion in close proximity to the thyroid. Barium esophagram exposed the lateral cervical esophageal diverticulum which was then excised by an open lateral cervical approach. **CONCLUSIONS:** Killian-Jamieson diverticula are rare phenomena that can present in a variety of ways. The most common presenting symptom is dysphagia. Our patient is the only known reported case of a KJ diverticulum presenting as a thyroid mass. A pharyngoesophagram is the gold standard for diagnosis and should be used early in the workup of dysphagia. Patients with a suspected KJ diverticula should undergo pharyngoesophagoscopy followed by an open exploration of the upper lateral cervical esophagus with resection of the diverticulum.

### 94. Malignant Fibrous Histiocytoma of the Submandibular Gland

Joseph Shvidler, MD, Tripler AMC, HI  
Gregory D. Farwell, MD, Sacramento, CA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the current diagnosis and treatment recommendations for malignant fibrous histiocytoma of the head and neck.

**OBJECTIVES:** Malignant fibrous histiocytoma (MFH) is a rare entity in the head and neck. We describe a unique case of a fifty five year old male who presented with a level IB neck mass that had been slowly growing for the past five years. **STUDY DESIGN:** Case report. **METHODS:** The fine needle aspiration revealed poorly differentiated tumor of unknown origin. Comprehensive levels I and IIA neck dissection were performed. **RESULTS:** The final pathology demonstrated malignant fibrous histiocytoma of the submandibular gland. **CONCLUSIONS:** In review of the literature this is a unique case presentation for malignant fibrous histiocytoma of the sub-

mandibular gland. We present this informative case and a detailed review of current treatment recommendations for this rare entity.

## 95. Heterogeneity of Gene Expression Profiles in Head and Neck Squamous Cell Carcinoma (HNSCC)

Farhad Sigari, MD MS, Chicago, IL  
Guy J. Petruzelli, MD, Maywood, IL  
Mark E. Whipple, MD MS, Seattle, WA  
Kerstin M. Stenson, MD, Chicago, IL  
Mark W. Lingen, DDS PhD, Chicago, IL

**EDUCATIONAL OBJECTIVE:** Participants should be able describe how microarray methodology may be used to demonstrate heterogeneity of gene expression profiles in HNSCC, and how this heterogeneity can be used to classify distinct populations of HNSCC.

**OBJECTIVES:** A number of genetic alterations in oncogenes and tumor suppressor genes have been found in HNSCC. However, the specific pattern of genetic alterations required for progressive transformation in HNSCC has not been delineated. **STUDY DESIGN:** The major goal of this study was to determine the global expression profile of HNSCC in order to begin to molecularly classify these tumors. **METHODS:** Keratinocytes were harvested from 50 snap frozen HNSCC specimens. Total RNA was extracted and subjected to high fidelity amplification. RNA integrity and purity/concentration determined. Fragmented cRNA was hybridized to Affymetrix human 133 2.0 chip. The arrays were washed and stained and then scanned. Hierarchical clustering was performed expression maps of clustered genes were created. Principal component analysis performed. **RESULTS:** Both the hierarchical and PCA clustering of the samples demonstrated the presence of a number of different major clusters of patients. Variable expression of 131 genes identified two distinct populations of HNSCC. WAP expression appeared to be significant. Further two different clusters were identified with respect to the angiogenic gene set. **CONCLUSIONS:** These findings demonstrate that HNSCC can be stratified based upon their global expression profile. In addition, they underscore the concept of inter-tumoral heterogeneity and imply that these differences may result in a number of specific molecular mechanisms by which individual tumors within the same histologic type express a given tumor phenotype. Finally, this work demonstrates that future studies designed to explore the relationship between variable gene expression patterns and their biology, predicted clinical outcome, and potential response to therapy is warranted.

## 96. Endoscopic Sentinel Lymph Node Biopsy in a Porcine Model

Jamie D. Sisk, MD, Jackson, MS  
Karen T. Pitman, MD\*, Jackson, MS

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss problems and recent trends in the management of the clinical N0 neck for early head and neck squamous cell carcinoma. A new approach to deal with current problems associated with sentinel lymph node biopsy will be demonstrated.

**OBJECTIVES:** To study the accuracy and feasibility of endoscopic sentinel lymph node biopsy in a porcine model. **STUDY DESIGN:** Experimental, nonrandomized prospective study using an animal model. **METHODS:** 100 microcuries of technetium labeled sulfa colloid (Tc-SC) was injected into the ventral surface of both the right and left oral tongue of six adult Yorkshire pigs. A handheld gamma probe was then used to locate the sentinel node transcutaneously, and 0.25ml of isosulfan blue was injected into the previous injection sites of the tongue. Endoscopic sentinel node dissection was then performed using a combination of balloon dissection and CO2 insufflation. The operative time, blood loss, and radioactivity of the lymph node by way of maximum 10 counts per second were measured. **RESULTS:** In all cases in which the sentinel lymph node was detected transcutaneously, endoscopic excision was successful. Endoscopic visualization as well as an endoscopic gamma probe confirmed the presence of both Tc-SC and isosulfan blue dye in the sentinel node in each pig. The procedure lasted 22 to 61 minutes (median duration 35 minutes). There was no blood loss in any of the pigs. Mean radioactivity measured 14,466 counts/second per lymph node. **CONCLUSIONS:** Endoscopic sentinel lymph node biopsy for oral tongue lesions is feasible.

## 97. P63 and Notch-1 Expression During Human Salivary Gland Morphogenesis

Christopher A. Sullivan, MD, Winston-Salem, NC  
Matthew Bolinger, MD, Winston-Salem, NC  
James Yoo, MD, Winston-Salem, NC  
Anthony Atala, MD, Winston-Salem, NC

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand basic concepts of salivary embryology and the role of the p63 and notch-1 genes in salivary morphogenesis.

**OBJECTIVES:** p63 and notch-1 gene function are essential for formation of normal epithelial tissues in mammals. In order to study the role of these genes in human salivary morphogenesis, we have developed an in vitro cell culture system in which we can observe the formation of salivary gland structures from undifferentiated salivary epithelial cells. In this study, we aimed to demonstrate the role of p63 and notch-1 expression in human salivary structure formation. **STUDY DESIGN:** Basic scientific laboratory investigation. **METHODS:** Salivary epithelial cells were cultured from human salivary tissue by explant technique. First, third, sixth and tenth passage primary culture cells were screened for p63 and notch-1 expression. These cells were placed into a gel culture system containing collagen and growth factors. Salivary structure formation was observed using phase contrast microscopy. Gels were sectioned at various time points and analyzed using H&E staining for morphology, and immunohistochemical and PCR analyses for amylase, p63 and notch-1 function. **RESULTS:** Salivary cell function was confirmed by expression of amylase in all cultures. Early passage primary culture cells expressed p63 and notch-1 proteins; late passage cells expressed only p63. In gel cultures, cells expressing only p63 failed to form complete salivary units and cells expressing p63 and notch-1 formed branching salivary structures. **CONCLUSIONS:** The presence of p63 and notch-1 function appears to be essential for human salivary branching morphogenesis. Loss of notch-1 expression leads to incomplete salivary structure formation in vitro.

## 98. Dedifferentiated Acinic Cell Carcinoma of the Parotid Gland: An Aggressive, Rare Variant of Acinic Cell Carcinoma

Sarah K. Wise, MD, Atlanta, GA  
Susan Muller, DMD, Atlanta, GA  
Amy Y. Chen, MD MPH, Atlanta, GA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to recognize the rare diagnosis of dedifferentiated acinic cell carcinoma (DACC). Additionally, participants should understand that the treatment course and outcomes from dedifferentiated acinic cell carcinoma differ significantly from standard acinic cell carcinoma (ACC).

**OBJECTIVES:** Acinic cell carcinoma (ACC) is considered a low grade malignancy with low metastatic potential and 5 year survival >80%. Few cases of a rare variant of ACC, dedifferentiated acinic cell carcinoma (DACC) have been reported, all occurring in the parotid. Unlike low grade ACC, DACC is a highly aggressive, lethal tumor. Recognizing this variant is important in therapeutic management. **STUDY DESIGN:** Case report and literature review. **METHODS:** Clinic and operative notes, imaging studies, and pathology of a 47 year old man with DACC are examined. Previous literature reports of this entity are reviewed. **RESULTS:** A 47 year old man presented with a left parotid mass. Computed tomography revealed a 3.0 x 2.2 cm left parotid tail mass, multiple parotid tail nodes, and a 1.8 cm level IIA node. CT guided fine needle aspiration biopsy of the parotid mass and a parotid tail lymph node revealed polyhedral cells with eccentric nuclei and granular basophilic cytoplasm favoring ACC. Cellular atypia and mitoses were absent. Total parotidectomy and neck dissection were performed. Microscopic examination revealed two neoplastic cell populations. One component was typical ACC similar to the FNA. The second component showed atypical, pleomorphic cells, increased nuclear/cytoplasmic ratio, and numerous mitoses. Lymphovascular invasion was present but no perineural invasion seen. 3/29 lymph nodes contained metastasis, showing predominately ACC and focal DACC. Adjuvant therapy included external beam radiation. **CONCLUSIONS:** DACC has great metastatic potential to regional lymph nodes and distant sites including bone, lung, or brain. Expert pathologic recognition of the high metastatic potential and lethal nature of DACC is integral to appropriate management.

## 99. Lactoferrin Inhibits Growth of Head and Neck Squamous Cell Carcinoma Both In Vitro and In Vivo

Jeffrey S. Wolf, MD, Baltimore, MD  
Mark S. Schneyer, BS, Baltimore, MD (Presenter)  
Guoyan Li, MD, Baltimore, MD  
Scott E. Strome, MD\*, Baltimore, MD  
Julina Ongkasuwan, MD, Baltimore, MD  
Daqing Li, MD, Philadelphia, PA  
Bert W. O'Malley, Jr., MD\*, Philadelphia, PA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand that lactoferrin inhibits the growth of squamous cell carcinoma of the head and neck.

**OBJECTIVES:** To determine whether recombinant human lactoferrin inhibits the growth of HNSCCA both in vitro. To determine whether oral lactoferrin inhibits the growth of HNSCCA in the murine model. To determine the mechanism of this growth inhibition. **STUDY DESIGN:** Both in vitro and in vivo with control groups. **METHODS:** Human and murine squamous cell carcinoma cell lines were used. MTT growth assays, apoptotic assays, cell cycle and cytokine analysis were performed in both murine and human cells lines. Murine SCCVII cells were implanted into the floor of mouth of 50 immunocompetent mice varying dosages of lactoferrin via

oral gavage. Tumors were allowed to grow for a total of 15 days after which tumors, serum, and spleens were measured and harvested for analysis. **RESULTS:** The addition of lactoferrin inhibited tumor growth in the murine model and cellular proliferation in vivo. There were increases in G0/G1 cell cycle arrest in both cell lines and animal tumors with resultant increases in p19. Lactoferrin inhibited cellular production of proangiogenic and prometastatic cytokines and induced lymphocytic tumor infiltration. **CONCLUSIONS:** Lactoferrin slows tumor growth by exerting a direct cell cycle inhibition and via modulation of the immune system which makes it useful as a novel therapeutic approach in the treatment of HNSCC. Oral dosing of lactoferrin is an efficacious delivery method.

#### **100. The Use of Autologous Plasma Adhesives and Platelet Rich Plasma in Hemithyroidectomy: A Blinded Randomized Controlled Trial**

John H. Yoo, MD, London, ON Canada  
Kathryn E. Roth, MD, London, ON Canada (Presenter)  
Brian Hughes, MD, London, ON Canada  
Kevin Fung, MD, London, ON Canada  
Jason H. Franklin, MD, London, ON Canada  
Howard B. Lampe, MD\*, London, ON Canada

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to: 1) evaluate the effect of autologous plasma products applied topically to the hemithyroidectomy surgical bed in terms of postoperative drainage and pain; 2) understand the composition of autologous platelet rich and platelet poor plasma and its applications in soft tissue surgery; and 3) consider possible future applications of autologous plasma products in head and neck surgery for improved wound healing and decreased risk of bloodborne disease transmission.

**OBJECTIVES:** Most commercially available biocompatible adhesives use pooled human plasma. Autologous alternatives, such as platelet rich plasma (PRP), platelet poor/fibrin rich plasma (PPP), and thrombin can be derived from the patient's own blood. PPP can provide high concentrations of platelet derived growth factors while PRP provides tissue adhesive properties. The objective of this study was to examine the effect of autologous plasma products, in a homogeneous head and neck surgical population. Postoperative surgical drainage and pain were evaluated in patients undergoing hemithyroidectomy. **STUDY DESIGN:** Blinded randomized controlled trial. **METHODS:** Patients undergoing hemithyroidectomy were randomized for topical application to the surgical bed with autologous plasma versus saline. Hemithyroidectomy was selected as the ideal vehicle for this study because of the standardized nature of this operation. During surgery PRP, PPP, and thrombin were prepared from 60cc of blood using the Biomet Gravitational Platelet Separation(TM) system. PRP/PPP or saline was then applied to the wound immediately prior to skin closure. Postoperative drainage, visual analogue scale for postoperative pain, analgesic use, and perioperative complications were recorded. Patients and data collectors were blinded to the group assignments. **RESULTS:** A statistically significant difference of 45% in total drainage was seen in the autologous plasma group. Postoperative pain and analgesic use was reduced in the autologous plasma group. **CONCLUSIONS:** The use of autologous PPP and PRP in hemithyroidectomy resulted in decreased postoperative drainage, pain and analgesic use. The potential benefits of these products for head and neck soft tissue surgery warrant further investigation.

### **Laryngology**

#### **101. Histopathological Study of the Correlation Between the Laryngeal Space Extension and Cervical Lymph Node Metastasis in Glottic Carcinomas**

Hideki Chijiwa, MD, Kurume, Fukuoka Japan  
Hirohito H. Umeno, MD, Kurume, Fukuoka Japan  
Kiminori K. Sato, MD, Kurume, Fukuoka Japan  
Tadashi T. Nakashima, MD, Kurume, Fukuoka Japan

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the histopathologic importance of PGS or CA for the neck lymph node metastasis in glottic carcinomas.

**OBJECTIVES:** The paraglottic space (PGS) and cricoid area (CA) of the larynx are loose areolar area composed of loose elastic, collagenous fibers and adipose tissue. They were found to contain main blood vessels of the larynx. We examined the correlation of the histopathologic extension of glottic carcinoma to PGS or CA and cervical lymph node metastasis. **STUDY DESIGN:** The charts of 45 (44 male, 1 female) patients who received total laryngectomy against the squamous cell carcinoma of the glottis between 1991 and 2003 were reviewed. **METHODS:** Macroscopic and microscopic study of the removed larynx of the same patient was done and histopathologic evidence of invasion to the PGS or CA was analyzed. **RESULTS:** Eight of 24 patients (33%) whose cancer invaded into the PGS or CA had cervical lymph node metastasis. In contrast, only one (5%) of 21 patients without any evidence of invasion

into each space had lymph node metastasis. There was a statistically significant difference ( $p<0.05$ ) between them. In 36 patients who were free from metastasis, recurrence of the neck occurred in 6 (38%) of the 16 patients with histopathologic evidence of PGS or CA extension, whereas recurrence occurred in only one (5%) of the 20 patients without the space extension ( $p<0.05$ ).

**CONCLUSIONS:** Invasion of cancer to the PGS or CA is an important factor for the neck lymph node metastasis in glottic carcinomas. In these patients, postoperative radiotherapy or preventive neck dissection is recommended.

## 102. Effectiveness of Amitriptyline Versus Cough Suppressants in the Treatment of Chronic Cough Due to Post-Viral Vagal Neuropathy

Anita Jeyakumar, MD, Rochester, NY

Michael C. Haben, MD, Rochester, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the etiology and treatment options of chronic cough.

**OBJECTIVES:** Prospective, randomized control study to evaluate the effectiveness of amitriptyline versus cough suppressants in the treatment of chronic cough due to post-viral vagal neuropathy. **STUDY DESIGN:** Prospective, randomized control study (N=20).

**METHODS:** Patients have a clinical history consistent with post-viral vagal neuropathy which includes a daily dry, nonproductive cough precipitated by a throat tickle, dry sensation, laughter or speaking and with a history of an antecedent upper respiratory tract infection. All patients had been tried on antireflux medication (proton pump inhibitors) and had a negative chest x-ray prior to presentation. All were nonsmokers without a history of asthma. Patients on ACE-inhibitors were excluded from the study. Patients were randomized by chart numbers. Those with even numbers were placed on amitriptyline 10 mg at bedtime. Odd numbers were placed on codeine/guaifenesin 10-100mg/5ml, 10ml every 6 hours standing dose, while awake. Both groups were instructed to complete 10 days of therapy. Data was collected by a registered nurse who was blinded to the therapy. Subjects were asked to rate the reduction in the frequency and severity of their cough by 100, 75, 50, 25 and 0%. Those patients experiencing a 75-100% were recorded as having a complete response, 25-50% a partial response, and 0% as having no response. In the amitriptyline group, partial responders had their medication increased to 10mg every evening and at bedtime. Patients in the codeine/guaifenesin group with zero to partial responses were then tried on amitriptyline. Final results were recorded and used for statistical analysis. **RESULTS:** A majority of patients in the amitriptyline group achieved a complete response on the initial dose of 10mg. Patients who were partial responders generally had minimal benefit from twice daily dosing and frequently discontinued the second dose due to excessive side effects. None of the codeine/guaifenesin group achieved a complete response. Almost all these patients subsequently received a partial or complete response on the amitriptyline. **CONCLUSIONS:** Amitriptyline is an effective first line therapy for select cases of suspected post-viral vagal neuropathy.

## 103. WITHDRAWN

### Donor Bone Marrow in Laryngeal Transplantation: Results of a Rat Study

Samir S. Khariwala, MD, Cleveland, OH

Oliva Dan, BS, Cleveland, OH

Robert R. Lorenz, MD, Cleveland, OH

Aleksandra Klimczak, PhD, Cleveland, OH

Maria Siemionow, MD PhD, Cleveland, OH

Marshall Strome, MD\*, Cleveland, OH

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the role of bone marrow in solid organ transplantation and mechanisms associated with its success or failure in laryngeal transplantation.

**OBJECTIVES:** The concept of donor bone marrow transplantation has been successfully used in human solid organ transplantation to increase recipient chimerism. The development of recipient chimerism is associated with a decreased need for immunosuppression and even donor specific tolerance. In this study, we attempted to augment recipient chimerism by the transfer of donor bone marrow at the time of rat laryngeal transplant. **STUDY DESIGN:** Experimental study in rats. **METHODS:** The study utilized a well established semi-allogeneic rat laryngeal transplant model with partial MHC mismatched Lewis-Brown-Norway (LBNfl) donors and Lewis (LEW) recipients. Donor bone marrow was introduced at transplantation via 1) intravascular injection; and 2) transfer of a vascularized femoral bone graft. Recipients were treated with an established immunosuppressive regimen consisting of everolimus and anti-abTCR mAb for a seven day perioperative course. Animals received a five day boost of the same regimen at 90 days post-transplant. PTH levels and histological examination were used for rejection surveillance and scoring. **RESULTS:** Animals treated with intravenous bone marrow injection followed by perioperative and pulsed immunosuppression commonly demonstrated early rejection (90%). Animals receiving transfer of vascularized donor femur had an average rejection score of 2.9 (scale of 1-6) at 180 days post-

transplant. Mixed lymphocyte reaction did not demonstrate donor specific tolerance in the latter group and chimerism was <1%. **CONCLUSIONS:** In the rat laryngeal transplant model, donor bone marrow does not lead to augmentation of peripheral chimerism using our established pulsed immunosuppression protocol. In many cases, rejection occurred earlier than animals not receiving bone marrow. This may be due to several different factors including 1) an element of graft versus host disease; 2) inability to establish bone marrow engraftment due to our short-term perioperative immunosuppression regimen; or 3) preferential rejection of donor bone marrow cells.

#### **104. The Endoscopic Management of Zenker's Diverticulum: CO2 Laser Versus Endoscopic Stapling Techniques**

Frank R. Miller, MD, San Antonio, TX  
Jess B. Bartley, BS, San Antonio, TX  
Randal A. Otto, MD\*, San Antonio, TX

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the endoscopic management of Zenker's Diverticulum (ZD) using the CO2 laser and the endoscopic stapling techniques.

**OBJECTIVES:** The purpose of this project was to analyze the endoscopic management of ZD utilizing both the CO2 laser and endoscopic stapling techniques. This study will compare the two techniques in terms of diverticulum size, onset to oral intake, hospital stay, resolution of symptoms (dysphagia and regurgitation), and complications. **STUDY DESIGN:** A retrospective consecutive case series performed at an academic medical center. **METHODS:** Forty patients underwent an attempted endoscopic resection of the ZD using either the CO2 laser or the endoscopic stapling technique. The two techniques were compared on a variety of parameters including diverticulum size, hospital stay, onset to oral intake, resolution of symptoms, and complications. Symptom scores were obtained before and after surgery with a patient self-reported scoring report (scale 0 to 3 for both dysphagia and regurgitation with 0 indicating asymptomatic and 3 severe symptoms). **RESULTS:** Forty patients underwent an attempted endoscopic management of ZD. Five patients (12.5%) failed endoscopic exposure (4 converted to open, 1 observed). Sixteen patients underwent CO2 laser management and 19 underwent endoscopic stapling. The mean diverticulum size (3.8 cm CO2 laser vs. 4.4 cm stapling) was not significantly different for the two groups. Both groups demonstrated a significant decrease in preoperative versus postoperative dysphagia and regurgitation symptoms scores respectively; CO2 laser dysphagia score 3.0 to 1.7 and regurgitation score 1.5 to 0.7 while endoscopic stapling dysphagia score 2.9 to 1.2 and regurgitation score 1.4 to 0.5. Overall 86% of patients demonstrated an onset of liquid intake on postoperative day 1 and the average length of stay was 3.4 days CO2 laser and 1.5 days endoscopic stapling,  $p < .0015$ . Complications included dental trauma in 4 patients (2 CO2 laser and 2 stapling) and subcutaneous air in 3 patients (all three CO2 laser). There were no cases of mediastinitis or perioperative death. **CONCLUSIONS:** The endoscopic management of ZD is a safe and effective technique. The endoscopic stapling technique appears to have an improved efficacy and safety when compared to the CO2 laser technique. The two techniques will be compared and contrasted.

#### **105. Injection vs. Medialization Laryngoplasty for the Treatment of Unilateral Vocal Fold Paralysis**

Justin E. Morgan, MD, USAF Academy, CO  
Richard I. Zraick, PhD, Little Rock, AR  
Allison W. Griffin, MS, Little Rock, AR  
Travis L. Bowen, BS, Little Rock, AR  
Felicia L. Johnson, MD, Little Rock, AR

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the advantages and disadvantages of injection and medialization laryngoplasty and compare voice results obtained from injection and medialization laryngoplasty.

**OBJECTIVES:** To determine whether injection laryngoplasty or medialization laryngoplasty is more effective in the treatment of unilateral vocal fold paralysis (UVFP). **STUDY DESIGN:** A retrospective study of patients with UVFP who underwent either injection or medialization laryngoplasty at our institution between July 29, 2003, and March 8, 2005. **METHODS:** The data analyzed included patient characteristics and type of intervention, along with the pretreatment and posttreatment voice parameters of videostrobolaryngoscopy, perceptual analysis, and patient's subjective voice assessment. **RESULTS:** Nineteen patients were evaluated. The average time from intervention to posttreatment evaluation was 3 months (range, 1-9 months). Improvements were demonstrated in all three voice parameters in both the injection and the medialization groups. No significant differences were found in the degree of improvement between the two groups. Videostrobolaryngoscopy and the perceptual analysis, both rated by the authors, correlated well with each other, but they both correlated poorly with the patient's subjective voice analysis. **CONCLUSIONS:** Injection and medialization laryngoplasty were comparable in their improvement of subjective and objective voice outcomes. Both treatment modalities should

be included in the otolaryngologist's armamentarium for managing UVFP.

### **106. Invasive Aspergillus Infection With Airway Compromise Due to Cricoid Cartilage Destruction**

Amy L. Reynders, MD, Syracuse, NY

Richard T. Kelley, MD, Syracuse, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the potential for fungal organisms to cause laryngeal cartilage destruction with resultant airway compromise and stenosis.

**OBJECTIVES:** Present two patients with acute airway obstruction and significant laryngeal compromise with cricoid cartilage destruction. Demonstrate that fungal infections can mimic malignancy and cause significant airway stenosis. **STUDY DESIGN:** Case series of two patients with cricoid cartilage destruction secondary to aspergillus infection. **METHODS:** Two diabetic patients presented with initial airway compromise and findings of significant laryngeal obstruction. CT scans revealed destruction of the cricoid cartilage in both patients. One patient, an 80 year old female, had a prior history of 4 weeks of endotracheal intubation due to coronary bypass surgery. Over the ensuing three months she had progressive dyspnea and dysphagia. She underwent tracheostomy at an outside facility due to acute airway obstruction and was referred for further evaluation. The second patient, a 61 year old female, initially presented with a two month history of progressive dyspnea and dysphagia. She underwent panendoscopy with biopsy at an outside facility—findings were consistent with chronic inflammation in the postcricoid region. At our facility, initial flexible nasopharyngolaryngoscopy revealed an exposed portion of the cricoid cartilage. She had significant airway obstruction and required eventual tracheostomy. Both patients underwent operative endoscopy. Deep biopsies were taken from multiple areas in the subglottic region to rule out malignancy and determine the potential etiology. **RESULTS:** Both patients had significant airway stenosis requiring tracheostomy. Pathology results were consistent with necrotic cartilage with fungal hyphae. Fungal cultures grew aspergillus fumigatus in each patient. Treatment with an intravenous antifungal was begun after biopsy results were obtained. The 80 year old patient developed MRSA pneumonia, ARDS and cardiac failure and died three weeks after admission. The 61 year old patient's acute fungal infection was successfully treated with intravenous antifungals. She underwent three additional airway surgeries over a course of ten months to attempt possible decannulation. She eventually died four years later of other causes. **CONCLUSIONS:** Fungal infections of the laryngeal cartilages have been rarely reported in the literature and can present with significant cartilage destruction. At the time of detection, significant airway stenosis can be present. Deep biopsies are essential to rule out malignancy and to help direct treatment to the underlying cause.

### **107. The Vocal Fold Paralysis of George Orwell: War, Politics and the Voice**

Lucian Sulica, MD, New York, NY

**EDUCATIONAL OBJECTIVE:** HISTORICAL TOPIC: At the conclusion of this presentation, the participants should be able to learn historical aspects of the disability and treatment of vocal fold paralysis based on the personal account of the author George Orwell.

**OBJECTIVES:** To relate the personal experiences of the author George Orwell after his wartime neck wound and vocal fold paralysis. **STUDY DESIGN:** Review of the available writings and correspondence of George Orwell. **METHODS:** A historical review of Orwell's own writings and the letters of his friends that bear on the subject. **RESULTS:** In May of 1937, in a trench near Heusca, Spain, George Orwell was shot in the neck by a sniper. The wound left him with a vocal fold paralysis and a brachial plexus injury. Among the most articulate authors of the twentieth century, Orwell left a unique account in his publications and correspondence of the experience of being shot, his grueling evacuation and subsequent treatment, and of the practical consequences of paralytic dysphonia in very trying circumstances. **CONCLUSIONS:** Orwell's testament is the most lucid and dramatic literary account of vocal fold paralysis, useful as an account of laryngology in 1937, of the patient's experience of vocal fold paralysis and, not least, of humanity and heroism.

### **108. A Novel Method for Noninvasively Estimating SGP Via Airflow Redirection**

Alexander K. Yuen, Madison, WI

Christopher D. Baggott, Madison, WI

Jack J. Jiang, MD PhD, Madison, WI

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to appreciate how new data acquisition technology and voice research are enhancing subglottal pressure (SGP) measurement to the point of routine clinical application. Ideally, they would compare the current limitations of noninvasive SGP measurement to our system and what it can do to overcome these difficulties.

**OBJECTIVES:** Subglottal pressure (SGP) is potentially a very useful tool for clinicians, allowing the calculation of vocal efficiency and aiding in the assessment of laryngeal function. Current methods for accurately assessing SGP are invasive, and noninvasive methods are fallible, preventing frequent clinical use. This study seeks to demonstrate the validity of a novel method, capable of quickly, accurately, and noninvasively estimating SGP during phonation. **STUDY DESIGN:** This was a methodological study designed to prove the validity and consistency of our device. **METHODS:** This study took place in two steps. First, tracheotomy patients were tested with this device, while a pressure transducer simultaneously recorded actual SGP. These values were compared on a trial to trial basis to establish the validity of the device. Second, twenty-five volunteer subjects (selected without regard to medical history) were tested in ten consecutive trials. This data was compared in an intra-subject analysis to establish the consistency of the device. **RESULTS:** Pilot results taken from laboratory technicians have demonstrated solid results. Individual's standard deviations over 10 trials ranged from 0.209 cmH<sub>2</sub>O to 0.340 cmH<sub>2</sub>O among the subjects tested. Volunteer and tracheotomy patient data are currently being collected and therefore not available at the time of this submission. **CONCLUSIONS:** This novel device shows great promise, already yielding low variation in a pilot study. Two copies of the system have been implemented to record volunteer and tracheotomy patient data. There exists great opportunity to apply this technology in the clinical setting.

## Otology

### 109. Mucoepidermoid Carcinoma of the External Auditory Canal (EAC)

Anthony Bared, MD, Miami, FL  
Sandeep P. Dave, MD, Miami, FL  
Simon I. Angeli, MD, Miami, FL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the controversies surrounding the appropriate management of external auditory canal mucoepidermoid carcinoma. In particular, the participants should be able to compare the issues surrounding an aggressive en bloc versus conservative step by step surgical approach to this lesion. Furthermore, the lack of an adequate staging system and the difficulty in detecting mucoepidermoid carcinoma in surgical margins by frozen section analysis should be stressed.

**OBJECTIVES:** To present the third reported case of mucoepidermoid carcinoma of the external auditory canal (EAC) in the English literature and discuss the appropriate management of this lesion. **STUDY DESIGN:** Case report. **METHODS:** A retrospective chart review of a single patient who presented to our tertiary care medical center. **RESULTS:** A 41 year old man presented with a left EAC mass. Excisional biopsy revealed an intermediate grade mucoepidermoid carcinoma with positive margins. The patient subsequently underwent a wide local resection, superficial parotidectomy, and selective neck dissection. Although intraoperative frozen section margins were negative, permanent histopathological examination demonstrated tumor in the medial margin. In addition, the tumor was upgraded to a high grade mucoepidermoid carcinoma. The patient was taken back to the operating room for a wider local resection and EAC reconstruction with a temporoparietal pedicled flap and split thickness skin graft. All margins were negative on final histopathological examination. Radiation therapy was deferred in the event of a recurrence. The patient is currently disease free two years after the final surgery. **CONCLUSIONS:** Most authors advocate an aggressive surgical approach, which includes a lateral temporal bone resection, for the treatment of EAC carcinoma. Although this may be warranted in cases of squamous cell carcinoma, mucoepidermoid carcinoma of the EAC may be amenable to a conservative step by step approach for local control with less postoperative morbidity. Given the difficulty in detecting mucoepidermoid carcinoma in surgical margins by frozen section analysis, patients should be informed of the possibility for further surgery (re-resection) when a conservative approach is used.

### 110. Treatment of Meniere's Disease in an Only Hearing Ear

Jon E. Isaacson, MD, Hershey, PA  
William M. Peterson, BS, Hershey, PA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to explain the difficulties in treating Meniere's disease in an only hearing ear and discuss the treatment options currently in use.

**OBJECTIVES:** Treating Meniere's disease (MD) in an only hearing ear is challenging, and the literature does not offer clear guidelines. Our objective is to define the current practice patterns for this difficult problem. We are particularly interested in the options for patients who remain symptomatic despite maximum conservative medical treatment. **STUDY DESIGN:** Survey study. **METHODS:** A survey regarding the treatment of MD in an only hearing ear was sent out to a nonrandomized sample of the American Neurotology Society and the American Otological Society. We asked practitioners to rank their 1st and 2nd line therapies including surgical and nonsurgical options. **RESULTS:** 346 surveys were sent and 139 were returned (40%). 97% recommended dietary modification as first line with more than half recommending strict salt restriction (1500mg/day) and no caffeine. Only 36% recommended steroids. Second line treatments, in order of significance, were the Meniett device, intratympanic steroids, endolymphatic mastoid

shunt, intratympanic gentamicin, and endolymphatic sac vein decompression. Interestingly, almost 50% were uncomfortable intubating or perfusing an only hearing ear, but 75% would operate on an only hearing ear depending on the circumstance. **CONCLUSIONS:** Practitioners continue to see and treat MD in an only hearing ear despite the lack of literature regarding this problem. We have collected data documenting the current practice patterns for treatment. There is wide variability regarding second line treatment options.

### 111. The Treatment for Otitis Media With Effusion by Using 5-Fluorouracil Ointment in Clinical Study

Shin-ichi Kanemaru, MD PhD, Kyoto, Japan  
Masaru Yamashita, MD, Kyoto, Japan  
Yoshihiro Tamura, MD, Kyoto, Japan  
Hiroo Umeda, MD, Kyoto, Japan  
Koichi Omori, MD PhD, Hukushima, Japan  
Juichi Ito, MD PhD, Kyoto, Japan

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the mechanisms of the efficacy of 5-FU for otitis media with effusion. This easy and simple treatment should be highly recommended for intractable otitis media with effusion.

**OBJECTIVES:** The aim of this study is to evaluate the combined effect of 5-fluorouracil (5-FU) and myringotomy for the treatment of otitis media with effusion (OME). Otitis media with effusion is usually treated by medications, myringotomy, or insertion of ventilation tube (VT). Except for its VT, however, their effects do not last much longer. Insertion of VT has a lot of sequelae: to cause of easy infection, large perforation of tympanic membrane and cholesteatoma. In this study, we assessed whether 5-FU has the potentiality of prolonging the effect of myringotomy or not. **STUDY DESIGN:** In vitro study and a clinical application. **METHODS:** (Study I) Fibroblasts harvested from three GFP mice were cultured in four dishes each. Different doses of 5-FU were contained in each four dishes. After two week culture, proliferation rates of fibroblasts were compared. (Study II) One hundred and one patients (54 males and 47 females) were randomly selected from patients with intractable OME. They were divided into 2 groups. Myringotomy with or without 5-FU painting were performed in group I (n=64) and II (n=37), respectively. The application dose of 5-FU ointment was about 0.1 mg at a time. Natural closure rates of tympanic membrane in both groups were assessed. **RESULTS:** (Study I) In vitro, 5-FU inhibited the growth of fibroblasts in a dose dependent fashion. (Study II) The average closure times of tympanic membrane were 18.6 days and 7.1days in group I and II, respectively. No adverse events were not observed in both groups. **CONCLUSIONS:** 5-FU is useful in prolonging the effect of myringotomy.

### 112. Vestibular Evoked Myogenic Potentials in Young Children: Testing Feasibility and Normative Data

Timothy A. Kelsch, MD, Tacoma, WA  
Lynne A. Schaefer, MA, Tacoma, WA  
Carlos R. Esquivel, MD, Tacoma, WA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to establish vestibular evoked myogenic potentials as a feasible test of unilateral vestibular function in children as young as 3 years old. As well, the participant will be able to identify expected age related changes to the VEMP tracing and define asymmetric or absent responses. We will discuss latency changes, optimal testing parameters and future applications of VEMP testing.

**OBJECTIVES:** Vestibular evoked myogenic potential (VEMP) testing is a test of the vestibulocollic reflex well established in adults. Expected normal values in children and their possible changes in development have not yet been described. This study focuses on the feasibility of testing in young children, as well as the expected normal values and changes in VEMP response with development. **STUDY DESIGN:** Prospective. **METHODS:** Thirty healthy children (60 ears) ages 3 to 11 underwent audiologic assessment and VEMP testing. VEMP was performed with alternating clicks at 80, 85, 90 dB nHL and analyzed using averaged, unrectified electromyograms with electrodes on mid-sternocleidomastoid and sternum ipsilateral to stimulus. Latencies, amplitude, compliance and symmetry were analyzed according to age. **RESULTS:** Of thirty subjects completing VEMP testing all had adequate responses and 28 (93%) had symmetric responses. Mean peak latencies (+/-SD) of p11 and n18 were 11.3 ms (1.3ms) and 17.6 ms (1.4 ms) respectively. Mean p11-n18 peak amplitude (+/-SD) was 122microV (68) with average asymmetry ratio 18%. The n18 latency of ages 3-5 were significantly shorter in the left ear, with an absolute shorter latency in the right ear when compared to older subjects. Regression analysis suggested a group threshold of 77 db nHL. **CONCLUSIONS:** VEMP is a feasible, innocuous study performed in young children to screen unilateral vestibular function with reproducible results. Mean latencies suggested a shorter initial negative peak (n18) than adult studies, consistent with prolongation seen in previous studies on effects of age. 90 dB nHL clicks were adequate for 100% response rates. Normal latency and amplitude values of single channel VEMP unrectified electromyograms were established. This is the first study describing expected latencies and optimal testing parameters in children.

### 113. **Otologic Manifestations in Fanconi Anemia**

Jeffrey Hung Kim, MD, Bethesda, MD  
Carmen C. Brewer, PhD, Bethesda, MD  
Christopher K. Zalewski, MA, Bethesda, MD  
Andrew J. Griffith, MD PhD, Rockville, MD  
Neelam L. Giri, MD, Rockville, MD  
Blanche P. Alter, MD MPH, Rockville, MD

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss common otologic presentations in Fanconi anemia and to recognize FA in previously undiagnosed patients.

**OBJECTIVES:** Fanconi anemia (FA) is an autosomal recessive disorder with multiorgan congenital abnormalities, aplastic anemia, and increased risk of malignancy. Otologic abnormalities have been reported occasionally. Hearing loss was one of the major anomalies previously correlated with early onset bone marrow failure in FA. In this study we are examining comprehensive otologic, audiologic, and imaging findings. **STUDY DESIGN:** Prospective, consecutive FA subjects (n=20) in a multidisciplinary epidemiology protocol for inherited bone marrow failure disorders. **METHODS:** 16 (32 ears) out of 20 FA subjects underwent comprehensive otolaryngologic and audiologic evaluation, temporal bone computerized tomography (CT). Five ears in 4 subjects were excluded due to their prior otologic surgeries. **RESULTS:** A total of 27 ears in 16 patients were examined. Abnormal tympanic membrane findings, including small tympanic membrane/bony annulus, abnormally formed malleus, abnormally coursing chorda tympani, and atresia, were found in 18 ears (67%). Hearing loss (HL) was identified in 14 ears (52%): conductive in 9; mixed in 2, and sensorineural in 3. CT scans commonly showed bony plates within the tympanic membrane; the diameter and height of the tympanic bony annulus were significantly shorter than non-FA controls. **CONCLUSIONS:** The most common ear findings in FA are abnormally developed tympanic membrane, bony annulus, and ossicles. Although hearing loss is common, the anatomic changes can be present in the absence of hearing loss. Congenital conductive HL with these anatomic findings in association with other congenital anomalies should prompt further investigation for FA prior to medical/surgical intervention.

### 114. **BAHA After Vestibular Schwannoma Resection: Surgical Technique and Results**

Sam J. Marzo, MD, Maywood, IL  
John P. Leonetti, MD, Maywood, IL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand indications for implantation of the bone anchored cochlear stimulator in patients who have unilateral deafness after treatment of vestibular schwannoma, understand the surgical technique and management of complications, and understand the hearing benefit.

**OBJECTIVES:** The objectives of this presentation are to understand the indications for implantation of a bone anchored cochlear stimulator in patients who have unilateral deafness after treatment of vestibular schwannoma, understand the surgical technique and management of complications, and understand the hearing benefit. **STUDY DESIGN:** Retrospective case review series at an academic medical center. **METHODS:** The inpatient, outpatient, and surgical charts of patients who underwent placement of a bone anchored cochlear stimulator for rehabilitation of hearing loss were reviewed. Patients whose hearing loss was secondary to a vestibular schwannoma were selected. Demographic, perioperative, postoperative, and audiometric data were gathered on these patients for this study. **RESULTS:** Between September 2003 and September 2005, 69 patients underwent implantation of a bone anchored cochlear stimulator, and in 11 of these patients, the reason for placement of the bone anchored cochlear stimulator was for rehabilitation of a hearing loss secondary to vestibular schwannoma. All patients underwent surgery at least 6 months after their vestibular schwannoma resection. There were 5 females and 6 males, with an average age of 56 years (range 35-59). All patients underwent activation at 3 months postoperatively. One patient had skin growth over the implant. There were no CSF leaks, implant extrusions, or major complications. The device was well tolerated with good satisfaction based on the abbreviated profile of hearing aid benefit questionnaire. **CONCLUSIONS:** The bone anchored cochlear stimulator can be used to improve the hearing handicap in patients with unilateral deafness secondary to treatment of vestibular schwannoma. The device is well tolerated with an acceptable complication rate.

### 115. **The Irradiated Ear: Early and Late Effects Upon the Middle and Outer Ear**

Iman Naseri, MD, Atlanta, GA  
Malcolm D. Graham, MD\*, Atlanta, GA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to: 1) identify the chronic effects of radiation on the middle and outer ear; and 2) discuss the various options for the management of the irradiated ear.

**OBJECTIVES:** To evaluate the early and late effects of radiation on the middle and outer ear, including the middle ear space, eustachian tube, tympanic membrane, and the skin, bone and cartilage of the external auditory canal. **STUDY DESIGN:** Case series. **METHODS:** A sample of patients with a history of head and neck cancer treated in the past with radiation, or in combination with chemotherapy and/or surgery, were evaluated in a clinic setting. Their otologic history and physical findings were reviewed. **RESULTS:** The most common symptom among the study group was diminished hearing (82%). The most common finding among all patients was serous otitis media (82%), followed by chronic otitis externa (64%) and osteoradionecrosis of the tympanic bone (23%). **CONCLUSIONS:** Patients undergoing radiation therapy as a part of the treatment regimen for their head and neck cancer may be at risk for developing otitis externa, serous otitis media, and osteoradionecrosis of the tympanic bone. Current management options will be discussed along with recommendations.

#### 116. Intraoperative Staining of Tympanoplasty Graft: A Technique to Facilitate Graft Placement

Derya Talas, MD, Mersin, Turkey  
Anh Nguyen-Huynh, MD PhD, Stanford, CA (Presenter)  
Christopher Kim, MD, Napa, CA  
Nikolas Blevins, MD, Stanford, CA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to perform a simple technique of staining tympanoplasty graft that can be helpful in both teaching tympanoplasty to residents and achieving success in challenging situations.

**OBJECTIVES:** To describe a simple technique of staining tympanoplasty graft to facilitate graft placement. **STUDY DESIGN:** Retrospective case review. **METHODS:** Purple pigment from a standard surgical marking pen is applied to the graft at the time it is harvested. The graft is positioned as an underlay graft with the dyed surface facing laterally against the remnant of the tympanic membrane. **RESULTS:** The color contrast with adjacent undyed tissues facilitates identification of graft margin and accurate placement of the graft. The technique has been used for over ten years with results comparable to the published literature and without any adverse effect. **CONCLUSIONS:** This technique is beneficial when visibility of tissue interface is suboptimal due to bleeding, canal geometry or other anatomic constraints. The technique is also very helpful in teaching tympanoplasty to residents.

#### 117. Tympanum Canal Angles Anteriorly and Inferiorly

N. Wendell Todd, MD MPH\*, Atlanta, GA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to know the range of angles anteriorly and inferiorly, two correlates of these angles, and risks of iatrogenic angle cholesteatoma.

**OBJECTIVES:** To clinically describe the tympanum canal angles anteriorly and inferiorly, assess bilateral symmetry, assess the angles relative to mastoid pneumatization, and assess the relationship of the angles to manubrium orientation in the skull. The angles formed by the tympanic membrane anteriorly and inferiorly with the external ear canal can be surgically challenging and harbor iatrogenic cholesteatoma. The 27-60 degree range of values reported for these angles seems not to have been determined in a clinically applicable manner. **STUDY DESIGN:** Postmortem anatomic study of 41 bequeathed adult crania without clinical otitis media. **METHODS:** As viewed through the external ear canal, the tympanum canal angles were measured (in 10 degree increments) anterior, anterior-inferior and inferior relative to the line of the manubrium. Mastoid sizes were determined radiographically. **RESULTS:** The tympanum canal angle anteriorly for the right ear ranged 40-60 degrees, median 55; antero-inferior, 50-70, median 60; inferiorly, 70-80, median 75. Bilateral symmetry was found, each  $r > .63$ ,  $P < .001$ . The angles did not correlate with either mastoid pneumatization or manubrium orientation relative the Frankfort plane. **CONCLUSIONS:** The tympanum canal angles anteriorly and inferiorly have comparatively narrow ranges and exhibit bilateral symmetry. The angles are unrelated to both mastoid size and manubrium orientation in the skull.

#### 118. A New Measurement Technique of the Concentration of Nitrous Oxide Gas in the Middle Ear: An Evaluation Trial for the Transmucosal Gas Exchange Function

Masaru Yamashita, MD, Kyoto, Japan  
Shin-ichi Kanemaru, MD PhD, Kyoto, Japan  
Yoshihiro Tamura, MD, Kyoto, Japan  
Hiroo Umeda, MD, Kyoto, Japan  
Koichi Omori, MD PhD, Fukushima, Japan  
Juichi Ito, MD PhD, Kyoto, Japan

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to know this technique is useful for the evaluation of transmucosal gas exchange function in the middle ear. The residual mucosal capacity of the patients with otitis media could be assessed by this technique.

**OBJECTIVES:** The aim of this study is to investigate the efficacy of a capnomonitor for an assessment of the mucosal function in the middle ear. Our group showed previously the importance of mucosal regeneration in the mastoid for the patients with intractable otitis media. It is because middle ear pressure is controlled by the function of eustachian tube and that of middle ear mucosa, but it's hard to evaluate the mucosal function separately. Some reports utilized nitrous oxide gas and the pressure monitor systems for this purpose, but they couldn't confirm the actual contribution of this gas in their experiments. To solve this struggle, this study was designed. **STUDY DESIGN:** An animal experiment. **METHODS:** Chinchilla was used as an experimental animal. A probe of a capnomonitor, which is for carbon oxide and nitrous oxide, was designed and inserted into the bulla of the animal. Then nitrous oxide was applied. **RESULTS:** The concentration of nitrous oxide increased and plateaued within a minute in each ear. This result is consistent with clinical experiences of the otologists. When the nitrous oxide gas at the concentration of 80% was administered, the concentrations in the middle ears increased up to 13-30%. **CONCLUSIONS:** The concentration of nitrous oxide in the middle ear was measured with the use of the capnomonitor. It was increased and plateaued immediately after the appliance of the gas. This new measurement technique is unique and may have the potential as an indicator for residual mucosal function in the patients with otitis media.

## **Pediatric**

### **119. Laryngeal Granular Cell Tumor Presenting as Airway Obstruction in a Pediatric Patient**

Khwaja A. Ahmed, MD, Memphis, TN  
Thomas A. Knipe, MD, Memphis, TN  
Royce E. Joyner, MD, Memphis, TN  
Jerome W. Thompson, MD MBA, Memphis, TN

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to recognize the clinical picture consistent with laryngeal granular cell tumor and have a heightened awareness of this rare diagnosis, even in the pediatric patient.

**OBJECTIVES:** To present a rare case of airway obstruction in a six year old female child secondary to laryngeal granular cell tumor. **STUDY DESIGN:** Case report and review of the literature. **METHODS:** A six year old female with known asthma presented to the emergency room with a 24 hour history of worsening shortness of breath. The patient clinically deteriorated rapidly over the course of the next 3 hours with the development of biphasic stridor, suprasternal retractions, and difficulty maintaining her oxygen saturation despite treatment with intravenous steroids, epinephrine nebulizers, and mixed helium-oxygen inhalation. A plain chest film revealed severe subglottic narrowing. **RESULTS:** Upon direct laryngoscopy in the operating room, a large, cystic appearing ballottable mass was noted to arise from the right subglottis, causing nearly 80% airway obstruction. A rigid ventilating bronchoscope was gently advanced beyond the obstructing lesion. The bronchoscopy examination was normal and the patient was intubated. A biopsy of the subglottic mass was taken two days later at the time of elective tracheotomy. A review of the pathology was consistent with a diagnosis of granular cell tumor. **CONCLUSIONS:** Granular cell tumor of the larynx is a rare but potentially serious cause of airway obstruction in the pediatric patient. Fewer than 10 cases have been reported in patients less than 10 years of age. The clinician should be aware of this entity in order to be able to diagnose it in future.

### **120. Group A Betahemolytic Streptococci in the Adenoid of Tonsillectomy Patients Detected by Rapid Cycle Real Time PCR and Standard Culture**

Jonathan H. Lee, MD, Rochester, MN  
Laura J. Orvidas, MD, Rochester, MN

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, participants should understand the correlation between GABHS presence in tonsils and adenoid tissue of tonsillectomy patients and should understand the role of rapid cycle real time polymerase chain reaction (rcPCR) and standard culture (SCx) in the detection of Group A beta-hemolytic streptococci (GABHS).

**OBJECTIVES:** Using standard swabbing techniques, rcPCR has been shown to detect GABHS at rates equal to SCx and requires only a few hours for results. This study examines the rates of GABHS detection by rcPCR and SCx at the adenoid in tonsillectomy patients. **STUDY DESIGN:** Prospective study of 130 patients undergoing tonsillectomy with or without adenoidectomy. **METHODS:** At tonsillectomy, swabs were taken of the pharyngeal tonsil surface, the pharyngeal tonsillar core, and the adenoid surface. Tissue samples were also taken from the tonsil core and the adenoid (if adenoidectomy was performed). Each sample was analyzed for

GABHS by rcPCR and SCx. **RESULTS:** GABHS was detected at the tonsil surface in 29 of the 130 (22%) patients. Of these 29 patients, 23 underwent adenoidectomy, and GABHS was detected in the adenoid of all 23 (100%). Only 12 of those 23 patients (52%) underwent tonsillectomy for infectious indications. In patients who were GABHS positive at the tonsil surface, but who did not undergo adenoidectomy, GABHS was detected by swab of the adenoid in 75% of cases. **CONCLUSIONS:** All patients undergoing both tonsillectomy and adenoidectomy had detectable GABHS at the adenoid when GABHS was detected at the tonsil surface. These findings may suggest a role for adenoidectomy in patients undergoing tonsillectomy for both infectious and obstructive indications.

## 121. **WITHDRAWN**

### **Pycnodysostosis: A Case Report and the Importance of the Early Diagnosis for the Adequate Management of These Patients**

Ana Carolina Raposo Sallum, São Paulo, Brazil  
Manoel de Nobrega, São Paulo, Brazil

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to recognize some symptoms and particular features of the syndrome to make an early diagnosis and to improve the prognosis of the patients. The participants must learn more about the syndrome and to improve their capacity to make others studies and to make others researches.

**OBJECTIVES:** Pycnodysostosis is a rare hereditary bone abnormality of autosomal recessive inheritance. It is based on mutation of the codifying gene of cathepsin K, an enzyme localized in osteoclasts, responsible for osseous reabsorption and remodeling. It causes an increase of bone density, hypoplasia of the mandible, dysplasia of skull bones, delayed closure of fontanelles, separated cranial sutures, partial aplasia of terminal phalanges, tendency towards pathologic fractures, short stature and chronic obstruction of the upper airway due to pharyngeal narrowing evidenced in cephalometric studies. The objective of this study is to present a patient with pycnodysostosis and its otorhinolaryngological manifestations. **STUDY DESIGN:** Study design is report of a case. **METHODS:** A male patient, eight years old, already diagnosed with pycnodysostosis, was received for an auditory evaluation. With a previous history of multiple bone fractures, oral breathing with nocturnal snoring and apnea. He was submitted to an adenoidectomy at two years old, without change in the obstructive respiratory symptoms, even after the surgery. He uses CPAP to sleep. Denies consanguinity and family history. At physical examination, hydrocephaly is observed, micrognathia, exophthalmos, dystrophy of distal portion of the phalanges and fingernails and difference of size between lower limbs. **RESULTS:** Audiologic evaluation was normal. Orthodontic treatment was initiated for correction of orofacial deformity and improvement of nasal breathing. **CONCLUSIONS:** Although the syndrome of the pycnodysostosis is a rare entity, otorhinolaryngologists should look for important chronic obstruction of the upper airway, to bone fragility and dysplasias for the early multidisciplinary diagnosis and intervention, so as to improve the patient's prognosis.

## 122. **Focal Dermal Hypoplasia: Otolaryngologic Manifestations of a Rare Syndrome**

Luke J. Schloegel, BA MSIV, Saint Louis, MO  
Umang Mehta, MD, Saint Louis, MO  
Raj Sindwani, MD FRCS, Saint Louis, MO

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to recognize the otolaryngologic manifestations of focal dermal hypoplasia and appreciate the benefits of a multidisciplinary approach to this syndrome.

**OBJECTIVES:** To describe the otolaryngologic manifestations of focal dermal hypoplasia (FDH), or Goltz syndrome, a rare disorder characterized by the abnormal development of tissues derived from mesoderm and ectoderm. **STUDY DESIGN:** Case series and literature review. **METHODS:** Four female patients with FDH were evaluated at the ectodermal dysplasias annual family conference. Otolaryngologic symptoms were explored and rated using a Likert scale from 1 (absent symptom) to 4 (severe symptom) and physical findings were documented. Additionally, a thorough review of the literature was performed, in order to assess current knowledge regarding FDH. **RESULTS:** The average age of the patients was 2.5 years. A range of head and neck manifestations of varying severity was discovered. These included chronic infections (otitis media, pharyngitis), recurrent cerumen impactions, allergic rhinitis, nasal concretions, speech delay, difficulty swallowing and hoarseness. Heat intolerance, allergic symptoms and speech delay were rated most concerning by family members. Three of four patients had undergone myringotomy and tube placement. The most dramatic physical findings included cleft lip/palate, lop ear, blindness, and oral papillomas. **CONCLUSIONS:** This is the first study to describe the otolaryngologic manifestations of FDH. The otolaryngologist should be aware of this X linked disorder, as affected individuals commonly present with significant head and neck symptomatology. A multidisciplinary approach to treatment is advocated.

### 123. **Changing Trends in the Indications for Tonsillectomy in Children**

David L. Walner, MD, Chicago, IL

Noah P. Parker, BA, Chicago, IL

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the changing trends in the indications for pediatric tonsillectomy.

**OBJECTIVES:** To chronicle and update the changing trends regarding indications for tonsillectomy. Our hypothesis was that the percentage of patients having surgery for an indication of chronic tonsillitis continues to decline. **STUDY DESIGN:** A review of the literature and a retrospective analysis of patient data. **METHODS:** The literature review was performed via PubMed and Ovid Medline. Current patient data was examined for tonsillectomy or adenotonsillectomy performed by a single, board certified pediatric otolaryngologist in 2004 and 2005. Patients were divided by age groups: 0-3 years, 4-8 years, 9-12 years and 13-19 years. All patient data was reviewed by the surgeon and kept strictly confidential. **RESULTS:** The literature has shown a definite decline in the number of patients undergoing tonsillectomy for the indication of chronic tonsillitis over the past 28 years. Our patient population included more than 350 patients from under 1 year of age up to 19.5 years of age. The average age was 6.4 years old. Chronic tonsillitis was the primary indication for surgery in 0% of patients in the 0-3 age group, 7% in the 4-8 age group, 20% in the 9-12 age group and 25% in the 13-19 age group. Airway obstruction and obstructive sleep apnea were in the indications in the vast majority of the remaining patients. Chronic tonsillitis was the main indication in only 8.3% of all patients in our study group. **CONCLUSIONS:** Our data indicate that the percentage of patients undergoing adenotonsillectomy for chronic infection continues to decline and that the percentage of patients undergoing the procedure for obstruction continues to increase.

## **Plastic/Reconstructive**

### 124. **Cadaveric Mandibular Transplant—A Viable Option for Total Mandibular Defects?**

Demetrio J. Aguila, III, MD, New York, NY

David Jurman, DDS MD, New York, NY

Alex Greenberg, DDS MD, New York, NY

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss cadaveric mandibular transplantation as a possible option for total mandibular defect reconstruction.

**OBJECTIVES:** Reconstruction of total mandibular defects often yields suboptimal cosmetic results, and condyle reconstruction usually leads to impaired mastication. Previous success with cadaveric tracheal transplantation at our institution has prompted us to consider cadaveric mandible transplantation. The purpose of this study is to assess two specific goals: 1) will cadaveric mandible implanted en bloc into the latissimus dorsi revascularize? 2) if viable, can that implanted mandible be transferred and provide a functional reconstructive option for patients with total mandibular defects? **STUDY DESIGN:** Case study of novel surgical technique. **METHODS:** A patient with a total mandibular defect underwent implantation of a complete cadaveric mandible into the left latissimus dorsi muscle (Stage I). CT scan and bone scans will assess the viability of the implant 4-6 months following the original surgery (Stage II), followed by jaw reconstruction using the free vascularized graft within 2 weeks (Stage III). **RESULTS:** Stage I has been successful—cadaveric mandible was transplanted into the latissimus dorsi muscle and the patient's postoperative course has been uncomplicated by infection or implant breakdown. **CONCLUSIONS:** The first known transplantation of cadaveric mandible en bloc in a human has been completed without infection, rejection, breakdown, or fracture. Mandibular reconstruction will be scheduled after vascularization and viability of the graft have been established. Early results are promising and may provide a new option for reconstruction of total mandibular defects with improved temporomandibular joint function and cosmetic outcome.

### 125. **Repair of Saddle Nose Deformities in Wegener's Granulomatosis**

Brian J. Chung, MD, Cleveland, OH

Frank Papay, MD, Cleveland, OH

Shashidhar Kusuma, MD, Cleveland, OH

Stephen B. Cannady, MD, Cleveland, OH

Daniel S. Alam, MD, Cleveland, OH

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to describe ideal graft materials, techniques, and timing for the repair of saddle nose deformities in Wegener's granulomatosis.

**OBJECTIVES:** To describe the institutional experience with external nasal deformity repair in a patient cohort with Wegener's granulomatosis. **STUDY DESIGN:** Retrospective case series. **METHODS:** Medical chart review. Patient data including aesthetic results,

complications, and intraoperative details were recorded. **RESULTS:** Five patients were identified with a diagnosis of Wegener's granulomatosis who had undergone previous rhinoplasty. One of the 5 patients had undergone rhinoplasty at an outside institution. All 4 patients who underwent surgery at our institution demonstrated some degree of a saddle nose deformity with septal perforation and had an external rhinoplasty approach with exclusively non-mucosal incisions. Graft materials used included costal cartilage, auricular cartilage, and calvarial bone. All patients achieved good postoperative results initially and 3 of the 4 have maintained their results. There were no flare-ups observed during the immediate postoperative period. Average follow up time for this group of patients was 14 months (1—51). **CONCLUSIONS:** Repair of external nasal deformities can be safely performed in patients with Wegener's granulomatosis. Surgery is ideally performed using autologous graft materials during periods of quiescent disease. Furthermore, surgical repair should be performed in an extranasal, subcutaneous fashion with preservation of the nasal mucosa.

## 126. Synthetic Biocompatible Polymers Enhance the Duration and Moldability of Injectable Filler Materials

Alexander T. Hillel, MD, Baltimore, MD

Derek K. Boahene, MD, Baltimore, MD

Jennifer H. Elisseeff, PhD, Baltimore, MD

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the formation of a synthetic biologic moldable filler material and compare the duration of synthetic biologic composite fillers with market available filler materials.

**OBJECTIVES:** Injectable augmentation with filler materials is used to treat laryngeal paralysis and facial soft tissue volume loss. Filler materials mimic extracellular matrix and provide a scaffold to support adjacent tissue. Injectables avoid open surgical procedures and cause minimal discomfort to the patient. However, they lack longevity and require multiple injections to maintain volume. The short duration of injectables, such as hyaluronic acid (HA), may be due to dermal extravasation and rapid resorption. Adding biocompatible synthetic polymers to HA may modulate physical properties, including crosslinking, which should increase longevity. **STUDY DESIGN:** In vivo prospective study analyzing the formation of synthetic biological composite fillers and comparing its duration of action with market available filler material. **METHODS:** Mice were injected subcutaneously in the flank with HA and HA-poly(ethylene-glycol) diacrylate (HA-PEG). After injection HA-PEG was exposed to light to initiate photopolymerization. Injection sites were observed and followed with serial digital photography. Volumetric analysis was performed with digital calipers. **RESULTS:** The synthetic biologic composite polymer formed a palpable, soft implant after exposure to light. Preliminary results of the implants after two weeks demonstrate the HA lost 50% of the height dimension while the HA-PEG gel retained its height. **CONCLUSIONS:** The addition of PEG to the HA enhances its lifetime. Enough light crosses the skin to initiate the reaction forming a soft implant that maintains its shape. The increased crosslinking provided by PEG creates a protective encasement around the HA molecules, slowing HA diffusion and potential host enzymatic degradation. PEG enhanced HA demonstrates increased duration and improved contouring of injectable implants in vivo.

## 127. Advantages of Microvascular Free Tissue Transfer for Defects of the Scalp and Lateral Temporal Bone

Marita S. Teng, MD, New York, NY

Neal D. Futran, MD DMD, Seattle, WA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to explain the advantages of using free tissue transfer for the challenging task of reconstructing the scalp or lateral temporal bone. They should be able to identify cases in which free tissue transfer is particularly useful in contrast to other conventional methods of reconstruction.

**OBJECTIVES:** Defects of the scalp and lateral temporal bone can result from tumor, trauma, or chronic infection. Simple reconstructive methods such as skin grafts, locoregional flaps, or tissue expanders are often infeasible because of defect size, active infection, radiation, or dural exposure. Because vascularized tissue coverage is often crucial to avoid intracranial complications, we present the use of microvascular reconstructive techniques in managing these defects. **STUDY DESIGN:** Retrospective chart review. **METHODS:** Data were collected on all patients at our institution who had scalp or lateral temporal bone defects reconstructed with free tissue transfer from May 1996—December 2004. Cases were analyzed for defect characteristics, type of flap, vessel selection, radiation status, dural exposure, complications, and outcomes. **RESULTS:** 38 free flaps were performed in 36 patients with scalp or lateral temporal bone during the study period. Seven resections included craniotomy, and 29 patients had either pre- or postoperative radiation. Defect size ranged from 6-550 cm<sup>2</sup>. All flaps (24 latissimus, 11 rectus, 2 radial forearm, and 1 omental) were transferred successfully. Vein grafts were only required in two patients. Four major complications occurred: cerebritis with seizures, large wound dehiscence, abdominal wound hematoma, and skull osteomyelitis. Eight minor complications consisted of donor site seromas and small wound dehiscences. Cosmetic results were consistent and durable. **CONCLUSIONS:** Microvascular free tissue transfer is a safe, reliable method of reconstructing scalp and lateral temporal bone defects while offering favorable cosmetic results. Major complica-

tion rates are low. We favor the use of latissimus flap with skin graft coverage for large scalp defects and rectus free flap for lateral temporal bone defects. Advantages include long pedicle length and potential for optimal scalp contour.

### **128. Tissue Engineered Bone Regeneration of Canine Skull Using Bone Marrow Derived Stromal Cells and Beta-TCP**

Hiroo Umeda, MD, Kyoto, Japan  
Shin-ichi Kanemaru, MD PhD, Kyoto, Japan  
Masaru Yamashita, MD, Kyoto, Japan  
Yoshihiro Tamura, MD, Kyoto, Japan  
Masanao Kishimoto, MD, Kyoto, Japan  
Juichi Ito, MD PhD, Kyoto, Japan

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to recognize the progress of bone regenerative therapy and its usefulness. And this therapy will be understood to be clinically applicable in the near future.

**OBJECTIVES:** The aim of this study is to regenerate tougher cranial bone to the clinically tolerable level with tissue engineering technique. In our previous managed bone formation we used only a composite scaffold mainly composed of beta tricalcium phosphate (beta-TCP). In this study whether bone marrow derived stromal cells (BSCs) promote the thick bone formation was investigated. **STUDY DESIGN:** Preliminary: an animal experiment. **METHODS:** Adult beagle dogs were used for this experiment. Craniotomy was performed as the same clinical manner. The bone defect (2cm x 2cm) was created at each canine temporoparietal region. They were divided into three groups. In group I, the bone defect was closed by replacing the original free bone flap without filling the residual gap. In group II, the gap was filled with the composite scaffold: collagen coated beta-TCP and autologous bone fragments with fibrin glue. In group III, their own cultured bone marrow derived stromal cells (BSCs) and the upper composite scaffold was used as filler of the gap. The sites of craniotomy were analyzed with three dimensional computed tomography (3D-CT) and histopathological examination after three and six months. Mechanical strength of the sites was also evaluated. **RESULTS:** In group II and III, bone regeneration was observed, and new bone formation was more widely existed in group III than in group II. **CONCLUSIONS:** This study showed that BSCs have the potential to promote the bone regeneration and confirmed the efficacy of the composite scaffold made of beta-TCP and autologous bone fragments with fibrin glue.

## **Rhinology**

### **129. Sinonasal Mucosal Melanoma Presenting With Acute Visual Loss Secondary to Orbital Involvement**

Khwaja A. Ahmed, MD, Memphis, TN  
Matthew R. Stumpe, MD, Memphis, TN  
Sandeep Samant, MD, Memphis, TN

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to recognize the potential for visual loss secondary to sinonasal mucosal melanoma, as well as understand the potential symptomatic improvement that can be achieved with surgical debulking.

**OBJECTIVES:** To present a case of sinonasal mucosal melanoma causing visual loss secondary to optic nerve involvement. **STUDY DESIGN:** Case report and review of the literature. **METHODS:** A 25 year old white female with chronic symptoms of nasal stuffiness and intermittent epistaxis presented with an acute bilateral visual loss over 5 days. Examination revealed a left sided friable mass in the nasal cavity. Extraocular movements were intact bilaterally, but visual acuity was 20/100 and 20/200 on the right and left side, respectively. CT and MRI imaging studies revealed a large nasopharyngeal mass extending into the posterior ethmoid cavities with involvement of the optic chiasm and bilateral optic nerves. **RESULTS:** After an endoscopic biopsy revealed a diagnosis of mucosal melanoma, the patient was taken back to the operating room for tumor debulking in an effort to decompress the orbit and achieve symptomatic improvement. Intraoperatively, the tumor was noted to involve the entire sinonasal cavity with destruction of normal landmarks. The lamina papyracea was eroded with melanoma, and the pigmented staining was noted in the orbital periosteum extending posteriorly to the level of the orbital apex bilaterally. Debulking of the tumor was performed with bilateral decompression of the orbits. Postoperatively, vision was restored with 20/20 visual acuity noted bilaterally. **CONCLUSIONS:** Mucosal melanomas of the paranasal sinuses can cause visual loss secondary to orbital involvement. This complication has not been reported in the literature thus far. The otolaryngologist should be aware of this clinical entity and recognize the symptomatic improvement that can be achieved with surgical intervention.

### **130. The Yield of Sinus CT in Patients With Isolated Facial Pain and Negative Nasal Endoscopy**

David A. Kieff, MD, Boston, MA

**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the value of sinus CT in the diagnostic work up of patients with negative nasal endoscopy and an isolated complaint of facial pain.

**OBJECTIVES:** To determine the diagnostic value of nasal endoscopy in predicting the presence of sinus disease as demonstrated by CT scan in patients who present with an isolated symptom of facial pain. **STUDY DESIGN:** Prospective case series. **METHODS:** Forty-two consecutive adult patients who presented with isolated facial pain of more than two weeks duration and had negative nasal endoscopy comprised the study group. These patients also underwent sinus CT imaging. The findings of the sinus CTs were reviewed to determine if they could explain the etiology for the facial pain. A CT scan finding was considered relevant if it correlated with location of the pain. **RESULTS:** There were 27 females and 15 males with a median age of 38 years. The pain was unilateral in 20 of the patients. The facial pain was frontal, periorbital/retroorbital, maxillary, or a combination thereof. Fourteen patients (33%) had sinus CT findings that might have explained their facial pain. Four (10%) patients had CT demonstrated mucosal disease in one or more sinuses correlating with the location of the facial pain. Thirteen (31%) patients had anatomic findings on CT that could potentially obstruct the ostiomeatal (OMC) complex. The anatomical findings included conchae bullosae, haller cells, and agger nasi cells. Three of the patients had both mucosal disease and anatomic findings. **CONCLUSIONS:** The majority of patients who had isolated facial pain and negative nasal endoscopy had no findings on their sinus CT to explain their facial pain.

### 131. Important Clinical Symptoms in Patients Undergoing Functional Endoscopic Sinus Surgery for Chronic Rhinosinusitis

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**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to: 1) understand the diagnostic criteria of chronic rhinosinusitis; 2) understand symptom improvement rates in patients with chronic rhinosinusitis undergoing sinus surgery; and 3) understand which symptoms are most important in terms of severity and prevalence in patients undergoing sinus surgery.

**OBJECTIVES:** To evaluate the prevalence and severity of individual rhinosinusitis task force (RSTF) symptoms in patients with chronic rhinosinusitis (CRS) undergoing functional endoscopic sinus surgery (FESS). **STUDY DESIGN:** Retrospective analysis of prospectively collected data. **METHODS:** The prevalence and severity of individual RSTF major and minor symptom scores graded on a visual analog scale (VAS) were compared. Correlation between absolute improvement in individual symptom scores at 1 year postoperative was performed. **RESULTS:** One hundred fifty-eight of 201 patients met inclusion criteria giving a response rate of 78%. Average age was 49.4 (range 18-80) with a male to female ratio of 1.1:1. The preoperative leading mean symptom scores were postnasal drip (5.8+0.3), nasal obstruction (5.7+0.3), and facial congestion (5.1+0.3). These symptoms were also the most prevalent with 82%, 84% and 79% of patients reporting these symptoms, respectively. Postoperative symptom improvements were significant ( $p < 0.0001$ ) across all RSTF domains except fever. The highest percentage improvement was seen with facial congestion (93%), nasal obstruction (92%) and postnasal drip (85%). Multivariate analysis revealed significant ( $p < 0.0001$ ) high correlation between improvements of facial pain/pressure with facial congestion ( $r = 0.72$ ), facial congestion with nasal obstruction ( $r = 0.65$ ), and facial pain/pressure with headache ( $r = 0.72$ ). **CONCLUSIONS:** The top three RSTF symptoms were postnasal drip, nasal obstruction, and facial congestion in terms of prevalence and severity. Significant improvement in RSTF symptom scores is achieved after FESS. Of these symptoms the degree of improvement of facial pain/pressure, facial congestion, nasal obstruction, and headache are highly correlated.

### 132. Minimally Invasive Treatment of Vascular Malformations of the Head and Neck

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**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to understand the indications and treatment options for vascular malformations including new laser treatment recommendations.

**OBJECTIVES:** Congenital vascular lesions are classified as hemangiomas or vascular malformations according to their histology and structure. Accurate diagnosis and classification of these lesions can help the physician predict behavior and guide appropriate treatment. Although many of these lesions are treated with surgical resection, minimally invasive therapy with intralesional laser or sclerosants offers a valuable alternative. This paper reviews and discusses vascular malformations presenting to a major tertiary medical

center. Its focus is upon presentation and diagnosis, current treatment options including interstitial Nd:YAG laser photocoagulation therapy, intralesional sclerotherapy, and discusses outcomes of both surgical and nonsurgical candidates. **STUDY DESIGN:** Retrospective chart review of those patients who underwent vascular malformation treatment at a major academic center between 1995 to 2005. Outcomes were compared. Treatment algorithm is presented. **METHODS:** The charts of patients who underwent sclerotherapy, laser treatment or surgical resection of a vascular malformation in the head and neck were retrospectively reviewed. The technique was evaluated. The authors present an algorithmic approach to diagnosis, management, and treatment. The authors provide an outcome analysis and discuss the relative advantages and disadvantages of each treatment method in relation to complications, recurrence, functional recovery and cosmesis. **RESULTS:** Twenty-five patients underwent successful treatment of a vascular malformation in the head and neck from 1995-2005. Arteriovenous malformations were preoperatively treated with embolization and subsequently resected. Venous malformations were treated with a combination of sclerotherapy and surgical resection or Nd:YAG laser photocoagulation. Cosmesis was acceptable for both groups. **CONCLUSIONS:** Vascular malformations continue to challenge the head and neck surgeon. For lesions where surgical resection entails a high chance for morbidity, minimal invasive sclerotherapy offers a powerful and effective treatment option. A standardized plan for evaluation, diagnosis, and treatment is necessary.

### 133. Effect of Asthma on Outcome in Revision Surgery for Pediatric Rhinosinusitis

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**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to: 1) explain the association between asthma and rhinosinusitis in patients undergoing endoscopic sinus surgery; and 2) discuss the outcome of revision surgery in asthmatic children with rhinosinusitis.

**OBJECTIVES:** 1) To determine the effect of asthma on the outcome of children undergoing revision endoscopic sinus surgery (ESS); and 2) to determine the effect of age, allergy, asthma, Lund-Mackay CT stage, and cigarette smoke exposure on outcome in revision ESS using multivariate analysis. **STUDY DESIGN:** Prospective nonrandomized study in a pediatric otolaryngology tertiary service. **METHODS:** Our study group consisted of 39 children undergoing revision ESS over a nine year period ending March 2004. Children included in the study ranged in age from 2 to 13 years. The children were followed up after surgery at 3 month intervals. All children had at least 1 year follow-up. A questionnaire was used to assess the status of major symptoms. **RESULTS:** The success of ESS in children who had primary surgery was 90%. The success of revision ESS was 62% ( $p < 0.001$ ). 22/39 (56%) of children who had revision ESS were asthmatic compared with 37% of children who had primary surgery ( $p = 0.03$ ). 14/22 (64%) asthmatic children had a successful outcome after revision ESS, compared with 10/17 (59%) of nonasthmatic children ( $p = 0.76$ ). Using multivariate analysis controlling for age, allergy, CT stage, and cigarette smoke exposure, asthma again was not a significant predictor of success ( $p = 0.23$ ). Of all the variables, age and allergy were the only predictors of success in revision ESS. **CONCLUSIONS:** Asthma does not appear to adversely affect outcome in children undergoing revision ESS. 64% of asthmatic children had a successful outcome after revision ESS. Age and allergies are independent predictors of success in revision surgery for pediatric rhinosinusitis.

### 134. Maxillary Sinus Adenosquamous Carcinoma in a Patient With Recurrent Mycetoma

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**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss the clinicopathologic presentation of sinonasal adenosquamous carcinoma; demonstrate understanding of the need for extensive investigation of underlying pathology in recurrent sinonasal mycetoma; discuss treatment of sinonasal adenosquamous carcinoma.

**OBJECTIVES:** We discuss the unique characteristics of sinonasal adenosquamous carcinoma presenting in a patient with recurrent maxillary sinus mycetoma. We review pertinent literature on the subject and present a clinicopathologic review of this unique, aggressive neoplasm and suggest recommendations for surgical management. **STUDY DESIGN:** Case report and review of the literature. Recommendations are given for management of this unique sinus pathology. **METHODS:** We present a case of maxillary sinus adenosquamous carcinoma in a patient with recurrent maxillary sinus mycetoma. We discuss the unique presentation of this high grade, aggressive neoplasm in the context of recurrent mycetoma. We discuss the potential etiology, management, and treatment of adenosquamous carcinoma and review the current literature on head and neck adenosquamous malignancy. **RESULTS:** A 77 year old female with a previous history unilateral maxillary mycetoma removed 3 years previously presented to our institution with recurrent symptoms of maxillary sinusitis. Physical exam and CT scanning confirmed purulence and opacification of the right maxillary sinus. Revision endoscopic sinus surgery revealed mycetoma and abnormal, hyperplastic maxillary sinus mucosa. Mucosal biopsies were positive for adenosquamous carcinoma on frozen and permanent histologic section. The patient underwent medial maxillectomy with

clear margins. **CONCLUSIONS:** Recurrent mycetoma of the paranasal sinuses demands extensive investigation to rule out underlying pathology. Adenosquamous carcinoma is an infrequent finding in the paranasal sinuses and treatment should be aggressive surgical excision with or without adjuvant therapy. This case is unique as adenosquamous carcinoma associated with recurrent mycetoma has not been previously reported.

### 135. Reconstruction Following Endoscopic Skull Base Surgery

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**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to describe the approach for reconstruction following endoscopic skull base surgery and to identify risk factors associated for postoperative CSF leak.

**OBJECTIVES:** To describe the surgical technique and efficacy of reconstruction following endoscopic skull base surgery. **STUDY DESIGN:** Consecutive case series performed by a single surgical team at a tertiary medical center. **METHODS:** The operative, office and hospital charts of 53 procedures were reviewed for patient demographics, surgical variables, surgical adjuncts (image guidance, lumbar drain, fluorescein) and complications. Analysis was performed to determine a possible correlation between these factors and postoperative cerebrospinal fluid (CSF) leak. **RESULTS:** The majority of lesions were pituitary adenoma (60%), meningioma (9.4%), craniopharyngioma (9.4%) and chordoma (5.7%). The endoscopic approach was based on the site of the lesion and included transsphenoidal sella (69.8%), transsphenoidal planum sphenoidale (13.2), transclival (3.8%) and transethmoidal/cribriform (3.8%). Intrathecal fluorescein and image guidance were used in 83% and 91% of cases, respectively. Complete gross tumor removal was achieved in 43 cases (81.1%). The skull base was reconstructed with a variety of autologous (nasal septum, abdominal fat, fascia lata) and synthetic (dural substitute, tissue glue) materials. Planned lumbar drainage of CSF was performed in a minority of patients (22.7%). There were six cases (11.3%) of postoperative CSF leak all of which resolved with bed rest and lumbar drainage. In comparison to the entire cohort, patients who experienced postoperative CSF leak were noted to have larger tumors (mean largest dimension: 3.34 vs 2.17 cm), similar location and pathology of tumors, higher rate of intraoperative leakage of fluorescein (100% vs 45%), greater requirement of dural substitute (33.3% vs 7.5%) and longer hospitalization (13.1 vs 5.2 days). **CONCLUSIONS:** Reconstruction following endoscopic skull base surgery is a highly successful procedure. Risk factors associated with CSF leak may be used to predict the need for planned lumbar drainage.

### 136. Chondromyxoid Fibroma: A Case Report

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**EDUCATIONAL OBJECTIVE:** At the conclusion of this presentation, the participants should be able to discuss features, including clinical, radiological, and histological, of chondromyxoid fibroma, a rare soft tissue tumor of the head and neck.

**OBJECTIVES:** Chondromyxoid fibroma (CMF) is a rare, benign cartilaginous tumor that most often occurs at the metaphysis of long bones of the lower extremity. This report describes a rare case of histologically proven CMF of the ethmoid bone in a 17 year old female. Only four previously reported cases have originated in the ethmoid sinus. The clinical signs, as well as the radiographic and histological features, are presented. **STUDY DESIGN:** Case report. **METHODS:** Not applicable. **RESULTS:** Not applicable. **CONCLUSIONS:** Not applicable.