

TRIOLOGICAL SOCIETY 2007 ANNUAL PROGRAM

THURSDAY, APRIL 26, 2007

**8:00 - 12:00 INTRODUCTION OF GUESTS
AND SCIENTIFIC SESSION - Elizabeth A-B-C**

8:00 *Welcome and Remarks by President
David F. Wilson, MD*, Portland, OR*

8:10 *Introduction of Guest of Honor
William F. House, MD*, Aurora, OR*

8:15 - *Presidential Citations*

8:35 *Derald E. Brackmann, MD*, Los Angeles, CA
Kenneth H. Brookler, MD*, New York, NY
Fred D. Owens, MD*, Dallas, TX
Richard J. Trevino, MD*, San Jose, CA
Jack L. Pulec, MD, Los Angeles, CA (posthumous)
James L. Sheehy, MD, Los Angeles, CA (posthumous)*

8:35 - **Presidential Speaker**

8:55 **“Acoustic Neuroma Management 2007”
Derald E. Brackmann, MD*, Los Angeles, CA**

MODERATOR

David F. Wilson, MD*, Portland, OR

8:55 MOSHER AWARD PRESENTATION - TRIOLOGICAL THESIS

**Impact of Perioperative Systemic Steroids on Surgical Outcomes in Patients with Chronic Rhinosinusitis with Polyposis: Evaluation with the Novel Postoperative Sinus Endoscopy (POSE) Scoring System
Erin D. Wright, MD, Edmonton, AB, Canada**

Educational Objective: At the conclusion of this presentation, participants should be able to identify the value of perioperative steroids within their own practice for patients undergoing endoscopic sinus surgery for chronic rhinosinusitis with polyposis.

Objectives: The objective of this randomized, double blind, placebo-controlled study was to assess the effect of peri-operative systemic steroids on subjective and objective surgical outcomes for patients undergoing endoscopic sinus surgery (ESS) for chronic rhinosinusitis with polyposis (CRSwP). The secondary objective was to begin validation of the newly developed post-operative sinus endoscopy (POSE) scoring system. **Methods:** Patients who had failed maximal medical therapy and were scheduled to undergo ESS were eligible for the study. Participants were randomized to receive either 30 mg of prednisone or placebo for 5 days pre-operatively and 9 days post-operatively. Operative and baseline clinical data was collected using the Lund-McKay staging system including its Sinus Symptom Questionnaire as well as additional data regarding mucosal health, the technical difficulty of surgery, and endoscopic data using the Lund-Kennedy Endoscopic Score (LKES) and POSE scale. Data was also collected at 2-weeks, 1 month, 3 months, and 6 months post-operatively. A sample size of 24 was calculated to detect a clinically relevant difference between groups of 40 percent. Routine statistical comparisons were performed as well as repeated measures analysis of variance with Bonferroni adjustment due to the multiple comparisons performed. To address the secondary objective, data was also collected at all post-operative time points using the POSE instrument, which was designed with the intention of enhancing face-validity and responsiveness to change. Comparisons were performed between the POSE and LKES including assessment of sensitivity to change, correlation between the two scales, and correlation with symptom scores. **Results:** Twenty-six patients participated in the study. Operative data demonstrated a significantly higher percentage of severely inflamed sinonasal mucosa in patients not pretreated with systemic steroids, which was associated with technically more difficult surgery in the estimation of the operating surgeon. In terms of postoperative symptoms there was no differ-

ence between treatment groups with both placebo and prednisone significantly improved over baseline up to 4 weeks postoperatively. Endoscopic assessment of patients post-operatively demonstrated a treatment effect ($p < 0.05$) with clinically healthier cavities seen in patients treated with prednisone up to 6 months post-operatively as compared to baseline ($p < 0.001$) although the strongest effect is seen at the 2-week time point. In comparing the two endoscopic scales, the POSE and LKES correlated highly ($R > 0.70$; $p < 0.001$) both in terms of absolute score and change-in-score. There is some evidence that the POSE score may be more sensitive to change than the LKES and the POSE scores did correlate more strongly with symptom scores than the LKES although both endoscopic scores correlated only weakly with symptom scores. **Conclusions:** The data presented in this study supports the practice of administering pre-operative systemic steroids to patients undergoing ESS for CRSwP. Further, in the practice of surgeons who provide intensive post-operative care post-ESS including debridement and medical therapy based on the endoscopic findings, there is evidence to support administering systemic steroids in the post-operative period. The POSE scoring system compares favorably to the LKES and may confer advantages in terms of face/content validity and responsiveness to change and is worthy of further validation.

9:05 FOWLER AWARD PRESENTATION - TRIOLOGICAL THESIS

An In Vitro Model System to Study Gene Transfer in the Human Inner Ear
Bradley W. Kesser, MD, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, participants should be able to understand gene therapy applied to the inner ear and appreciate that harvested tissue from the human vestibular system at the time of surgical labyrinthectomy can serve as an in vitro model system to study pharmacologic agents, including viral vectors, designed to restore function to the inner ear.

Objectives: Gene transfer in the mammalian inner ear using viral vectors is well-established in several animal models both in vitro and in vivo. Surgical labyrinthectomy for Meniere's Disease or resection of vestibular schwannoma offers a rare opportunity to harvest human inner ear tissue. The objectives of this study were to demonstrate the successful harvest and culture of human vestibular sensory epithelia, and to determine the feasibility of transgene expression in this tissue using several recombinant adenoviral vectors. We will further characterize adenoviral transfection of human inner ear tissue by calculating dose response and time response curves. Insertion of the wild-type potassium channel gene *KCNQ4* into the adenoviral vector genome will determine if this vector system can drive expression of a functionally relevant gene into human vestibular epithelia. Transfection of adenoviral vectors into human labyrinthine sensory epithelium in vitro will support the use of adenovirus as an effective agent in gene transfer studies, and will offer proof of principle that human inner ear tissue is suitable for the transfer of exogenous genetic material using viral vectors. **Methods:** Human vestibular sensory epithelia were harvested and placed in tissue culture at the time of surgical labyrinthectomy. Several adenoviral vectors containing the green fluorescent protein (GFP) reporter gene were used to transfect the human tissue. Expression of GFP in the cultured inner ear sensory epithelia was examined under confocal microscopy and transfection rates (percent of cells transfected) were calculated. Transfection rates were observed over varying concentrations of viral titer and varying incubation times to generate dose-response and time-response curves. Expression of the *KCNQ4* ion channel was demonstrated using immunofluorescence under confocal microscopy. **Results:** Human vestibular epithelia were successfully harvested, kept viable, and maintained in culture as long as four days. The tissue was transfected with a variety of adenoviral vectors. Numerous GFP-positive hair cells and supporting cells were observed as early as 24 hours post-transfection (mean transfection rate, 19.6%; range 1-72%) for all adenoviral vectors studied. Inoculation with varying titers of a single adenoviral vector displayed dose-dependence, with viral titers of 2.7×10^7 viral particles/mL corresponding to a transfection rate of 50%. Using an anti-*KCNQ4* antibody, immunostaining was noted in 39% of cells. 52% of the *KCNQ4*-positive cells were GFP-positive including supporting cells and type I and type II hair cells. Much of the *KCNQ4* expression in the GFP-positive cells was presumably driven by adenoviral-directed gene transfer. **Conclusions:** Human vestibular sensory epithelia can be harvested and maintained in culture as long as four days and can serve as a valuable tool to study in vitro gene transfer. Recombinant adenovirus transfects both supporting cells and hair cells in organotypic human vestibular sensory epithelia in a dose-dependent and time-dependent fashion. Adenovirus may be a suitable gene therapy vector to drive expression of exogenous proteins, such as the wild-type form of deafness genes. Cultured human vestibular tissue is a viable model system for the study of gene transfer in the inner ear.

9:15 HONORABLE MENTION FOR CLINICAL RESEARCH - TRIOLOGICAL THESIS

Rising Incidence of Oropharyngeal Squamous Cell Carcinoma in Colorado and the United States and the Potential Role of Oncogenic Human Papilloma Virus
Joel A. Ernster, MD, Colorado Springs, CO

Educational Objective: At the conclusion of this presentation, the participants should be cognizant of the rising incidence of oropharyngeal squamous cell carcinoma and the role human papilloma virus is playing in this phenomenon.

Objectives: To document the increasing incidence of oropharyngeal (OP) squamous cell carcinoma (SCCa) in Colorado and the United States and to provide evidence to support the concept that this rise in incidence is largely due to oncogenic HPV. **Study Design:** Epidemiologic review and retrospective case series analysis. **Methods:** We collected data from the Colorado Central Cancer Registry (CCCR) and from the Surveillance, Epidemiology and End Results program (SEER) of the National Cancer Institute (NCI) compar-

ing the average annual age-adjusted incidence rates of OP and non-OP head and neck SCCa between the periods 1980 to 1990 and 1991 to 2001. We then obtained data on 72 patients with OP SCCa from El Paso County, Colorado, from 1980 through 2004. We analyzed archival tumor tissue from these patients using polymerase chain reaction (PCR) to ascertain the presence or absence of HPV subtypes 16 and 18. **Results:** The average annual age-adjusted incidence rate per 100,000 population of OP SCCa in males in Denver Metro, Colorado increased from 2.54 to 3.47 ($p < 0.05$) or 36.6% between 1980-1990 and 1991-2001, while the U.S. rate increased from 4.34 to 4.81 ($p < 0.05$) or 10.8%. The rates in females declined. The rates of non-OP head and neck SCCa decreased between the identical time periods. Smoking status and ethnic makeup of the populations in the two time periods in Denver Metro were similar. Of the 72 cases of OP SCCa analyzed with PCR, 50 were positive for HPV 16. The ratio of HPV-positive cases to HPV-negative cases prior to 1995 was 0.72 (8:11). The ratio afterward was 3.81 (42:11). **Conclusions:** OP SCCa is increasing in Colorado males and to a lesser extent in males throughout the U.S. Most of the archival tumor tissue from cases identified in El Paso County, Colorado after 1994 contained the HPV 16 genome. In the absence of other explanations, this suggests that oncogenic HPV infection of OP tissues may be the explanation for the rise in average annual age-adjusted incidence of OP SCCa in Denver Metro, Colorado and probably the rest of the U.S.

9:22 HONORABLE MENTION FOR BASIC RESEARCH - TRIOLOGICAL THESIS

Mucin Gene Expression in Human Middle Ear Epithelium

Joseph E. Kerschner, MD, Milwaukee, WI

Educational Objective: At the conclusion of this presentation the participants should be familiar with the central role that mucins play in the pathogenesis of otitis media and understand the complex environment of mucin gene expression in middle ear epithelium and what impact this may have on developing novel treatment strategies for this disease.

Objectives: To investigate the expression of recently identified human mucin genes in human middle ear epithelial (MEE) specimens from in vivo ME tissue and to compare this mucin gene expression to mucin gene expression in an immortalized cell culture in vitro source of human MEE. **Methods:** Human MEE was harvested as in vivo specimens and human middle ear epithelial cell cultures were established for in vitro experimentation. RNA was extracted from MEE and primers designed for RT-PCR to assess for mucin genes MUC1, MUC2, MUC3, MUC4, MUC5AC, MUC5B, MUC6, MUC7, MUC8, MUC9, MUC11, MUC12, MUC13, MUC15, MUC16, MUC18, MUC19 and MUC20 expression. Mucin gene expression in the in vivo and in vitro middle ear tissue was compared against tissues with known expression of the mucin genes in question. **Results:** Mucin genes MUC1, MUC2, MUC3, MUC4, MUC5AC, MUC5B, MUC7, MUC8, MUC9, MUC11, MUC13, MUC15, MUC16, MUC18, MUC19 and MUC20 were identified and expressed in both the in vivo and in vitro samples of MEE. Mucin genes MUC6, MUC12, and MUC17 were not identified in either tissue samples. **Conclusions:** Many of the mucin genes that have been recently identified are expressed in human MEE. These genes are expressed in a similar manner in both in vivo and in vitro models. Understanding the mechanisms in which these genes regulate the physiology and pathophysiology of MEE will provide a more thorough understanding of the molecular mechanics of the MEE and disease conditions such as otitis media.

9:29 HONORABLE MENTION FOR CLINICAL RESEARCH - TRIOLOGICAL THESIS

Gustatory Impairment in Patients Undergoing Radiation Therapy for Head and Neck Cancer

Natasha Mirza, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the changes in taste which head and neck cancer patients suffer from and the effects of radiation on the structure and function of the taste system.

Objectives: To determine whether 1) radiation therapy alters the ability to identify tastants, and 2) whether there were radiation-related decrements in the number of taste papillae and taste pores. **Design:** Prospective, longitudinal, study. **Methods:** Testing was conducted approximately two weeks prior to starting radiation therapy, and two weeks, two months and six months after completing radiation therapy. A 96 trial regional taste test was administered. Videomicroscopy was performed to count the fungiform papillae and taste pores. Statistical analysis used an analysis of variance (ANOVA) of taste test scores and papilla and taste pore numbers at time points before and after radiation therapy. **Results:** Relative to controls, patients with head and neck cancer had lower taste identification test scores for caffeine (bitter; $p = 0.003$), sodium chloride (salty; $p = 0.02$), and citric acid (sour; $p = 0.06$), but not for sucrose (sweet; $p = 0.16$). Only the citric acid test scores differed significantly across the multiple test periods, with a significant group by time interaction ($p = 0.03$). Patients exhibited fewer papillae than did the controls ($p = 0.02$). The number of taste pores was lower in the patient than in the control group ($p = 0.003$), and a significant group by time interaction was present ($p = 0.03$). **Conclusions:** The present study shows that head and neck cancer patients have decrements in taste function and structure and radiation therapy adversely affects sour taste and taste pores.

9:37 HONORABLE MENTION FOR BASIC RESEARCH - TRIOLOGICAL THESIS

Oncostatin-M Enhances Osteoinduction in a Rabbit Critical Calvarial Defect Model

J. Paul Moxham, MD, Vancouver, BC, Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) better understand the role of Interleukin-6 cytokines and Oncostatin-M, in particular, in osteogenesis; and 2) understand future directions of research into bone growth factors.

Introduction: Oncostatin-M (OSM) is a member of the interleukin-6 family of cytokines with controversial roles in bone homeostasis. Evidence supports a role in bone regulation but the balance between healing promotion and acceleration of bone destruction is unclear. It is also uncertain as to whether or not these varied responses may be dose dependent or related to interactions with other growth factors within the bone microenvironment. **Objective:** To determine if OSM enhances osteoinduction in a rabbit critical calvarial defect model and whether there is a dose response curve. **Hypothesis:** OSM enhances osteoinduction and there is a dose response curve favoring lower doses over higher doses. **Study Design:** Controlled animal study using arms of increasing concentrations of OSM in an inactive demineralized bone matrix carrier (DBM) to assess the degree of osteoinduction through standard histomorphometric analysis and a variant of the radiodensitometry technique. **Methods:** Twenty-five skeletally mature New Zealand white rabbits were randomized into control and experimental arms. Incremental doses of OSM (30µg, 100µg, and 300µg /gram) in an inactivated guanidine-extracted demineralized bone matrix (Gu-DBM) carrier were implanted into a critically sized (13mm) calvarial defect. Arms of carrier alone and no carrier served as controls. The animals were sacrificed at 4 weeks and histomorphometry and radiodensitometry analyses were then accomplished. **Results:** All OSM arms showed a statistically significant increase in bone formation and bone density compared to either control arm. There was also a statistically significant increase in bone area by histomorphometry between each OSM group, showing an inverse relationship to dose. Radiodensitometry analysis confirmed significant bone density difference comparing experimental groups to controls and also showed a significant difference between the low dose and the higher doses of OSM. It failed to show any significance between the higher two doses when compared to each other. **Conclusions:** OSM enhances osteoinduction in vivo and will close a critically sized calvarial defect in a rabbit model when delivered in a Gu-DBM carrier. There appears to be an inverse dose relationship with new bone formation.

9:45 - Break in Exhibit Hall/View Posters - Douglas Pavilion
10:15

10:15 - OTOLOGY FORUM - Elizabeth A-B-C

11:15 Research Update: Stem Cell and Genetic Therapies for Hair Cell Related Hearing Loss

Moderator: Rick A. Friedman, MD*, Los Angeles, CA

Panelists: Bryan A. Liang, MD PhD JD, San Diego, CA
Allen F. Ryan, MD PhD, San Diego, CA
Neil Segil, PhD, Los Angeles, CA

11:20 - 12:00 ALA & TRIO GUEST LECTURES
Elizabeth A-B-C

11:20 American Laryngological Association Daniel C. Baker Jr. Lecture
“Education and Research Horizons in Laryngology”
Gerald S. Berke, MD*, Los Angeles, CA

11:40 Triological Society Joseph Ogura Lecture
“Medical Missions to Vietnam and Cuba: Lessons in Global Education”
Byron J. Bailey, MD*, Galveston, TX

12:00 Lunch in Exhibit Hall/View Posters - Douglas Pavilion

SATURDAY, APRIL 28, 2007

7:00 - Business Meeting (Members Only) New Fellow Induction and
7:50 Reception - Elizabeth B-C

8:05 - 9:45 CONCURRENT SESSIONS
Session I: Head & Neck - Elizabeth B-C
Session II: Plastic, General & Peds - Elizabeth A

10:00 - 11:00 CONCURRENT PANELS
PANEL #1: NUANCES IN RHINOPLASTY - Elizabeth A
PANEL #2: OPTIONS FOR MANAGEMENT OF
LARYNGEAL CANCER - Elizabeth B-C

11:00 - 12:00

PANEL: MINIMALLY INVASIVE SURGERY FOR RHINOSINUSITIS: HOW MUCH IS ENOUGH? -
Elizabeth B-C

8:05-9:45 CONCURRENT SESSION I: HEAD & NECK -
Elizabeth B-C

MODERATORS

W. Jarrard Goodwin, MD FACS*, Miami, FL
Bert W. O'Malley Jr., MD*, Philadelphia, PA

8:05 Use of PET/CT in Deferring Neck Dissection After Chemoradiation Therapy in Stage IV Head and Neck Cancer

Jayakar V. Nayak, MD PhD, Pittsburgh, PA
Rohan R. Walvekar, MD, Pittsburgh, PA
Stephen Y. Lai, MD PhD, Pittsburgh, PA
Robert L. Ferris, MD PhD, Pittsburgh, PA
Barton F. Branstetter, MD, Pittsburgh, PA
Jonas T. Johnson, MD*, Pittsburgh, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) understand applicability of PET/CT scans in the evaluation of head and neck cancer staging; 2) understand the basic design of observational longitudinal patient studies; and 3) discriminantly evaluate indications for planned versus deferred neck dissection.

Objectives: To determine whether combined positron emission tomography and computed tomography (PET/CT) could help to avoid unnecessary planned neck dissections in patients with advanced head and neck squamous cell carcinoma (HNSCC), we designed an observational study of patients with de novo cervical N2-N3 regional spread of HNSCC. **Study Design:** Observational study. **Methods:** We included all patients who underwent post-treatment PET/CT within 5 months of completing chemoradiation therapy. Thirty such patients were identified. The PET/CT was "positive" if the radiologist recommended tissue sampling or resection of cervical lymph nodes. Patients who had positive PET/CT underwent confirmatory biopsy given clinical suspicion for recurrent disease. Patients with "negative" PET/CT were followed clinically and radiographically for a minimum of 9 months (median 20 months). **Results:** Eight (27%) of the 30 post-treatment PET/CT studies were positive. Six (75%) of the cases had histologically confirmed viable tumor. In the 22 patients with negative PET/CT no recurrence was identified during the study. This corresponds to a sensitivity of 100% (6/6), specificity of 92% (22/24), positive predictive value of 75% (6/8), negative predictive value of 100% (22/22), and accuracy of 93% (28/30). Thus 24 (80%) of 30 patients were spared neck dissection without evidence of recurrent disease in the neck. The other 6 patients underwent neck dissection and had histologically confirmed residual nodal disease. **Conclusions:** Our results suggest that planned neck dissection after chemoradiation therapy for HNSCC may be deferred in favor of serial PET/CT imaging, and that biopsy of suspicious fluorodeoxyglucose (18F)-avid regions may be considered prior to therapeutic neck dissection.

8:13 VSV-IL-12 and Cisplatin Eradicates Squamous Cancer Cells But Not Normal Epithelial Cells

Chih-Kwang Sung, MD, New York, NY
Georges Wanna, MD, New York, NY
Bryan Choi, MS, New York, NY
Eric M. Genden, MD, New York, NY
Edward J. Shin, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate VSV-F can be used in combination with cisplatin to eradicate squamous cancer cells.

Objectives: The principal anti-tumor activity of oncolytic viruses derives from their replication within tumor cells, which results in cell apoptosis and production of progeny virions that can spread to adjacent tumor cells. We have previously reported a recombinant

oncolytic virus (VSV-IL-12) which is capable of producing interleukin 12 between tumor cells which significantly reduces tumor burden and improves survival. Here we evaluate the potential to combine a potent chemotherapeutic agent for squamous cell cancers (cisplatin) with VSV-IL-12 to improve therapeutic efficacy. **Study Design:** In vitro testing of human and murine SCC cell lines using an oncolytic virus and cisplatin alone or in combination. **Methods:** In vitro testing of three SCC cell lines and human keratinocytes using recombinant VSV-IL-12 and cisplatin. Each cell line was tested using VSV-IL-12 at MOI of .01 in the presence and absence of 0.3 micrograms/cc of cisplatin. The ability of VSV-IL-12 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. **Results:** VSV-IL-12 demonstrated rapid replication with greater than 1000 fold increase in titers over 48 hours. Infection of tumor cell lines with VSV-IL-12 resulted in complete cell death of all SCC lines tested at 72 hours. Human keratinocytes were unaffected by VSV-IL-12 and cisplatin. VSV-IL-12 replication was attenuated by 1000 fold in these normal cells when compared to SCC cells. The addition of cisplatin did not affect the ability of VSV-IL-12 to replicate or eradicate squamous cancers in any of the cell lines tested. **Conclusions:** Our results suggest that VSV-IL-12's oncolytic ability is not compromised by cisplatin and combined treatment should be examined in an animal model to explore potential synergistic or additive effects in vivo.

8:21 Coronoideotomy for the Treatment of Intractable Trismus in Head and Neck Cancer Patients

Amit D. Bhrany, MD, Seattle, WA

Mark E. Izzard, MBBS, Auckland, New Zealand

Andrew J. Wood, MBBS, Auckland, New Zealand

Neal D. Futran, MD DMD, Seattle, WA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the effectiveness of coronoideotomy for the treatment of trismus refractory to medical therapy in head and neck cancer patients.

Objectives: Trismus is a common adverse effect of tumor extension or treatment for those with head and neck malignancy. Physical therapy is the mainstay of treatment but many patients still fail to maintain adequate mouth opening. Coronoideotomy is a treatment option for those with trismus, and the purpose of this study was to evaluate the effectiveness of coronoideotomy in treating trismus refractory to physical therapy. **Study Design:** Prospective case series. **Methods:** Eighteen head and neck cancer patients with interincisal distances less than or equal to 20 mm underwent coronoideotomy after failing physical therapy for at least 3 months. All patients had undergone maximal radiation therapy for either, half after tumor resection. **Results:** Post-coronoideotomy, mean interincisal distances improved 22.1 mm and 21.8 mm at 6 and 12 months, respectively, with all patients maintaining an interincisal distance greater or equal to 35 mm. Tumor location, tumor histology, nor the addition of surgical resection impacted outcome. **Conclusions:** Coronoideotomy is effective at improving trismus refractory to physical therapy in head and neck cancer patients.

8:29 Intraoperative Radiation Therapy in Head and Neck Cancer Treatment: Logistical Considerations and Reconstructive Outcomes in an Initial Institutional Patient Cohort

Michael D. Most, MD, New York, NY

Douglas K. Frank, MD, New York, NY (Presenter)

Alexander C. Allori, MD, New York, NY

Kenneth S. Hu, MD, New York, NY

Mark L. Urken, MD, New York, NY

Mark L. Smith, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should have an understanding of the logistics of intraoperative radiation therapy delivery (IORT) to the head and neck cancer patient. Participants should also have an understanding of the expectations for viability and function related to the free and pedicled tissue transfers that are necessary for the treatment and rehabilitation of the head and neck cancer IORT patient.

Objectives: Intraoperative radiation therapy (IORT) delivers high dose radiation to a defined area in complex wound beds subsequent to tumor extirpation and prior to wound closure/reconstruction. Complex functional and vascular head and neck anatomy, however, presents unique technical concerns to centers interested in utilizing IORT, particularly in surgical salvage settings. An initial experience with IORT in the management of head and neck cancer is presented. Emphasis is placed on IORT delivery logistics and outcomes (viability and function) related to the free and pedicled tissue transfers that are necessary for the treatment and rehabilitation of the IORT patient. **Study Design:** Retrospective review. **Methods:** Technical and logistical considerations of IORT delivery to a diverse group of 12 patients with complex head and neck surgical wounds was studied. Viability and functional outcomes pertaining to the free and pedicled tissue transfers that were required in our patient population were assessed. **Results:** Patients received 1000-1200cGy IORT to various complex wound beds prior to free or pedicled flap closure. Ten patients who received IORT were treated in the surgical salvage setting—all of these patients had received prior conventional external radiation to the treatment region. There were 8 free tissue transfers and 8 pedicled tissue transfers used to reconstruct surgical defects in our study population. Wound breakdown occurred in 1 free and 1 pedicled tissue transfer patient respectively. **Conclusions:** IORT can be delivered in precise fashion to complex head and neck

surgical wounds. Reconstruction in the context of IORT can be achieved with expectation of good healing despite heavy cumulative radiation doses.

8:37 Otolaryngologist Performed Ultrasound for the Identification of Parathyroid Adenomas

Theresa A. Gurney, MD, San Francisco, CA
Lisa A. Orloff, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand situations in which otolaryngologist performed ultrasound is useful in preoperative identification and localization of parathyroid adenomas and its strengths in comparison to other localizing modalities.

Objectives: To demonstrate the efficacy of otolaryngologist-head and neck surgeon performed ultrasound for the preoperative localization of parathyroid adenomas and its strengths in comparison to other localizing modalities. **Study Design:** A retrospective chart review of all patients evaluated with otolaryngologist performed ultrasound for the localization of parathyroid adenomas from August 2004 to present. **Methods:** All patients evaluated with otolaryngologist performed ultrasound for the localization of parathyroid adenomas from August 2004 to present were identified. Comparison of the preoperative ultrasound to other preoperative studies, such as sestamibi, and to intraoperative findings and final pathological reports was performed. **Results:** A total of 21 parathyroid adenomas were localized preoperatively. Sixteen were in females and 5 were in males. The age of patients ranged from to 26-84 years of age. The size range of adenomas detected was 0.5 - 1.9cm. For comparison pathology specimens ranged from 1.0 - 2.5cm in size. Ultrasound identified 100% of the parathyroid adenomas and localized 100% of the lesions to the correct side. Additionally ultrasound localized the parathyroid adenomas to the correct location, superiorly or inferiorly, 95% of the time. For comparison sestamibi scans performed on the patients localized the parathyroid adenoma only 71% of the time. **Conclusions:** Otolaryngologist-head and neck surgeon performed ultrasound can accurately identify the location of parathyroid adenomas and is a useful and reliable tool for preoperative planning.

8:45 Protein Microarray Characterizes Variable Protein Expression in Nasal Polyps From Patients With Cystic Fibrosis (CF)

Vijay R. Ramakrishnan, MD, Denver, CO
Milene T. Saavedra, MD, Denver, CO
Todd T. Kingdom, MD, Denver, CO

Educational Objective: At the conclusion of this presentation, the participants should be able to understand how current protein array technology allows for characterization of sinonasal polyp protein expression across CF and non-CF nasal polyp disease.

Objectives: To identify target proteins that may account for the unique characteristics of polyp formation in the patient with CF. **Study Design:** Protein microarray and western blot analysis of prospectively obtained sinonasal polyp tissue. **Methods:** Three nasal polyp specimens were obtained prospectively from two patient groups. The comparison group consisted of adult patients with aspirin tolerant nasal polyposis. The experimental group consisted of adult patients with documented CF, nasal polyposis, and *P. aeruginosa* airway colonization. Pooled samples in duplicate experiments were incubated on the Sigma Panorama Antibody Signal Transduction protein microarray, enabling high throughput analysis of 259 proteins involved in cell proliferation, differentiation, and death. Proteins were identified using a microarray scanner and a student's T test used to identify significant differences in pairs. Western blot analysis was used to confirm array findings. **Results:** The protein array revealed signal differences in cell cycle and DNA damage/apoptosis pathways between CF vs. non-CF nasal polyps. Significant differences were detected in multiple cell cycle proteins including cyclin D1, cdk6, and cdc27. Apoptotic pathway proteins, such as Bcl-xl, were also differentially expressed in the two groups. Western blot analysis confirmed differences in cyclin D1 and Bcl-2 (a Bcl-xl analog) expression between CF and non-CF samples. **Conclusions:** Protein microarray technology is a valuable asset in identifying differences between CF and non-CF nasal polyp disease. In sinus literature to date nasal polyps have never been evaluated by high throughput protein arrays to stratify differences across diseases. We have identified differences in cell cycle and apoptotic protein expression between CF and non-CF nasal polyp disease. Ideally such technology could be applied to identification of therapeutic targets in the future.

8:53 Q & A

8:59 Tumor Necrosis Factor Inhibitors and Squamous Cell Carcinoma of the Head and Neck

Samuel H. Engel, MD MPH, St. Louis, MO
Timothy E. Hullar, MD, St. Louis, MO
John B. Sunwoo, MD, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the risk of malignancy in patients receiving tumor necrosis factor (TNF) inhibitors and discuss the possible association between anti-TNF antibody therapy and squamous cell carcinoma of the head and neck.

Objectives: Tumor necrosis factor (TNF) inhibitors are used to treat inflammatory arthritis and inflammatory bowel disease. However, a recent meta-analysis of randomized controlled trials found a dose dependant increased risk of malignancies with anti-TNF therapy, but no cases of squamous cell carcinoma of the head and neck (SCCHN) have been reported. We report a case correlating TNF antibody therapy with SCCHN and discuss the association between anti-TNF therapy and malignancy. **Study Design:** Case presentation and review of the literature. **Methods:** The course of a patient receiving anti-TNF therapy who developed SCCHN is reported and the relevant literature is reviewed. **Results:** A 34 year old male on Remicade (infliximab, a chimeric anti-TNF- α antibody) for two years for Crohn's disease presented with five days of neck swelling and pain. A large fluctuant right neck mass, consistent with an abscess, was incised, drained, and sent for culture and pathology. Cultures grew streptococcus, and Bartonella PCR was positive; however, histopathology also revealed poorly differentiated squamous cell carcinoma. Subsequent evaluation revealed T2N2b SCCHN of the right tongue base. The patient's infliximab was stopped, and he was treated with chemoradiation with a biopsy proven complete response. Seven months later the infliximab was restarted for worsening of his Crohn's. After four weeks on infliximab, he developed massive local recurrence and distant metastasis. **Conclusions:** TNF has been shown to inhibit SCCHN, and TNF inhibitors increase the risk of malignancy. No cases of SCCHN related to anti-TNF therapy have been previously reported. Caution should be used when patients with SCCHN are being treated with anti-TNF therapy.

9:07 Control Rate of Base of Tongue Cancer Using Chemoradiation Therapy Followed by Boost Brachytherapy Implants

Hootan Zandifar, MD, Syracuse, NY
Michael Hsie, MD, Syracuse, NY
Jack M. Hsu, MD, Syracuse, NY
Seung-Shin Hahn, MD, Syracuse, NY
Robert M. Kellman, MD, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the role of brachytherapy with combination of chemo and radiation therapy for treatment of early and advanced base of tongue cancer.

Objectives: The objective of this research is to compare local control rates of our institution's treatment guideline of combination chemoradiation therapy followed by high dose boost brachytherapy implants to other accepted modalities of treatment. **Study Design:** Retrospective chart review over 10 years at an academic institution. **Methods:** Charts of 32 patients treated at our institution for base of tongue cancer was identified. 17 subjects underwent chemotherapy and radiation therapy followed by brachytherapy while 15 patients underwent other modalities of treatment. **Results:** Of the subjects undergoing chemoradiation followed by boost brachytherapy their T staging varied from 4 (24%) subjects at T4, 3 (18%) subjects at T3 and remainder of the 10 (58%) subjects at T2 or T1. While the non-brachytherapy group showed 3 (20%) subjects at T4, 1 (7%) subject at T3 and the remaining 11 (73%) subjects at T2 or T1. The median followup period for brachytherapy group was 19 months (Mean = 31 months) while the median followup period for the other modality group was 27 months (Mean = 26.8 months). The local control rate for brachytherapy group was 100% while the local control rate for non-brachytherapy group was 81.25%. Also 100% of patients in the brachytherapy group showed complete clinical response. Soft tissue radionecrosis at the site of implantation was seen in 3 patients in brachytherapy group, otherwise side effect/complication profile for the two groups was very similar. **Conclusions:** At our institution chemoradiation therapy followed by boost brachytherapy after 6 weeks gives an excellent local control regardless of tumor size while not drastically changing the complication rate.

9:15 Organ Preserving Transoral Laser Microsurgery (TLM) for Cancer of the Hypopharynx: An Alternative to Standard Therapy?

Alexios Martin, MD, Goettingen, NDS Germany
Martin C. Jaeckel, MD, Darmstadt, HES Germany
Hans Christiansen, MD, Goettingen, NDS Germany
Martin Kron, PhD, Ulm, BW Germany
Wolfgang Steiner, MD, Goettingen, NDS Germany

Educational Objective: At the conclusion of this presentation, the participants should be able to assess the role of transoral laser microsurgery as a therapeutic option in treatment of hypopharyngeal cancer and compare its results to those of standard therapy (open surgery and (chemo-)radiotherapy).

Objectives: Publications in the recent years have indicated transoral laser microsurgery (TLM) to be a valid treatment option for organ and function preserving surgery of early and moderately advanced laryngeal and pharyngeal cancer. Purpose of this study was to analyze if TLM could be an alternative treatment to (chemo-) radiation and open surgery. **Study Design:** Retrospective statistical chart analysis of the tumor database. **Methods:** A retrospective chart analysis was carried out. Excluded were patients with pretreatment, simultaneous second primaries and N3 neck disease. 172 patients matched the inclusion criteria of which 150 had a pyriform sinus can-

cer. Patients were treated by TLM with -mainly delayed- selective neck dissection (93%) and/or postoperative radiotherapy (53%). **Results:** 15% of the patients belonged to stage I and II (UICC/AJCC 2002) and 85% to stage III and IVa. The median followup was 45 months. 5 year Kaplan-Meier local control was 83% for pT1, 78% for pT2, 75% for pT3 and 58% for pT4a. 5 year Kaplan-Meier recurrence free survival was 79% for stage I and II, 59% for stage III and 49% for stage IVa. Results and discussions are focused on the homogenous group of 150 patients with pyriform sinus cancer, although all 172 patients were statistically analyzed. **Conclusions:** Our data supports the conclusion that TLM is a valid therapeutical alternative to standard treatment under oncological and functional aspects, while morbidity and complication rate tend to be lower.

9:23 The Role of PET Scan in the Management of Head and Neck Cancer

Thomas C. Kelly, MD, Detroit, MI
Ozlem E. Tulunay, MD, Detroit, MI
John J. Jacobs, MD*, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) explain how PET scans function; 2) compare CT, MRI and PET scans for diagnosing head and neck cancer; 3) describe the usefulness of PET scan in diagnosing cancer of unknown primary; and 4) describe the risks and benefits of utilizing PET scan in practice.

Objectives: PET scans are being used more frequently each year. In this study we aimed to investigate the effect of PET scans on our decision making in the management of patients with head and neck cancer. **Study Design:** A retrospective chart review of 120 patients undergoing 152 PET scans with biopsy proven head and neck cancer. **Methods:** A comprehensive review of pathology reports, imaging reports (PET, CT neck/thorax), and patient charts was performed. The rationale for ordering a PET scan, post-scan comments by clinicians, and the sequence of further testing and treatment were documented in order to assess its impact on clinical management. **Results:** The overall sensitivity was 81% and specificity 77.4%. For initial staging (26% of scans performed) sensitivity was 60% and specificity 100%. For restaging disease (65% of scans performed) sensitivity was 88% and specificity was 68%. For surveillance (9% of scans performed) sensitivity was 90% and specificity was 80%. PET scans were most helpful in restaging patients with recurrent disease. They were less helpful in initial staging and surveillance. The vast majority of the time PET imaging did not change management. **Conclusions:** Our experience shows that PET scans may lead to unnecessary interventions as well as being costly. PET did not change management in the vast majority of the cases. We believe that they are most useful in recurrent disease and should be used only if the obtained information will impact patient care.

9:31 Evaluation of Combined Positron Emission/Computed Tomography in Head and Neck Squamous Cell Carcinoma

Justin B. Rufener, MD, Detroit, MI
Mumtaz J. Khan, MD, Karachi, Sindh Pakistan

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the utility of PET/CT in the detection of head and neck squamous cell carcinoma.

Objectives: Positron emission tomography (PET) is helpful in identifying hypermetabolic lesions which may represent malignancy. The anatomic detail provided by PET alone has been a limitation in evaluation of head and neck malignancy. Recent technology which fuses PET and computed tomography (CT) images theoretically allows for more accurate detection of head and neck malignancy. The aim of this study is to review outcomes following PET/CT fusion studies to determine their accuracy. **Study Design:** Retrospective outcomes study. **Methods:** We reviewed 872 consecutive PET/CT scans performed from March 2004 to March 2005. At total of 47 of these were obtained for evaluation of head and neck squamous cell carcinoma and 46 were included in the analysis. Medical records were reviewed and eventual clinical outcomes or histopathologic findings were recorded and compared with the PET/CT impression. A determination was also made as to whether the PET/CT resulted in a major change in clinical management. **Results:** Accuracy, sensitivity and specificity of PET/CTs were determined. Overall accuracy was 72%. Sensitivity was 72% and specificity 76%. PET/CT findings resulted in a major change in clinical management in 25%. **Conclusions:** PET/CT is an important and useful method in the evaluation of head and neck squamous cell carcinoma when used in conjunction with clinical examination.

9:39 Q & A

9:45 - Break in Exhibit Hall/View Posters - Douglas Pavilion

10:00 (approved by COSM)

8:05 - 9:45 CONCURRENT SESSION II: PLASTIC & RECONSTRUCTIVE, PEDIATRIC & GENERAL - Elizabeth A

MODERATORS:

Richard J. Trevino, MD*, San Jose, CA

Ellen M. Friedman, MD*, Houston, TX

8:05 Resolving Feeding Difficulties With Early Airway Intervention in Pierre Robin Sequence

Michael E. Lidsky, BS, Minneapolis, MN

James D. Sidman, MD*, Minneapolis, MN

Timothy A. Lander, MD, Minneapolis, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the importance of early airway intervention in resolving feeding difficulties in children with Pierre Robin Sequence and the degree of intervention required by Pierre Robin children with additional disorders and syndromes.

Objectives: To observe rates of gastrostomy tube placement in Pierre Robin Sequence (PRS) and to determine if relieving airway obstruction solves feeding difficulties. **Study Design:** All PRS referrals to a multidisciplinary cleft team for children at a tertiary pediatric hospital from January 1988 to June 2006 were retrospectively reviewed. **Methods:** Patients were analyzed for occurrence of g-tube placement, neurologic disorders, and airway intervention including tracheotomy and mandibular distraction osteogenesis. **Results:** 67 PRS patients were divided into two categories: 51 (76.1%) isolated Pierre Robin Sequence (iPRS) and 16 (23.9%) with additional disorders and syndromes (sPRS). Patients were then placed into two subgroups: those who received early airway intervention and those who received late or no airway intervention. Of the 51 iPRS children 12 (23.5%) received early airway intervention none of whom required a g-tube. There were 39 (76.5%) children that received late or no airway intervention and 5 (12.8%) of these required g-tube placement. Of the 16 sPRS children 8 (50%) received early airway intervention and 7 (87.5%) of these still required a g-tube. Of the remaining 8 (50%) sPRS patients that received late or no airway intervention 5 (62.5%) required a g-tube. **Conclusions:** In children with iPRS feeding difficulties can be resolved with early airway intervention. Delaying airway intervention may necessitate feeding assistance as all of the iPRS children that required a g-tube fell into this category. The presence of additional disorders and syndromes further complicates treatment as most of the sPRS children required g-tubes regardless of airway intervention.

8:13 Utility of Physician History and Physical Updates for Ambulatory Otolaryngic Surgery

Scott L. Lee, MD, Albany, NY

Jessica Clayton, MSIV, Bayshore, NY

Steven M. Parnes, MD*, Albany, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the effects of hospital policy on the cost of healthcare delivery. Furthermore the era of evidence based medicine and pay for performance may play a critical role in the future of healthcare delivery.

Objectives: Hospital policies often develop with an intention to improve patient care. As an era of institutional and individual pay for performance (P4P) monitoring emerges, hospital policies will likely become more stringent. Whether these guidelines serve to improve patient safety or simply increase the economic burden of the healthcare delivery remains unknown. We evaluate the yield of a policy at our institution's ambulatory surgical facility that all patients have histories and physicals (H&P's) updated by a physician within 7 days of surgery. **Study Design:** Retrospective review. **Methods:** Institutional Review Board approval was obtained. We conducted a retrospective review of the otolaryngology operative log to identify all cancellations from January 2005 to May 2006. **Results:** 2,715 procedures were scheduled and 90 (3.3%) were cancelled. Of the cancellations three resulted from a new preoperative H&P finding. The number of H&P updates needed to identify one patient not fit for elective surgery was 905. **Conclusions:** Healthcare expenses continue to grow at an alarming rate. Updating H&P's for the caseload described adds an estimated \$12,319.88 to \$42,899.24 per year to the cost of surgery by the otolaryngology service at this one institution. While medical practice is under the scrutiny of evidence based medicine (EBM), hospital policy often is not. Policies aimed at improving patient care should be supported by evidence that it does so. Otherwise the time and economic burdens of the healthcare system may continue to escalate uncontrollably.

8:21 Temporal Bone Imaging in GJB2 Deafness

Evan J. Propst, MSc MD, Toronto, ON Canada

Susan E. Blaser, MD FRCPC, Toronto, ON Canada

Tracy L. Stockley, PhD, Toronto, ON Canada

Robert V. Harrison, PhD DSc, Toronto, ON Canada

Karen A. Gordon, MA PhD, Toronto, ON Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize temporal bone radiological findings in GJB2 deafness and determine whether evaluation of the temporal bone is required in individuals with biallelic GJB2 mutations.

Objectives: To describe temporal bone findings on computed tomography (CT) imaging in GJB2 related hearing loss. We asked whether evaluation of the temporal bone is required in individuals with biallelic GJB2 mutations. **Study Design:** Randomized, blinded, controlled, prospective measurement. **Methods:** Blood from 264 pediatric cochlear implant users was analyzed for mutations in the GJB2 gene. Thirty-six aspects of the temporal bone on CT imaging were evaluated in 53 individuals (106 ears) with biallelic disease causing GJB2 mutations. A subset of patients was age matched and compared with normally hearing individuals. Subjects with biallelic GJB2 mutations were tested for mutations in the SLC26A4 gene to rule out Pendred syndrome as a confounding cause of large vestibular aqueduct syndrome. **Results:** Approximately 53% of subjects with biallelic GJB2 mutations had at least one temporal bone anomaly. The most common findings were: 1) dilated endolymphatic fossa (28%); 2) hypoplastic modiolus (25%); 3) large vestibular aqueduct (8%); 4) hypoplastic horizontal semicircular canal (8%); 5) hypoplastic cochlea (4%). Compared to normally hearing individuals, the GJB2 group had hypoplasia of the cochlear nerve canal, lateral semicircular canal vestibule and internal auditory canal (t-tests, $P < .001$), and were 11 times more likely to have a hypoplastic modiolus. Dilated endolymphatic fossae were 1.4 times more common in the GJB2 group, and large vestibular aqueducts were 3 times more common in the GJB2 group, as compared with normally hearing controls. **Conclusions:** Temporal bone anomalies are common in GJB2 related hearing loss and imaging of the temporal bone should be included in routine evaluation of these individuals.

8:29 Cadaveric and Engineering Analysis of the Septal L Strut

Ted Mau, MD PhD, San Francisco, CA
S. T. Mau, PhD, Northridge, CA
David W. Kim, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should gain insight into how the dimensions of the septal L strut determine its mechanical strength and how surgical modifications change the stability of the L strut.

Objectives: To identify patterns of failure of the L strut, to identify elements of the nasal framework that support the L strut, and to investigate the effect of altering L strut design on its stability. **Study Design:** Laboratory study with human cadaveric heads and computational modeling. **Methods:** We applied directional forces to cadaveric L struts and noted patterns of failure as incremental forces were applied. Next, based on engineering principles, we hypothesized that the L strut can be strengthened by augmenting its attachment to the bony septum. This was tested by applying lateral forces to 2 groups of cadaveric L struts with different widths. Finally, computational modeling using the finite element method (FEM) was employed to determine quantitatively the effect of various modifications on the stability of the L strut. **Results:** The L strut was found to respond to frontal force initially by buckling. This buckling was reversible until the force exceeded a certain threshold when the L strut broke at the bony cartilaginous junction. The threshold force varied depending on the length of the overlap with the bony vault. Intact mucoperichondrium provided significant stability. Modeling with FEM showed that the preservation of a triangular piece of cartilage at the dorsal attachment of the L strut reduced the maximal tensile stress by 20%. **Conclusions:** Intrinsic elasticity of the septal cartilage, the mucoperichondrial flap, and overlap with the bony vault all contribute to the stability of the L strut, which is enhanced by preserving a small segment of cartilage at the bony cartilaginous junction of the dorsal strut.

8:37 The Effect of Platelet Rich Plasma and Fibrin Sealant on Facial Nerve Regeneration in a Rat Model

Tarik Y. Farrag, MD, Baltimore, MD
Mohamed A. Lehar, MD, Baltimore, MD
Pauline A. Verhaegen, MS, Netherlands
Kathryn A. Carson, MS, Baltimore, MD
Patrick J. Byrne, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, 1) the participants will understand the potential of a new clinical application for platelet rich plasma in facial nerve; 2) should be able to understand effect of platelet rich plasma and fibrin sealant on facial nerve regeneration, as well as their potential applications; and 3) should be able to understand the comparison and difference between the 2 compounds on facial nerve regeneration.

Objectives: To investigate the effects of platelet rich plasma (PRP) and fibrin sealant on facial nerve regeneration. **Study Design:** Prospective, randomized and controlled animal study. **Methods:** Experiments involved the transection and repair of facial nerve on 49 male adult rats. Seven groups were created dependant upon the method of repair: suture; platelet rich plasma (PRP) (with/without suture); platelet poor plasma (PPP) (with/without suture); and fibrin sealant (FS) (with/without suture) groups. Each method of repair

was applied immediately after the nerve transection. The outcomes measured were: 1) observation of gross recovery of vibrissae movements within 8 week period following nerve transection and repair using a 5 point scale and comparing the left (test) side with the right (control) side; 2) comparisons of facial nerve motor action potentials (MAP) recorded before, and 8 weeks after nerve transection and repair, including both the transected and control untreated nerves; 3) histological evaluation of the axons counts and the area of the axons. **Results:** (I) Vibrissae movements observation: the inclusion of suturing resulted in an overall improved outcomes. This was found for comparisons of the suture group with PRP group; PRP with/without suture groups; and PPP with/without suture groups ($P<0.05$). PRP without suture group had a significantly greater degree of recovery than the PPP without suture group ($P<0.05$), but it did not have better performance than suture ($P>0.05$). The movement recovery of the suture group was significantly better than FS group ($P=0.014$). The recovery of function of the PRP groups was better than that of the FS groups, although this did not reach statistical significance ($P=0.09$). (II) Electrophysiological testing: there was a significantly better performance of the suture group when compared to PRP and PPP without suture groups in the nerve conduction velocity ($p<0.05$). The PRP with suture group had the best results when compared to suture as well as PPP with suture groups in the duration and latency-2 of MAP ($p<0.05$). For the FS groups no results were found demonstrating a biologic effect. PRP with suture group demonstrated the best performance in the latency-2 and the area under the curve of MAP when compared to the suture and FS with suture groups ($p<0.05$). (III) Histomorphometric analysis: PRP with suture demonstrated the greatest increase in axons counts when compared to suture, FS with suture and PPP with suture groups ($p<0.05$). There was no statistically significant difference seen in axon diameter. **Conclusions:** The best results for the return of function in our rat facial nerve axotomy models occurred when the nerve ends were sutured together. At the same time the data demonstrated a measurable neurotrophic effect when PRP was present, with the most favorable results seen with PRP added to suture. There was an improved functional outcome with the use of PRP in comparison to FS or no bioactive agents (PPP). FS showed no benefit over conventional suturing in facial nerve regeneration. Our study provides the potential of a new clinical application for PRP in peripheral nerve regeneration.

8:45 “Not One Single Case of Throat Irritation” The Tobacco Industry’s Effort to Deceive the Public About the Dangers of Smoking

Hussein A. Samji, MD, Stanford, CA

Robert K. Jackler, MD, Stanford, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the deceptive techniques employed by the tobacco companies in marketing their deadly product.

Objectives: To study the methods used by tobacco companies to deceive the public about the health hazards of smoking with an emphasis upon misuse of the image of the “throat specialist” in cigarette advertisements. **Study Design:** Historical analysis. **Methods:** Evaluation of several hundred magazine ads (1920s-1950s) with overtly deceptive health claims and the relevant literature on the subject. **Results:** Early in the last century, when questions about the health effects of smoking became a topic of widespread discussion, tobacco companies undertook a multifaceted campaign to allay the public’s fears. As terms like “smoker’s cough” and “coffin nails” (referring to cigarettes) began to appear in the popular vernacular, tobacco marketers recognized the need to counter this threat to their livelihood. One strategy was to use endorsements by healthy and vigorous appearing singers, radio stars, and actors. Another was to raise fears over weight gain: “Reach for a Lucky instead of a sweet.” Among the more reprehensible tactics was the utilization of the image of the noble and caring physician to sell cigarettes: doctors were depicted both as satisfied and enthusiastic partakers of the smoking habit (e.g., “More Doctors Smoke Camels”). Images of medical men (and a few token women) appeared under warm reassurances of the safety of smoking. Frequently images appear of a head mirrored “throat doctor”, smiling benignly while indicating that the company’s product would do no harm. Indeed, many cigarette ads, especially for menthol brands, suggested a therapeutic soothing benefit from smoking. **Conclusions:** Our intention is to tell—principally through advertising images—the story of how, between the late 1920s and the early 1950s, tobacco companies used deceptive and often patently false claims in an effort to reassure the public of the safety of their products.

8:53 Q & A

8:59 Sleep Disordered Breathing and Obstructive Sleep Apnea in the Cleft Population

Harlan R. Muntz, MD, Salt Lake City, UT

Matthew A. Wilson, BS, Salt Lake City, UT (Presenter)

J. Fredrik Grimmer, MD, Salt Lake City, UT

Albert H. Park, MD, Salt Lake City, UT

Marshall E. Smith, MD, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) understand the high incidence of sleep disordered breathing in the cleft population; 2) understand the effect of surgical intervention on sleep disordered breathing in the cleft population; and 3) understand the need for postoperative evaluation of sleep in this population.

Objectives: Children with cleft deformities have the tendency for multilevel airway obstruction. The incidence of sleep disordered breathing (SDB) in this population has not been well studied. This study attempts to describe the high incidence and the results of intervention. **Study Design:** A three year retrospective chart review from a tertiary cleft and craniofacial team. **Methods:** The symptoms of sleep disordered breathing and polysomnographic data was reviewed and analyzed using descriptive statistics and multivariate analysis. **Results:** Of the 516 children seen during the period, 121 (23.4%) had symptoms suggestive SDB. 18 of these had a tonsillectomy with or without partial adenoidectomy without polysomnogram (PSG). 69 (57%) had a PSG and 28 a followup PSG. Syndromic children had significantly more symptoms of SDB and were more likely to undergo PSG ($p=0.043$). Of those children who underwent a PSG only 6 had normal obstructive apnea—hypopnea index (OAH) with an average respiratory disturbance index (RDI) of 15.5+/-17.5 and OAH of 12.05+/-15.57. Post-intervention PSG showed significant improvement in RDI ($p=0.048$) and OAH ($p=0.012$) using a single tailed Wilcoxon analysis. Unfortunately many of the children still had sleep disordered breathing and 12 required CPAP. There were also a high percentage of children with Periodic Leg Motion syndrome (24.7%). **Conclusions:** There is a high incidence of sleep disordered breathing and definable OSA in the cleft population. Though there is a significant improvement after intervention, many of the children need further therapy. Post-intervention PSG should be strongly considered.

9:07 Embryonic Germ Derived Cells May Be Characterized as a Mesenchymal Progenitor Cell

Alexander T. Hillel, MD, Baltimore, MD
Shyni S. Varghese, PhD, Baltimore, MD
Jennifer S. Petsche, BA, Baltimore, MD
Jennifer H. Elisseff, PhD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to understand and discuss applications of stem cells for tissue engineering in the head and neck.

Objectives: There is a large clinical need for bone, cartilage, and fat tissue for plastic and reconstructive procedures in the head and neck. Current therapy has high morbidity and often a poor cosmetic outcome creating a need for alternative cell sources. Embryonic germ (EG) cells are derived from the primordial gonadal ridges of human fetuses. Differentiated EG cells form embryoid bodies, which yield embryoid body derived (EGD) cells—partially differentiated yet highly proliferative cells that do not form teratomas when implanted. This study's objective is to determine if EGD cells are capable of osteogenic, chondrogenic, and adipogenic differentiation in vivo, and therefore, may be considered a mesenchymal progenitor cell. **Study Design:** In vivo animal study to determine EGD cells capability for mesenchymal tissue generation. **Methods:** EGD cells were cultured in vitro in adipogenic, osteogenic, and chondrogenic differentiating media for twenty-one days. For in vivo studies cells were pre-differentiated, encapsulated in hydrogels, and implanted subcutaneously in athymic mice. Histologic and gene expression analysis was performed. **Results:** Adipogenic differentiation was verified by positive Oil Red O staining and PPAR³, \pm P2, and LPL gene expression. Type II collagen and aggrecan gene upregulation and Safranin-O staining confirmed chondrogenesis. Osteogenesis was confirmed through von Kossa staining and bone sialoprotein, type I collagen, and alkaline phosphatase gene expression. **Conclusions:** This represents the first study to demonstrate EGD cells are capable of mesenchymal tissue generation in vitro and in vivo. EGD cells represent a highly proliferative, non-tumorigenic stem cell for mesenchymal tissue engineering with therapeutic potential for reconstruction and augmentation in the head and neck.

9:15 Environmental Allergy Influences Nasal Culture Bacteriology With Implications for Antibiotic Therapy Selection

Akshay M. Mehta, MD, Rockville, MD
Michael S. Morris, MD, Rockville, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the correlation between allergy status and bacterial infection and identify situations in which allergy testing may help elucidate the incidence of chronic otolaryngology disease.

Objectives: Upper respiratory tract infection and allergy remain the most common and challenging aspects of outpatient medicine and contribute to difficulty in deciding upon treatment algorithms. The influence of allergy on pathogen selectivity in nasal cultures was studied in an effort to further refine treatment selection. **Study Design:** Over a 1 year period 228 patients presenting for otolaryngology/allergy evaluation in an outpatient setting were subjected to both allergy testing and aerobic nasal culturing. Presenting complaints included sinusitis, otitis media, pharyngitis, and allergy symptoms involving the head and neck. **Methods:** Results were obtained for pathogen type and antibiotic sensitivity. Allergy testing employed the ImmunoCAP IgE quantification for specific airborne and food allergies. **Results:** 80/228 (35.08%) patient cultures were positive with *S. aureus* (33) and *S. pneumoniae* (14) being the most prominent. 50/80 (62.50%) of the patients with positive cultures were also positive for allergies. 23/50 (46%) of patients testing positive for both allergy and infection tested positively for *S. aureus*. 20/36 (55.55%) female patients with a positive culture grew *S. aureus* coagulase positive. Upon further adjusting to include allergy status female patients with positive infection and positive allergy status had an even higher incidence of *S. aureus* infection (16/25; 64.0%). 55/148 (37.16%) patients testing negatively for infection subsequently tested positively for allergy. **Conclusions:** Allergy and bacterial infection are significantly correlated; patients with allergies had higher

rates of infection than those without allergies. Women with an allergenic disease predisposition had the highest percentage of infection with *S. aureus* as the most commonly cultured pathogen.

9:23 Tracheal Stenosis Following Placement of Percutaneous Dilational Tracheotomy

Thomas E. Christenson, MD, Philadelphia, PA
Greg J. M. Artz, MD, Farmington Hills, MI
Joseph R. Spiegel, MD, Philadelphia, PA
Maurits S. Boon, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand that tracheal stenosis is a potential long-term complication of percutaneous dilational tracheotomy as well as understand the mechanisms that lead to tracheal stenosis in these cases.

Objectives: In this paper we present a series of patients referred to our practice for management of tracheal stenosis following placement of a percutaneous dilational tracheotomy. We will discuss findings and management in these cases. **Study Design:** Case series. **Methods:** All patients were evaluated with CT scan and operative endoscopy. Inpatient and outpatient records were reviewed retrospectively. **Results:** Eight patients were referred to our practice for management of tracheal stenosis following percutaneous dilational tracheotomy. CT findings of anterior tracheal ring or cricoid compression and destruction were noted in each case. Endoscopy revealed stenosis secondary to anterior tracheal wall or anterior cricoid collapse in all cases. In these cases revision operations were necessary to correct the damaged tracheal wall due to narrowing of the tracheal lumen. **Conclusions:** It has been demonstrated in the literature that with 20 years of experience, the percutaneous dilational tracheotomy procedure is more affordable, faster to perform and a generally safe procedure when done under appropriate conditions. Most case series of percutaneous dilational tracheotomy reveal an equal or lower risk of short-term complications than open tracheotomy. This series demonstrates that tracheal stenosis is a potential long-term complication. Longitudinal long-term followup of patients undergoing percutaneous dilational tracheotomy is indicated.

9:31 Reducing Post-Tracheotomy Morbidity and Mortality in the Hospital—Implementation of the Core Competencies in Resident Education

Samuel T. Ostrower, MD, Bronx, NY
Ronda E. Alexander, MD, Bronx, NY
Marvin P. Fried, MD*, Bronx, NY
Sanjay R. Parikh, MD, Bronx, NY
Bradley A. Schiff, MD, Bronx, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the ACGME core competencies of resident education and describe the systematic implementation of the competencies toward unique clinical problems.

Objectives: To reduce morbidity and mortality of tracheotomy patients in the hospital inpatient setting. **Study Design:** Implementation of the ACGME required core competencies in resident education. **Methods:** Review of monthly morbidity and mortality conference records and retrospective chart reviews were performed to identify commonalities in tracheotomy related mortalities. A multidisciplinary committee composed of surgeons, intensivists and nurses was formed to systematically address the problem with the close involvement of otorhinolaryngology residents at each step in the process. **Results:** During a one year period from July 2004 - July 2005 eight post-tracheotomy mortalities were identified at a large university hospital, an increase of more than 100% over each of the three previous years. Several problems were brought to light after review of the individual cases. The multidisciplinary committee established a hospital wide uniform tracheotomy tube policy and required the postoperative placement of tracheotomy patients in one of three designated units where experienced nurses and house staff were always available. The department of otorhinolaryngology-head and neck surgery developed and implemented a hospital wide educational initiative aimed at increasing knowledge of tracheotomy related issues among respiratory therapists, registered nurses and medical house staff. **Conclusions:** Successful implementation of the six ACGME required core competencies, especially patient care, practice based learning and system based practice, was achieved through the systematic approach to the problem of post-tracheotomy mortality in the hospital setting.

9:39 Q & A

9:45 - Break in Exhibit Hall/View Posters - Douglas Pavilion

10:00

10:00 - 11:00 CONCURRENT PANELS

PANEL #1: NUANCES IN RHINOPLASTY - Elizabeth A

Moderator: Stephen S. Park, MD*, Charlottesville, VA
Panelists: Roger L. Crumley, MD MBA*, Irvine, CA
Patrick J. Byrne, MD FACS, Baltimore, MD
Jonathan M. Sykes, MD, Sacramento, CA

PANEL #2: OPTIONS FOR MANAGEMENT OF LARYNGEAL CANCER - Elizabeth B-C

Moderator: Ernest A. Weymuller Jr., MD*, Seattle, WA
Panelists: Gregory S. Weinstein, MD*, Philadelphia, PA
Gregory T. Wolf, MD, Ann Arbor, MI
Parvesh Kumar, MD, Los Angeles, CA

11:00 - 12:00

PANEL: MINIMALLY INVASIVE SURGERY FOR RHINOSINUSITIS: HOW MUCH IS ENOUGH? -

Elizabeth B-C

Moderator: Peter H. Hwang, MD*, Stanford, CA
Panelists: Peter J. Catalano, MD, Burlington, MA - Minimally Invasive Sinus Technique (MIST)
Brent A. Senior, MD, Chapel Hill, NC - Traditional FESS
Winston C. Vaughan, MD, Palo Alto, CA - Balloon Catheter Dilation

12:00 Lunch in Exhibit Hall/View Posters - Douglas Pavilion

5:30 - 7:00 MEET THE AUTHORS POSTER RECEPTION (WITH ASPO & AHNS) - Douglas Pavilion

**7:00 - 8:30 GRAPE EXPECTATIONS
A CALIFORNIA WINE EXPERIENCE - Americas Cup
All COSM attendees are invited to attend.
Business casual dress.
Tickets may be purchased for \$65 at
www.cosm.md or onsite**

SUNDAY, APRIL 29, 2007

*7:00 - Business Meeting (Members Only) - Elizabeth A-B-C
7:50*

*8:00 Announcements
Introduction of President-Elect
Harold C. Pillsbury, MD*, Chapel Hill, NC*

8:05 - 9:45 OTOTOLOGY SESSION - Elizabeth A-B-C

MODERATORS:

C. Phillip Dasptit, MD*, Phoenix, AZ
John W. House, MD*, Los Angeles, CA

8:05 The Effect of Transtympanic Gentamicin Treatment on Vestibular Evoked Myogenic Potentials (VEMPs) in Patients With Meniere's Disease
David G. Gossman, MD, Lexington, KY
Raleigh O. Jones, MD, Lexington, KY
Jennifer B. Shinn, PhD, Lexington, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the anatomic basis of the VEMP reflex and its use in evaluating vestibular pathology. The participants will demonstrate knowledge of transtympanic gentamicin treatments and their effect on the VEMP in Meniere's disease patients. Additionally participants will be able to compare how the VEMP changes relate to symptomatic control of the vertiginous symptoms of Meniere's disease.

Objectives: Chemical labyrinthectomy with gentamicin perfusion of the middle ear is a well excepted treatment for the vertiginous symptoms of Meniere's disease. The objective of this study was to evaluate the effect of this gentamicin therapy on the vestibular evoked myogenic potential (VEMP). **Study Design:** The present investigation was a retrospective chart review. **Methods:** Seven patients diagnosed with unilateral Meniere's disease were selected and staged according to AAO-HNS protocol. The criteria for inclusion were 1) unilateral Meniere's disease; 2) a present VEMP on initial testing; 3) failure of medical therapy to control vertigo; 4) no conductive hearing loss; and 5) otherwise untreated Meniere's disease. Transtympanic injections of gentamicin were performed at weekly intervals. The perfusions were repeated until the patients achieved subjective control, or significant improvement, in their vertigo. Audiograms and VEMPs were recorded one week after each treatment. **Results:** The VEMP was ultimately ablated by the gentamicin treatments in all seven patients. This preceded vertigo control in all but one case. The average number of treatments to eliminate the VEMP response was 1.4. The average number of gentamicin treatments needed to subjectively control vertigo was 3.1. **Conclusions:** Transtympanic middle ear perfusion of gentamicin results in ablation of the vestibular evoked myogenic potential. This finding precedes symptomatic control of vertigo in most Meniere's disease patients undergoing chemical labyrinthectomy with gentamicin.

8:13 Anterior Transcanal Tympanoplasty: A Minimally Invasive Surgical Technique to Repair Anterior Perforations

Michael D. Seidman, MD*, West Bloomfield, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to understand and perform the technique of repairing anterior tympanic membrane perforations through an anterior transcanal approach.

Objectives: To report a novel minimally invasive surgical technique to repair anterior tympanic membrane perforations. **Study Design:** A report of 45 patients that underwent an anterior transcanal approach to repair anterior tympanic membrane (TM) perforations. **Methods:** From 1995 through 2005, 689 patients with chronic suppurative otitis media were evaluated and underwent surgical intervention at this tertiary medical center. 45 patients with isolated anterior TM perforations underwent a tympanoplasty utilizing a novel transcanal anterior approach. The approach is similar in principal to a standard transcanal approach for a small posterior perforation, but in the patients presented herein, an anterior tympanomeatal flap was raised rather than a posterior flap. The operation is essentially a mirror image of what is described for formal transcanal tympanoplasty. **Results:** Pre- and postoperative audiometric studies were compared. Preoperative air bone gaps ranged from 12 dB to 50 dB and averaged 31 dB. The perforations ranged in size from 20-50% of the TM. Postoperative air bone gaps ranged from 5 to 30 dB and averaged 15 dB. 41 of 45 patients (91%) had closure of their TM perforations. 1-10 year follow up are provided. **Conclusions:** The procedure described is a minimally invasive surgery to repair anterior TM perforations. The procedure is relatively simple and obviates the need for a large postauricular incision. This should be considered as an alternative for a standard postauricular tympanoplasty. It allows the surgeon to repair anterior perforations much the same way as small posterior perforations with less recovery time. A video will be shown.

8:21 Intraoperative Laser Doppler Velocimeter Measurement of Intact Ossicular Chain Motion Compared to Piezoelectric Ossicular Sensing and Driving During Implantation of the Esteem

Eric M. Kraus, MD MS, Greensboro, NC
Jack A. Shohet, MD, Newport Beach, CA
Peter J. Catalano, MD, Burlington, MA
Douglas A. Chen, MD, Pittsburgh, PA
Moises A. Arriaga, MD*, Pittsburgh, PA
Samuel C. Levine, MD*, Minneapolis, MN

Educational Objective: After this presentation, participants should understand the use of the laser doppler vibrometer (LDV) to measure intact ossicular chain motion before implantation and measurements of ossicular motion after implantation of the investigational Esteem™ Totally Implantable Middle Ear Device (TIMED).

Objectives: To measure the motion of the intact ossicular chain using the intraoperative laser doppler vibrometer (LDV) and to compare the native state with "sensed" motion of the incus and "driving" motion of the stapes after implantation of the Esteem™ system. **Study Design:** Multicenter, nonrandomized, single subject, prospective, controlled FDA phase II investigational protocol #0203. **Methods:** The study group consisted of 70 adult participants with symmetric, moderately severe sensorineural hearing loss and a normal middle ear. A sound source was placed in the ear canal, an extended facial recess tympanomastoidectomy was performed, and an

Esteem system consisting of a sound processor, sensor transducer, and driver transducer was implanted. Intraoperative measurements of incus and stapes displacement prior to disarticulation were made with a laser doppler vibrometer. After the Esteem™ system was implanted, stapes displacement was measured. **Results:** Comparing intraoperative LDV measurements of intact ossicular chain displacements to Esteem™ system displacement helped to validate Esteem™ system performance prior to closing. Intraoperative LDV data correlated with comparable ossicular chain and Esteem™ system data previously obtained in fresh frozen temporal bones. **Conclusions:** Intraoperative laser doppler vibrometer measurements of the intact ossicular chain establish a baseline for individual patients. Using LDV measurements during surgery helps to guide proper placement of the Esteem™ ossicular transducers and aid in confirming the integrity of the Esteem™ system prior to closing.

8:29 Evolution in the Assessment and Management of Trigeminal Schwannoma

Myles L. Pensak, MD*, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the contemporary assessment and management algorithm employed in the evaluation and care of this select patient population.

Objectives: 1) To describe the contemporary neuroradiographic studies employed in the assessment of trigeminal neuroma; 2) review the complex skull base osteology involved with these lesions; and 3) describe a contemporary management algorithm. **Study Design:** Retrospective review of 23 cases. **Methods:** Chart review. **Results:** Between 1984-2006 23 patients with trigeminal schwannoma were evaluated. There were 10 males and 13 females ranging in age from 14 to 77. 15 patients underwent combined transpetrosal extirpation, 5 patients underwent stereotactic radiation, and 3 were followed without intervention. Of the 15 undergoing surgery, total tumor removal was done in 9 cases and cytoreductive surgery performed in 6 patients; of these, 4 received postoperative radiation. 1 patient undergoing primary radiation therapy required subsequent surgery. There were no deaths in this series. Cranial neuropathies were present in 14 patients pretreatment and observed in 17 patients post-treatment. Major complications included: meningitis (1), CSF leakage (2), major venous occlusion (1), and temporal lobe infarct (1). **Conclusions:** Trigeminal neuromas are uncommon lesions of the skull base. They may present in the middle fossa, posterior fossa or both. Moreover caudal extension results in their presentation in the infratemporal fossa. Contemporary diagnostic imaging, coupled with selective utilization of both surgery and radiation will limit morbidity and allow for the safe and prudent management of this uncommon lesion.

8:37 Nonverbal Cognitive Abilities and Auditory Performances in Children Fitted With ABI: Preliminary Report

Liliana A. Colletti, PhD, Verona, Italy
Zoccante G. Leonardo, MD, Verona, Italy

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the progress observed in deaf children fitted with auditory brainstem implant that cannot benefit from a cochlear implant.

Objectives: The favorable results obtained in adults with nontumoral (NT) cochlear or cochlear nerve abnormalities motivated us to extend ABI indications to children with profound hearing loss not candidate to a cochlear implant (CI). This study illustrates the trend of children fitted with ABI in terms of their auditory perceptual development and their nonverbal cognitive abilities. **Study Design:** Retrospective case review. **Methods:** In our department from 2000 to 2006, 24 children aged 14 months to 16 years received an ABI for different tumor and NT diseases. Five of these children had been previously fitted elsewhere with a CI with no auditory results. The retrosigmoid approach was used in all children. Intraoperative EABRs and postoperative EABRs and EMLRs were performed. **Results:** No postoperative complications were observed. Their CAP scores ranged 2-7 (average: 4); MAIS scored 2-97.5% (average: 38%); MUSS scores ranged 5-100% (average: 49%) and LIP scored 5-100% (average: 45%). Scores on two of the four subtests of the LEITER-R test used in the seven children considered for cognitive evaluation in this study increased significantly during the first year of ABI use. **Conclusions:** This preliminary study shows that there is a significant improvement in some cognitive parameters in addition to the development of hearing ability. This is due to several factors, among which there is certainly, as demonstrated in the literature on CI, the activation of the auditory sensory canal which was previously absent.

8:45 Glomus Tumors and the Elderly: Conservative Management and Long-Term Control in Patients With Advanced Age

Maura K. Cosetti, MD, New York, NY
Belachew Tessema, MD, New York, NY
Christopher Linstrom, MD*, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) identify and discuss controversies in the management of glomus tumors in patients of advanced age; and 2) assess and evaluate a conservative treatment strategy involving limited surgical resection and vigilant monitoring on the outcome measures of tumor control, peri-treatment morbidity, symptom resolution and hearing preservation.

Objectives: To describe a conservative treatment strategy involving limited surgical resection, vigilant long-term monitoring and delayed radiotherapy of glomus tumors in an elderly population. **Study Design:** Retrospective case review. **Methods:** All patients over the age of 60 with glomus tympanicum or jugulare were included. Primary outcome assessment included length of hospitalization, peri-operative morbidity, symptom resolution, hearing preservation and long-term tumor control. **Results:** Eight female patients with mean age of 75.8 years (range 63-84 years) with followup from 24 months to 10 years (mean 5.2 years) were identified. Six (75%) of patients presented with pulsatile tinnitus as initial complaint. Five patients underwent outpatient transcanal surgical excision of the middle ear component of the paraganglioma. Tumor extending to the jugular foramen was purposely not resected. Three patients had relative or absolute contraindications to surgical resection and were treated with observation or primary radiation therapy. Post-treatment audiometric evaluation confirmed stable or improved hearing. Pulsatile tinnitus resolved in all patients. No patient experienced cranial nerve deficits, extended hospitalization or blood transfusions. All patients were followed biannual then annual radiologic imaging. One patient with tumor left behind in the jugular foramen had radiologically identified tumor growth and return of pulsatile tinnitus six years later and was treated successfully with radiotherapy. **Conclusions:** A prolonged natural history and the morbidity associated with surgical intervention have led to controversies in the treatment of glomus tumors in the elderly. Our experience supports recent limited reports advocating conservative surgical excision, vigilant long-term monitoring and planned radiotherapy in this population.

8:53 Q & A

8:59 Superior Semicircular Canal Dehiscence: A Report of Two Cases Diagnosed After Failed Stapedectomy for Conductive Hearing Loss

Chris M. Bergeron, MD, Stanford, CA
Sumit K. Agrawal, MD, Stanford, CA
Nikolas H. Blevins, MD, Stanford, CA

Educational Objective: Superior semicircular canal dehiscence (SSCD) is a recently described condition that may present with conductive hearing loss suggestive of otosclerosis. If the otologic surgeon is unaware of this possibility, a stapedectomy may be attempted. To avoid this potential misdiagnosis the clinician needs to accurately differentiate between these two distinct conditions.

Objectives: To report two cases of SSCD diagnosed only after failed surgical treatment for conductive hearing loss attributed to otosclerosis. We will review the diagnostic criteria for each disease process. **Study Design:** Retrospective case review and literature review. Setting: tertiary care center. **Methods:** Patients: A 58 year old man and 36 year old woman presenting with unilateral conductive hearing loss and vestibular dysfunction. Both carried a diagnosis of otosclerosis. The male patient had undergone primary and revision stapedectomy, and the female patient had undergone stapedotomy, both at an outside facility. Both postsurgical air bone gaps remained unchanged. Upon referral both patients underwent high resolution computed tomography (HRCT). **Results:** The diagnosis of SSCD was confirmed by HRCT in both patients. **Conclusions:** Superior semicircular canal dehiscence is a recently described and relatively uncommon entity that may mimic more common conditions such as otosclerosis. It must be included in the differential diagnosis for patients presenting with conductive hearing loss and a normal otoscopic examination. The presence of atypical vestibular symptoms, uncharacteristic auditory sensations, or acoustic reflexes despite a conductive hearing loss should warn the clinician of the potential for SSCD. In such situations HRCT may confirm the diagnosis and prevent needless middle ear exploration or stapedectomy.

9:07 Revision Bone Anchored Hearing Aid Surgery: Our Experience

Neena Agarwal, MD, Maywood, IL
Sam J. M. Marzo, MD, Maywood, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the indications and management of revision BAHA surgery.

Objectives: Bone anchored hearing aid (BAHA) surgery has a significant risk of complication necessitating a revision procedure. To our knowledge no published reports exist describing revision BAHA surgery. We reviewed our series of patients requiring reimplantation to determine the cause of failure, optimal surgical management, and preventative methods. **Study Design:** A retrospective review of the database of BAHA patients performed at our institution. **Methods:** Between September 2003 and September 2006, 92 BAHA implantations were performed on 80 patients for unilateral conductive, mixed, or sensorineural hearing losses of which 10 underwent revision surgery. We studied these patients' perioperative care to assess indications for revision, surgical techniques, and postoperative management. **Results:** Our revision group had a mean age of 44 years (range 8-69 years) with 8 males and 2 females. These 10 patients underwent 11 revision procedures with one patient requiring 2 reimplantations. Four patients had loss of their skin grafts likely due to increased scalp soft tissue thickness. Our intraoperative measurements of scalp thickness found no correlation with viability of the skin graft postoperatively. The remaining six patients had skin overgrowth which we successfully revised with longer abutments and strict wound care. Two of our patients with a history of acoustic neuromas had a modification to their BAHA reimplantation. As an alternative to harvesting the skin graft with the dermatome, we elected to raise skin flaps using their previous incisions. We now use this

as our initial technique in all acoustic neuroma BAHA patients. **Conclusions:** Revision BAHA surgery requires adaptation to the cause of failure by modifying surgical techniques and enforcing strict wound care to optimize success of implantation.

9:15 Squamous Cell Carcinoma of the Temporal Bone

Amy Anne Donatelli Lassig, MD, Ann Arbor, MI

H. Alexander Arts, MD, Ann Arbor, MI

Hussam K. El-Kashlan, MD, Ann Arbor, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate understanding of the disease process of squamous cell carcinoma of the temporal bone as well as appropriate treatment and expected outcomes.

Objectives: To provide an up to date review of treatment and outcomes of patients with squamous cell carcinoma of the temporal bone.

Study Design: Retrospective case review of all patients treated within a tertiary care academic medical center for squamous cell carcinoma of the temporal bone between 1995 and 2006. **Methods:** 30 patients were evaluated with squamous cell carcinoma of the temporal bone originating from the external auditory canal as well as adjacent sites. Factors evaluated were demographics of age and gender, presenting symptoms, facial nerve status, followup time, previous treatment, workup, stage, surgical intervention, adjuvant therapy, histopathological findings, recurrence, and survival. Lateral temporal bone resection was the primary and most aggressive procedure performed. Main outcome measure was disease free survival. **Results:** The overall disease free survival for this series when considering both external auditory canal and adjacent site squamous cell carcinomas was 67%. When evaluated by tumor stage disease free survival was as follows: T1 tumors = 100%, T2 tumors = 80%, T3 tumors = 67% and T4 tumors = 56%. Aggressive tumors of this series originating at periauricular sites adjacent to the external auditory canal behaved in a similar manner to these tumors. **Conclusions:** Lateral temporal bone resection provides comparable disease free survival rates to other studies employing more radical surgical therapy in the form of subtotal and total temporal bone resection. Such resection is appropriate treatment for many squamous cell carcinomas of the external auditory canal and surrounding adjacent sites, as these tumors are similar in disease progression and prognosis.

9:23 Current Bacteriology of the Suppurative Otitis: A Review of Culture Results

Ryan P. Raju, MD, Oklahoma City, OK

Nathan W. Hales, MD, Edmond, OK

Amber M. Kile, BS, Amarillo, TX

Wayne E. Berryhill, MD, Oklahoma City, OK

James E. Saunders, MD*, Oklahoma City, OK

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the current bacteriology patterns and be aware of the existence of community acquired resistant bacteria in suppurative otitis. They should also have an increased understanding of the role of cultures in the management of the draining ear.

Objectives: Despite the recognition of increasing antibiotic resistance by most otolaryngologists few studies have investigated the role of resistant bacteria in the outpatient management of the draining ear. In addition most otolaryngologists do not routinely retrieve cultures from discharging ears. In this study we review the ear culture results from an outpatient otology practice to better define the changes in bacteriology in recent years and the role of cultures in the management of these patients. **Study Design:** Retrospective review. **Methods:** Culture results and outpatient records from 157 patients collected over a three year period were reviewed. Information regarding the bacteria cultured, antibiotic resistance, patient age, clinical diagnosis and treatment efficacy were analyzed. **Results:** The overall incidence of community acquired methicillin resistant staphylococcus aureus (MRSA) infected patients increased in the last three years from 6% to 11%. Likewise the number of resistant infections from *Corynebacterium* sp. increased from 8% to 12% during this period. These trends however were not statistically significant. Other antibiotic resistant bacteria were noted in this study although much less frequently. In our practice the number of pediatric patients with MRSA infections increased from none to 50% of the total MRSA infections during this period, although the overall number of patients is small. Fungal cultures were often positive in the absence of obvious clinical signs of otomycosis. The clinical findings, patient age, and culture source were analyzed in an attempt to identify a high risk pattern. No definitive high risk profile could be identified. Resistant bacteria including MRSA were noted in cases of granular myringitis, external otitis, chronic suppurative otitis media, and post-tympanostomy otorrhea. We will also discuss cost effective strategies for the use of cultures in this setting and the current treatment options for MRSA infections of the ear. **Conclusions:** Community acquired ear infections may be infected by antibiotic resistant bacteria in a substantial number of pediatric and adult patients. In our opinion outpatient cultures play an important role in the management of suppurative otitis that is refractory to initial treatment.

9:31 Reconstruction of Congenital Microtia-Atresia: Outcomes With the Medpor/BAHA Approach

Darius Kohan, MD, New York, NY

Luc G. Morris, MD, New York, NY (Presenter)

Thomas Romo III, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to compare various approaches to treatment of patients with microtia-atresia, and explain the relative advantages of auricular reconstruction using Medpor in combination with hearing rehabilitation with BAHA implantation.

Objectives: Ideal surgery for congenital microtia-atresia would offer excellent cosmetic and hearing rehabilitation with minimal morbidity. Classical approaches require multiple procedures including rib cartilage harvest and aural atresia repair. Our facial plastic and otologic team approach incorporates a high density porous polyethylene (Medpor) auricular framework followed by one stage bone anchored hearing aid (BAHA) implantation. We evaluated the efficacy, safety and morbidity of this two stage dual system approach.

Study Design: Retrospective review of patients undergoing combined Medpor/BAHA reconstruction between 2003-2006. **Methods:** The first stage involves placement of the Medpor framework beneath a temporoparietal fascia flap followed by a second stage procedure for lobule transposition and BAHA implantation. **Results:** 21 patients (23 ears) were evaluated. Aesthetic quality of the implants was excellent with a high degree of framework detail visible, and a postauricular crease created in all patients. All patients were satisfied with the cosmetic result. There were no major Medpor complications such as infection, extrusion, loss of implant, or flap necrosis. BAHA significantly improved hearing in all patients with a complication rate of 12.5% (1 failure of osseointegration, 2 cases of cellulitis and skin overgrowth). **Conclusions:** The Medpor/BAHA dual system approach to microtia-atresia has produced excellent cosmetic results and hearing outcomes which compare favorably to traditional microtia-atresia repair. This is a two stage aesthetic and functional protocol which carries an acceptably low rate of complications.

9:39 *Q & A*

9:45 - *Break in Exhibit Hall/View Posters - Douglas Pavilion*
10:15

10:15 - 12:00 LARYNGOLOGY/RHINOLOGY SESSION - Elizabeth A-B-C

MODERATORS:

Steven D. Schaefer, MD*, New York, NY
Andrew Blitzer, MD DDS*, New York, NY

10:15 Adult Intralesional Cidofovir Therapy for Laryngeal Papilloma: A 10 Year Perspective

Neil Tanna, MD, Washington, DC
Douglas Sidell, BS, Washington, DC
Arjun S. Joshi, MD, Washington, DC
Steven A. Bielałowicz, MD*, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the role of intralesional cidofovir therapy in laryngeal papilloma patients including those that experience a disease relapse.

Objectives: To assess the long-term efficacy of intralesional cidofovir therapy in a previously reported cohort of adult subjects with laryngeal papilloma. **Study Design:** Retrospective review at a tertiary care medical center. **Methods:** We previously reported on the favorable clinical response to intralesional cidofovir therapy in 13 adult subjects. The subjects were enrolled in an open trial prospective study (1997-2001) and completed the injection only treatment protocol, and all subjects achieved a disease remission after an average of 6 injections. In the current study we review the clinical course of these subjects during an extended observational period (2001-2006). Additional interventions, disease severity, and adverse outcomes are reported. Patients with documented relapse of disease underwent additional intralesional cidofovir injections. Unlike the original treatment protocol adjunctive procedures, including surgical debulking and pulse dye laser ablation, were utilized in the relapse group. **Results:** Following the original cidofovir protocol 6 patients (46%) received no further interventions. The remaining 7 patients (54%) required further treatment for disease relapse with a mean duration of remission before relapse of 1.05 years. Mean procedures per year following relapse for these patients was 1.98. Of the 7 relapse patients 2 continued to have stable disease with regular injections, 2 were lost to followup during relapse treatment, and 3 remitted again. For this latter cohort the mean procedures per year necessary to achieve a second remission was 0.39. **Conclusions:** Intralesional cidofovir injections have been shown to be effective therapy for adult laryngeal papilloma and should be considered in those patients that experience a disease relapse.

10:23 Donor Bone Marrow in Laryngeal Transplantation: Results of a Rat Study

Samir S. Khariwala, MD, Cleveland, OH
Olivia 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 discuss issues associated with laryngeal transplantation, the importance of minimizing chronic immunosuppression and effects of adding donor bone marrow to transplant recipients.

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.

10:31 Examining the Surface Topography of Vocal Fold Collagen Using Atomic Force Microscopy

Mahalakshmi Sivasankar, PhD CCC-SLP, West Lafayette, IN
Sarah M. Fairfield, BE, West Lafayette, IN
Albena Ivansevich, PhD, West Lafayette, IN

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the utility of atomic force microscopy in examining the surface topography of collagen in the vocal folds, and also recognize the importance of nanoscale investigation of vocal fold collagen in designing biomaterials that restore vocal fold geometry after aging and disease.

Objectives: Collagen plays an important role in maintaining the geometry of vocal folds and facilitating voicing. Traditional investigations of vocal fold collagen using light microscopy with staining do not provide quantitative information on the surface topography, spatial organization, or adhesion properties of collagen. The primary objective of this study was to use atomic force microscopy (AFM) to examine the surface topography of vocal fold collagen. This information is crucial in designing biomaterials for restoring vocal fold geometry. **Study Design:** Experimental. **Methods:** Fresh porcine larynges (N = 5) were obtained from the local abattoir. The deep layer of the lamina propria was bluntly dissected with phonosurgical instruments from the overlying cover and the underlying muscle. The sample was cut into 10mm² squares and placed on a polycarbonate membrane attached to a 12 mm stainless steel AFM disc. The samples were air dried and AFM measurements were performed in contact mode. **Results:** Three dimensional surface profiles of isolated vocal fold collagen were obtained at magnifications ranging from 1-10 microns. Extensive overlap and entanglement of collagen was observed. Additionally collagen distribution was heterogeneous at the anterior and posterior margins. **Conclusions:** To our knowledge this is the first study that has examined the surface topography of vocal fold collagen at the nanoscale level. Understanding the properties of collagen fibers is essential to designing biomaterials that can restore the shape and pliability of vocal folds after scarring or surgery. The application of AFM to understanding the chemical composition and the mechanical characteristics of proteins in the vocal folds will be discussed.

10:39 Treatment of Vocal Fold Paralysis With Injection of Autologous Muscle Stem Cells (Myoblasts)

Stacey L. Halum, MD, Indianapolis, IN
Moumita Naidu, BS, Indianapolis, IN
Dawn Delo, BS, Winston-Salem, NC
Cynthia M. Hingtgen, MD PhD, Indianapolis, IN
Anthony Atala, MD, Winston-Salem, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to define the origin of muscle stem cells (myoblasts) and discuss the potential application of autologous myoblasts for the treatment of vocal fold paralysis.

Objectives: Autologous myoblast (muscle stem cell) therapy may be an ideal treatment for vocal fold paralysis due to its technical ease (administered via injection), its potential to restore muscular defects and dynamic function, and its autologous origin. The goal of this project was to determine if autologous myoblast injection into the thyroarytenoid (TA) muscle after recurrent laryngeal nerve (RLN) injury can attenuate TA muscle atrophy and enhance spontaneous reinnervation. **Study Design:** Animal experiment. **Methods:** Unilateral RLN transection and sternocleidomastoid muscle (~1 gram) biopsies were performed in 16 male Wistar rats. Biopsies were used to create myoblast cultures for each animal. One month later, 10^7 autologous myoblasts labeled with fluorescent cell membrane marker (PKH26) were injected into the denervated TA of each study animal with saline injected into controls. Animals were euthanized at one month and two months after myoblast injection. Outcomes included myoblast survival, TA fiber diameter and volume, and reinnervation status (motor endplate staining). **Results:** All denervated TA study specimens demonstrated viable myoblasts under fluorescent microscopy with the myoblasts demonstrating fusion with the TA myofibers at 2 months. The myoblast treated group had greater mean TA fiber diameter than controls at both 1 month (25.7 μm versus 23.5 μm) and 2 months (25.1 μm versus 21.1 μm) [$p < 0.05$]. Mean TA volumes were also greater in the myoblast treated groups at both time points. There was a nonsignificant trend toward enhanced spontaneous reinnervation in the myoblast treated groups. **Conclusions:** Autologous myoblast therapy may be a future treatment for vocal fold paralysis with current findings demonstrating attenuation of TA muscle atrophy. Future studies will involve longer term followup, and use autologous myoblasts genetically modified to secrete neurotrophic factors to promote selective reinnervation.

10:47 Longitudinal Followup of Adductor Spasmodic Dysphonia Patients Following Botulinum Toxin Injection: Quality of Life Results

Randal C. Paniello, MD*, St. Louis, MO
Jamie Barlow, MSW, St. Louis, MO
Jannie S. Serna, BS, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the variation in voice related quality of life experienced by patients with adductor spasmodic dysphonia after receiving botulinum toxin injections.

Objectives: Botulinum toxin injections are used routinely to treat patients with adductor spasmodic dysphonia. Following an initial “breathy phase”, most patients experience improvement for a few weeks to months then a gradual decline until their next injection. In this study voice related quality of life (VRQOL) data was collected at biweekly intervals through 1-3 injection cycles in an attempt to quantify the proportion of each cycle that patients experience meaningful benefit. **Study Design:** Prospective, nonrandomized case series. **Methods:** Patients receiving stable dose botulinum injections for adductor spasmodic dysphonia were invited to participate. Voice recordings and clinical outcomes data were collected by telephone every two weeks throughout each injection cycle. Quality of life data was normalized for cycle length and interpolated to generate composite curves. **Results:** Twenty-two patients completed data collection for at least one full injection cycle. The average cycle was 25.9 weeks, the mean age was 59.8. On a 100 point scale the total VRQOL scores peaked at 77.4 at 30% of the cycle then gradually declined. The social emotional (SE) subscale scores were significantly better than the physical subscale scores ($p < .05$). The total VRQOL score exceeded 75 during only 14% of the cycle (52.6% for SE subscores, 0% for physical subscores). If the threshold is lowered to 70, the total VRQOL exceeded this level during 54.6% of the cycle (69.6% for SE subscores, 44.1% for physical subscores). For the 11 patients completing 3 full injection cycles there were no significant differences between the three cycles, and the mean VRQOL scores were similar to the values above. At the beginning and end of each cycle the total VRQOL scores averaged 52.8 (56.0 for SE subscale, 50.7 for physical subscale). **Conclusions:** Although botulinum toxin injections provide significant improvement for these patients, the initial breathy phase and the late declining phase add up to a significant proportion of each cycle spent with a reduced quality of life. At best the total VRQOL averages below 80%. This longitudinal study provides a unique look at the effect of this condition and its treatment on these patients’ lives. A suitable long-term treatment for this condition is needed to eliminate the cyclical voice results experienced with the botulinum toxin injection approach.

10:55 Q & A

11:01 Symptomatic Outcomes in Endoscopic Sinus Surgery: A Systematic Review of Measurement Methods

Alexander C. Chester, MD, Washington, DC
Raj H. Sindwani, MD, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) demonstrate an understanding of the various validated survey instruments available to measure symptomatic outcomes following sinus surgery; 2) compare the relative advantages and disadvantages of the survey instruments presented; and 3) discuss, in general terms, the expected outcomes following endoscopic sinus surgery.

Objectives: To determine the type and prevalence of measurement methods employed to analyze symptomatic outcomes following endoscopic sinus surgery (ESS). **Study Design:** Systematic literature review and analysis. **Methods:** All English language studies consisting of more than 20 adult patients from 1981 to 2005 reporting patient based outcome results after ESS were included. Data were

derived from Medline, EMBASE, and a review of cited references. **Results:** 136 studies reported ESS outcome results of 18,642 patients [study range 20 to 1,112 patients, mean 137 patients per study (SD 168)]. The number of studies increased over 5 year intervals: 0 (1981-1985), 13 (1986-1990), 30 (1991-1995), 45 (1996-2000) and 48 (2001-2005). Only 33 studies measured symptomatic outcomes using a standardized survey and of the 17 validated instruments used the most common were: Chronic Sinusitis Survey (10), Short Form-36 (10), and Sinonasal Outcome Test-20 (8). None of the remaining 14 surveys was used more than twice. Other outcome measures employed included: patient symptom scores [3-point (4), 4-point (7)], Visual Analog Scale (VAS) measurements [6-point (3), and 11-point (13)], and numerous non-standardized questionnaires. Only 49 studies were prospective. The use of standardized survey instruments increased significantly from 1996-2000 to 2001-2005, [5 vs 25 ($p < .0001$)]. **Conclusions:** Symptomatic results following ESS have been assessed inconsistently by numerous measures. A recent trend towards more exact methods, however, is suggested by an increased number of reports using validated survey instruments in the last 5 years. The use of validated measures is encouraged as it affords useful comparisons of outcomes.

11:09 Dual Action of TGF Beta-1 on Nasal Polyp Derived Fibroblasts

Stewart C. Little, MD, Charlottesville, VA
S. Brandon Early, BS, Charlottesville, VA
David C. Shonka Jr., MD, Charlottesville, VA
Joseph K. Han, MD, Charlottesville, VA
Larry Borish, MD PhD, Charlottesville, VA
John W. Steinke, PhD, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the action of TGF beta-1 on nasal polyp derived fibroblasts in relation to polyp formation.

Objectives: Transforming growth factor beta-1 (TGF beta-1) is a known fibrogenic factor that also has immunosuppressive properties. We wanted to determine the effect of stimulation with TGF beta-1 on nasal polyp derived fibroblasts and assess the role this molecule would have in polyp formation and growth. **Study Design:** Nasal polyp derived fibroblasts were cultured with or without TGF beta-1 and analyzed using paired T tests. **Methods:** Fibroblasts were isolated from nasal polyps following endoscopic surgery by digestion of the tissue with trypsin for 1 hour at 37 C. Cells were plated and grown till confluent after which they were split and used in assays. Cells were stimulated with TGF beta-1 and RNA was collected after 16 hours. Supernatants were collected after 24 hours and proliferation was measured after 96 hours of culture. **Results:** TGF beta-1 significantly ($p < 0.02$) increased proliferation of nasal polyp derived fibroblasts. We examined the expression of inflammatory cytokines and found that TGF beta-1 decreased expression of CCL2 (MCP-1), CCL5 (RANTES), CCL11 (eotaxin), G-CSF and GM-CSF ($p < 0.05$). In contrast incubation with TGF beta-1 increased fibronectin, procollagen, VEGF and TGF beta-1 protein production ($p < 0.05$). For select samples, we confirmed that the increased protein production was due to increased mRNA expression. **Conclusions:** These studies suggest that TGF beta-1 expression in polyp tissue can have dual effects. One role is to act as an anti-inflammatory agent shown by the ability to inhibit proinflammatory mRNA and protein production. At the same time TGF beta-1 expression leads to increases in factors involved in fibrosis and angiogenesis promoting remodeling and cell growth.

11:17 Multilevel Minimally Invasive Techniques for Snoring and Obstructive Sleep Apnea/Hypopnea Syndrome (OSAHS)

Michael Friedman, MD*, Chicago, IL
Paul Schalch, MD, Chicago, IL
Ninos J. Joseph, BS, Chicago, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to appreciate the efficacy, morbidity and patient satisfaction related to multilevel minimally invasive techniques for the treatment of snoring and mild to moderate OSAHS.

Objectives: 1) To assess the satisfaction, morbidity and efficacy of multilevel minimally invasive techniques for the treatment of snoring and mild/moderate OSAHS; and 2) to present a staging system for OSAHS treatment. **Study Design:** An IRB approved chart review of all patients treated in a 6 month period for OSAHS was performed. **Methods:** 104 patients treated with multilevel minimally invasive techniques had complete data available. Pertinent data included pre- and post-treatment: snoring level, physical examination; Epworth Sleepiness Scale (ESS); and polysomnography data. In addition treatment morbidity, complications, and satisfaction were studied. Physical examination was based on a staging system identifying levels of abnormality in the nose, palate, tonsil, hypopharynx, as well as systemic abnormalities. Multilevel minimally invasive techniques included: orbital nasal valve suspension, RF inferior turbinate reduction, palatal implantation, RF intracapsular tonsil reduction, and RF tongue base reduction. The current anatomic staging system we use will be presented. **Results:** 66 patients had three sites treated, 34 patients had only two sites treated, and 4 patients had four sites treated. Pre- and postoperative evaluation revealed the following results. 91.8% of the patients had improvement in snoring levels and 73% had 50% reduction in snoring level. Mean ESS levels were reduced from 14.2 to 12.2. Mean apnea hypopnea index was reduced from 26.8 to 16.2. Morbidity and complications recorded were far less than with open procedures. **Conclusions:** Multilevel

minimally invasive techniques are effective in improving symptoms of OSAHS with minimal morbidity. These techniques compare favorably with open surgical procedures. Those patients who fail to improve are candidates for open techniques.

11:26 Endoscopic Study of the Palatovaginal Canal and its Artery: The Potential Importance of an Overlooked Structure

Islam R. Herzallah, MD, Miami, FL
Roy R. Casiano, MD*, Miami, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the palatovaginal canal and its artery. This endoscopic orientation should allow better management during extended endoscopic procedures as well as more efficient control of intractable cases of posterior epistaxis.

Objectives: The palatovaginal (pharyngeal) canal is a small bony tunnel that lies between the sphenoid process of the palatine bone and the vaginal process of the sphenoid bone. The canal is known anatomically to hold the pharyngeal artery. Despite the recent detailed understanding of sinonasal anatomy and its vascular supply, little information is available about this region from the endoscopic perspective. In this study a well demonstrated endoscopic cadaveric study of the palatovaginal canal was introduced. **Study Design:** Endoscopic endonasal microsurgical cadaveric study. **Methods:** Twenty sides in ten adult cadaver heads have been dissected endoscopically. The area of the sphenopalatine foramen as well as the adjacent pterygopalatine fossa and pterygoid base has been exposed. Careful dissection of the angle between the sphenopalatine foramen and the vidian canal has demonstrated a constant small tunnel that runs posteromedially in the sphenoid floor. Endoscopic data were documented and a digital file of high quality endoscopic pictures was obtained using a computer based video capture system. **Results:** The palatovaginal canal was identified as a constant anatomical structure although the thickness of its bony wall varied among different heads. Endoscopic relationships of the canal and its artery with other valuable landmarks were described. **Conclusions:** The current study provides a novel endoscopic orientation of an overlooked structure. The pharyngeal artery can be a potential source of unexpected bleeding during extended endoscopic sphenoid procedures and often confused with the septal branch of the sphenopalatine artery. The artery may also account for a number of intractable posterior epistaxis cases.

11:34 Increased Prevalence of Maxillary Sinus Hypoplasia in Chinese Patients With Chronic Sinusitis

James M. Pearson, MD, New York, NY
Tina He, MD, New York, NY
Azita Khorsandi, MD, New York, NY
Li James, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) explain the diagnosis of maxillary sinus hypoplasia (MSH) and its grading system; 2) demonstrate the CT imaging findings characteristic of MSH; 3) compare the prevalence of MSH in the general population with that found in the Chinese population; 4) explain reasons for the increased risk of orbital complications during functional endoscopic sinus surgery (FESS) in MSH patients with regard to corresponding anatomic abnormalities of the lateral nasal wall and orbit; and 5) discuss surgical methods in which orbital complications may be minimized during FESS.

Objectives: To demonstrate and quantify an increased prevalence of maxillary sinus hypoplasia (MSH) in the Chinese sinusitis population as compared with non-Chinese controls. Furthermore to characterize the degree of MSH in this population using an established grading system. Finally to discuss the relevance of MSH to the sinus surgeon. **Study Design:** Retrospective review. **Methods:** 100 consecutive sinus CT scans performed for the evaluation of chronic sinusitis in adult Chinese patients were compared with 100 consecutive sinus CT scans performed on non-Chinese controls. All CT scans were performed at the same institution and taken with at 1 mm intervals. A neuroradiologist graded all cases of MSH using the standard grading system described in 1990 by Bolger et al., based on the degree of maxillary sinus pneumatization and lateral nasal wall abnormalities. **Results:** MSH was demonstrated in 39% of adult Chinese chronic sinusitis patients compared with only 5% in non-Chinese chronic sinusitis patients in this series. Furthermore in the Chinese sinusitis population type II MSH was most commonly found (74%). **Conclusions:** The prevalence of MSH in the Chinese sinusitis population is significantly higher when compared both with non-Chinese controls in this study as well as rates reported in the literature (1.73-10.4%). Diagnosis of MSH relies on CT imaging findings. MSH is known to be associated with abnormalities in the anatomy of the lateral nasal wall and orbit. Recognition of the increased prevalence of MSH in the Chinese chronic sinusitis population may enable the surgeon to anticipate difficulty during FESS and to avoid inadvertent orbital complications.

11:42 Initial Use of Balloon Dilation in the Frontal Recess

Ryan M. Rehl, MD, East Palo Alto, CA
Winston C. Vaughan, MD, East Palo Alto, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the safety and efficacy of frontal recess endoscopic balloon catheter dilation.

Objectives: The objectives are to evaluate the safety and efficacy of frontal recess endoscopic dilation (FRED). **Study Design:** A retrospective analysis of adverse events, ostial patency and patient symptom changes during a multicenter analysis of a new balloon catheter device. **Methods:** Candidates for frontal sinus surgery were treated with FRED alone or FRED with standard dissection to other sinuses (hybrid procedure). Endoscopic determination of frontal ostia patency and SNOT-20 surveys occurred at 1, 12 and 24 weeks. **Results:** Seventy-six patients (136 recesses) underwent attempted FRED. One hundred twenty-four recesses (91%) were amenable to dilation. At 6 months 116 recesses were available for followup. Nineteen frontal ostia were not visualized endoscopically. Of the ostia that were visualized 96/97 (99%) were patent. No adverse events occurred. Both baseline and 6 month SNOT-20 scores were available in only 53 patients. Patients treated with only FRED had a mean change of -1.05 ($p=0.0023$) while patients who had hybrid procedures had a mean change of -1.41 ($p<0.0001$). 81% of patients undergoing FRED alone and 86% undergoing hybrid procedures had improvement of SNOT-20 scores. **Conclusions:** Both the hybrid procedure and FRED alone appear to be safe and effective treatments for carefully selected patients with frontal recess disease. No adverse events were noted up to the 6 month followup. Further long-term data will be needed.

11:50 Q & A

12:00 Adjourn

POSTERS

GENERAL, PEDIATRICS AND PLASTICS

1. Prospective Randomized Single Blind Controlled Trial Comparing Electrocautery and Coblation in Post-Tonsillectomy Pain in Children

Jaime L. Bedford, MD, Grand Rapids, MI
Joseph F. Goodman, MS IV, Grand Rapids, MI
Thomas R. Spooner, MD, Grand Rapids, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the morbidity of postoperative pain associated with complete tonsillectomy in children. The audience should be able to discuss postoperative pain levels associated with electrocautery and coblation for complete tonsillectomy with their patients.

Objectives: The specific aim of this study was to evaluate the effect upon pain when comparing the Bovie cautery versus the coblation method of performing complete tonsillectomy in children. **Study Design:** This was a single blinded, prospective, randomized controlled study with each participant being their own control. **Methods:** From June 2005 to March 2006, children aged 5-15 who required tonsillectomy for recurrent tonsillitis or airway obstruction were eligible for enrollment. The patients had no prior history of bleeding or routine usage of pain medications. Each child was randomized at the time of surgery to have either the right or left tonsil removed by coblation and the other removed by electrocautery. Postoperatively worksheets were provided and parents recorded daily which side hurt more in general and with swallowing and talking as reported by the child for seven days until their followup visit. **Results:** Twenty-six children were enrolled in the study. On days 2-4 and 6 there was significantly less pain reported on the Coblator treated side compared to the electrocautery treated side ($p<0.05$). On days 2-4 patients reported significantly less pain on the Coblator side when talking, and on days 3-6 patients reported significantly less pain on the Coblator side when swallowing. **Conclusions:** On the basis of pain alone, with swallowing, and with talking, the Coblator is a better tool for complete tonsillectomy in children.

2. Comparison of CT Angiography Versus Conventional Angiography for Penetrating Neck Trauma: A Level I Trauma Center Four Year Experience

Shaheen M. Counts, BA, Houston, TX
Gabriel Calzada, MD, Houston, TX
Anthony E. Brissett, MD, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the evaluation and management of penetrating neck trauma. In particular compare CT angiography to conventional angiography in the evaluation of patients with penetrating neck trauma.

Objectives: To determine the sensitivity and specificity of computed tomographic (CT) angiography in the diagnosis of vascular injuries in penetrating neck trauma. Our hypothesis is that CT angiography can provide a noninvasive alternative to conventional angiography. **Study Design:** A retrospective chart review of all penetrating neck injuries during a 50 month period at a level I trauma center. **Methods:** Patients with penetrating neck trauma were included in the study if they underwent evaluation via angiography. The

sensitivity, specificity, positive and negative predictive values were calculated. **Results:** In all 203 consecutive patients were evaluated for penetrating neck trauma. Fifty-six patients were referred for angiographic evaluation; 13 underwent CT angiography, 33 underwent conventional angiography, and 10 were evaluated with both studies. In 8 (35%) of 23 patients arterial lesions were detected with CT angiography. These patients were either referred for conventional angiography (n=6) or observed (n=2). In addition there was one false positive study and one inadequate study. Sensitivity of helical CT angiography was 89%, specificity was 100%, positive predictive value was 100% and negative predictive value was 93%. Conventional angiograms showed arterial injuries in 18 (42%) of 43 patients. Sensitivity of conventional angiography was 94%, specificity was 100%, positive predictive value was 100% and negative predictive value was 97%. **Conclusions:** The sensitivity and specificity of helical CT angiography are high for detection of major vascular injuries in patients with penetrating neck trauma. In the initial evaluation of stable penetrating neck injuries CT angiography appears to be a safe screening modality.

3. Localized Oropharyngeal Amyloidosis

Joseph M. Curry, MD, Philadelphia, PA
Christopher C. Grindle, MD, Philadelphia, PA
Kelly M. Malloy, MD, Philadelphia, PA
William M. Keane, MD*, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the clinical presentation and treatment of localized amyloidosis of the tonsil and lateral oropharyngeal wall.

Objectives: 1) Describe the clinical presentation and treatment of localized amyloidosis of the tonsil and lateral oropharyngeal wall; and 2) review the existing literature on this rare pathology. **Study Design:** Case report. **Methods:** We report a case and the treatment of a 29 year old female who presented with a right oropharyngeal mass found to be non-AL (non-Amyloid, Light chain) type amyloid. **Results:** An otherwise healthy 29 year old female presented with complaint of odynophagia for several months was found to have a mass in the right oropharynx. Clinical exam revealed a yellow, exophytic, and broadly based lesion at the right tonsil and lateral oropharyngeal wall. Biopsy revealed the lesion to be non-AL type amyloid. Computed tomographic (CT) imaging revealed a 4 cm solid mass which was noninvasive. Laboratory workup showed no evidence of systemic amyloidosis or related disease. Given her symptoms the patient underwent tonsillectomy with resection of the oropharyngeal lesion and local advancement flap closure. Final pathology confirmed the diagnosis of amyloid. The patient recovered without complication and appears to be free of disease. While numerous reports of amyloidosis of the upper airway exist, localized amyloid of the oropharynx is an exceptionally rare lesion. Additionally most cases of localized amyloid appear to be of the AL type. **Conclusions:** Localized amyloidosis of the oropharynx is a rare lesion. Biopsy is necessary for diagnosis and it is essential to rule out systemic disease. Surgical resection of the lesion may be effective in treating symptoms.

4. The Preoperative Importance of Considering Cervical Sympathetic Chain Schwannoma

Marc R. Dean, MD, Shreveport, LA
Enrique Gonzalez, MD, Shreveport, LA
Cherie-Ann O. Nathan, MD*, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) review a rare case of a schwannoma arising from the cervical sympathetic chain; and 2) discuss differential diagnosis of a carotid sheath mass with discussion on the controversy of splaying of the carotid bifurcation, and to discuss evaluation, pathologic characteristics and management of these tumors.

Objectives: The differential diagnosis of carotid sheath tumors is dependent on vascularity and splaying of the carotid bifurcation. One such controversy is the rare case of cervical sympathetic chain schwannoma. We present the ninth reported case in the literature of this entity with special emphasis on preoperative counseling. **Study Design:** Case report. **Methods:** A 47 year old male presented with right neck and shoulder pain accompanied with paresthesias upon turning his head to the right. CT with contrast unveiled a nonenhancing right neck mass that splayed the internal and external carotid arteries. Hence an FNA was performed which confirmed schwannoma. The most common schwannoma in the carotid sheath is that of the vagus nerve and hence patient was counseled about possibility of hoarse voice and dysphagia. **Results:** Exploration of the right neck revealed a cervical sympathetic chain schwannoma which was excised with sacrifice of the sympathetic nerve and Horner's syndrome noted postoperatively. Patient developed first bite syndrome following surgery. **Conclusions:** Cervical sympathetic chain schwannomas are rare tumors requiring resection. A nonenhancing mass causing splaying of the carotid bifurcation should include cervical sympathetic chain schwannoma (although controversial) in the differential diagnosis more so than vagus nerve schwannomas which more often displace the internal jugular vein posterolaterally and the internal carotid artery anteromedially but do not separate the internal and external carotid arteries. The importance lies in preoperative counseling to include first bite syndrome with less emphasis on possible thyroplasty for vocal cord paralysis.

5. Cervical Tuberculosis in Association With the Use of Tumor Necrosis Factor \pm Inhibitors

Robert S. Glade, MD, Washington, DC

Jeremy White, MD, Washington, DC
Neil Tanna, MD, Washington, DC
David A. Bianchi, MD, Silver Spring, MD

Educational Objective: At the conclusion of this presentation, the participants should consider cervical tuberculosis in the differential diagnosis of patients using TNF-± inhibitors with concomitant cervical adenopathy.

Objectives: Tumor necrosis factor ± (TNF-±) inhibitors including infliximab, etanercept, and adalimumab have revolutionized rheumatologic care and are now frequently employed in the treatment of inflammatory diseases including rheumatoid arthritis, inflammatory bowel disease and psoriatic arthritis. TNF-± plays an essential role in the host defense against mycobacterium tuberculosis (TB). Accordingly reactivation of latent TB and progression of recently acquired TB have been associated with the use of TNF-± inhibitors. **Study Design:** Case report and literature review. **Methods:** Review of patients records. **Results:** We report a case of a 65 year old microbiologist with a history of both prostate cancer and occupational TB exposure treated with etanercept for psoriasis. He presented to the otolaryngologist with a history of chronic cough. Workup revealed multiple findings worrisome for metastatic disease including left supraclavicular lymph node enlargement on computerized tomography (CT) imaging as well as hypermetabolic activity within the left supraclavicular region with positron emission tomography (PET). Excisional biopsy was performed. Histopathologic staining revealed caseating granulomas within the lymph nodes. Culture of the supraclavicular nodes grew mycobacterium tuberculosis. **Conclusions:** We conclude that the otolaryngologist should consider cervical tuberculosis in the differential diagnosis of patients using TNF-± inhibitors with concomitant cervical adenopathy.

6. Low Temperature Controlled Bipolar Radiofrequency Based Ablation (Coblation®) for the Treatment of Retroglossal Obstruction in the Multilevel Management of Obstructive Sleep Apnea Syndrome (OSAS)

David Greene, MD, Naples, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate the low temperature radiofrequency ablation base of tongue (RFBOT) technique and discuss its role in the management of retroglossal obstruction and explain how RFBOT compares to other radiofrequency base of tongue surgical procedures.

Objectives: At the conclusion of this presentation, the participants should be able to consider the role of low temperature bipolar radiofrequency ablation (RFBOT) for the treatment of retroglossal obstruction in the multilevel management of OSAS. **Study Design:** A retrospective chart review of 200 cases in which RFBOT was used for treatment of retroglossal obstruction. Patient characteristics, treatment variables, and adverse effects were recorded to assess safety and effective use of RFBOT. **Methods:** RFBOT was performed on patients with retroglossal obstruction. Each patient underwent RFBOT treatment with a total number of lesions ranging from four to twelve on the posterior portion of the tongue centered on the circumvallate papilla and areas posterior to this site. Preoperative (and postoperative when available) overnight polysomnograms and nasopharyngeal endoscopy were assessed. Pre- and postoperative evaluation also included recording of Epworth Sleepiness Scale (ESS) scores, body mass index (BMI), modified Mallampati grade, tonsil size, and complications were assessed. **Results:** Over two hundred RFBOT procedures have been performed over the past five years. Patients' ages ranged from 32 to 75 years with an average followup period of 6 months to 5 years. No perioperative complications were encountered. No infections or motor sensory deficits were reported. Pre- and post-treatment data demonstrate an RDI decrease from 34.1 ± 28.1 to 11.3 ± 11.0 . **Conclusions:** Low temperature bipolar radiofrequency ablation for the base of tongue has shown to be a rapid, safe, and valuable adjunct in the treatment of retroglossal obstruction. The surgical technique and its role in the multilevel management of OSAS will be discussed in detail.

7. Free Tissue Transfer for Reconstruction of the Head and Neck in the Pediatric Population; A Ten Year Review of Our Experience

Douglas K. Henstrom, MD, Rochester, MN
Eric J. Moore, MD, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the challenges in free flap reconstructions and compare our experience with the sparse data in the literature concerning free tissue transfer reconstructions of the head and neck in the pediatric population.

Objectives: 1) Discuss challenges in free flap reconstructions of the head and neck in children; and 2) present our experience with free flap reconstruction of head and neck deformities in pediatric patients. **Study Design:** Retrospective chart review. **Methods:** A review of our experience at this tertiary care center from 1995-2003 found 7 patients (ages 4-15) who underwent free flap reconstruction for head and neck defects. We performed 4 fibula, 2 scapula, and 1 temporoparietal free flap reconstruction. All reconstructions were performed immediately following extirpation of disease. Followup ranged from 6 months to 8 years. **Results:** All free flaps survived. All patients showed acceptable occlusion and masticatory function and returned to a regular diet. At last followup all soft tissue coverings were intact. The fibula was used in the majority of cases for: need for bony reconstruction, amount of bone it provides, ease of dissec-

tion, and decreased time for case with use of 2 surgical teams. There have been no noticeable leg growth discrepancies in any of our fibula flap patients and all have returned to normal function. **Conclusions:** Tumor removal and subsequent reconstruction should be carried out during the same surgical procedure for children. Resection of large masses in children can have severe long-term effects, but very acceptable results can be obtained by reconstruction with a vascularized free flap. Our patients have returned to appropriate normal activity as well as a normal diet. Longer followup is needed to continue to assess potential growth disturbances in donor sites as well as the reconstructed mandibles.

8. Oral Pain As a Symptom of Heavy Metal Poisoning: A Case Report

Christopher W. Hilton, MD, Minneapolis, MN
Derek J. Schmidt, MD, Minneapolis, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinical evaluation of patients with oral pain and paresthesia and describe the presentation and clinical course of poisoning by heavy metals with attention to its head and neck manifestations.

Objectives: Evaluation of patients with oral pain can be a diagnostic challenge. Poisoning by heavy metals is a rare cause of oral pain. We review the clinical evaluation of patients with oral pain and paresthesia and review the presentation and clinical course of poisoning by heavy metals with attention to its head and neck manifestations. **Study Design:** Case report and literature review. **Methods:** We describe a case referred to the otolaryngology department at our institution. A literature review was performed by searching the MEDLINE database from 1966 to the present for keywords: “oral pain”, “burning mouth”, “stomatitis”, “arsenic”, and “heavy metals.” **Results:** We present the case of a 58 year old woman seen in our clinic with oral paresthesia and pain as the sole symptom of heavy metal poisoning. Patients with heavy metal poisoning may present with peripheral paresthesia and pain and rarely these paresthesias may involve the oral cavity. **Conclusions:** This is the first case in the otolaryngology literature of a patient with heavy metal poisoning presenting solely with oral pain and paresthesia. While a rare etiology of oral pain, as our case demonstrates, poisoning by heavy metals must be included in the differential diagnosis when evaluating these patients.

9. Advanced Applications of Medial Crural Overlay Technique in Nasal Tip Refinement

Tang D. Ho, MD MSc, Houston, TX
Fred J.V.D. Bressler, MD, Houston, TX
Anthony E. Brissett, MD, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the utility of the medial crural overlay technique in rhinoplasty.

Objectives: To describe advanced applications of the medial crural overlay (MCO) technique in tip refinement and its aesthetic outcomes. **Study Design:** Retrospective review. **Methods:** Rhinoplasties involving the MCO technique were reviewed. Preoperative and postoperative records including photographic documentation were analyzed. The Global Aesthetic Improvement Scale was used to grade the overall aesthetic improvement and variability analyzed. **Results:** Bilateral or unilateral MCO technique involves the precise transection and subsequent overlap and suturing of the medial crura near the level of the columella-lobular junction. The longest vertical segment from columellar base to division point is best positioned lateral to the segment which is continuous with the upper portion of the lower lateral cartilage (LLC). This inset allows for greater stability of the cartilaginous support framework to the nasal tip, and allows the placement of a columellar strut graft, when indicated, without unnecessary widening of the nasal tip. These advanced techniques, in combination with lateral crural steal (LCS) sutures and autologous cartilage grafting allow for excellent control of nasal tip deprojection and rotational control of the LLC. In our experience applying these advanced techniques, combining MCO with domal sutures, LCS and grafts, makes the use of older tip truncation techniques for the difficult, over-projected nasal tip, unnecessary and rarely indicated. **Conclusions:** The advanced MCO techniques effectively deproject and stabilize the tip. The tip complex can be preserved with rotational control of the LLC when MCO is used in conjunction with strut grafts, LCS, and domal sutures.

10. Otolaryngologic Manifestations of Neurofibromatosis Type I

Anita Jeyakumar, MD, Cleveland, OH
Todd M. Brickman, MD, Rochester, NY
Keiko Hirose, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to evaluate a patient with neurofibromatosis 1 and treat them appropriately.

Objectives: A review on pediatric cases of type 1 neurofibromatosis (NF1) diagnosed from 2001 to 2006 at our department. **Study Design:** Retrospective chart review. **Methods:** Patients with the ICD-9 code for neurofibromatosis 1 were identified in our database. Demographic information, including unique otolaryngologic manifestations of neurofibromatosis, and other common otolaryngologic

problems will be reviewed. **Results:** There were two female and five male patients, mean age of presentation 5 and 4.52 years respectively. All patients showed neurofibromas accompanied by fibromas, cafe au lait spots, 4 cases showed massive left sided plexiform neurofibromatosis causing gross asymmetry of the face. 85.7% of patients had evidence of chronic middle ear disease and 57% of patients had evidence of obstructive sleep apnea (OSA). None of our cases had malignancies or gastrointestinal tract involvement. **Conclusions:** NF1, an autosomal dominant disease, exhibits extreme clinical variability. This variability greatly increases the burden for affected families and impairs our ability to understand the pathogenesis of NF1. In otolaryngology children appear to have characteristic large neurofibromas, but also seem to manifest more common conditions such as middle ear disease and obstructive sleep apneas.

11. An Unusual Fibrosclerotic Lesion of the Laryngotracheal Complex Presenting as Subglottic Stenosis

Douglas R. Johnston, MD, Philadelphia, PA
Joseph Curry, MD, Philadelphia, PA
Raphael Rubin, MD, Philadelphia, PA
Marc Rosen, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants will have gained familiarity with the presentation and pathology of this destructive fibrosclerotic lesion of the laryngotracheal complex and will have considered a strategy for effective management.

Objectives: To describe the pathology, presentation, and management complexities of this unusual, destructive fibrosclerotic lesion of the laryngotracheal complex. **Study Design:** Case report. **Methods:** We present an otherwise healthy 21 year old male with a history of a two week intubation in infancy who presented with a one year history of progressive shortness of breath with acute exacerbation. **Results:** On presentation the patient was found to be stridorous and to have a marginal airway. He underwent fiberoptic intubation, tracheotomy, and biopsy of the larynx, trachea, and thyroid gland. He was found to have a 3 cm, Cotton-Meyer grade III subglottic stenosis. Dense, nodular fibrosis of the strap muscles and laryngotracheal cartilages, as well as the endolarynx, was evident. Biopsies revealed dense peritracheal desmoplastic reaction with focal erosion of cartilage. However features diagnostic for relapsing polychondritis or orbital pseudotumor were not present. **Conclusions:** This is a case of a novel fibrosclerotic lesion of the laryngotracheal complex and anterior neck structures which presented with significant subglottic stenosis and airway compromise. Due to the unknown etiology of this condition, established treatment and prognosis have not been defined.

12. Photodynamic Therapy With the Silicon Phthalocyanine Pc 4 in a Cottontail Rabbit Papilloma Virus Xenograft System

Richard G. Lee, MD, Cleveland, OH
Mark A. Vecchiotti, MD, Boston, MA
Nancy L. Oleinick, PhD, Cleveland, OH
James E. Arnold, MD, Cleveland, OH
Robert C. Sprecher, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the use of photodynamic therapy in treatment of virus associated benign tumors.

Objectives: Recurrent respiratory papillomatosis (RRP) often leads to significant morbidity in affected patients. Photodynamic therapy (PDT) has shown success in reducing tumor size and decreasing recurrence rates on virally induced tumors such as RRP. However sensitizing agents used previously possess some important drawbacks. The silicon phthalocyanine Pc 4, a relatively new photosensitizer, demonstrates a more favorable side effect profile. Solid malignant tumors have been treated with Pc 4-PDT, but studies have not addressed benign virus associated tumors. It is hypothesized that use of Pc 4-PDT in a Cottontail Rabbit Papilloma virus (CRPV) xenograft model will reduce tumor size and decrease recurrence rates. **Study Design:** Prospective multi-arm controlled animal trial. **Methods:** Forty two C.B-17 SCID mice underwent xenograft placement of rabbit skin and subsequent inoculation with CRPV suspension. Induced papillomas were measured regularly and divided into control and treatment groups/subgroups based on four dosage schemes. Animals were observed for up to 80 days post-treatment. **Results:** Animals treated with 1.0 mg/Kg of Pc 4 combined with 150 joules/cm² of light energy flux had regression of induced papillomas and replacement with normal epithelium. Slopes of the logarithmic papilloma growth rates were compared among the treatment and control groups. Animals treated with the highest dose of Pc 4-PDT demonstrated a lower and statistically significant different growth rate compared to those treated with Pc 4 only (p<.05, using Scheffe multiple comparisons method.) **Conclusions:** In a CRPV model of papilloma growth Pc 4-PDT reduced tumor size and growth rates. Further study to evaluate the long-term effects on tumor recurrence is prudent.

13. Static Reanimation Using SurgiSIS Facial Sling: A Case Series and Review of the Literature

Douglas D. Leventhal, MD, Philadelphia, PA
Edmund A. Pribitkin, MD*, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the anatomy of the facial nerve and its innervation of the facial musculature. Participants should be able to recognize the functional and cosmetic consequences from paralysis of the facial nerve. They should be able to discuss the various options for facial nerve reconstruction, both dynamic and static. Participants should understand the strengths, weaknesses, and indications of the different procedures. Finally the audience should be able to compare our technique using SurgiSIS to the other materials that have been employed for static facial suspension.

Objectives: Facial paralysis is a devastating condition resulting in physiological and cosmetic problems. Aside from appearance facial paralysis affects mastication, speech production, and eye closure. Treatment for this condition consists of dynamic reanimation or static procedures. Static methods support and stabilize facial tissue enhancing symmetry and functionality. A variety of materials both native and foreign have been used for static facial suspension but each has its own limitations. To date there are no studies documenting efficacy or benefit of one substance over another. The objective of this study is to describe our experience in using SurgiSIS facial slings in a series of 5 patients with facial paralysis. **Study Design:** Retrospective chart review. **Methods:** Illustrative case series using questionnaires and literature review generated by PubMed citation search. **Results:** Five patients with facial paralysis were treated with the SurgiSIS facial sling procedure. Four patients achieved satisfactory results after the initial procedure. One patient was displeased with the aesthetic outcome and required a revision procedure to increase the tautness of the implant. In four of the cases the sling was tunneled subcutaneously and sutured to the muscle. In one case the sling was tunneled subcutaneously and subperiosteally, thereby suspending all the soft tissue in the midface. **Conclusions:** SurgiSIS is a viable material for static facial slings. In our experience facial slings composed of SurgiSIS yielded both cosmetic and functional improvement. Furthermore the novel technique of using a two plane dissection generated excellent results. Further studies need to be conducted in order to evaluate the ongoing benefit over time.

14. **Blastomycosis of the Head and Neck: A Case Report and Review of the Literature**

Michelle Ferdinand Liu, MD MPH, Portsmouth, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the transmission, recognize the clinical and histopathologic findings, and discuss the management of this rare fungal disease.

Objectives: Blastomycosis is a rare systemic fungal disease caused by the dimorphic mycotic organism, *Blastomyces dermatitidis*. A case of systemic blastomycosis with head and neck pathology is presented along with a review of the literature and discussion of the clinical features, histopathologic findings, diagnosis and management of the disease. **Study Design:** A 33 year old African-American male presented with disseminated subcutaneous nodules including a painful lower lip lesion that needed tissue biopsy. The patient reported onset of fever, malaise, night sweats, and erythematous nodules that covered his entire body six weeks prior to hospitalization. **Methods:** After numerous failed treatments with intravenous antibiotics and negative skin wound cultures, an excisional biopsy of one mucosal lesion was obtained. **Results:** The diagnosis of blastomycosis was confirmed by histopathologic examination as well as a positive serum *Blastomyces* antibody study. The patient was treated successfully with intravenous amphotericin B followed by oral itraconazole without recurrence of the disease. **Conclusions:** The clinical importance of recognizing the presentation of blastomycosis is due to the relatively common incidence of otolaryngologic manifestations. The otolaryngologist will often be involved in the diagnosis of head and neck lesions, particularly if tissue sampling is required for histopathologic evaluation. Misdiagnosis of head and neck lesions has resulted in unnecessary procedures and subsequent morbidity. Left untreated, the mortality rate of blastomycosis approaches 5%. Treatment is medical not surgical. This case presentation should reinforce the basic clinical features and appropriate treatment of systemic blastomycosis.

15. **Spontaneous Rupture of the Pharynx**

Richard Peter Manes, MD, Washington, DC

Jan C. Groblewski, MD, Washington, DC

Ziad E. Deeb, MD*, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of spontaneous rupture of the pharynx, a rarely reported clinical entity.

Objectives: 1) To present a case of spontaneous rupture of the pharynx due to excessive emesis; and 2) to review the presentation and management of this rare clinical entity. **Study Design:** Retrospective review. **Methods:** Case report and literature review. **Results:** A 56 year old male presented with throat pain and shortness of breath after a prolonged period of binge drinking had led to excessive episodes of emesis. The patient reported sensing a 'pop' in his throat while vomiting. The patient was intubated in the emergency department after flexible laryngoscopy revealed significant airway edema. Subsequent computer tomographic imaging revealed retropharyngeal air. On hospital day number two the patient was taken to the operating room for direct laryngoscopy and esophagoscopy, where a healing perforation was noted in the posterior pharyngeal wall. The patient was treated conservatively with antibiotics and remained clinically stable without evidence of mediastinitis. He was extubated and started on a liquid diet on postoperative day one after a negative swallow study. The patient was subsequently discharged in stable condition. **Conclusions:** While esophageal rupture following excessive emesis is a well recognized entity requiring intervention, pharyngeal rupture is rare. Prompt recognition of this entity is

imperative given the morbidity and mortality associated with mediastinitis, a potential sequelae. However, most cases do respond to conservative treatment.

16. Cochlear Nerve Aplasia Detected Through Kindergarten Hearing Screening—A Series of Eight Cases

J. Paul Moxham, MD FRCSC, Vancouver, BC Canada
J. Matthew Dickson, MD, Vancouver, BC Canada (Presenter)
Karen K. Wong, MD, Toronto, ON Canada
Nicole Thong, BSC, Vancouver, BC Canada
Jeffrey P. Ludemann, MD CM FRCSC, Vancouver, BC Canada
Beth Brooks, MSC, Vancouver, BC Canada
Michael A. Sargent, MD FRCSC, Vancouver, BC Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the importance of diagnostic imaging in the evaluation of children with sensorineural hearing loss due to cochlear nerve aplasia.

Objectives: To describe the importance of imaging with the use of magnetic resonance (MR) or computed tomography (CT) during the diagnostic workup of a patient with sensorineural hearing loss to determine the status of the cochlear nerve. **Study Design:** Retrospective case series. **Methods:** A pediatric database was used to find patients with diagnoses of absent cochlear nerve. A retrospective chart review was then undertaken from July 1999-July 2004 looking at the route to diagnosis and any concomitant factors. Patients who had presented at kindergarten screening were included in the study. Review was made of audiologic investigations undertaken: routine audiometry, ABR, and distortion product OAE. Radiologic investigations were also reviewed consisting of CT and/or MR scans. **Results:** The database yielded 12 cases of cochlear agenesis. 4 patients were excluded because they had absence of the entire inner ear structures ipsilateral to the aplastic cochlear nerve (2 cases) and because they had multiple congenital anomalies (2 cases). There were equal numbers of males and females. There was a slight left sided preponderance (5:3) and age ranged from 5 through 7 years. All children had failed the initial screening audiogram. Followup audiologic evaluation revealed either profound loss/dead ear or a failed ABR in the presence of normal OAE testing. All patients had internal auditory canals (IAC) less than 1.4mm or MR compatible findings. **Conclusions:** Agenesis of the cochlear nerve may be more common than previously thought, especially in an otherwise healthy, nonsyndromic, school aged child. Although audiometric evaluation alone usually strongly suggests the diagnosis, definitive evaluation with MR remains the gold standard.

17. Ten Tips for Success in Otoplasty

George L. Murrell, MD*, Camp Pendleton, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the 10 tips for success in otoplasty.

Objectives: To present, illustrate, and discuss 10 specific tips for achieving favorable results in otoplasty. **Study Design:** Retrospective review of illustrative cases. **Methods:** Representative cases of patients with prominent ears will be used to describe 10 specific useful ideas for achieving favorable results in otoplasty. **Results:** The 10 tips for success in otoplasty include: a practical method for preoperative (1) and intraoperative (2) assessment, guidelines for auricular skin (3) perichondrium (4) and cartilage (5) conservation, a practical explanation of when (6) how (7) and in what sequence (8) Furnas and Mustarde sutures should be used, a logical patient friendly approach to the acute postoperative dressing (9) and wearing of a headband after surgery (10). **Conclusions:** The presented otoplasty tips are practical, specific, and useful ideas which can be helpful in achieving an aesthetic result and a happy patient.

18. Injectable Fillers in Facial Augmentation: Review of Radiographic Appearance

James M. Pearson, MD, New York, NY
Anthony P. Sclafani, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) discuss radiographic characteristics of commonly used injectable fillers in facial augmentation; 2) explain typical anatomic patterns of injectable filler distribution on CT; and 3) contrast the normal radiographic appearance of injectable fillers from that of pathologic conditions.

Objectives: To demonstrate the radiographic appearance of commonly used injectable fillers in facial augmentation in order to recognize the presence of filler, to compare and contrast characteristics of individual fillers, and to differentiate the presence of filler from pathologic processes using those characteristics. **Study Design:** Case study. **Methods:** A patient who had undergone treatment with 4 different injectable fillers was evaluated with computed tomography (CT). CT (axial, coronal, 3-D reconstructions) appearance of each filler is illustrated with regard to target location, dispersion of injected material and characteristic imaging appearance of each filler. **Results:** The appearance of 4 fillers: micronized collagen (Cymetra), hyaluronic acid (Restylane), calcium hydroxylapatite microspheres (Radiance), and autologous fat is illustrated. Calcium hydroxylapatite exhibits a strongly radio-opaque appearance while

hyaluronic acid, autologous fat and collagen are comparatively radiolucent, although clearly detectable. Radiolucent fillers are recognizable primarily by their effects on adjacent tissue planes. **Conclusions:** Injectable fillers used in facial augmentation may be recognized by their characteristic appearances on computed tomography. In this case a single patient having undergone injection with multiple filler types facilitates direct comparison of filler appearance in a single CT study. The location of filler material in the commonly treated regions of lips, nasolabial and glabellar folds and forehead rhytides aids in the recognition of filler and the differentiation from pathologic processes. As the use of injectable fillers becomes increasingly popular and commonly-practiced, these fillers will be present and detectable on more patients' CT studies of the head and neck. The ability to recognize these fillers and differentiate them from pathologic processes will become an important skill for the surgeon to possess.

19. Baseline Severity of Obstructive Sleep Apnea Syndrome (sOSAHS) vs. Body Mass Index (BMI): Their Role as Predictors for Surgical Treatment Success

Jon P. Pepper, BS, Orange, CA

Meghann L. Kaiser, MD, Orange, CA

Paul Schalch, MD, Orange, CA

Roger Crumley, MD*, Orange, CA

Educational Objective: At the conclusion of this presentation the participants should be able to 1) recognize the efficacy in achieving objective cure by means of uvulopalatopharyngoplasty (UPPP) alone or in combination with septoplasty/bilateral turbinate reduction (BTR); 2) identify the impact of body mass index (BMI) and baseline severity of OSAHS (sOSAHS) in surgical treatment outcome; and 3) identify the incidence of complications after UPPP with or without septoplasty/BTR in the immediate postoperative period when adhering to a strict postoperative management protocol including overnight admission to a monitored unit.

Objectives: 1) To assess the efficacy of UPPP alone or in combination with septoplasty/BTR for the treatment of OSAHS; 2) to determine the role of sOSAHS and BMI as predictors for successful surgical treatment outcome; and 3) to assess morbidity and complications of performing UPPP alone or in combination with septoplasty/BTR. **Study Design:** Retrospective, IRB approved review of 393 charts of patients diagnosed with OSAHS by PSG that underwent UPPP or UPPP + septoplasty/BTR between 10/91 and 12/04 in a tertiary care, university affiliated institution. **Methods:** Data was analyzed on patients that completed a postoperative PSG. Patients were classified as having mild (Apnea-Hypopnea Index [AHI] of 5-15), moderate (16-30) and severe (e31) OSAHS based on a preoperative PSG, and into normoweight (<25), overweight (25-29.9) and obese (e30) based on BMI. We estimated the correlation coefficients of sOSAHS and BMI and sOSAHS/BMI with objective cure. Complications presenting during the first 24 hours were recorded. **Results:** 107 patients (4 with mild, 35 with moderate and 68 with severe OSAHS) underwent surgical treatment (61 underwent UPPP/septoplasty/BTR and 46 UPPP only) and completed a postoperative PSG within an average of 5 months. Seven patients were classified as normoweight, 62 as overweight and 38 as obese. All patients were admitted to a monitored unit overnight, and none presented with immediate postoperative complications. Overall objective cure as determined by a 50% reduction in the AHI and a postoperative value of d20 was achieved in 41% of patients (43% for 61 patients that underwent UPPP/septoplasty/BTR and 39% for UPPP alone, p=0.36). The correlation coefficients were -0.04 for sOSAHS/ objective cure and -0.2 for BMI/ objective cure. **Conclusions:** Our series demonstrates an objective cure rate of 41%. Preoperative BMI has a discrete negative correlation with cure indicating that it might be a better predictor of outcome than is baseline severity of OSAHS which shows a correlation coefficient close to 0. Adherence to a strict postoperative protocol minimizes the rate of postoperative complications.

20. Orbital Floor Reconstruction With Porcine Small Intestinal Submucosa

Peter E. Seymour, MD, Philadelphia, PA

Howard M. Krein, MD PhD, Philadelphia, PA

David M. Brown, BS, Philadelphia, PA

Juri R. Bilyk, MD, Philadelphia, PA

Edmund A. Pribitkin, MD*, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the potential role of Surgisis as an alternative to current implants used in the repair of orbital floor fractures.

Objectives: To demonstrate that repair of induced rabbit orbital floor fractures with Surgisis (Cook Biotech Inc., West Lafayette, IN) provides adequate orbital content support while promoting mucosal and bone regeneration of the fracture site and can therefore serve as a viable repair option for these common injuries. **Study Design:** Prospective, controlled, blinded study. **Methods:** Ten New Zealand white rabbits underwent induced bilateral controlled (8mm) orbital floor fractures under general anesthesia. In each rabbit Surgisis, an acellular, freeze-dried soft tissue matrix derived from porcine small intestinal submucosa, was implanted subperiosteally to repair one orbital floor fracture thru a transconjunctival approach. The contralateral orbital floor fracture served as a control. Histological assessment was scheduled for 1, 3, and 12 months following surgery. **Results:** All ten rabbits survived the surgical procedure without infection, globe entrapment or implant rejection. Grossly the orbits appeared similar with the exception of mild enophthalmos on the control side in four of ten rabbits. Subtle histological differences were noted between the fractures repaired with Surgisis and those left to heal

without treatment. Eosinophilic infiltrates and multinucleated giant cell reactions as well as connective tissue fibrosis found to varying degrees in the Surgisis sites were not found in the control sites. Both sites were healed at all intervals. **Conclusions:** We submit that Surgisis can be successfully implanted as a graft in the repair of orbital floor fractures in rabbits. However its ability to promote central bone regeneration was not clearly established. Additional studies investigating its application in human orbital trauma are needed.

21. Long-Term Results of Tissue Engineered Palatal Bone Regeneration in a Canine Model

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

Educational Objective: At the conclusion of this presentation, the participants should be able to know it is difficult to regenerate the palatal bone that is thin and easy to be infected. However this presentation suggests the possibility of the palatal bone regeneration by tissue engineering technique.

Objectives: To compare the tissue response and new bone formation of palatal bone regeneration induced by beta-tricalcium phosphate (b-TCP)/collagen composite scaffold with or without autologous bone marrow derived stromal cells (BSCs) for six months with those for three months. We have already succeeded to regenerate palatal bone by the composite scaffold with or without BSCs for three months in a canine model. However the amount of newly formed bone was not enough. Then we try to regenerate palatal bone for a longer-term plan. **Study Design:** In vivo animal study. **Methods:** Twelve adult beagle dogs were used. Bone defect was surgically made on the left side of hard palate under the mucoperiosteum. Bone defects were filled with only composite scaffold in six dogs (group I) and composite scaffold with BSCs in other six dogs (group II). Histological examinations were performed in three dogs of each group at 3 and 6 months after operation. **Results:** No major troubles, such as infection, arisen in all dogs. Newly formed bone was observed around b-TCP in all dogs. The amount of regenerated bone in dogs 6 months after implantation in both groups was more than that in dogs 3 months after operation. Especially the best bone formation was observed in the dog of group II 6 months after operation. **Conclusions:** The results in this study suggest that larger amount of regenerated palatal bone demands longer period in a canine model. BSCs may contribute to regenerate the better quality bone.

22. Restoration of Eyelid Closure in Facial Paralysis Using Artificial Muscle: A Preliminary Cadaveric Analysis

Travis T. Tollefson, MD FACS, Sacramento, CA
Craig W. Senders, MD, Sacramento, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the exciting concept of creating an eyelid blink using an eyelid sling and an artificial muscle as shown in a video presentation.

Objectives: Traditional rehabilitation of permanent facial paralysis has concentrated on protecting the cornea using lubrication, tarsorrhaphy, gold weight eyelid loading, muscle transposition, or free tissue transfer. The field of robotics has introduced a wide range of artificial muscle technologies including an electroactive polymer that changes shape when a small voltage is applied. Restoration of the eyelid blink using this material may be possible. The objective of this study is to evaluate if a novel sling could create eyelid closure in a cadaver model. **Study Design:** Cadaver study. **Methods:** Four cadaver heads were evaluated. An upper blepharoplasty incision was used to secure an expanded polytetrafluoroethylene sling to the posterior lacrimal crest with a titanium screw. The sling was secured to the tarsal plate and passed through a hole drilled in the lateral orbital wall just above the lateral canthal attachment. A second sling was secured in the lower eyelid in a similar fashion. The distance of pull required to create complete eyelid closure was documented. Videography was performed. **Results:** Complete eyelid closure was attained with each eyelid procedure. When the sling was placed in both the upper and lower eyelids, only 3 mm of pull on the sling was required to create complete closure as compared to 6 mm when only the upper eyelid sling was placed. **Conclusions:** Eyelid closure was created in a cadaver model using a novel eyelid sling. In future studies an artificial muscle and eyelid sling mechanism will be evaluated for biocompatibility, durability, and ability to create a reproducible eyelid blink.

23. A Five Year Review of Cold-Steel Adenotonsillectomies and Postoperative Complications

Robert E. Wilson, MD, Lexington, KY
Richard C. Haydon, MD, Lexington, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the postoperative complications of adenotonsillectomies and compare the complication rates between the various surgical techniques, citing the advantages and

disadvantages among them.

Objectives: To review the postoperative complications of cold-steel adenotonsillectomies performed at our institution and compare our results with those of other surgical techniques reported in the literature. **Study Design:** Retrospective review and literature review. **Methods:** A retrospective review of all patients that underwent a cold-steel tonsillectomy +/- adenoidectomy during January 1, 2001, through January 1, 2006. 338 patients were identified and included in the study. All clinical information was reviewed, including clinic notes, operative reports, and hospital and emergency room notes. The results were then studied using basic descriptive statistical analysis. **Results:** Three (0.89%) patients experienced postoperative hemorrhage and two patients required surgical hemostasis. Two (0.59%) patients required postoperative readmission for pain control and rehydration. Mean estimated blood loss was 42 mL and mean operative time was 25 min. **Conclusions:** Post-tonsillectomy complications continue to be studied as newer surgical techniques are introduced. While many studies in the literature report no significant difference in postoperative bleeding among different surgical techniques, our study revealed a less than 1% rate in postoperative hemorrhage for the cold-steel technique. Less than 1% of patients needed admission for treatment of dehydration, indicating that for the majority of patients the oral intake was not compromised secondary to pain. While no definitive conclusion can be made based on this study, we believe that the cold-steel technique has lower postoperative complication rates when compared to other surgical techniques.

24. Emerging Trends in the Incidence and Treatment of Post-Tympanostomy Tube Methicillin Resistant *Staphylococcus Aureus* (MRSA) Otorrhea

VyVy N. Young, MD, Louisville, KY
Julie L. Goldman, MD, Louisville, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) recognize that the incidence of post-tympanostomy tube MRSA otorrhea is increasing; 2) recognize emerging trends in MRSA resistance patterns; and 3) identify types of antibiotics that can typically treat MRSA otorrhea.

Objectives: 1) determine the incidence of MRSA otorrhea at a pediatric hospital; and 2) evaluate treatment of MRSA otorrhea. **Study Design:** Retrospective review. **Methods:** Children who underwent ear culture between June 1, 2003, and December 31, 2005, were identified through the computerized hospital database. From medical records demographic information was collected, including history of tympanostomy tubes, organism(s) isolated, and antibiotic therapy. **Results:** 128 patients with previously placed tympanostomy tubes were identified. 44 had at least one culture that was MRSA positive. These were 100% sensitive to Bactrim and vancomycin. 79% were resistant to erythromycin, 71% to Augmentin and cefazolin, and 45% to clindamycin. The most common microbes were MRSA (overall incidence, 19%), pseudomonas (19%), and candida (12%). Recently, the incidence of MRSA and pseudomonas has increased while candida has decreased (correlation coefficients: 0.8, 0.2, 0.9). Antibiotic treatment information was available for 25 MRSA positive patients. No parenteral antibiotics were given. Three patients required no further antibiotics after the culture, however, four patients needed 10 or more antibiotics. Eight patients received multiple courses of the same antibiotic with 4 patients treated with multiple courses of different antibiotics. Overall there were 108 individual antibiotic treatment courses averaging 4 antibiotics per patient (range: 0-12). Nearly half (44%) received 2 or fewer antibiotics. **Conclusions:** The incidence of post-tympanostomy tube MRSA otorrhea at our pediatric hospital is ~20%. These were 100% sensitive to Bactrim and vancomycin but largely resistant to erythromycin (79%) and clindamycin (45%). MRSA otorrhea can be treated with oral antibiotics and/or ototopicals with nearly half of patients requiring 2 or fewer antibiotic courses.

HEAD & NECK

25. Attenuation of Bp1 Expression in Hypopharyngeal Squamous Cell Carcinoma Cell Lines Using RNA Interference (RNAi)

Nadir Ahmad, MD, Detroit, MI
Zizheng Hou, MD, Detroit, MI
Michael Benninger, MD*, Detroit, MI
Maria Worsham, PhD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the technique of RNA interference and how this technique can modulate gene expression in head and neck cancer.

Objectives: The gene BP1, a member of the DLX homeobox gene family, has been shown to have an oncogenic role in some cancers. A recent study from our laboratory has documented the first report of its expression in prechemotherapy treated hypopharyngeal squamous cell carcinoma cell lines. Postchemotherapy cell lines expressed BP1 at an even greater level suggesting a resistance or "escape" mechanism. Attenuating BP1 gene expression would render these cells more susceptible to chemotherapy and innate immune mechanisms and ultimately to cell death. **Study Design:** Basic science research. **Methods:** We used mutant p53 HNSCC cell lines UMSCC-11A and UMSCC-11B to confirm the presence and overexpression of BP1. UMSCC-11A and UMSCC-11B were derived from tumor

tissue obtained from the primary tumor site, the hypopharynx, before and after chemotherapy respectively. The novel technique of interference RNA (SiRNA) was then employed to attenuate the levels of BP1 which was analyzed using real time PCR and cell morphology. **Results:** RNA from normal squamous cells did not express BP1. UMSCC-11B had BP1 expression levels that were 30 times the level of UMSCC-11A. SiRNA treatment resulted in marked attenuation of BP1 expression in UMSCC-11B cell lines. **Conclusions:** Overexpression of the BP1 gene in postchemotherapy treated UMSCC-11B hypopharyngeal cell lines provides a glimpse of how carefully aberrant gene expression levels are choreographed in cancer cells to effect and ensure cell survival. The marked reduction in BP1 gene expression in UMSCC-11B after employing SiRNA demonstrates that tumor progression in HNSCC can be potentially arrested by targeting resistant cancer cells and rendering them susceptible to cell death.

26. Chondroblastoma of the Skull and Facial Bones; A Review of 10 Cases

Eran E. Alon, MD, Rochester, MN
Inwards Y. Carrie, MD, Rochester, MN
Eric J. Moore, MD, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to have a better understanding of the presentation, treatment, and prognosis of chondroblastoma of the skull and facial bones as well as radiological and histopathological findings.

Objectives: Discuss presentation, treatment, and prognosis of chondroblastoma of the skull and facial bones as well as radiological and histopathological findings. **Study Design:** Chart review. **Methods:** We reviewed the charts of 11 patients with the diagnosis of chondroblastoma of the skull and facial bones. **Results:** There were 8 males and 3 females in our series. The age distribution was between 31-61 years of age with a mean age of 46 years. The majority of the patients (8/11; 72%) presented with at least one otologic symptom. The duration of symptoms until diagnosis ranged from 3 months to 4 years. The majority of the cases (10/11; 90%) involved the temporal bone with variable intracranial extension or extension to surrounding structures. Treatment usually consisted of primary resection, although one patient underwent primary radiation for unresectable tumor. Earlier cases included adjuvant radiation therapy for subtotal resection. 7 patients (63%) whom underwent total resection or subtotal resection with radiation achieved a long-term disease free survival. The 4 other patients were either lost to followup or had recurrent disease. **Conclusions:** Chondroblastoma presenting in the skull and facial bones is a rare tumor requiring adequate excision to achieve cure. Evolving surgical techniques and new approaches to the skull base allow adequate resection without need for adjuvant radiation treatment and with acceptable morbidity.

27. SELP Hydrogel Mediated Adenoviral HSV Thymidine Kinase Gene Therapy for Head and Neck Cancer

Koji Araki, MD, Philadelphia, PA
Hamid Ghandehari, PhD, Baltimore, MD
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 understand how a novel silk elastin-like polymeric (SELP) delivery system enhances transgene expression and improves therapeutic outcome of adenoviral HSV thymidine kinase (Ad-tk) gene therapy against head and neck cancer.

Objectives: The present study investigates if a novel SELP controlled delivery system can prolong transgene expression, reduce toxicity and improve therapeutic outcome in Ad-tk gene therapy for the treatment of HNSCC. **Study Design:** Randomized, controlled studies were performed. **Methods:** Mouse model with human HNSCC tumor was used in this study. The intervention groups consisted of SELP, combined SELP with Ad-tk/ganciclovir, Ad-tk/ganciclovir, and control groups. Tumor sizes were measured before and after treatment. Transgene expression of tk was evaluated over multitime points during the treatment. Tumor samples were evaluated by immunohistochemistry. Statistical analysis was performed for each group. **Results:** Combined SELP and Ad-tk/ganciclovir treatment group significantly prolonged transgene expression and resulted in highly significant antitumor effect in the treatment of human HNSCC in our mouse model. **Conclusions:** The present study suggests that a novel SELP controlled delivery system can significantly prolong transgene expression in combination with Ad-tk gene transfer in HNSCC tumor cells. This novel system can reduce viral toxicity by preventing repeated viral administration in maintaining transgene expression as it is necessary for achieving a good antitumor effect. These results support the potential of SELP copolymers for localized gene delivery in the treatment of human HNSCC.

28. High HSP70 Expression Inhibits Caspase Cleavage and Enhances Cell Viability in Oral Carcinoma Cell Line

Suzana Brozovic, MD PhD, Louisville, KY
James W. Lillard, PhD, Louisville, KY
Eric J. Lentsch, MD, Louisville, KY
Wolfgang Zacharias, PhD, Louisville, KY
Donald L. Miller, MD PhD, Louisville, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate that high HSP70 expression in head and neck squamous cell carcinoma correlates with high tumor grade, metastasis and poor prognosis. High HSP70 expression inhibits tumor cell apoptosis through inhibition of caspase and increases cell proliferation and viability in head and neck squamous cell carcinoma cell line.

Objectives: Over 90% of head and neck tumors are squamous cell carcinomas (SCC) ranking as the sixth most frequently diagnosed cancer worldwide. Survival rates have not significantly improved for oral cavity carcinoma patients in the past 25 years, due to treatment approaches failing to consider oral cancer as a heterogeneous disease with differences in etiology, location, and biological behavior. A concise understanding of head and neck cancer biology and immunopathogenesis is desperately needed. **Study Design:** This proposed study rises from recent findings of increased both, constitutive and inducible HSP70 mRNA and protein expression in head and neck squamous cell carcinoma (HNSCC). **Methods:** Further HSP70 upregulation has been shown to correlate with poor therapeutic outcome in patients and to promote cancer growth by distinct mechanisms. Patient derived primary oral carcinoma cell line was stably transfected with pIRES-HSP70. **Results:** To date the HSP70 transfected oral carcinoma cell line inhibited apoptosis when exposed to TNF-alpha, increased cell proliferation, and improved viability. High HSP70 expression in oral carcinoma cells showed aggressive behavior and metastasis formation in xenograft mouse model. Inhibition of activation and cleavage of both, caspase -3 and caspase-8, together with inhibition of DNA fragmentation was observed in HSP70 transfected oral carcinoma cell line. The survival protein c-IAP-2 was increased in HSP70 transfected oral carcinoma cells. **Conclusions:** Taken together these studies show that high HSP70 expression inhibits tumor cell apoptosis through inhibition of caspase, increases cell proliferation, viability and tumorigenic potential in head and neck squamous cell carcinoma cell line.

29. Concomitant Lymphoma and Squamous Cell Carcinoma: Case Report and Review of the Literature

Anna Lisa DeBacco, BA, Hershey, PA
Ashraf Abou-Ellella, MD, Hershey, PA
Fred Fedok, MD, Hershey, PA
David Goldenberg, MD, Hershey, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the relationship between concomitant head and neck malignancies and the clinical implications of this relationship.

Objectives: To discuss the rare occurrence and implications of concomitant head and neck malignancies, namely small cell lymphocytic lymphoma (SLL) and squamous cell carcinoma (SCC). **Study Design:** Case report and review of the literature. **Methods:** A 69 year old gentleman with a right neck mass and history of cutaneous squamous cell carcinoma is presented and the association between lymphoproliferative and epithelial malignancies is discussed. **Results:** The gentleman underwent right superficial parotidectomy and right modified radical neck dissection. Pathological examination revealed metastatic SCC of the parotid gland and concomitant SCC and SLL of level 2 lymph nodes as well as three regional lymph nodes. A previous report suggests an increased incidence of SCC or lymphoproliferative disease when the other is present. This is likely to be related to the various shared risk factors associated with the individual diseases. The association between SCC and SLL is an important consideration in disease diagnosis and treatment. **Conclusions:** Our case of a 69 year old gentleman with concomitant SCC and SLL of the head and neck not only illustrates a rare phenomenon but also raises important clinical implications. Further research involving concomitant malignancies is necessary to more fully understand the shared risk factors and links between concomitant lymphoproliferative and epithelial malignancies of the head and neck.

30. The Role of Preoperative CT Guided FNAB for Parapharyngeal Space Tumors

Tarik Y. Farrag, MD, Baltimore, MD
Frank R. Lin, MD, Baltimore, MD
Wayne M. Koch, MD*, Baltimore, MD
Joseph A. Califano, MD, Baltimore, MD
Charles W. Cummings, MD*, Baltimore, MD
Ralph P. Tufano, MD, Baltimore, MD

Educational Objective: The literature supports the fact that FNA prior to parapharyngeal space (PPS) tumor surgery cannot be relied upon due to its low sensitivity to detect the exact diagnosis of the final pathology. At the conclusion of this presentation the participants should still be able to know the importance of preoperative FNA for PPS tumors which comes from its ability to distinguish between benign and malignant tumors. This has its impact on its role in the surgical planning for PPS tumors.

Objectives: To determine the role of CT guided fine needle aspiration biopsy (FNAB) in surgical planning of parapharyngeal space (PPS) tumors. **Study Design:** Chart review of 49 consecutive patients with surgically treated PPS tumors from 1995 to 2005. **Methods:** This is a retrospective study. Reports of 49 consecutive patients with PPS tumors who had surgical excision in our institution from 1995

to 2005 were reviewed. The patients included 29 patients who had CT guided FNAB prior to their surgery and 20 patients who did not have preoperative CT guided FNAB. The positive predictive values of the preoperative CT guided FNAB to identify benign and malignant PPS tumors were calculated. The surgical implication of knowing whether the PPS tumor was benign or malignant based on preoperative CT guided FNAB was then evaluated. **Results:** 29 patients had CT guided FNAB and it rendered a cytopathologic diagnosis that was the same as final pathology in 14 (48%) patients; suggestive but not conclusive in 6 (21%) patients; different in 3 (10%) patients; and 6 (21%) patients had a nondiagnostic result. 14/15 patients who had a final histopathology of pleomorphic adenoma had a correct or highly suggestive preoperative FNAB diagnosis. Positive predictive value (PPV) for CT guided FNAB to identify benign tumors is 90%, (18/20); but PPV to identify malignant PPS tumors is 75%, (3/4); and the surgical approach in 2/4 was transcervical with total parotidectomy, in 1/4 was midline mandibulotomy, and in 1/4 was LeFort-I. 20 patients did not have a preoperative CT guided FNAB, and 6/20 had a preoperative transoral, incisional biopsy, and 5 of these 6 patients had a correct diagnosis of pleomorphic adenoma. **Conclusions:** CT guided FNAB of PPS tumors is reliable to predict the nature of the PPS tumors (especially benign) which allows surgeon and patient to plan for treatment.

31. Lateral Temporal Bone Resection for Parotid Carcinoma

Murtaza T. Ghadiali, MD, Miami, FL
Adrien E. Eshraghi, MD, Miami, FL
Andrew Huang, BS, Miami, FL
Fred F. Telischi, MD*, Miami, FL
Francisco J. Civantos, MD*, Miami, FL
Donald T. Weed, MD*, Miami, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the role of lateral temporal bone resection (LTBR) in the surgical management of advanced stage parotid carcinoma and describe the prognostic factors associated with recurrence.

Objectives: To evaluate the clinical outcome of lateral temporal bone resection (LTBR) performed for parotid carcinoma at a tertiary university hospital. **Study Design:** Retrospective chart review of all patients who had LTBR for parotid carcinoma between 1995 and 2005. **Methods:** Thirteen patients with parotid carcinoma who underwent primary resection including LTBR were identified. Median followup was 23 months. Data on age, sex, staging, histopathological examination (including preoperative, intraoperative and postoperative data), surgery, adjunctive therapy, recurrence, and status at followup were obtained and analyzed. **Results:** Median age at diagnosis was 69 years. Survival data included at least 18 months of followup. Initial diagnosis included seven patients with squamous cell carcinoma, 2 patients with adenoid cystic carcinoma and 2 patients with carcinoma expleomorphic adenoma. All patients had either stage III or IV disease with 8 having stage III and 5 having stage IV. Five patients were free of disease with a mean followup of 45 months with all having negative final pathology margins. All but 1 of these patients received postoperative radiotherapy. Eight patients had either local recurrences or distant metastases with a mean time to recurrence or metastasis of 12 months. Six recurrences occurred in patients with positive postoperative surgical margins despite the fact that all but one had received additional radiotherapy. Nodal metastasis and perineural invasion at the time of surgery were significant prognostic factors for recurrence. **Conclusions:** Positive final surgical margins, nodal metastasis and perineural invasion are prognostic factors for recurrence of advanced stage parotid carcinoma despite LTBR and additional radiotherapy.

32. Familial Acinic Cell Carcinoma of the Parotid

Thomas L. Kennedy, MD*, Danville, PA
Johnathan M. Winstead, MD, Danville, PA (Presenter)
Nava K. Nawaz, MD, Danville, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the distinct clinical features of acinic cell carcinoma of the parotid gland specifically its familial occurrence.

Objectives: To describe the third known case of familial acinic cell carcinoma of the parotid gland with bilateral and multifocal presentation in one patient. **Study Design:** Case report. **Methods:** Medical history files and pathologic slides were reviewed for both the mother and daughter. Immunohistochemical techniques were used to compare the tumors. **Results:** The mother died from metastatic disease from her tumor. The daughter is currently undergoing treatment for her multiple tumors. She will require more aggressive therapy in light of her mother's outcome and the extent of her disease. **Conclusions:** This is the third case reported in the medical literature of familial acinic cell carcinoma and the second familial case with bilateral, multifocal presentation.

33. Airway Management Strategies for Primary Mucosa Associated Lymphoid Tissue (MALT) Lymphoma of the Trachea

Ayesha N. Khalid, MD, Hershey, PA
Craig A. Brooksby, BS PhD, Hershey, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain airway management strategies for a tracheal tumor and discuss the various short- and long-term treatment options.

Objectives: 1) Diagnosis of patients with primary tracheal neoplasms; and 2) airway management algorithms for primary tracheal neoplasms. **Study Design:** Case report and literature review. **Methods:** The presentation, imaging, histopathologic findings, and course of this case are described. The various airway management strategies and their implications are discussed. **Results:** A seventy-five year old female of Vietnamese origin presented to otolaryngology clinic for dysphonia and odynophagia despite treatment for GERD and bronchodilator therapy by her primary care physician. Physical examination demonstrated mild inspiratory stridor. Flexible fiberoptic laryngoscopy showed a moderate sized subglottic mass arising from her posterior trachea. CT scan demonstrated severe tracheal narrowing secondary to a posterior tracheal mass. Bronchoscopy demonstrated localized disease and the biopsy showed MALT lymphoma. Given evidence of a localized disease a temporary tracheal stent was placed with planned radiation therapy. Following two doses of radiation therapy (900 CGy) she presented with respiratory distress and underwent direct laryngoscopy and rigid bronchoscopy. She was found to have granulation tissue along the superior border of the stent, and the tracheal stent was successfully removed without airway compromise. Followup CT scan confirmed markedly reduced tumor size. **Conclusions:** Limited case reports describe successful therapy for MALT lymphoma of the trachea using surgical resection as well as bronchoscopic photoresection. An effective airway management algorithm for patients with primary tracheal neoplasms evaluates surgical intervention (tracheostomy), chemotherapy, radiation therapy, stenting, and/or a combination of these modalities in terms of their individual and combined risks/benefits and weighs them against individual patient preferences.

34. Aneurysmal Bone Cysts of the Larynx

Darren R. McDonald, MD, Rochester, MN
Kerry D. Olsen, MD*, Rochester, MN
K. K. Unni, MD, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the rare diagnosis of aneurysmal bone cysts of the larynx. They should be able to describe the clinical and histopathologic features as well as treatment recommendations related to aneurysmal bone cysts arising in the larynx.

Objectives: Aneurysmal bone cysts are benign, locally aggressive bony lesions that can present in the head and neck, most commonly the mandible and maxilla. Exceedingly rare is the extrasosseous presentation of an aneurysmal bone cyst arising in the larynx which usually presents with airway obstruction. **Study Design:** Case series and review of the literature. **Methods:** The charts of patients who presented with aneurysmal bone cysts arising in the larynx were retrospectively reviewed. The presenting clinical features, pertinent radiographic and pathologic characteristics as well extent of surgical treatment were examined. Functional outcomes following surgical treatment were evaluated. **Results:** Between 1957 and 2006 three patients were treated for an aneurysmal bone cyst of the larynx. History as well as clinical exam including flexible fiberoptic laryngoscopy were crucial in terms of followup and monitoring for recurrence. **Conclusions:** Though rare in the head and neck region aneurysmal bone cysts usually present in the mandible or maxilla. Aneurysmal bone cysts arising in the larynx is exceedingly rare. Prior to this study there have been only four reported cases of aneurysmal bone cysts within the larynx. Treatment of choice is conservative surgical excision and long-term followup is recommended given the possibility of recurrence.

35. False Positive PET-CT Findings in Waldeyer's Ring

Miriam A. O'Leary, MD, Boston, MA
Nirav A. Shah, MD, Boston, MA
Gregory A. Grillone, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the limitations of PET-CT in evaluating incidental findings in Waldeyer's ring.

Objectives: At our institution we have noted several referrals for incidental findings in Waldeyer's ring. We have not found PET-CT to consistently distinguish between neoplastic and nonneoplastic tissue in this region of the head and neck, and thus has not avoided operative biopsy for some patients with normal findings. **Study Design:** This is a retrospective chart review. **Methods:** We searched for all patients who received a PET-CT through our institution between 2/14/04 and 5/1/06 under the diagnostic codes "head and neck cancer, initial staging" and "head and neck cancer, restaging". **Results:** 82 patients were identified of whom 5 patients (6.1%) did not have a neoplastic diagnosis. Four of these patients had incidental abnormalities of Waldeyer's ring noted on conventional imaging modalities, two of whom had corresponding uptake on PET-CT and were thus biopsied with benign results. The fifth patient had an incidental abnormality of Waldeyer's ring noted on a PET-CT obtained for another reason and was biopsied with benign results. Thus 3 out of 5 patients (60%) had biopsies under general anesthesia of nonneoplastic tissue. **Conclusions:** The overlap between physiologic and pathologic FDG uptake in Waldeyer's ring remains problematic; PET-CT has not provided a consistent advantage over conven-

tional imaging modalities in this anatomic region. Some patients continue to undergo unnecessary surgical procedures for this reason. Perhaps future developments in PET-CT, such as immuno-PET, will better differentiate between normal and neoplastic tissue in Waldeyer's ring.

36. Molecular Classification of Thyroid Nodules by Cytology

Nitin A. Pagedar, MD, Cleveland, OH
Daniel H. Chen, BA, Cleveland, OH
Jay K. Wasman, MD, Cleveland, OH
Scott M. Wilhelm, MD, Cleveland, OH
Kumar N. Alagramam, PhD, Cleveland, OH
Pierre Lavertu, MD*, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the limitations of thyroid needle cytology and understand a new possibility for use of cytologic specimens to make an accurate prediction of malignancy in a thyroid nodule.

Objectives: Fine needle aspiration (FNA) biopsy of thyroid nodules provides cytologic specimens whose interpretation can direct patients toward either thyroidectomy or observation. About 20% of FNA specimens yield an indeterminate result. Recent studies have characterized differences in gene expression between benign and malignant conditions, most often using whole tissue. Our goal was to determine feasibility of quantitative PCR (qPCR)-based gene expression analysis in cytologic samples. For five genes shown to be overexpressed in thyroid carcinomas (fibronectin, galectin-3, Met/HGFR, MUC1, and GA733-precursor) we compared expression between pathologic states. **Study Design:** Prospective laboratory analysis of twenty thyroidectomy specimens. **Methods:** Routine microscopy was performed. Cytologic samples were obtained from the dominant nodules and RNA was extracted. Preliminary analysis using fluorometry and reverse-transcriptase PCR (RT-PCR) was performed. Expression levels of the test genes in nodules and from control samples were measured by real time qPCR. Fold changes in gene expression were compared. **Results:** One specimen did not yield sufficient intact RNA; another consisted of Hurthle cell adenoma adjacent to papillary carcinoma; these were eliminated from consideration. RT-PCR revealed satisfactory RNA recovery. qPCR showed significant overexpression of fibronectin in the four papillary carcinomas compared with the five goiters and seven follicular adenomas. Differences in fibronectin and MUC1 expression between the two follicular carcinomas and the follicular adenomas approached significance. No other differences were statistically significant. **Conclusions:** FNA specimens were a satisfactory source of tissue for qPCR-based gene expression analysis. Fibronectin was overexpressed in papillary carcinoma specimens compared with goiters and follicular adenomas. The other studied genes did not reliably classify the samples.

37. Primary Head and Neck Clear Cell Carcinoma

Zara M. Patel, MD, New York, NY
Jean Anderson Eloy, MD, New York, NY
Eric M. Genden, MD FACS, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the presentation, clinical course, pathology, prognosis and treatment modalities for primary head and neck clear cell carcinoma.

Objectives: To investigate the clinical course and pathologic behavior of primary head and neck clear cell carcinoma (HNCC). **Study Design:** A retrospective review. **Methods:** A retrospective chart review was performed of all patients managed at a tertiary care center with the diagnosis of primary HNCC over a 16 year period. Charts were reviewed for age, gender, primary site, pathologic grade, stage, treatment and recurrence. **Results:** Fifteen patients were identified ranging in age from 37 to 87 years (avg. 61). The female to male ratio was 1.5:1. Seven different primary sites were identified: The palate (4), base of tongue (4), maxilla (2), nasal cavity (1), tonsil (1), mandible (1), parotid (1) and thyroid (1). The origin included odontogenic, thyroid, major salivary glands or minor salivary glands. Patients were treated with surgical resection (9 patients) or surgery and postoperative radiation (6 patients). Followup ranged from two months to 16 years. Four patients demonstrated local recurrence (26%), two patients demonstrated regional recurrence (13%), and 5 patients manifested distant metastasis to either the lung or liver (33%). Recurrence, metastasis and overall survival were influenced by the primary site, stage, pathologic grade, and use of adjuvant therapy. **Conclusions:** Primary HNCC is rare. This review is the first to encompass all types and builds on literature suggesting the behavior of this disease is very much dependent on the cell of origin and may not warrant its own category as a pathologic entity. The use of adjuvant therapy may be helpful in preventing recurrence.

38. A Case Report of Sweet's Syndrome and Lymphoepithelial Sialadenitis: Clinical Features and Differentiation From Kimura Disease

David M. Saito, MD, San Francisco, CA
Lisa Ann Orloff, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to outline the differential diagnosis for

parotid gland swelling and skin rash in a young patient with autoimmune disease, discuss the characteristics of Kimura disease, lymphoepithelial sialadenitis, and Sweet's syndrome, and explain the various treatment options available.

Objectives: We will review the clinical features, radiology, pathology, and management of our patient with parotid gland lymphoepithelial sialadenitis with overlying Sweet's syndrome and contrast these findings with those of Kimura disease. **Study Design:** Case report and brief literature review. **Methods:** Case report and brief literature review. **Results:** A 23 year old Asian-American man with a history of systemic lupus erythematosus presented with a one year history of right parotid gland swelling associated with a pruritic vesicular outbreak affecting the overlying skin. Ultrasonography of the gland revealed a diffusely enlarged and heterogeneous signal consistent with chronic parotitis. Fine needle aspiration of the gland suggested lymphoepithelial sialadenitis. A skin biopsy of the affected right cheek skin revealed a neutrophilic infiltrate consistent with Sweet's syndrome. The patient was prescribed a course of hydroxychloroquine which greatly alleviated his pruritus and skin rash. His parotid gland swelling also significantly improved with time. **Conclusions:** Our patient's initial presentation bore strong resemblances to the descriptions of Kimura disease affecting the parotid gland. However with imaging and biopsies we secured a diagnosis of lymphoepithelial sialadenitis with overlying Sweet's syndrome. A careful diagnostic approach can distinguish between these rare disorders and allow the otolaryngologist to suggest appropriate treatment.

39. The Expression and Prognostic Value of Surface Proteins in Head and Neck Squamous Cell Carcinomas

Joachim Schmutzhard, MD, Innsbruck, Austria
Volker Scharfetter, MD, Innsbruck, Austria
Ilona M. Schwentner, MD, Innsbruck, Austria
Georg M. Sprinzl, MD, Innsbruck, Austria

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the expression pattern and the prognostic value of surface proteins in HNSCC with special emphasis on epithelial cell adhesion molecules and the EGF receptor family.

Objectives: Head and neck squamous cell carcinomas show an increasing incidence and make up to 5% of all malignancies. In this work three cell surface proteins are investigated, which could be possible targets in currently arising tailored cancer treatment: epithelial cell adhesion molecule (EpCam), the epidermal growth factor (EGFR, c-erbB-1 or HER1) and HER2/neu (c-erbB-2). **Study Design:** In this study specimens from 114 histological verified squamous cell carcinoma of pharynx and oral cavity were analyzed. **Methods:** The surface proteins were tested with pharmacodiagnostic kits. **Results:** From the 114 tested tumor samples the EGFR receptor was with 44.7% (51 cases) the most frequent over expressed surface marker. The EpCam protein was usable shown over expressed in 22.8% (26 cases). Only seldom the HER 2 protein was found over expressed in 3.5% (4 cases). **Conclusions:** Being over expressed in almost a quarter of the tested tumors, therapeutically monoclonal antibodies against EpCam might turn out to be a valuable alternative in concept of the tailored cancer therapy.

40. Tissue Engineered Bone Regeneration of Canine Skull With the Concept of Guided Bone Regeneration

Hiroo Umeda, Kyoto, Japan
Shin-ichi Kanemaru, MD PhD, Kyoto, Japan
Masaru Yamashita, MD, Kyoto, Japan
Yoshihiro Tamura, MD, Kyoto, Japan
Shigeru Hirano, MD PhD, 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: To estimate the effect of calcium arginate membrane for keeping bone regenerative space. We previously succeeded skull regeneration using bone marrow derived stromal cells (BSCs) and beta-tricalcium phosphate (b-TCP). However excessive fibrous tissue intrusion or defluxion of a scaffold sometimes interrupted the bone regeneration. To prevent such disadvantages we examined the barrier membrane made of calcium arginate. **Study Design:** Preliminary: an animal experiment. **Methods:** Adult beagle dogs were used for this experiment. Craniotomy was performed as the same clinical procedure. The bone defect (2cm x 2cm) was created at each canine temporoparietal region. Four experimental models were designed with or without/filler or covering. In group I the original free bone flap was only replaced at the defect. In group II after replacing the bone flap the defect was covered with the calcium alginate membrane. In group III autologous BSCs and the composite scaffold: b-TCP and autologous bone fragments with fibrin glue were used as filler of the gap. In group IV both the above filler and the covering were applied. Histologic examinations three months after the operation were done. **Results:** In group I and II bone regeneration wasn't observed. Of group IV more extensive bone formation and less fibrous tissue intrusion were observed than those of group III. **Conclusions:** Calcium arginate membrane has the possibility to prevent excessive fibrous tissue intrusion and/or defluxion of a scaffold. It revealed that keeping regenerative space is useful for the better quality of cranial bone regeneration.

OTOLOGY

41. Primary Facial Canal Glomus Tumor Presenting as a Parotid Mass

Arman A. Abdalkhani, MD, Stanford, CA

Nikolas H. Blevins, MD, Stanford, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to create a differential diagnosis for fallopian canal tumors and to discuss the etiology, radiologic findings, histologic appearance, and treatment of fallopian canal glomus tumors.

Objectives: To present an unusual case of primary fallopian canal glomus tumor presenting as a parotid mass and review the literature regarding fallopian canal glomus tumors. **Study Design:** Case report with literature review. **Methods:** Comprehensive PubMed and OVID Medline search of fallopian canal glomus tumors. **Results:** We review the case 65 year old woman with a 10 year history of right sided facial paralysis and a 3 year history of ipsilateral, painless parotid enlargement. Upon surgical resection the tumor was confirmed to be a paraganglioma on histologic analysis and appeared to have originated from within the fallopian canal. A total of 10 cases of fallopian canal glomus tumors have been reported in the literature. Our case is the first to present with a parotid mass. We review the presenting symptoms, radiologic findings, treatment, etiology, and natural progression of these tumors. Facial weakness and/or pulsatile tinnitus was present in all previously reported cases. Two of these patients were erroneously diagnosed with Bell's palsy. Extratemporal extension of the tumor was associated with facial weakness for extended periods of time. Patients should receive a fine cut CT and MRI imaging of the temporal bone for idiopathic facial nerve weakness that does not respond to conventional therapy. All cases in the literature, including ours, were treated surgically with a transmastoid approach. **Conclusions:** This experience illustrates that with time, facial canal glomus tumors can grow and extend extratemporally into the parotid gland. The clinician should keep this rare entity in mind when caring for a patient with neoplastic facial paralysis.

42. Soft Failure at the Facial Recess

Erik V. Berg, Boston, MA

Weiru Shao, MD, Boston, MA

Michael E. Dybka, PhD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate understanding of the complex diagnosis of cochlear implant soft failure, discuss the application of 2005 Cochlear Implant Soft Failures Consensus Development Conference recommendations, and discuss the various causes of this unique soft failure.

Objectives: Cochlear implant soft failures, when a device malfunction is suspected but cannot be proven using in vivo methods, are a rare complication. It's a difficult diagnosis because it is one of suspicion, exclusion, and eventual confirmation by explantation. **Study Design:** Case report. **Methods:** A 21 year old female received a Clarion Hi Focus cochlear implant in right ear. There were no surgical complications, device testing was within normal limits, and a photograph showed an intact electrode array. Five years later she presented with intermittent performance, headaches, dizziness, and FNS. Over the next eight months she returned for multiple reprogrammings and internal/external hardware testing because of decreased speech perception (HINT scores fluctuating from 61-90%). Pregnancy, allergic reaction to medication, and question of perilymphatic fistula complicated the case. **Results:** During tympanomastoidectomy significant scarring was found plus a sheared electrode array near the facial canal. The array was tented away from the facial canal which temporarily improved function. Eventually reimplantation with a Clarion HiRes 90K device resolved all symptoms. **Conclusions:** The case raises interesting points of discussion. First how difficult it is to diagnose soft failures. Second this is a unique case of FNS at the facial recess instead of near the cochlea. Third how was the array damaged? There is photographic evidence of the intact electrode array coating in the initial surgery and damage nearly six years later. Possible causes include scar contraction, micro-motion, or combination of both. This case highlights the need for more research in diagnosing soft failure in vivo and thus eliminating the term soft failure.

43. Population Based Characteristics of Malignant Neoplasms of the Middle Ear

Naveen D. Bhandarkar, MD, Chicago, IL

Robert A. Williamson, MD, Chicago, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to cite the most common histologies and demographic characteristics of middle ear malignancies as well as gain an understanding of the nature of the SEER database.

Objectives: To study demographic data, treatment, and survival for malignant neoplasms of the middle ear and determine adequacy of database review for such tumors. **Study Design:** Retrospective database review over 30 year period (1973-2003). **Methods:** The Surveillance, Epidemiology, and End Results database was reviewed for malignant tumors of all histologic types located in the middle

ear. Pediatric (age < 18) and adult cases were collected and analyzed separately. Clinical characteristics were tabulated and analyzed statistically; Kaplan-Meier survival curves were constructed. **Results:** The most common histologies in the pediatric and adult populations were rhabdomyosarcoma and squamous cell carcinoma respectively. Treatments reported included no treatment, surgery alone, surgery with radiation therapy in any order, and radiation alone. The administration of chemotherapy was not reported. Median overall survival was 17 months for all tumors, 64 months for pediatric tumors, and 13 months for squamous cell carcinoma. Kaplan Meier curves for specific survival patterns are presented graphically. **Conclusions:** The SEER database is a valuable tool for population based review of rare neoplasms such as malignancies of the middle ear. Prognosis varied according to histology; overall prognosis was poor for adult tumors and worse specifically for squamous cell carcinoma but better for pediatric tumors. Limitations of the database include cross-sectional and regional population study, inconsistency in data reporting, lack of staging data to correlate with treatment, and failure to report administration of chemotherapy. Site specific classification of cases involving the ear and temporal bone was not available but would be useful. Modification of the database to address limitations would significantly strengthen its utility and clinical applicability.

44. **Progressive Hemifacial Atrophy (Parry-Romberg Syndrome)**

Christopher J. Danner, MD, Tampa, FL

Loren J. Bartels, MD*, Tampa, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) discuss the clinical characteristics of Parry-Romberg syndrome; 2) explain the pathophysiology; 3) list differential diagnosis; and 4) describe the treatment of progressive hemifacial atrophy.

Objectives: The objective is to describe two cases with Parry-Romberg syndrome and accomplish a literature review explaining pathophysiology, differential diagnosis and treatment of progressive hemifacial atrophy. **Study Design:** Chart review with literature review. **Methods:** Retrospective chart review. **Results:** Two patients with progressive hemifacial atrophy consistent with Parry-Romberg syndrome are described. **Conclusions:** Parry-Romberg syndrome (PRS) is a rare neurocutaneous disorder characterized by progressive facial atrophy. A significant number of patients have brain involvement with intracerebral atrophy or white matter hyperintensity noted on MRI imaging. Facial paresthesia, trigeminal neuritis, headaches and epilepsy are associated with the disorder and represent the major central nervous system comorbidities. A disturbance of fat metabolism is thought to be the primary cause of the disorder. PRS is frequently associated with linear scleroderma “en coup de saber” in which there is considerable diagnostic overlap. PRS seems to be more common in children. Neuroimaging studies should be considered in all patients.

45. **Auditory Processing of Intensity for Rapidly Occurring Sounds: ERP Evidence in Normally Developing Children and Adults**

Elizabeth Dinces, MD MS, Bronx, NY

Elyse Sussman, PhD, Bronx, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to explain how intensity coding of rapid sounds in the event related potential (ERP) are affected by the complexity of the sound environment in children and adults. The participant should also understand that ERP's can be studied with rapid rate paradigms.

Objectives: From an early age our ability to understand speech is highly dependent on the accurate perception of rapid variations of intensity and frequency within the speech signal. In this study we assessed intensity coding at a rapid pace in typically developing 10-11 year olds and adults by recording the obligatory auditory evoked brain potentials (ERP's). **Study Design:** Cross-sectional repeated measures design with variables of complexity and sound intensity. **Methods:** We presented 1000 Hz tones with a 125 ms onset-to-onset pace and compared the ERP responses to the same sounds presented at a rate of 750ms. 24 subjects watched a closed captioned video while the ERP's were recorded with scalp electrodes. The key variable was the complexity within which the sound intensities were presented. In one condition a single intensity level was presented, whereas in the complex conditions two or more intensity levels were intermixed. **Results:** Based on our previous study, we hypothesized that intensity would not be coded as an absolute function of sound level and expected that complexity would influence the amplitude of the evoked responses. A significant effect of intensity on the pre-attentive obligatory ERP responses was found, as evidenced by increases in amplitude of the N1 and P2 components in both the slow and fast paced conditions. Additionally an effect of the sound environment on the ERP response was found, sound intensity as evidenced by latency and amplitude changes. **Conclusions:** We conclude that the sound environment influences the neurophysiological response to sound intensity in normally developing children and adults. Fast paced paradigms that more closely approximate real life situations can be studied in school aged children.

46. **Outcome of Cochlear Implant Surgery in Patients More Than Eighty Years Old**

Adrien A. Eshraghi, MD, Miami, FL

Michael J. Rodriguez, MD, Miami, FL (Presenter)

Ellam Adil, BS, Miami, FL

Simon Angeli, MD, Miami, FL
Fred Telischi, MD*, Miami, FL
Thomas J. Balkany, MD*, Miami, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to consider cochlear implantation in patients older than eighty years old as a possibility for hearing and quality of life improvement.

Objectives: Evaluate the auditory performance and quality of life following cochlear implantation in patients greater than 80 years of age. **Study Design:** Retrospective trial, tertiary referral center. **Methods:** The study group is comprised of 20 profoundly hearing impaired patients implanted after 80 years of age from 1992 thru 2004. Pre-op evaluation consisted of pure tone audiometry and speech discrimination scores. The results of these tests were compared using a student's t-test to similar tests taken postoperatively. Improvements in quality of life are evaluated postoperatively with the validated Hearing Handicap Inventory for the Elderly (HHIE) questionnaire completed by the study participants. **Results:** Following implantation the participants experienced a significant improvement in audiologic performance ($P < 0.05$) and quality of life. **Conclusions:** This is the first study to focus on a patient group this extreme in age. With increasing life expectancy it is important to begin to stratify risk versus benefit of cochlear implantation in this age group. Cochlear implantation can improve audiologic performance and quality of life in patients older than eighty years old. Additional studies could examine surgical complications in this age group.

47. The Influence of the Age on Tissue Engineered Regeneration of the Mastoid Air Cells

Shin-ichi Kanemaru, MD PhD, Kyoto, Japan
Masaru Yamashita, MD, Kyoto, Japan
Harukazu Hiraumi, 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 understand the importance of the mastoid air cells regeneration to achieve a complete recovery from intractable otitis media.

Objectives: To estimate the influence of the patient's age on mastoid air cell (MAC) regeneration by implantation of artificial pneumatic bones (APB). The gas exchange mechanism in the mucosa of MACs has an important role in middle ear pressure regulation, and its failure is one of the main causes of intractable otitis media. Therefore, to achieve a complete recovery from it, it is necessary to regenerate/generate MAC function. Previously we showed that MACs were enabled to regenerate by implantation of APB. **Study Design:** Pilot study of patients with otitis media. **Methods:** Collagen coated hydroxyapatite of honeycomb-like structure with a high pore ratio (90%) was used as APB. At the first stage of tympanoplasty APB was implanted into the newly opened mastoid cavity. 27 patients were randomly selected from chronic otitis media patients with cholesteatoma (n=13), cholesteatoma with adhesive otitis media (n=7), and severe chronic otitis media (n=7). They were divided into 2 groups by their age: group I (n=7, under 15 years old) and group II (n=20, over 16 years old). Regeneration was evaluated via high resolution computed tomography. The final assessment was performed 12 months after the 2nd stage operation. **Results:** Regeneration of MACs was observed in 85.7% of group I and 45% of group II. In all patients under 9 year old regeneration of MACs succeeded. **Conclusions:** Age is thought to be one of the most influenced factors in regeneration of MACs and their functions. Though the younger is more advantageously in regeneration of them it can be achieved even in the aged patients by this tissue engineered therapy.

48. Efficacy of the Bone Anchored Hearing Aid (BAHA) in Adults With Single Sided Deafness

Christopher J. Linstrom, MD*, New York, NY
Carol A. Silverman, PhD MPH, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the efficacy of the BAHA for single sided deafness over time in relation to objective measures of localization and speech recognition in noise and a subjective measure of benefit.

Objectives: The goal was to objectively and subjectively examine communicative efficacy of the BAHA over time in adults with single sided deafness. **Study Design:** Prospective investigation. **Methods:** Participants were five adults with single sided deafness who consented to BAHA implantation. At 1 and 6 months post sound processor fitting, a test of sound localization (using 500- and 2000-Hz narrow band noise bursts) and the Hearing-in-Noise (HINT) test were administered, and a subjective measure of patient satisfaction was obtained using the Abbreviated Profile of Hearing Aid Benefit (APHAB). **Results:** Better performance in the BAHA aided than unaided (BAHA off) condition in the majority of the 4 HINT conditions was obtained for only 2 of the 5 participants and 1 of the 5 participants at 1 and 6 months post sound processor fitting, respectively. Better localization performance in the BAHA aided than unaided condition was obtained by 3 of the 5 participants and 0 of the 5 participants at 1 month and 6 months post fitting, respectively. Nevertheless, on the subjective APHAB measure, 4 of the 5 participants rated their communicative performance better with their BAHA

on than off. **Conclusions:** We observed limited BAHA benefit for sentence recognition in background noise in adults with single sided deafness. At 6 months post fitting the BAHA provided benefit to 3 of the 5 participants in the HINT condition whereby the sentences were presented on the bad ear side, a very difficult listening situation for persons with single sided deafness. We did not observe BAHA benefit for localization at 6 months post fitting.

49. Office Based Radiological Examinations of the Middle Ear Using New Cone Beam Computed Tomography (CBCT)

Hiroshi Ogawa, MD, Fukushima, Japan
Mitsuyoshi Imaizumi, MD, Fukusshima, Japan
Takamichi Matsui, MD, Fukushima, Japan
Yukio Nomoto, MD, Fukushima, Japan
Koichi Omori, MD, Fukushima, Japan

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the new cone beam CT system, and the images obtained by this system were great value in the diagnosis of the middle ear disease.

Objectives: We evaluated the clinical applicability and efficiency of CBCT for visualization of middle ear using a 3D Accuitomo apparatus (Morita Mfg. Corp, Japan.). It features high resolution imaging in a limited cylindrical area of 60 mm in diameter and 60 mm in length, which is ideal for the examination of microscopic bony structures. By putting the patient in a sitting position in order to fit into smaller clinical offices, the system is designed to be compact (width 1.6 meter, depth 1.2 meter). **Study Design:** Prospective case series. **Methods:** The temporal bone region in 62 patients was examined using the 3D Accuitomo CBCT technique. **Results:** We obtained high resolution images of equal or higher quality than those obtained using a conventional multidetector CT (MDCT) system. In particular images of the ossicles were of higher quality than those obtained using MDCT in the cases of middle ear anomaly, injury, and cholesteatoma. The images obtained by this system were of great value in the diagnosis of the conductive deafness. These images provide useful for the visualization of minute configurations which can then be used in the planning of surgical intervention. By limiting imaging area this system allows us to acquire high quality images while minimizing the patient's exposure to harmful radiation. **Conclusions:** Based on radiological evaluation of the middle ear using the new CBCT, the system was highly efficient while being suited to the office clinic due to its compact nature.

50. Use of Topical Mitomycin C for Management of External Canal Meatal Stenosis

Renee J. Penn, MD, Washington, DC
Hung J. Kim, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to identify and explain the various approaches to management of external auditory canal meatal stenosis (EACMS) including the potential role of topical mitomycin C in conjunction with surgical therapy.

Objectives: External auditory canal meatal stenosis (EACMS) can result after otologic surgery, chronic infections, radiation therapy and trauma. Traditionally EACMS has treated with surgery alone. However re-stenosis after meatoplasty can frequently occur as a result of cicatricial scar formation. We report two cases of EACMS in which topical mitomycin C application was utilized intraoperatively at the time of meatoplasty. **Study Design:** Retrospective case series and literature review. **Methods:** Two patients with severe EACMS underwent meatoplasty and intraoperative application of topical mitomycin C (0.4mg/mL) to the meatal soft tissue. One patient had developed EACMS and canal cholesteatoma 50 years after external beam radiation therapy and multiple facial reconstructions for treatment of congenital facial hemangiomas. The second patient developed EACMS from hypertrophic scar formation three years after otologic surgery for cholesteatoma. The pre- and postoperative meatal patency and healing results are evaluated. **Results:** Two cases of EACMS were successfully managed with combined treatment of meatoplasty and topical mitomycin C therapy. Early postoperative results at 6 months reveal good patency of the meatus with no evidence of re-stenosis or infection. No complications from mitomycin C have been appreciated. **Conclusions:** Reports of utilization of topical mitomycin C have been described to reduce scar tissue formation. In the management of EACMS the goal of treatment is avoidance of re-stenosis and maintenance of a self-draining ear. Our reports suggest that topical mitomycin C therapy may be a helpful adjunct to surgical intervention for managing EACMS.

51. Cigarette Smoke Condensate Upregulates NF-kappa-B and Muc5b Expression in Murine Middle Ear Epithelial Cells

Diego A. Preciado, MD PhD, Washington, DC
George H. Zalzal, MD, Washington, DC
Mary C. Rose, PhD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) discuss cellular mechanisms by which cigarette smoke exposure may contribute to otitis media; 2) understand NF-kappa-B mediated cell events such as mucin gene

activation; and 3) explain promoter regulation of Muc5b.

Objectives: Cigarette smoke exposure has been shown to be a risk factor in the development of otitis media (OM). Molecular mechanisms which contribute to this pathologic link are unknown. MUC5B, a secreted mucin protein, has been shown to be preferentially upregulated in OM. NF-kappa-B is a ubiquitous transcription factor that in bronchial cells is activated by cigarette smoke condensate (CSC) resulting in mucin gene upregulation. **Study Design:** We hypothesized that in vitro stimulation of middle ear epithelial cells (MEEC) with CSC upregulates Muc5b through the activation of NF-kappa-B. **Methods:** Time course CSC stimulation of immortalized murine MEEC was performed. Reverse transcriptase polymerase chain reaction (RT-PCR) was done to show whether CSC induces Muc5b expression. Luciferase reporter assays were performed to determine whether CSC activates differing lengths of the Muc5b 5' flanking region. Electromobility shift assays (EMSA) and transcription factor assays (TFA) were performed to demonstrate NF-kappa-B activation with CSC. **Results:** RT-PCR demonstrated induction of Muc5b expression with CSC. Reporter assays showed a 3-5 fold induction of plasmids containing -556, -350, and -255 base pairs upstream of the Muc5b start codon, as well as induction of the NF-kappa-B consensus site with CSC. The induction correlated with EMSA and TFA 3-5 fold stimulation of NF- κ B. **Conclusions:** CSC activates Muc5b expression in cultured MEEC through induction of its promoter region. Furthermore the fact that this induction correlates to functional NF-kappa-B activation hints that much like in bronchial tissues, the activation of mucins by cigarette smoke is mediated via internal cellular transcription factor pathways.

52. Facial Nerve Decompression Surgery: Analysis of 19 Cases and Literature Review

Rafael E. Quinonez, MD PhD, Maywood, IL
Mobeen Shirazi, MD, Maywood, IL
John P. Leonetti, MD, Maywood, IL
Sam J. Marzo, MD, Maywood, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the current theories of facial nerve decompression for Bell's palsy, Ramsay Hunt syndrome, and temporal bone fractures.

Objectives: Late facial nerve decompression for Bell's palsy, Ramsay Hunt syndrome, and temporal bone fractures remains a controversial subject especially when performed more than two weeks after onset of symptoms. The purpose of this study was to review the current literature on this topic and contrast those findings with long-term results of delayed facial nerve decompression at our institution. **Study Design:** Retrospective case review, literature analysis. **Methods:** Nineteen patients with complete facial nerve paralysis underwent facial nerve decompression (transmastoid n=15, middle cranial fossa n=4). Average follow-up was a minimum of 1 year. The time between the onset of symptoms and surgical decompression ranged from 30-180 days (mean=62). Main outcomes measured were indications for facial nerve decompression, timing of surgery, and postoperative facial function using the House Brackmann grading (HB). **Results:** Following facial nerve decompression, facial function improved to HB I (n=2), HB II (n=5), and HB III (n=2) in the Bell's palsy group. Facial function grade was HB I (n=1), HB II (n=5), and HB III (n=3) in the Ramsay Hunt syndrome group. In the temporal bone fracture group, facial function grade was HB II (n=1) and HB V (n=1). Reviews of current theories of late facial nerve decompression are presented. **Conclusions:** Delayed facial nerve decompression for Bell's palsy, Ramsay Hunt syndrome, and temporal bone fractures continues to be controversial. Nevertheless in our limited experience, normal or near normal facial function was obtained in the majority of patients. Future research endeavor should include multicenter investigations with a greater number of patients.

53. Vestibular and Ototoxicity Across the Platinum Spectrum - Early Experience With Oxaliplatin Chemotherapy in Cancer Patients

Panos S. Savvides, MD PhD MPH, Cleveland, OH
Judith A. White, MD PhD, Cleveland, OH (Presenter)

Educational Objective: At the conclusion of this presentation, the participants should be able to compare and contrast expected vestibular and ototoxicity in cis- carbo- and oxaliplatin chemotherapy regimens.

Objectives: 1) To describe self-reported vestibular symptoms during treatment with a new platinum chemotherapy agent, oxaliplatin; 2) to correlate self-reported vestibular symptoms with the development of peripheral neuropathy, which is the most common dose limiting toxicity of oxaliplatin; and 3) to determine the incidence of sensorineural hearing loss in patients on an oxaliplatin containing chemotherapy regimen for solid tumor malignancies (predominantly colorectal cancer). **Study Design:** Retrospective case series of 20 patients on an oxaliplatin containing chemotherapy regimen. **Methods:** Audiological evaluation, peripheral neuropathy scale (PNS, Almadrones 2004 and Common Toxicity Criteria for Adverse Events, version 3) and self-reported dizziness (Dizziness Handicap Inventory, Jacobsen, 1990) were assessed. **Results:** 40% of patients reported significant dizziness handicap (DHI > 10). 25% reported that quick head movements increased their problem. Dizziness handicap was associated with a grade 2 or higher severity of peripheral neuropathy ($r=0.82$, $p=0.04$). High frequency sensorineural hearing loss was common, although the lack of a baseline comparative audiogram limited conclusions. **Conclusions:** Oxaliplatin is a new platinum chemotherapeutic agent used in solid tumors. The most

common dose limiting toxicity is neuropathy. Forty percent of patients undergoing oxaliplatin chemotherapy in our study group (n=20) report significant dizziness, and 25% report symptoms highly suggestive of vestibular disorder (rapid head movements increase symptoms). The presence of significant vestibular symptoms is associated with the presence of severe peripheral neuropathy. Further research is needed to define the prevalence of vestibular and ototoxic effects of oxaliplatin in cancer patients.

54. **Manubrium Stapes Offset**

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

Educational Objective: At the conclusion of this presentation, participants should be able to know the range of distances of the height and horizontal offset between the manubrium and the capitulum of the stapes and be able to better approach the challenges of type II tympanoplasty.

Objectives: To depict the malleus-stapes offset, its relationships to orientation of the manubrium as viewed through the external ear canal relative a horizontal plane, and mastoid pneumatization size. **Study Design:** Postmortem anatomic dissection of 41 bequeathed adult crania (82 temporal bones) without clinical otitis. **Methods:** The malleus-stapes offset was analyzed both as a surgeon does intra-operatively and from above through the tegmen tympani after the technique of Mills (1991). Mastoid sizes were determined radiographically. **Results:** From the surgeon's perspective for the right ear the "height" (manubrium to capitulum) ranged 0-1.5 mm (mean 0.5); the "horizontal" offset ranged 1.0-4.0 mm (mean 2.2). Both height and horizontal offset exhibited wide intersubject variability, quite weak bilateral symmetry, and no relationship with either manubrium orientation or mastoid size. **Conclusions:** These data do not suggest that the ranges of manubrium-stapes height and offset correlate with either manubrium orientation or extent of mastoid pneumatization.

55. **P. Aeruginosa Biofilms in Flow Chambers Are Inhibited by Gentian Violet and Ferrous Ammonium Citrate**

Eric W. Wang, MD, Saint Louis, MO
Osarenoma Olomu, BS, Saint Louis, MO
Gabriela Agostini, MD, Saint Louis, MO
Daniel Runco, BS, Saint Louis, MO
Robert Nason, MD, Saint Louis, MO
Richard A. Chole, MD PhD*, Saint Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role of biofilms in otolaryngologic infections and explain the role of biofilm inhibitors to reduce biofilm volume.

Objectives: To study the effect of gentian violet (GV) and ferrous ammonium citrate (FAC) on pseudomonas aeruginosa biofilms grown in flow chambers. The PA biofilm phenotype is associated with the chronicity of several otolaryngologic infections. Otopathogenic pseudomonas aeruginosa (OPPA) are competent biofilm formers that generate more biofilm in vitro than PAO1, a common laboratory strain. This study evaluated two potential biofilm inhibitors, GV and FAC, in reducing OPPA and PAO1 biofilm volumes in flow chambers. **Study Design:** OPPA and PAO1 biofilm volume was measured in the presence of GV or FAC. **Methods:** OPPA and PAO1 expressing a green fluorescent protein plasmid (pMRP9-1) was inoculated into a glass flow chamber and biofilms were grown under low flow conditions in Lucia-Bertoni broth at room temperature for 48 hours. Subsequently GV or FAC was added to the media for an additional 24 hours. Biofilm formation was visualized by confocal laser microscopy and biofilm volume was assayed by measuring fluorescence. Statistical analysis was performed by ANOVA. **Results:** OPPA produced greater volumes of biofilm than PAO1. GV and FAC resulted in decreased OPPA and PAO1 biofilm volumes in a dose dependent manner but had no effect on planktonic growth. **Conclusions:** The efficacy of GV and FAC in reducing biofilm volume in OPPA in vitro suggests that these inhibitors could reduce biofilms in vivo. Although complete eradication of biofilm was not seen at these concentrations, higher doses of either inhibitor, the potential synergy of these inhibitors and the use of an inhibitor with antibiotics could further enhance the efficacy of this potential intervention.

56. **Ototoxicity of Acetaminophen in the Mouse Neonatal Cochlea Culture**

Joshua G. Yorgason, MD, Salt Lake City, UT
Jose N. Fayad, MD*, Los Angeles, CA
William M. Luxford, MD, Los Angeles, CA
Andrew K. Groves, PhD, Los Angeles, CA
Neil N. Segil, PhD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should demonstrate an awareness of ototoxicity of acetaminophen in combination with hydrocodone as reported in the literature. Participants should be able to explain the benefits of the Math1-GFP neonatal mouse cochlear for studying ototoxicity. They should be able to discuss the findings of hair cell specific toxicity

to acetaminophen exposure and compare the effect to exposure to hydrocodone. They should discuss the clinical applications and the future scope for studying acetaminophen ototoxicity in humans.

Objectives: Ototoxicity has been described clinically with the use of hydrocodone (HC) and acetaminophen (AC) in combination but not in either drug alone. We hypothesize that HC and AC are synergistically toxic to the inner ear. The study objective is to use our previously established cochlea culture model of ototoxicity to test our hypothesis in the neonatal mouse. **Study Design:** Experimental study. **Methods:** The basal third segment of the Organ of Corti was dissected in newborn transgenic Math1-GFP mouse cochleas and cultured overnight in Medium199 with 10% fetal bovine serum. Medium was replaced with increasing concentrations 75:1 of AC and HC (HC 15ug/mL + AC 1125 ug/mL, HC 25ug/mL + AC 1875ug/mL, HC 35ug/mL + AC 2625ug/mL, HC 40ug/mL + AC 3000ug/mL). Separate cultures were exposed to the highest dose of either acetaminophen or hydrocodone alone. Control cultures were exposed to medium alone. Hair cell death was measured by absence of Math1-GFP expression on fluorescent microscopy 22-24h after drug exposure. After fixation hair cell apoptosis was confirmed using immunohistochemistry with hair cell specific Myosin7a and with anti-activated Caspase3. **Results:** A dose dependant hair cell toxicity was observed with the combination drug (percent survival with increasing dose was 98%, 56%, 16% and 4%). At the highest concentration of hydrocodone alone there was 99% hair cell survival. In contrast the highest dose of acetaminophen there was only 7% hair cell survival. **Conclusions:** In our neonatal cochlear culture model acetaminophen, not hydrocodone, induces hair cell apoptosis possibly explaining clinical ototoxicity from using this drug combination.

SINUS, LARYNGOLOGY

57. Extraluminal Air in the Head and Neck: A Metaanalysis

Sidrah M. Ahmad, BS, Philadelphia, PA
Joshua L. Scharf, MD, Philadelphia, PA (Presenter)
John P. Gaughan, PhD, Philadelphia, PA
Ahmed M.S. Soliman, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the major etiologic factors for extraluminal air in the head and neck.

Objectives: Free air in the fascial planes of the head and neck results from various etiologies. Prompt identification is important in order to prevent serious complications. We present a series of twenty-eight patients with free air in the fascial planes of the neck that presented to our institution with a metaanalysis of the published English language literature. **Study Design:** A retrospective review and metaanalysis of the English language literature. **Methods:** A retrospective review of all patients presenting to our hospital with free air in the fascial planes of the neck, between the years 2000 and 2006, was carried out. The presentation, radiologic findings, etiology and management were recorded. A metaanalysis of the English language literature was also performed. **Results:** Twenty-eight patients with free air in the fascial planes of the neck from various etiologies were identified. Odynophagia was identified in 10.7% of patients of which 66.7% required surgical intervention. Using a weighted random effects metaanalysis, patients presenting with cough, dysphagia, odynophagia, and soft tissue tenderness, edema, or erythema were found to have longer hospital stay. Also patients who presented with sore throat, soft tissue tenderness, edema, or erythema, and palpable crepitus required a significantly longer period for complete resolution of free air. At our institution an initial complaint of odynophagia was a predictor of surgical intervention. Patients who presented with a complaint of odynophagia were 18 times more likely to require surgical intervention during the course of their hospital stay ($p=0.0438$). **Conclusions:** Free air in the fascial planes of the neck is a rare occurrence but carries a high morbidity. Knowledge of the early signs and symptoms is useful in predicting outcome.

58. Effect of Proton Pump Inhibitor Pantoprazole on Growth and Morphology of Oral Lactobacillus Strains

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Neal D. Hammer, MS, Ann Arbor, MI
Benjamin J. Vesper, BS, Chicago, IL
Lin Tao, DDS PhD, Chicago, IL
James A. Radosevich, PhD, Chicago, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the possible effects of systemic proton pump inhibitor pharmacotherapy on oral flora.

Objectives: Proton pump inhibitors (PPI) used to suppress acid secretion in the stomach are amongst the most widely prescribed medications. There is emerging evidence of proton secretion elsewhere in the aerodigestive tract, and acidic microenvironments are integral to oral flora such as lactobacillus. The hypothesis of this study is that growth rate and morphology of oral lactobacillus strains are affected by PPI's. **Study Design:** Prospective in vitro study. **Methods:** Nineteen different strains of lactobacilli were inoculated in microtiter plates at pH of 4.5 - 6.5, and exposed to two-fold dilutions of pantoprazole at a range of 2.5 mg/mL - 2.5 µg/mL. Bacterial

growth was monitored, and the minimal inhibitory concentration (MIC) of the drug was determined for the strains most sensitive to pantoprazole. **Results:** In the unexposed (control) group, nine lactobacilli strains were affected by pH changes from 6.5 to 4.5. In the group exposed to pantoprazole eight of the nineteen lactobacilli strains were found to have an MIC below 313 mg/mL, with *L. plantarum* 14917 being the most sensitive (MIC=20 µg/mL). In some strains such as *L. s. salivarius* 11741, gram staining revealed conformational changes in the bacteria when grown in the presence of pantoprazole. **Conclusions:** Growth rates and morphology of oral lactobacillus are affected by the pH of the environment. Pantoprazole at physiologic doses further affects growth rates and conformation in some strains. The balance of oral flora and upper digestive tract homeostasis may be affected by unexpected targets of PPI pharmacotherapy with possible unanticipated consequences.

59. Effects of Dust Mite Allergies on the Phonation Subsystem

Michael A. Carron, MD, Detroit, MI
James P. Dworkin, PHD, Detroit, MI
Robert J. Stachler, MD, Detroit, MI
John H. Krouse, MD PhD*, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to better understand the effects of perennial allergies on the form and function of the larynx. Specifically readers will be exposed to the role of skin prick allergy testing and voice laboratory analyses in analyzing the phonation subsystem in allergic and nonallergic patients. They will understand that in day to day living, patients with perennial allergies do not necessarily have poorer voice characteristics when compared to controls.

Objectives: This study examines laryngeal anatomy and physiology in patients with dust mite allergies. Skin prick testing, acoustic voice analysis and speech aerodynamic testing are employed. Our hypothesis is that in allergic individuals, IgE mediated response will occur with inflammation, edema and mucous in the endolarynx. **Study Design:** Prospective, blinded case control study. 21 experimental and 28 control subjects. **Methods:** The presence of allergy to *D. pteronyssinus* was assessed via skin prick test. Acoustic analysis of voice was used to determine fundamental frequency, jitter, shimmer and harmonic to noise ratio were measured. Speech aerodynamic testing was used to calculate transglottal flow, subglottal pressure and glottal resistance measurements. Videostroboscopic exam was performed to examine and record the anatomy and physiology of the larynx and vocal fold mechanism. Mann-Whitney U tests were employed to assess for statistically significant differences among the two groups. **Results:** Data from acoustic analyses, speech aerodynamic testing, digital audio recordings, and videostroboscopic examination were statistically compared between experimentals and controls. There were no statistically significant differences in any of the categories. **Conclusions:** Persons with perennial dust mite allergy do not exhibit worsened laryngeal function or speech quality. This may be due to low perennial antigen exposure in normal day to day situations. However, when exposed to a high antigen load, laryngeal performance may be impaired i.e. coughing, throat clearing and hoarseness. This hypothesis will be tested by examining laryngeal function and speech quality when a person is in season and out of season for allergy.

60. The Diagnostic Dilemma of Sinonasal Destructive Lesions

John M. DelGaudio, MD*, Atlanta, GA
Eric E. Berg, MD, Atlanta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the diagnostic dilemma in destructive sinonasal lesions and the nuances of diagnosis.

Objectives: The differential diagnosis of sinonasal destructive lesions is limited yet often difficult to distinguish clinically. It includes Wegener's granulomatosis, lethal midline granuloma (lymphoma), vanishing bone (Gorham's) disease, chronic indolent invasive fungal sinusitis, intranasal cocaine abuse, and tumors. While sinonasal manifestations of such diseases may be subtle extensive destruction may also be found. Further proper diagnosis is vital to adequate treatment of disease. We present a series of cases that point out the difficulty in diagnosis of destructive sinonasal processes. **Study Design:** Case series. **Methods:** The cases of five patients presenting to an otolaryngology clinic with destructive sinonasal disease of unknown etiology will be reviewed. **Results:** We present five cases representing the spectrum of destructive disease that may be encountered in a clinical practice. Two patients with midfacial destructive processes and negative serologic workups were subsequently diagnosed with Wegener's granulomatosis based on positive anti-proteinase 3 assay. Cases of midfacial lymphoma, cocaine abuse, and indolent invasive fungal sinusitis may mimic Wegener's granulomatosis clinically and serologically, and will also be presented. These cases serve to demonstrate the difficulties one may encounter in the evaluation of a patient who presents with a destructive sinonasal lesion. The same disease process may vary dramatically in clinical stage and severity. Different disease processes may have remarkably similar clinical characteristics. Accurate diagnosis of these patients is essential and is aided by evaluation with a clear differential diagnosis in mind. **Conclusions:** Sinonasal destructive lesions can present a diagnostic challenge. Careful workup and laboratory evaluation can allow differentiation of these processes.

61. Endoscopic Salvage of Failed Frontal Sinus Cranialization

Joshua L. Hentzelman, MD, St. Louis, MO
Raj H. Sindwani, MD, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) explain the indications and technique of frontal sinus cranialization; 2) demonstrate the importance of establishing a barrier between the intracranial cavity and the sinonasal tract below during cranialization and understand the complications that can result if such a separation is not adequately maintained; and 3) discuss the role of endoscopic management of pneumocephalus following frontal sinus cranialization.

Objectives: A fundamental objective of frontal sinus cranialization is to isolate the intracranial contents from the air containing sinonasal structures below. We present the unusual complication of massive pneumocephalus following cranialization surgery which was successfully managed endoscopically. **Study Design:** Case report. **Methods:** A 37 year old otherwise healthy male suffered a GSW to the head. Due to extensive trauma to the frontal sinuses the patient underwent debridement and bilateral frontal sinus cranialization performed by neurosurgery and plastic surgery at a tertiary care center. The patient did well initially but presented 2 months later with severe frontal headaches. A CT scan was obtained and the otolaryngology service was then consulted. **Results:** The CT scan showed massive pneumocephalus with apparently patent nasofrontal outflow tracts (ducts) bilaterally. Cephalad bowing of a pericranial flap within the pneumatized anterior cranial cavity was also visualized. The separation of the intracranial cavity from the sinonasal tract was reestablished via a transnasal, endoscopic approach through both frontal recesses, employing abdominal fat, fibrin glue and mucosal grafts. The patient was discharged from hospital within 48 hours. Six weeks postoperatively he reported a significant reduction in his headaches, and a CT scan demonstrated near total resolution of the pneumocephalus. Ten months after surgery the patient continued to do well with no evidence of intracranial air on imaging. **Conclusions:** Frontal sinus cranialization is a complex operation that should only be performed by appropriately trained surgeons. If needed reconstitution of the intracranial cavity-sinonasal tract barrier may be accomplished endoscopically, thereby avoiding the morbidity of a revision craniotomy.

62. Papillary Cystadenoma of the Nasal Cavity

Paul E. Johnson, MD, New York, NY
Tom T. Karnezis, BA, New York, NY
Ian S. Storper, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the characteristics, presentation and management of papillary cystadenomas of the nasal cavity.

Objectives: We report the management of a papillary cystadenoma of the nasal cavity with en bloc endoscopic resection. **Study Design:** Case report. **Methods:** Case report of a 68 year old gentleman with a papillary cystadenoma of the nasal cavity. The characteristics, presentation and management of this tumor are discussed. **Results:** The patient underwent en bloc endoscopic resection of the tumor. He remains without evidence of recurrence to date. **Conclusions:** Papillary cystadenomas are rare tumors of the nasal cavity. They may be managed with en bloc endoscopic resection.

63. Image Guided Transsphenoidal Endoscopic Drainage of a Petrous Apex Cholesterol Granuloma - A Useful Technique for Select Lesions

Arjun S. Joshi, MD, Washington, DC
Douglas R. Sidell, MS, Washington, DC
Neil Tanna, MD, Washington, DC
Vivek R. Deshmukh, MD, Washington, DC
David A. Schessel, MD, Washington, DC
Philip E. Zapanta, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the surgical options for treatment of cholesterol granulomas. In addition the participants should appreciate the advantages/disadvantages associated with the endoscopic transsphenoidal approach.

Objectives: Surgical management of cholesterol granuloma of the petrous apex has traditionally involved either transmastoid and/or craniotomy approaches. In this report particular focus will be paid to the newer endoscopic transsphenoidal approach and the utility of CT/MRI fusion versus single modality image guidance when using this technique. **Study Design:** A retrospective chart review of one patient with a petrous apex cholesterol granuloma treated with endoscopic transsphenoidal drainage followed by a discussion of recent literature. **Methods:** This report discusses our management of an otherwise healthy adult female with a petrous apex cholesterol granuloma who was treated using an CT/MR image guided endoscopic transsphenoidal approach. **Results:** A 33 year old female presented with headache, diplopia, and retromastoid pain and was subsequently found to have a large petrous apex cholesterol granuloma ensheathing the otic capsule, displacing the IAC, abutting the carotid and basilar arteries, and eroding the clivus. Using CT/MR fusion image guidance the exact location of the internal carotid and basilar artery was mapped out allowing for accurate drilling and wide mar-

supialization intraoperatively. The patient was discharged the next day. The patient remains symptom free at three months, and endoscopic examination reveals a widely patent cavity without reaccumulation. **Conclusions:** The endoscopic approach is a useful technique for the treatment of select anteromedial lesions of the petrous apex. Clinicians should be aware of the technique's advantages and limitations.

64. **Modulation of MyoD and Ki-67 Positive Satellite Cells in the Short-Term Denervated Rat Thyroarytenoid Muscle**

Yoshihiko Kumai, MD, Kumamoto, Japan
Satoru Miyamaru, MD, Kumamoto, Japan
Takaaki Ito, MD PhD, Kumamoto, Japan
Eiji Yumoto, MD PhD, Kumamoto, Japan

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize that denervation induces activation of satellite cells (SCs) expressing MyoD or Ki-67 which are not detected in the control rat thyroarytenoid (TA) muscle.

Objectives: To evaluate the effects of short-term denervation on the SCs and myocytes in the rat TA muscle using expression of the myogenic regulatory factor, MyoD and a marker for nuclei proliferation, Ki-67. **Study Design:** Quantitative immunohistochemical assessment of MyoD and Ki-67 expression in SCs and myocytes following denervation. **Methods:** Fifteen Wistar rats were treated with transection of the left recurrent laryngeal nerve (RLN) and were sacrificed at 1, 3, or 7 days after the treatment (each group; n=5). Double fluorescein immunostaining was performed to visualize the localization of MyoD⁺ SCs and Ki-67⁺ SCs using anti-M-cadherin antibody, a SC-specific marker. We examined the temporal changes of the ratios of MyoD⁺ SCs and Ki-67⁺ SCs among all counted muscle fibers and all counted M-cadherin⁺ SCs in both the denervated and contralateral TA muscle. **Results:** In the denervated side, TA muscle contained 3.8±0.4% MyoD⁺ SCs, 1.3±0.4% Ki-67⁺ SCs. 22.6± 2.2% of the SCs were MyoD⁺ and 14.5 ± 4.4% were Ki-67⁺, whereas, in the control side, SCs did not express these markers. **Conclusions:** In the rat TA muscle, denervation induces SCs activation, which was not detected on the control side. Based on this molecular basis, SCs may be good targets for the therapy of prevention of TA muscle atrophy following RLN paralysis in the future.

65. **Investigation of the Role of Common Respiratory Viral Pathogens in the Mucosa of Patients With Chronic Rhinosinusitis Using PCR Techniques**

Biana G. Lanson, MD, New York, NY
Aaron N. Pearlman, MD, New York, NY
Richard A. Lebowitz, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) appreciate the role of microbial and viral flora in the paranasal sinuses of patients with chronic rhinosinusitis with and without nasal polyps; and 2) understand molecular techniques and their utility in the investigation of viral DNA and RNA in nasal mucosa tissue.

Objectives: To investigate the presence of common respiratory viral pathogens and to determine the bacterial and fungal environment in sinus mucosa of patients with chronic rhinosinusitis (CRS) with nasal polyps and those without nasal polyps. **Study Design:** Prospective, cross-sectional study. **Methods:** Patients undergoing endoscopic sinus surgery for CRS were divided into two groups based on the presence or absence of nasal polyps. Intraoperative bacterial and fungal cultures were obtained from the maxillary antrum or ethmoid bulla. Ethmoid bulla mucosa was used for DNA extraction. Reverse transcriptase polymerase chain reaction (RT-PCR) and PCR were performed to investigate the presence of four common respiratory viral pathogens—adenovirus (DNA-virus), respiratory syncytial virus, influenza A and B viruses (RNA-viruses). **Results:** Forty-two patients were enrolled in the study: 18 patients with nasal polyps and 24 without polyps. Successful PCR to identify viral DNA was performed on 42 samples. Thirty-nine samples had adequate DNA for RT-PCR to identify viral RNA. No evidence of viral DNA or RNA was found in any of the samples. Bacterial culture results showed no significant difference between the two groups in monomicrobial versus polymicrobial growth. The most commonly isolated organism, staphylococcus epidermidis, was present in 33 patients. Bipolaris was isolated in one patient with nasal polyps. **Conclusions:** With the use of PCR technique there was no evidence of adenovirus, respiratory syncytial virus, or influenza A and B viruses in the mucosa of patients with CRS with or without nasal polyps. Staphylococcus epidermidis was the most commonly isolated organism in the mucosa of patients with chronic rhinosinusitis.

66. **Extranodal Sinonasal Lymphoma Presenting as Chronic Sinusitis With Palate Findings**

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Sidney P. Lipman, MD, Erie, PA
Rick A. Fornelli, MD, Erie, PA
Howard L. Levine, MD*, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the extranodal palatal man-

ifestations of sinonasal non-Hodgkin's lymphoma.

Objectives: Extranodal non-Hodgkin's lymphoma (NHL) presenting as chronic sinusitis by literature review and case study. **Study Design:** Literature review with 2 case studies. **Methods:** This review encompasses the English language literature accessed using PubMed and Medline. Key words for literature search included sinonasal lymphoma, extranodal NHL, and palate manifestations of lymphoma. Two patients with chronic sinusitis and palate swelling presented to our clinic. Preoperative evaluation included physical exam, CT scan, and rigid nasal endoscopy. Operative intervention included endoscopic sinus surgery and palate biopsy. Histopathology and immunohistochemistry were consistent with extranodal NHL (one NK/T cell, the other B-cell). Treatment consisted of chemotherapy and radiation therapy. One patient subsequently expired of his disease while the other is in remission. **Results:** Extranodal NHL of the sinuses can present with varying symptoms including referred otalgia, throat pain, nasal discharge, palatal irregularities and chronic suppurative sinusitis. Primary surgery should include fresh tissue including microdebrider samples collected in traps sent for analysis with flow cytometry and immunohistochemistry. A high index of suspicion for lymphoma should exist in patients who do not improve with traditional management including aggressive antimicrobial and steroid pharmacotherapy. Patients may present with symptoms consistent with local immune dysregulation in the sinonasal area leading to chronic infection. **Conclusions:** Extranodal NHL remains difficult to diagnose. A high index of suspicion and adequate fresh tissue remains paramount to the timely diagnosis and appropriate treatment of this disease. Failure to send tissue for routine fresh histopathology and immunohistochemistry may lead to delay in diagnosis and poorer overall outcome.

67. **Outpatient Evaluation and Management of Skull Base Defects Following Minimally Invasive Endoscopic Transsphenoidal Pituitary Surgery**

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James Evans, MD, Philadelphia, PA
William M. Keane, MD*, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the role of endoscopic examination, debridement, and evaluation of skull based defects and dural repairs following endoscopic pituitary resections and also advanced cranial base surgery.

Objectives: Endoscopic endonasal transsphenoidal surgery is an advanced technique used for resection of pituitary and skull base tumors that provides improved efficacy, patient morbidity, and complication rates postoperatively. The ability to monitor the sella and evaluate the skull base repair in an outpatient setting is an additional advantage of this technique that may ultimately also play a role in tumor surveillance postoperatively. **Study Design:** Illustrative case series. **Methods:** Chart review, technique description, and review of literature. **Results:** In-office endoscopic evaluation of the sphenoid sinus following transsphenoidal resection of skull base tumors at 2 week, 4 week, and monthly intervals is well tolerated and reveals excellent healing of the dural repair as well as the nasal mucosa, with direct visualization and assessment of any potential CSF leakage or local inflammation/infection. Skull base repairs may be debrided and assessed for graft survivability as well as bone remodeling. **Conclusions:** Successful postoperative management of pituitary and skull base tumors following minimally invasive transsphenoidal resections includes serial endoscopic evaluation and visualization of the skull base repair.

68. **Aberrant Expression of CTGF/CCN2 in Recurrent Respiratory Papillomatosis**

John M. Schweinfurth, MD, Jackson, MS
Kong T. Chong, PhD, Jackson, MS

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the possible roles of CCN2 in the course of RRP.

Objectives: Recurrent respiratory papillomatosis (RRP) is a condition of virally transformed neoplastic epithelial growth. Papilloma are highly vascular tumors, and angiogenesis may play an important role in the proliferation of RRP. The objective of this study is to determine if connective tissue growth factor (CTGF/CCN2) is elevated in RRP and if levels correlate with the clinical severity and course of the disease. **Study Design:** Prospective basic science study. **Methods:** Following institutional approval and individual patient consent, biopsy specimens were prospectively collected from 12 patients (9 children and 3 adults) with RRP over an 18 month period at intervals of routine surgery. Eight control upper respiratory specimens were obtained for comparison from individuals without evidence of RRP. Clinical disease severity in each patient was recorded on a visual analog scale from 1 to 5 at the time of biopsy with 5 being most aggressive. CCN2 levels were determined by real time polymerase chain reaction (RT-PCR). **Results:** Thirty-seven biopsy specimens were collected and tested over an 18 month period for an average of three interim measurements for each patient. CCN2 concentrations were increased by 4 to 6 fold over those of mucosal controls ($p > 0.05$). Although levels varied within each patient's clinical course, the correlation between CCN2 levels and the observed interim clinical disease behavior was weak ($r = -0.144$) and not statistically significant ($p = 0.396$). **Conclusions:** CTGF/CCN2 is upregulated in RRP but does not appear to correlate with interim changes

in clinical disease severity.

69. Correlation Between Human Epithelial α -Defensin (hBD-1, 2 and 3) Expression and Clinical Behavior in Recurrent Respiratory Papillomatosis

John M. Schweinfurth, MD, Jackson, MS
Kong T. Chong, PhD, Jackson, MS

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss possible roles of human beta defensins in the clinical course of recurrent respiratory papillomatosis.

Objectives: Beta defensins have been shown to be important in mucosal viral defense. The objective of the current study is to determine the relationship between human beta defensins 1, 2, and 3, and the clinical behavior of recurrent respiratory papillomatosis (RRP). **Study Design:** Prospective basic science. **Methods:** Following institutional review approval and patient consent, biopsy specimens were prospectively collected from 6 patients with recurrent respiratory papillomatosis (RRP) over a two year period and analyzed for beta defensin expression by quantitative, reverse-transcriptase, polymerase chain reaction (RT-PCR) assay. Interval clinical behavior was rated on a visual analog scale of 1 to 5 with 5 being most aggressive. **Results:** Twenty-seven specimens from 6 individuals were examined for an average of 4.5 per patient. HBD-1, -2 and -3 messenger RNAs were detectable in papilloma samples from all patients and the levels were higher than in oral mucosal tissues from healthy individuals. Immunohistochemical analysis showed that both hBD-1 and 2 were localized in the upper epithelial layers of papilloma infected tissues. Expression of hBD-2 was highly upregulated at over 1000-fold higher relative transcription levels. A moderately aggressive clinical course was associated with high levels of hBD initially; progressively aggressive clinical behavior was associated with a subsequent decrease in hBD levels and persistent aggressive disease. **Conclusions:** Human α -defensins are upregulated in respiratory papillomas. Preliminary findings suggest that RRP may negatively impact hBD levels in the transition to more aggressive clinical growth characteristics. This finding suggests that hBDs might be related to innate and adaptive immune responses targeted against papillomavirus induced epithelial lesions.

70. Endoscopic Removal of a Penetrating Orbitocranial Foreign Body: Case Report With Literature Review

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Laurie Ackerman, MD, Orange, CA
Amir M. Karam, MD, Orange, CA
Brian J. Wong, MD, Orange, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the indications of endoscopic removal of penetrating orbitocranial foreign bodies.

Objectives: 1) To report a unique case of a penetrating orbitocranial foreign body (POCFB); 2) to detail the minimally invasive endoscopic removal; and 3) to review the literature on POCFBs and contrast the bifrontal craniotomy approach with the advantages of nasal endoscopic management. **Study Design:** Observational case report with literature review. **Methods:** Medline search under the following headings: 1) "Eye Injuries, Penetrating" [MeSH]; 2) "Head Injuries, Penetrating" [MeSH]. **Results:** A 12 year old male was impaled in the orbit with a gate latch. Fortunately he remained motionless until the paramedics detached the latch from the gate. In the ER he was conscious and alert, with no evidence of CSF leak or globe injury. Imaging studies showed the latch displacing the globe laterally, piercing the lamina papyracea, and traversing the nasal cavity, ethmoid vault, and cribriform plate en route to the olfactory bulb. Neurosurgical consultation ascertained that removal via bifrontal craniotomy would necessitate extensive brain retraction and result in permanent anosmia. Attempting nasal endoscopic removal was deemed prudent, given this morbidity and a lack of brain parenchymal violation. An ethmoidectomy was performed, the object was removed, and the anterior cranial base defect was repaired under direct endoscopic visualization. The patient recovered without a CSF leak or other neurologic sequelae. **Conclusions:** We herein report the first nasal endoscopic removal of POCFBs. To date craniotomy is the only reported management of POCFBs (e.g., screwdriver, chopstick, arrow, nail, etc.) in the literature. We discuss the indications for endoscopic assisted techniques and propose them as novel and preferable options for select cases.

71. Mucosal Regeneration of Trachea Using a New Biomaterial: Bacterial Cellulose

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Educational Objective: At the conclusion of this presentation, the participants should be able to know the effectiveness of bacterial

cellulose for the regeneration of tracheal mucosa and the wide range application of this new biomaterial.

Objectives: To evaluate the potentiality of bacterial cellulose (BC) as a biomaterial for mucosal regeneration of the trachea. It is very important for tracheal regeneration to accelerate mucosal regeneration free from the risks of air leakage and infection. BC consists of pure cellulose nanofibrils synthesized by *Acetobacter xylinum*. The mechanical strength and hydrophilic property of BC can reduce above risks. **Study Design:** In vitro and in vivo canine studies. **Methods:** This study consists of two parts: in vitro and in vivo experiments. In in vitro experiment the efficiency of BC for mucosal regeneration was evaluated. Mucosa was harvested from canine trachea. After enzymatic treatment mucosal cells were collected and cultured on BC membrane. The ability of their proliferation was assessed microscopically. In in vivo experiment the possibility of clinical application of BC was evaluated. A round defect (1.5cm in diameter) was created on the cervical trachea at the level of the 4th and 5th tracheal rings. A BC membrane was sutured to the defect with resected cartilage denuded of mucosa. The postoperative status was evaluated both endoscopically and histologically. **Results:** Proliferation of mucosal cells was confirmed on the surface of BC membrane in in vitro experiment. In vivo experiment revealed that the luminal surface of trachea was covered with regenerated mucosa. No obvious complication was observed. **Conclusions:** This study demonstrated that BC is a useful biomaterial for regeneration of the tracheal mucosa. This tissue engineering technique is a possible treatment for regeneration of tracheal defect.

72. Hyaluronan Based Scaffolds to Tissue Engineer Cartilage Implants for Laryngotracheal Reconstruction

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Harvey M. Tucker, MD*, Cleveland, OH
James E. Dennis, PhD, Cleveland, Ohio

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the potential and the limitations of tissue engineered cartilage grafts for laryngotracheal reconstruction.

Objectives: Costal cartilage is considered the standard grafting material for laryngotracheal reconstruction (LTR). However, donor site morbidity, including pneumothorax, can be a considerable problem. Tissue engineered cartilage may offer a solution to this problem. This study investigated the feasibility of using hyaluronan based scaffolds (HBS) to tissue engineer cartilage grafts for LTR in rabbits. **Study Design:** Animal study. **Methods:** 18 New Zealand White rabbits underwent LTR: 12 rabbits received autologous tissue engineered cartilage grafts and 6 animals, serving as a positive control group, received native auricular cartilage. To determine any differences in response to the site of implantation, a second piece of engineered neocartilage of similar dimensions was inserted perilyaryngeally. The rabbits were sacrificed 3, 6, and 12 weeks after the LTR and their larynx examined. **Results:** None of the 18 rabbits showed signs of respiratory distress. Intraluminally at the site of implantation, a smooth, noninflammatory scar was visible. Histologically, the native auricular cartilage implants showed excellent integration without any signs of inflammation or cartilage degradation. In contrast all tissue engineered grafts, whether implanted peri- or intralaryngeally, revealed marked signs of an unspecific foreign body reaction leading to a complete degradation of the neocartilage. **Conclusions:** In contrast to the success with which HBS has been applied in articular defect repair, our results indicate that, in rabbits, HBS initiates a foreign body reaction, if implanted intra- or perilyaryngeally, leading to cartilage degradation and graft failure. These findings suggest limitations on the environment in which HBS can be applied. We are currently investigating alternative scaffolds for LTR.

73. Laryngeal Melanosis: A Report of Three Cases and Review of the Literature

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Susan R. Cordes, MD, Indianapolis, IN

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the clinical finding of laryngeal melanosis, its etiology, and discuss its clinical significance.

Objectives: Report three cases of laryngeal melanosis and review the literature to determine the possible etiology and clinical implications of this lesion. **Study Design:** Case report and literature review. **Methods:** Report of three individual cases and Ovid review of literature using keywords "laryngeal melanosis". **Results:** Three cases of laryngeal melanosis are reported. Review of the literature is done to determine the possible etiology and clinical implications of this lesion. Melanosis is defined as a benign pigmented lesion of mucosa characterized by pigmentation of basal keratinocytes with a normal or slightly increased number of melanocytes. Studies regarding the incidence of pigmented changes of the larynx are few and the frequency of laryngeal melanosis in the general population not known. Pigment production increases in response to local chronic irritation and inflammation. There is no known direct causal relationship of this entity with mucosal melanoma but was reported in relation to laryngeal neoplasm. **Conclusions:** Routine surveillance of patients with laryngeal melanosis is recommended given its potential relationship with malignancy.