

THE TRIOLOGICAL SOCIETY 112TH ANNUAL MEETING

MAY 28-30, 2009
JW MARRIOTT DESERT RIDGE
PHOENIX, ARIZONA

28th *Thursday*
May

1:00 - 5:05 SCIENTIFIC SESSION ***Grand Sonoran F***

- 1:00 WELCOME BY PRESIDENT**
Myles L. Pensak, MD FACS*, Cincinnati, OH
- 1:05 PRESIDENTIAL CITATIONS**
Michael E. Glasscock III, MD FACS*, Austin, TX
Jack L. Gluckman, MD FACS*, Cincinnati, OH
John F. Kveton, MD FACS*, New Haven, CT
Charles M. Myer III, MD FACS*, Cincinnati, OH
Harold C. Pillsbury, MD FACS*, Chapel Hill, NC
Mitchell K. Schwaber, MD*, Nashville, TN
- 1:30 WHAT'S NEW A CENTURY LATER? PAPERS FROM THE LARYNGOSCOPE IN 1909
UPDATED BY ESTEEMED EXPERTS**
Introduction by H. Bryan Neel III, MD PhD FACS*, Rochester, MN
- 1:40 An Abundant Meatal Flap for the Radical Operation
(Fred Whiting, MD, New York, NY, August, 1909)**
Michael M. Paparella, MD*, Minneapolis, MN
- 1:52 Clinical Diagnosis and Operative Procedure in Intra-Laryngeal Carcinoma from the
Standpoint of the Laryngologist (Chevalier Jackson, MD, Pittsburgh, PA,
August, 1909)**
Eugene N. Myers, MD FACS*, Pittsburgh, PA
- 2:04 Bronchoscopy and Oesophagoscopy: The Technique, Utility and Dangers (E.
Fletcher Ingals, MD, Chicago, IL, July, 1909)**
Stanley M. Shapshay, MD FACS*, Albany, NY
- 2:16 Observations on Some Unusual Cases of Frontal Sinusitis (L. M. Hurd, MD, New
York, NY, August, 1909)**
Lanny Garth Close, MD FACS*, New York, NY
- 2:28 Q & A**

* Denotes Fellow

2:35 Break in Exhibit Hall/View Posters

MODERATOR

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

**3:00 MOSHER AWARD PRESENTATION - TRIOLOGICAL THESIS
CD44 Variant Isoforms in Head and Neck Squamous Cell Carcinoma Progression
Steven J. Wang, MD FACS*, San Francisco, CA**

Educational Objective: At the conclusion of this presentation the participants should be able to understand the role of CD44 variant isoforms in head and neck squamous cell carcinoma progression.

Objectives: The CD44 family of receptors includes multiple variant isoforms, several of which have been linked to malignant properties including migration, invasion, and metastasis. The objective of this study was to investigate the role of the CD44 v3, v6, and v10 variant isoforms in head and neck squamous cell carcinoma (HNSCC) tumor progression behaviors. **Study Design:** Laboratory study involving cell cultures and clinical tissue specimens. **Methods:** Analysis of the expression of standard CD44s and the CD44 variant isoforms v3, v6, and v10 was carried out in the HNSCC cell line, HSC-3. The role of CD44 isoforms in migration, proliferation, and cisplatin resistance was determined. Immunohistochemical analysis was performed on clinical tissue specimens obtained from a series of 82 HNSCC patients. The expression of standard CD44s and the CD44 v3, v6, and v10 variants in primary tumor specimens (n=82) and metastatic cervical lymph nodes (n=24) were analyzed with respect to various clinicopathologic variables. **Results:** HSC-3 cells express at least 4 CD44 isoforms, and these CD44 isoforms mediate migration, proliferation, and cisplatin sensitivity. Compared to primary tumors, a significantly greater proportion of metastatic lymph nodes demonstrated strong expression of CD44 v3 (lymph node: 14/24 vs. primary tumor: 38/82), CD44 v6 (lymph node: 18/24 vs. primary tumor: 26/82), and CD44 v10 (lymph node: 14/24 vs. primary tumor: 16/82), while expression of standard CD44 was not significantly different in metastatic lymph nodes and primary tumors (lymph node: 10/24 vs. primary tumor: 60/82). Expression of CD44 variant isoforms were associated with advanced T stage (v3 and v6), regional (v3) and distant (v10) metastasis, perineural invasion (v6), and radiation failure (v10). CD44 v6 and CD44 v10 were also significantly associated with shorter disease free survival. **Conclusions:** CD44 isoforms mediate migration, proliferation, and cisplatin sensitivity in HNSCC. Furthermore, expression of certain CD44 variants may be important molecular markers for HNSCC progression, and should be investigated as potential therapeutic targets for therapy.

**3:10 FOWLER AWARD PRESENTATION - TRIOLOGICAL THESIS
Fibroblast Growth Factor 18 Provides Directional and Proliferative Cues to
Developing Upper Respiratory Tract Cartilage
Ravindhra G. Elluru, MD PhD FACS*, Cincinnati, OH**

Educational Objective: At the conclusion of this presentation the participants should be able to 1) describe the anatomy of laryngeal and tracheal cartilage; and 2) list the role of the transcription factor SOX9 and fibroblast growth factor 18 in tracheal cartilage development.

Objectives: The majority of congenital airway anomalies arise from deficits in the respiratory tract cartilage, emphasizing the importance of this cartilage to the form and function of the upper airway. The primary objective of this study was to characterize molecular mechanisms that regulate rate and direction of chondrocyte growth in the larynx and trachea. Our specific hypothesis for this study was that fibroblast growth factor 18 (FGF18) provides proliferative and directional cues to the developing laryngeal and tracheal cartilage in the mouse by up-regulating the cartilage specifying gene, Sox9. **Study Design:** Molecular genetic and histological analyses of gene expression and cartilage growth in a mouse model. **Methods:** Controlled mating of wild-type FVB/N (Friend Virus B-type/NIH mouse) mice and fibroblast growth factor 18 (FGF18) over-expressing mice were carried out, and embryos ranging from embryonic (E) day 10.5 to E18.5 were obtained. The respiratory tract, including the larynx, trachea, and lung, was removed through meticulous dissection, and subjected to whole-mount in situ hybridization with RNA probes or was sectioned and subjected to immunohistochemistry. Respiratory tracts from FVB/N mice were grown in culture in the presence of exogenous FGF18 or known inhibitors of the FGF pathway, and then subjected to quantitative reverse transcriptase polymerase chain reaction (qRT-PCR) to measure the expression of cartilage specific genes. **Results:** The upper respiratory tract begins as a simple out-pouching from the ventral foregut endoderm at E10.5. The chondrocytes that form the cartilaginous structures of the upper respiratory tract are located at the junction of the respiratory tract out-pouching and the ventral foregut endoderm. This population of chondrocytes then undergoes directional proliferation to eventually assume the mature 3 dimensional configuration

of the upper respiratory tract cartilaginous framework. Immunohistochemical localization of extracellular signal-regulated kinases (ERKs), a known modulator of FGF signaling, demonstrated the presence of this enzyme at the periphery of growing cartilage. Explants of larynx-trachea-lung grown in culture with exogenous FGF18, demonstrated hyperplastic growth and directed growth towards the FGF18 source. Finally, both FGF18 over-expressing tracheas and tracheas cultured with exogenous FGF18 demonstrated increased expression of the cartilage specifying gene, Sox9. **Conclusions:** FGF18 provided both directional and proliferative cues to chondrocytes in the developing upper respiratory tract. FGF18 exerted this effect on developing chondrocytes by up-regulating Sox9 expression.

3:20 FOWLER AWARD PRESENTATION - TRIOLOGICAL THESIS
Chronic Rhinosinusitis-Associated Olfactory Loss: Creation of an Animal Model
Andrew P. Lane, MD*, Baltimore, MD

Educational Objective: At the conclusion of this presentation the participants should be able to describe the effects of olfactory inflammation in an animal model of chronic rhinosinusitis.

Objectives: The overall objective of the project was to generate an animal model of chronic rhinosinusitis (CRS) associated olfactory loss. The underlying hypothesis to be investigated with the model is that inflammatory cytokines present in CRS, through direct and indirect mechanisms, impact the function of olfactory receptor neurons, leading to the loss of the sense of smell. Ultimately, this mouse model will support detailed cellular and molecular analysis of inflammation induced anosmia, while also serving as a platform to test novel therapeutic agents. **Study Design:** Basic science research. **Methods:** A combination of immunological and molecular biological techniques, including polymerase chain reaction, agarose gel electrophoresis, in situ hybridization, Southern blot, immunohistochemistry, and enzyme linked immunosorbent assay were utilized to design, create, and characterize a genetically modified mouse model. **Results:** *In silico* analysis of an olfactory specific gene, Cyp2g1, and subsequent in situ hybridization, suggested that it would be a suitable target for genetic targeting. A DNA construct was cloned that contained an inducible gene expression system (tet-on) to be inserted into the mouse genome by homologous recombination at the Cyp2g1 site. Tissue specific expression was demonstrated after induction with doxycycline. A second mouse line, engineered to carry the tet-on promoter driving expression of the cytokine TNF- α , was also generated. Breeding of these lines results in mice with inducible olfactory inflammation and olfactory loss. **Conclusions:** CRS associated olfactory loss is a prevalent and frustrating health condition that is very debilitating to patients but continues to lack good treatment options. Much remains unknown regarding the effect of sinonasal inflammation on the olfactory system. The relative inaccessibility of the olfactory cleft makes it difficult to obtain tissue for study safely. Recent advances in molecular biology have made it possible to manipulate the mouse genome and create models of human diseases. The transgenic mouse described in this thesis represents a powerful tool that will be exploited to address basic unanswered questions about the causes of olfactory loss in CRS. At the same time, this model holds promise to allow new pharmacotherapies to be tested that might ultimately benefit patients whose sense of smell is diminished or lost in the setting of sinonasal inflammation.

3:30 HONORABLE MENTION FOR CLINICAL RESEARCH - TRIOLOGICAL THESIS
Outcomes of Tonsillectomy in Neurologically Impaired Children
Stephen F. Conley, MD FACS*, Milwaukee, WI

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the impact of dysphagia upon the perioperative management of tonsillectomy in neurologically impaired children and learn a protocol of enhanced monitoring to improve patient safety. They should also be aware of the long term outcomes following tonsillectomy in this patient group.

Objectives: Children with neurologically impaired (NI) swallow can undergo tonsillectomy safely and effectively. **Study Design:** Retrospective review. **Methods:** Forty-five children with documented dysphagia were compared to age- and procedure-matched normal children for operating room and clinical experience. Three further studies were limited to the NI children only: preoperative and postoperative video swallow studies (VSS), and polysomnography (PSG) for sleep disordered breathing history. Long term telephone followup of clinical outcomes was performed. **Results:** There was no statistically significant difference between the two groups measured by tonsil size, intraoperative or late post-tonsillectomy hemorrhage, but lowest measured oxygen levels were significantly different. No intraoperative complications, early post-tonsillectomy hemorrhage, hospital readmission or mortality occurred in either group. Three NI children each had an episode of aspiration pneumonia (early or late) without sequelae. Of the 32 VSS available for review, preoperative aspiration incidence was 38-41% with 67-85% resolution. Residual postoperative aspiration was 19-22% with 6-16% new onset aspiration. Of available matched pre- and post-operative PSG, 91% confirmed resolution of identified preoperative obstructive sleep apnea (OSA). Long term (mean 8.5 years) telephone followup of 20 NI children revealed improved breathing (95%), communication (90%), and feeding efficiency (55%). **Conclusions:** Tonsillectomy in NI children can be performed safely with appropriate monitoring and precautions with a 48 hour hospital postoperative stay recommended. Swallowing safety improves both objectively and subjectively in most NI children fol-

lowing tonsillectomy. Both preoperative and postoperative VSS are recommended for any NI child undergoing tonsillectomy. Long term followup identified improved quality of life measures for 90% of the NI children queried.

3:40 HONORABLE MENTION FOR CLINICAL RESEARCH - TRIOLOGICAL THESIS
Audiometric Pattern as a Predictor of Cardiovascular Status: Development of a Model for Assessment of Risk

David R. Friedland, MD PhD*, Milwaukee, WI

Educational Objective: At the conclusion of this presentation the participants should be able to 1) understand the potential relationship between audiometric pattern and risk of cardiovascular disease; and 2) understand the various patterns of presbycusis and their origins.

Objectives: This study hypothesizes that low frequency hearing loss is associated with underlying cardiovascular disease. The objective of this study was to use a mathematical model of hearing thresholds to predict cardiovascular status. **Study Design:** Logistic regression analyses of audiometric and cardiovascular data obtained through retrospective chart review. Application of a derived mathematical formula to a distinct prospectively enrolled cohort. **Methods:** Cardiovascular status was determined for a cohort of 1,168 patients seen in the audiology division. Associations between audiogram pattern and cardiovascular variables were tested with the Mantel-Haenszel statistic controlling for age and gender. Logistic regression models were developed incorporating cardiovascular risk factors and audiogram pattern. The models were applied to a separate cohort of 90 subjects recruited from cardiology and geriatric medicine clinics in whom audiograms were performed. **Results:** A significant association was found between low frequency hearing loss and cardiovascular disease and risk factors. When controlling for age, hypertension, diabetes, smoking and hyperlipidemia, low frequency presbycusis was significantly associated with intracranial vascular pathology such as stroke and transient ischemic attacks. Significant associations were also seen with peripheral vascular disease, coronary artery disease and a history of myocardial infarction. A mathematical formula using audiometric pattern and medical history to predict the probability of cardiovascular diseases and events was developed and tested. **Conclusions:** Audiogram pattern correlates strongly with cerebrovascular and peripheral arterial disease and may represent a screening test for those at risk. Patients with low frequency hearing loss should be regarded as at risk for cardiovascular events and appropriate referrals considered.

3:50 Q & A

3:55 JOSEPH OGURA LECTURE
Eco-Conservation in Surgery

Robin T. Cotton, MD FACS*, Cincinnati, OH

Otology Session

MODERATOR

John F. Kveton, MD*, New Haven, CT

4:15 Intratympanic Gentamicin for Meniere's Disease: Long Term, Prospective Quality of Life Outcomes

Charles B. Armstrong, MD, Madison, WI

G. Mark Pyle, MD*, Madison, WI

Nadine P. Connor, PhD, Madison, WI

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the utility of intratympanic gentamicin for the treatment of Meniere's disease and its effect on patients' quality of life. Understand the basic formulation of the injections.

Objectives: Our goal in this study is to prospectively evaluate the self-rated long term quality of life measures of patients with unilateral definite Meniere's disease who have undergone intratympanic gentamicin using three well established surveys after having failed maximal nonablative therapy. **Study Design:** Prospective observational outcome study conducted at a tertiary care center. **Methods:** 18 patients with definite unilateral Meniere's disease as defined in 1995 by the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS) were enrolled. Subjects were treated with intratympanic gentamicin using a titration method after failed medical management and thorough workup. They were administered the SF-12 health survey (SF-12), the AAO-HNS Functional Level Scale (FLS), and the Class A-F reporting guidelines preinjection, 6 months, 1 year and 2 years after final injections. Subjects provided their own control. This is a preliminary analysis of our data after one year of

followup. **Results:** Preinjection data revealed 5 of 12 quality of life outcome measures in the SF-12 as significantly lower than population normative values as anticipated. Preliminary data has been calculated for our 6 month and one year followups, as our study is ongoing. To date, the 6 month followup surveys demonstrate statistically significant improvements in quality of life. The one year followup surveys show 3 statistically significant measure improvements. The total number of surveys to analyze at this point is low at one year and therefore statistical significance as well as trends are evaluated. No patients experienced documented hearing loss and all patients have had control of their vertigo. **Conclusions:** This is the first study to prospectively evaluate quality of life measures in patients with Meniere's disease. Our study demonstrates a decreased preinjection quality of life compared with healthy populations. Additionally, our preliminary data would suggest that intratympanic gentamicin is a safe ablative technique for the treatment of Meniere's disease with subsequent improvements in quality of life up to one year after injections.

4:22 Transmastoid Superior Semicircular Canal Occlusion for Treatment of Superior Semicircular Canal Dehiscence Syndrome

Ryan M. Hendricker, MD, Columbus, OH
Edward E. Dodson, MD, Columbus, OH
D. Bradley Welling, MD PhD FACS*, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss and compare the transmastoid superior semicircular canal occlusion for the treatment of superior semicircular canal dehiscence syndrome with other available surgical approaches. Specifically, participants should be able to discuss surgical technique, available plugging materials, and audiometric and vestibular outcomes utilizing the transmastoid approach.

Objectives: Surgical repair for superior semicircular canal dehiscence (SSCD) involves either canal plugging or resurfacing via a middle fossa approach or a newer described technique involving transmastoid canal plugging. We describe our experience with transmastoid superior semicircular canal occlusion. **Study Design:** Retrospective case series review. **Methods:** Eleven consecutive patients undergoing transmastoid superior semicircular canal occlusions were included between February 2004 and July 2008 for the two senior authors. Charts were reviewed for presenting signs and symptoms, pre- and post-treatment audiometric data, and subjective measures of postoperative symptom resolution. All patients had fine cut computed tomography confirmed dehiscence. Followup ranged from 2-54 months. **Results:** Eleven patients had a total of fifteen transmastoid procedures. Nine patients were primary cases of SCDS and three patients were revisions. Of the fifteen procedures, 8 cases (53%) utilized a mixture of bone pate and fibrin glue, 2 cases (13%) utilized temporalis fascia and hydroxyapatite, 2 cases (13%) utilized temporalis muscle/fascia, and 1 case each (6%) utilized the following: temporalis fascia, monocortical bone, and fibrin glue; temporalis muscle/fascia and fibrin glue; cartilage/soft tissue and fibrin glue; bone pate/wax mixture and fibrin glue. Vestibular symptoms were subjectively improved in all but one case and hearing was improved or stable in nine patients. Two patients had profound sensorineural hearing loss (SNHL) postoperatively, one of which fully recovered with oral steroids and one which did not recover but was likely secondary to concurrent middle ear surgery. **Conclusions:** Transmastoid superior semicircular canal occlusion is an acceptable technique for the management of SCDS. Advantages of this approach include avoidance of a craniotomy, familiar approach for experienced otologists, and the ability to occlude the canal without manipulation of the defect. A variety of materials can be used for occlusion and no obvious outcome differences were detected based on material selection.

4:29 Cochlear Nerve Stimulation with Optical Radiation

Claus-Peter Richter, MD PhD, Chicago, IL
Andrew J. Fishman, MD, Chicago, IL
Agnella Izzo Matic, PhD, Chicago, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the limitations of contemporary cochlear implants that use electrical currents to stimulate neurons. Current spreads in the cochlea and does not allow stimulating small neuron populations. A novel method to stimulate neurons, optical radiation, allows to more selective stimulate cochlear neurons and to parallel transmit acoustical information to the brain. The auditory system can be better reconstituted with this modality of neural stimulation.

Objectives: Neural prosthetic devices, including cochlear implants, restore or supplement nervous system function that was lost during disease or injury. The devices stimulate remaining neural tissue with electric current, providing some input to the nervous system. Hereby, the challenge for neural prostheses is to stimulate remaining neurons selectively. With our experiments we will demonstrate that extreme spatially selective stimulation is possible using optical radiation. **Study Design:** Experimental animal study. **Methods:** Multichannel electrodes were used to record neural activities from the guinea pig inferior colliculus. The responses served to measure the selectivity of stimulation with optical radiation, stimulation with tone pips, and stimulation with electrical bipolar pulses. **Results:** While the selectivity for stimulation with optical radiation and acoustic tone pips was similar, electrical stimulation spread widely in the cochlea. **Conclusions:** Stimulation with optical radiation pulses is more selective than stimulation with electrical bipolar pulses. Our long term goal is to develop and build an optical cochlear

implant prosthesis to stimulate small populations of spiral ganglion cells.

4:36 **Effects of an Intratemporal Facial Nerve Crush on Facial Nerve Functional Recovery**

Kelly Cunningham, MD, Maywood, IL
Nijee Sharma, BS, Maywood, IL
Sam Marzo, MD FACS, Maywood, IL
Kathryn J. Jones, PhD, Maywood, IL
Eileen M. Foecking, PhD, Maywood, IL

Educational Objective: At the conclusion of this presentation, the participants will become familiar with our intratemporal facial nerve injury model which demonstrates a greater delay in all facial function parameters as compared to currently used extratemporal facial nerve injury models.

Objectives: To quantitatively evaluate the recovery of facial nerve function in an animal model following intratemporal versus extratemporal crush injury. **Study Design:** Experimental. **Methods:** Utilizing a previously described animal model for facial nerve injury, 25 adult male Sprague Dawley rats were equally divided into three cohorts; group I consisted of 9 rats that underwent facial nerve crush injury just proximal to the stylomastoid foramen (intratemporal) in the tympanic segment of the facial nerve, group II consisted of 10 rats that underwent facial nerve crush injury distal to the stylomastoid foramen (extratemporal), and finally group III consisted of 6 rats (sham treated) in which the facial nerve was unroofed in the tympanic portion but was left intact. Facial nerve function was then assessed daily by grading eye blink reflex, vibrissae orientation and vibrissae movement for a total of 56 days. Weekly electromyographies (EMGs) were also performed to evaluate the percent change in peak amplitude and latency on the crushed side as compared to the contralateral uninjured control side. **Results:** Recovery of all facial function parameters was significantly delayed following intratemporal injury when compared to extratemporal injury. EMG's demonstrated a significant decrease in peak amplitude ($p < 0.05$) for all four weeks following intratemporal injury compared to extratemporal and sham injury. In addition, we observed an increase in peak latency ($p < 0.05$) one week following intratemporal injury when compared to extratemporal and sham injury. Group II (extratemporal) demonstrated complete facial nerve recovery in 14.71 days versus group I (intratemporal) that failed to achieve complete facial function at 8 weeks. **Conclusions:** Our intratemporal facial nerve injury model offers a more superior and more clinically relevant model as compared to others as the nerve is most often injured due to tumor growth or intraoperative damage. The model used in the present study demonstrates delay in all facial function parameters following intratemporal injury, which was confirmed by EMG studies.

4:43 **Development and Pilot Testing of an Objective, Valid and Reliable Assessment Tool for Operative Competency in Mastoidectomy**

Kulsoom Laeeq, MD, Baltimore, MD
Nasir I. Bhatti, MD FACS, Baltimore, MD
John P. Carey, MD, Baltimore, MD
Charles Della Santina, MD, Baltimore, MD
Charles J. Limb, MD, Baltimore, MD
Howard W. Francis, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss objective assessment tools used to measure operative competency in otologic surgery. In addition, they will learn about measures to improve faculty development on use of such tools.

Objectives: Implementation of work hour limitations and need to stay compliant with Accreditation Council for Graduate Medical Education (ACGME) requirements has given rise to greater urgency to develop better tools for evaluation of residents. Mastoidectomy is one of the index procedures used to assess operative competency in otolaryngology. This study assesses validity and reliability of global and checklist assessment tools for mastoidectomy performed during cadaver dissection courses. Objectives: 1) pilot test feasibility, validity and reliability of evaluation tools for mastoidectomy; and 2) perform factor analysis of the items on the evaluation tool. **Study Design:** Prospective, development of assessment tool, resident educational intervention. **Methods:** Faculty evaluated residents (PGY 2-5) while they performed cortical mastoidectomy on cadaver temporal bones. Performance was rated using global and checklist assessment tools. Faculty was asked a priori to identify the item/s in the checklist assessment tool that they thought best predicted the overall surgical performance. Factor analysis was done and the predictive value of each item was compared with those identified by faculty. **Results:** Sixteen internal and external evaluators evaluated 26 residents over 2 years for a total of 74 evaluations. Construct validity was observed as scores improved with higher level of training. Agreement between internal and external evaluators was higher for checklist than global assessment tool. Factor analysis confirmed item (thinning canal wall) identified by faculty to be most predictive of overall surgical performance. **Conclusions:** Our results indicate that the tool we have developed is feasible, valid and reliable. Percent agreement and therefore reliability improved significantly with focused faculty development through faculty training sessions and instruction

manual.

4:50 **X-Ray Imaging of Cochlear Soft Tissue Pathology**

Stephanie Shintani-Smith, MD, Chicago, IL
Andrew J. Fishman, MD, Chicago, IL
Christoph Rau, PhD, Didcot, Oxfordshir UK
Wah Keat Lee, PhD, Argonne, IL
Claus-Peter Richter, MD PhD, Chicago, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) describe the features of synchrotron hard x-ray imaging and inline phase contrast imaging; 2) describe the specimen changes that occur when a cochlea is opened and prepared for histological studies; 3) discuss the benefits of studying a closed cochlea and an open cochlea; and 4) identify several soft tissue structural cochlear abnormalities on x-ray images.

Objectives: In the clinical setting, x-ray imaging of cochlear soft tissues could expedite diagnosis and disease management. However, existing techniques including conventional x-rays, CT, and MRI lack the spatial and temporal resolution needed to visualize microstructures within the closed cochlea. Microscopic visualization techniques require opening the cochlea, causing damage and shrinkage of delicate structures and leading to artifact of micromechanical measurements. To noninvasively study the cochlea, we developed a technique using inline phase contrast x-ray imaging. Our pilot experiments show that cochlear soft tissue pathologies can be imaged using x-rays. **Study Design:** Experimental animal study. **Methods:** At the Advanced Photon Source (APS) of Argonne National Laboratory, images of cochleae from mice and gerbils were taken with synchrotron hard x-rays at full field. The images were qualitatively compared with corresponding histologic sections and absorption contrast x-ray images. **Results:** X-ray phase and absorption radiographs were taken at photon energies of 15-31.5 keV. Different cochlear pathologies can be demonstrated, including diminished spiral ganglion cells following gentamicin administration. **Conclusions:** Inline phase contrast hard x-rays capitalize on the properties of soft tissue to change the phase of electromagnetic radiation, and change the phase information into appreciable amplitude information. The results demonstrate the potential of hard x-rays to noninvasively image cochlear soft tissue pathologies.

4:57 **Q & A**

5:05 **Adjourn**

***29th Friday
May***

7:00 - **BUSINESS MEETING (MEMBERS ONLY)**

7:50 **NEW FELLOW INDUCTION CEREMONY AND RECEPTION WITH TRIOLOGICAL FELLOWS - Grand Sonoran F**

***8:00 - 12:00 SCIENTIFIC SESSION
Grand Sonoran F***

8:00 **ANNOUNCEMENTS and RECOGNITION OF MILITARY COLLEAGUES**
Myles L. Pensak, MD FACS*, Cincinnati, OH

Head & Neck Session

MODERATOR

Mark S. Persky, MD FACS*, New York, NY

8:10 **Management of the Clinically Negative Neck during Salvage Laryngectomy for Recurrent Squamous Cell Carcinoma**

Isaac A. Bohannon, MD, Birmingham, AL
Renee A. Desmond, DVM PhD, Birmingham, AL

William R. Carroll, MD FACS, Birmingham, AL
Eben L. Rosenthal, MD FACS*, Birmingham, AL

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the management strategies of the clinically negative neck in patients with recurrent laryngeal cancer and the impact of neck dissections on post-operative complications and overall survival.

Objectives: To evaluate the complications and survival outcomes in patients with a clinically negative neck in salvage laryngectomy and understand the clinical utility of neck dissection in salvage laryngectomy. **Study Design:** Retrospective cohort study. **Methods:** This retrospective review identified 71 patients who underwent salvage laryngectomy from 2001 to 2007 via hospital database. Neck dissections were performed based on the surgeon preference. Postoperative complications, overall survival, site of recurrence, and number of neck dissections with positive metastasis were compared between patients with neck dissection and those with no neck dissection. **Results:** Thirty-eight patients underwent 71 neck dissections with salvage laryngectomy. There were 33 patients who had salvage laryngectomy without neck dissection. Only two of 71 (3%) total neck dissections had positive nodal metastasis. Comparison of complications between groups included fistula, wound infection, hematoma/bleeding, chyle leak, wound dehiscence, and flap failure did not reveal any statistical differences. Patients undergoing neck dissections had more complications (42.2%) than those with no neck dissections (21.3%), $p=0.04$. Patients with neck dissections had a higher proportion of fistulas (32%) than those with no neck dissections (18%). There was no survival advantage for patients who underwent neck dissection compared to no neck dissection $p=0.47$. **Conclusions:** There was no survival advantage gained by performing neck dissection in the clinically negative neck. This data supports elective management of the neck in patients with recurrent and advanced stage T stage supraglottic and glottic laryngeal cancers.

8:18 Revisiting the Role of PET-CT in Determining the Need for Planned Neck Dissection following Chemoradiation for Advanced Head and Neck Cancer

Christine G. Gourin, MD FACS*, Baltimore, MD
Brian J. Boyce, BS, Augusta, GA (Presenter)
Hadyn T. Williams, MD, Augusta, GA
Anne V. Herdman, MD, Augusta, GA
Paul A. Bilodeau, MD, Augusta, GA
Teresa A. Coleman, MD, Augusta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the limitations of PET-CT in the early post-treatment period.

Objectives: Planned neck dissection following chemoradiation (CR) has been advocated in patients with head and neck squamous cell cancer (HNSCC) with advanced nodal disease and a clinical complete response to CR because of the potential for residual occult nodal disease. The utility of PET-CT in identifying occult nodal disease prior to planned neck dissection is unclear. **Study Design:** Non-randomized retrospective analysis. **Methods:** The medical records of all patients treated with CR for advanced HNSCC with N2 or N3 disease from December 2003- June 2007 were reviewed. Patients with a clinical complete response were eligible for inclusion if PET-CT performed 8-11 weeks after CR showed no distant disease and they underwent planned neck dissection. **Results:** Thirty-two patients met study criteria. PET-CT was positive for residual nodal disease in 20 patients (63%). Pathology revealed residual carcinoma in 10 patients (31%): in 6 of 20 patients with positive PET-CT scans (30%) and 4 of 12 patients with negative PET-CT scans (33%). The sensitivity and specificity of PET-CT was 60% and 36%, respectively. Regional recurrence developed in 2 patients (6%), neither of whom was successfully salvaged. **Conclusions:** PET-CT does not reliably predict the need for planned posttreatment neck dissection in patients with a complete clinical response following CR. Regional recurrence rates are comparable to those reported for similar patients observed with PET-CT, suggesting no advantage to planned neck dissection, and salvage rates were poor. These data suggest that delaying the timing of PET-CT, with surgery reserved for positive findings, is a reasonable alternative to planned neck dissection to avoid unnecessary surgery.

8:26 Concomitant Chemoradiation for Patients with Advanced Oral Cavity Cancer (OCC)

Kerstin M. Stenson, MD FACS, Chicago, IL
Ezra E.W. Cohen, MD, Chicago, IL
Everett E. Vokes, MD, Chicago, IL
Elizabeth A. Blair, MD FACS, Chicago, IL
Joseph K. Salama, MD, Chicago, IL
Dan J. Haraf, MD, Chicago, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) detail why patients with advanced OCC have not been enrolled on chemoradiotherapy protocols; 2) understand the feasibility of multimodality, function

preserving approach; and 3) list the treatment related complications.

Objectives: Many patients with advanced head and neck cancer have achieved profound benefit from function preserving multimodality treatments. Despite these developments, patients with advanced oral cavity cancer (OCC) typically have not been enrolled in clinical trials utilizing these contemporary strategies. There exist dogmatic expectations of inferior outcome in OCC patients secondary to ineffectiveness of treatment and unacceptable toxicity. The purpose of this study was to analyze efficacy, survival and incidence of osteoradionecrosis of patients with stage III/IV oral cavity cancer who have undergone concomitant chemoradiotherapy. **Study Design:** Retrospective analysis of prospectively collected data. **Methods:** All advanced OCC patients who were enrolled in concomitant chemoradiotherapy protocols from 1994 to present were reviewed. This included analysis of 13 clinical trials and 996 patients. This study is comprised of 112 newly diagnosed advanced OCC patients. **Results:** Followup ranged from 13 to 132 months. Eighteen patients had stage III disease while 94 had stage IV. Fifty-eight patients had T4 disease. Fifty-seven patients are alive without recurrence of cancer. Twenty-seven patients died of recurrence or progression of disease. Seven patients suffered toxic deaths during treatment. There were 11 patients who suffered local/regional recurrences, 3 of which were salvaged successfully. Five patients developed osteoradionecrosis. Swallowing function evaluations and quality of life measurements are ongoing as are further survival analyses with respect to subsite and stage. **Conclusions:** Chemoradiation for patients with advanced OCC appears to be an effective reasonable option for patients with advanced OCC, especially for those patients who would require total glossectomy. Overall, the therapy is safe and long term complications are acceptable.

8:34 Combined Approach Technique for Management of Large Salivary Stones

Rohan R. Walvekar, MD, New Orleans, LA
Steven R. Bomeli, MD, Pittsburgh, PA
Ricardo L. Carrau, MD FACS*, Pittsburgh, PA
Barry Schaitkin, MD FACS, Pittsburgh, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the indications, technique, and complications of combined approach procedures for management of large stones within the major salivary glands.

Objectives: To review our experience with the combined approach (CA) for the management of large salivary stones. **Study Design:** Retrospective. **Methods:** Demographic and clinical data was collected on patients who underwent sialoendoscopy from July 2005 to April 2008 under an IRB approved protocol. Patients with large stones (greater than 4mm for submandibular and 3mm for parotid cases) underwent a CA procedure. When possible, the stone was trapped in a wire basket to prevent migration of the stone. After successful delivery of the stone the salivary duct was not routinely stented or repaired. **Results:** Of 98 patients, 11 (11.2%) patients required a CA for removal of large stones. Nine patients were female and two male with a mean age of 48 years (range, 27 to 67 years). Operative times were shorter for submandibular stones (mean 62 minutes; range 37 to 80 minutes) as compared to parotid stones (mean 119 minutes; range 75 to 210 minutes). Stone removal was successful in all cases (100%) without any major complications and only two minor complications (18%). **Conclusions:** The CA procedure allows complete removal of large or impacted sialoliths without the need for gland excision with acceptable complication rates. We recommend the CA for all cases of sialolithiasis where difficult endoscopic removal is anticipated. Trapping the stone in the wire basket allowed localization of difficult to palpate stones and facilitated stabilization while converting to the open approach. Although we had encouraging success rates without repairing the duct, our results need validation with longer followup and a larger sample size.

8:42 Differential Expression of Glucose Transport and Metabolic Proteins in Benign Versus Malignant Thyroid Neoplasms

Sunny S. Khichi, BS, Augusta, GA
Paul M. Weinberger, MD, Augusta, GA
Mark Merkley, BS, Augusta, GA
Edward Chin, MD, Augusta, GA
Lacey K. Adkins, BS, Augusta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain changes in glucose uptake and metabolism in well differentiated thyroid carcinoma.

Objectives: To measure changes in glucose transport and metabolic proteins in papillary thyroid carcinoma (PTC) compared with benign nodular disease (BND) and normal thyroid tissue. **Study Design:** Laboratory based study of benign and malignant thyroid tissue using tissue microarray technique. **Methods:** A commercially available tissue microarray consisting of benign and malignant thyroid tissue was queried by immunohistochemistry. Protein expression of key enzymes involved in cellular glucose uptake and metabolism was measured using specific antibodies to glucose transporter 1 (GLUT1), hexokinase2 (HK2), and the

F1 subunit of the mitochondrial oxidative phosphorylation enzyme Na-K ATPase (F1ATPase). Comparisons between protein expression levels and clinical/pathologic data were made by contingency table analysis with Mantel-Haenszel Chi Square statistic. **Results:** Thirty-seven unique samples from 33 patients were analyzed in duplicate. There were 23 malignancies (11 PTC, 5 follicular, 5 medullary, and 2 anaplastic carcinomas), 10 BND, and 4 normal thyroids. Papillary and follicular thyroid carcinomas were characterized by overexpression of GLUT1 ($p < 0.001$ and $p < 0.002$ respectively) and F1ATPase ($p = 0.002$ and $p = 0.051$ respectively), while medullary thyroid carcinoma had decreased F1ATPase expression ($p = 0.031$) compared to nonmalignant samples. For HEX2, only PTC displayed increased expression ($p < 0.001$). There was a progressive increase in expression of GLUT1 and HEX2 from normal thyroid (mean 0.0, 0.0) to BND (mean 0.1, 0.3) to PTC (mean 1.6, 1.2), ($p = 0.004$ and 0.001 respectively). **Conclusions:** Well differentiated thyroid carcinoma is characterized by alterations in proteins involved in glucose uptake and metabolism. There was a stepwise increase in GLUT1 and HEX2 expression from normal thyroid to BND to PTC.

8:50 In vitro and in vivo Modeling of Primary Head and Neck Squamous Cell Carcinoma

Jonathan H. Law, MD, Nashville, TN
Dan Liu, BS, Nashville, TN
James L. Netterville, MD FACS*, Nashville, TN
Brian B. Burkey, MD FACS, Nashville, TN
Robert J. Sinard, MD FACS, Nashville, TN
Wendell G. Yarbrough, MD FACS*, Nashville, TN

Educational Objective: At the conclusion of this presentation, the participants should understand the methodology for primary head and neck squamous cell carcinoma growth in short term culture. The audience should be able to describe the potential benefits of using luciferase expression for tracking and testing of primary tumor growth in xenograft models.

Objectives: To develop techniques for isolation, short term culture, and in-vivo modeling of epithelial and stromal cells from head and neck squamous cell carcinoma (HNSCC). **Study Design:** Development of serial bioluminescence imaging system for monitoring of primary HNSCC xenograft model. **Methods:** Primary HNSCC tissue was obtained from patients at biopsy/resection, enzyme digested, seeded onto collagen coated plates, and grown in keratinocyte growth media with 10% FBS. After reaching 70% confluence, cells were infected with lentivirus directing expression of luciferase. Infected primary tumor cells were transferred to denuded rat tracheas and implanted subcutaneously in nude mice. Following intraperitoneal injection of luciferin, in-vivo tumor growth was monitored by twice weekly bioluminescence imaging (BLI). At the time of sacrifice, immunohistochemical staining using antibodies specific to Ki-67, CD44, cytokeratin, and nuclear Ku was performed to determine cell proliferation, lineage, and origin. **Results:** Cultured cells exhibited morphology consistent with epithelial or stromal derivation. Eighty percent of cultures had viable cells present at 10 days, and 24% of primary cultures were maintained 30 days or longer. Immunostaining for nuclear Ku and cytokeratin confirmed human origin and epithelial cell lineage, respectively. Xenografts established tumors in-vivo from 59% of primary tumors. Preliminary data from the BLI of the xenograft model revealed successful expression of luciferase within xenograft models of normal epithelial mucosa and primary HNSCC. **Conclusions:** The success of short term primary tumor culture and xenograft tumor formation with luciferase expression is promising and offers potential in-vitro and in-vivo models to study HNSCC response to standard and novel therapies. Future research should focus on optimizing tumor growth in these models as well as the conditions for in-vivo monitoring via BLI.

8:58 Q & A

MODERATOR

Paul A. Levine, MD FACS*, Charlottesville, VA

9:03 Combined Antegrade and Retrograde Esophageal Dilation (CARD) for Management of Complete Esophageal Stenosis following Head and Neck Cancer (HNC) Treatment

Laura A. Goguen, MD FACS, Boston, MA
Michael T. Jaklitsch, MD FACS, Boston, MA
Charles M. Norris, MD FACS, Boston, MA
Marshall R. Posner, MD, Boston, MA
Robert I. Haddad, MD, Boston, MA
Donald J. Annino, MD DMD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the technique, efficacy and risks of CARD for management of complete esophageal stenosis following HNC treatment.

Objectives: Assess the safety and efficacy of CARD for management of complete esophageal stenosis following HNC treatment.

ment. **Study Design:** Retrospective review of all patients undergoing CARD following HNC treatment between May 2001 and September 2008. **Methods:** 45 patients identified for review. Parameters for assessing success and safety of treatment included: ability to obtain intraoperative esophageal patency, complications, number of dilations required, diet and gastric tube (GT) status. Factors associated with dilation failure were analyzed. **Results:** Intraoperative esophageal patency was obtained in 87%. Mean number of all dilations per patient was 3.5. Mean number of CARD per patient was 1.4. Resumption of oral intake occurred in 36/45 (80%). Diet results included: GT removal and regular 26/45 or soft diet 1/45 (60%), GT still in place and regular/soft 4/45 or pureed/liquid diet 5/45, and GT dependence with nothing by mouth 9/45. Laryngeal and pharyngeal stenosis, radionecrosis, tracheotomy dependence and elongated stenosis were associated with dilation failure. Complications occurred in 16/45 (38%): 8 pneumomediastinum, 6 GT site problems, 2 esophageal perforations, 1 pharyngeal infection. All complications resolved spontaneously or with minimal interventions. **Conclusions:** CARD was safe and effective. Intraoperative patency was achieved in 87%. Complications were minor. 80% resumed oral intake. The majority of patients had their GTs removed and resumed a regular or soft diet. Dilation failure was associated with laryngeal and pharyngeal stenosis, tracheotomy dependence and excessive stricture length. CARD should be considered before relegating patients with complete esophageal stenosis to chronic GT dependence or subjecting them to esophagectomy with or without laryngectomy/pharyngectomy.

9:11 Functional Outcomes following Secondary Free Flap Reconstruction of the Head and Neck

Tim A. Iseli, MBBS FRACS PGDipSAnat, Birmingham, AL
Joshua C. Yelverton, Birmingham, AL
Claire E. Iseli, MBBS MS PGDipSAnat, Melbourne, VIC Australia
William R. Carroll, MD FACS, Birmingham, AL
J. Scott Magnuson, MD FACS, Birmingham, AL
Eben L. Rosenthal, MD FACS*, Birmingham, AL

Educational Objective: At the conclusion of this presentation, the participants should be able to describe outcomes and predictors for success in a series of head and neck patients undergoing secondary free flap reconstructions.

Objectives: To evaluate outcomes and predictors for success in a series of head and neck patients undergoing secondary free flap reconstructions. **Study Design:** Retrospective chart review. **Methods:** 67 patients underwent 68 secondary free flaps (Oct 2004 - May 2008). Outcomes include: hospital stay, complications, flap operative time, enterogastric tube and tracheostomy requirement. Variables assessed include donor site, indication for surgery, and extra-cervical vascular anastomosis. **Results:** Radial forearm (39.3%) and osteocutaneous radial forearm (26.2%) were the most commonly used flaps. Mean hospital stay was 7.9 days. Mean operative time was 338min, with radial forearm being 67min less ($p=0.0001$). After an average follow up of 23.5 months, complications occurred in 40.5% of patients in the hospital (early) and 29.8% after discharge (late). 24.1% required further surgery, 23.8% tracheostomy at discharge and 36.9% prolonged enterogastric tube feeding. In-hospital mortality was 1.5%, total flap failure 1.5% and partial failure 5.9%. Early complications were highest with anterolateral thigh flaps ($p=0.001$). Patients with osteoradionecrosis had nonsignificant trends towards more early and late complications (52% vs. 36%, $p=0.281$) and higher rates of tracheostomy at discharge ($p=0.0001$). Use of extra-cervical vessels was comparable to use of cervical recipient vessels. **Conclusions:** Secondary free flaps are technically feasible for head and neck reconstruction with low mortality and flap failure rates. Extra-cervical and external carotid arteries are demonstrated to be equally effective. Patients with mandibular osteoradionecrosis should be cautioned regarding complications, including second surgeries, tracheostomy and long term enterogastrostomy feeding.

9:19 Manofluorographic and Functional Outcomes after Endoscopic Laser Cricopharyngeal Myotomy for Cricopharyngeal Bar

Ozan B. Ozgursoy, MD, Jacksonville, FL
John R. Salassa, MD FACS, Jacksonville, FL
John Casler, MD FACS*, Jacksonville, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to accurately assess the cricopharyngeal bar and indications for endoscopic surgical intervention.

Objectives: To investigate the clinical and manofluorographic outcomes after endoscopic laser cricopharyngeal myotomy (ELCPM) for cricopharyngeal (CP) bar. **Study Design:** Retrospective chart review. **Methods:** Chart review of 14 patients undergoing ELCPM from 2001 to 2007 was undertaken to determine the demographic data and the clinical and manofluorographic findings before and 6 months after surgery. Two patient groups were established according to pharyngeal driving pressures. **Results:** Fourteen patients underwent ELCPM for CP-bar without a concomitant head and neck or Zenker's procedure. There were no major surgical complications. All patients improved at least one stage of functional outcome swallowing scale (FOSS) after surgery. There was a significant difference between the mean preoperative and postoperative FOSS stages, 2.57 and 0.86, respectively ($p<0.001$). Videofluoroscopy demonstrated a significant increase in the mean cross-sectional CP open-

ing area (CP-area) after surgery from 32.75 to 123.52 mm² ($p < 0.001$). Manofluorographic pressure recordings showed a significant decrease in the intrabolus pressure gradient across the cricopharyngeal region (IB-Gra) from 25.44 to 13.22 mmHg ($p < 0.001$). Despite significant overall results, patient group had no significant effect on the parameters of postoperative outcomes. **Conclusions:** Subjective (FOSS) and objective (CP-area, IB-Gra) improvement in CP-bar patients occurred after ELCPM. We suggested IB-Gra as a reliable objective indicator for CP-myotomy and as an appropriate parameter for followup after surgery. ELCPM is a safe and effective treatment in appropriately selected patients with CP-bar. However, continued research on larger patient population is required to enhance our understanding of CP-bar and predictors of its treatment.

9:27 WITHDRAWN--Impact of Planned Neck Dissection for Advanced Oropharyngeal and Hypopharyngeal Carcinoma

Masahiro Suzuki, MD, Fukushima, Japan
Tetsuya Ogawa, MD, Nagoya, Japan
Yasuhisa Hasegawa, MD, Nagoya, Aichi Japan
Koichi Omori, MD, Fukushima, Japan

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the effectiveness of planned neck dissection.

Objectives: Planned neck dissection is performed for patients with N2 and N3 neck disease whose primary tumors are treated with primary chemoradiotherapy regardless of clinical response. The purpose of this study was to evaluate effectiveness of planned ND for advanced oropharyngeal and hypopharyngeal squamous cell carcinoma. **Study Design:** Retrospective study. **Methods:** This study includes one hundred patients with N2-N3 disease of oropharyngeal and hypopharyngeal squamous cell carcinoma between 1995-2006 at the department of head and neck surgery. All patients treated with platinum based chemoradiotherapy. Planned ND was performed in 40 patients (ND group) and was not performed in 60 patients (non-ND group). These two groups were analyzed in terms of overall survival, disease free survival and neck control rates. Survival rates were calculated by the Kaplan-Meier methods and compared between two groups by the log rank test. **Results:** Mean followup period was 26 months in ND group and 27 months in non-ND group. The 5 year overall survival rate was 80.5% in ND group versus 77.7% in non-ND group. The 5 year disease free survival rate was 75.4% in ND group versus 54.3% in non-ND group. The 5 year neck control rate was 91.5% in ND group versus 72.5% in non-ND group. There was significant difference in 5 year neck control rate between these two groups ($p = 0.049$). **Conclusions:** From our results, planned ND was effective for improving neck control rates. Planned ND is recommended in N2-N3 neck disease of oropharyngeal and hypopharyngeal squamous cell carcinoma.

9:35 An Assessment of PET/CT for Staging the Clinically Negative Neck in Upper Aerodigestive Tract Squamous Cell Cancer

Cherie Ryoo, MD, Columbus, OH
Enver Ozer, MD, Columbus, OH
Ryan Meacham, BS, Columbus, OH
Amit Agrawal, MD FACS, Columbus, OH
David E. Schuller, MD FACS*, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the significance of PET/CT in the staging of squamous cell cancer of the upper aerodigestive tract in the patient with a clinically negative neck.

Objectives: Fused modality fluorodeoxyglucose PET-CT has been shown to have diagnostic and staging value. This correlative study evaluates the positive predictive value, sensitivity, specificity, and accuracy of PET-CT in the detection of cervical metastases in head and neck cancer patients with clinically negative necks. **Study Design:** Correlative study. **Methods:** The study population included 243 upper aerodigestive tract squamous cell cancer patients between years 2005 and 2007 treated at a comprehensive cancer care institution who underwent preoperative PET/CT and some type of neck dissection with either an N0 (112 patients) or N+ (131 patients) clinical nodal status. **Results:** The neck nodal findings on physical exam and PET/CT were compared to the histopathological results of the surgical specimens. In the group of 112 patients who underwent 142 neck dissections with N0 nodal status, the sensitivity was 54%, the specificity was 75%, the PPV was 62%, and the NPV was 75%. In the group of 131 patients who underwent 168 neck dissections with N+ nodal status, the sensitivity was 93%, the specificity was 45%, the PPV was 97%, and the NPV was 45%. **Conclusions:** PET-CT in its current stage does not appear to offer an advantage in staging the clinically N0 neck due to high rates of false positives and negatives.

9:42 Q & A

9:48 Break in Exhibit Hall/View Posters

- 10:15 PRESIDENTIAL ADDRESS**
Between Scylla and Charybdis...Mentorship in Contemporary Medicine
Myles L. Pensak, MD FACS*, Cincinnati, OH
- 10:30 INTRODUCTION OF GUEST OF HONOR & GUEST OF HONOR ADDRESS**
The Conscience of Surgery
Harry R. van Loveren, MD, Professor & Chair, Department of Neurosurgery, University of South
Florida, Tampa, FL
- 10:55 - PANEL: THE PEDIATRIC AIRWAY - CONCEPTS,**
12:00 CONCERNS AND CONTROVERSY
Moderator: Charles M. Myer III, MD*, Cincinnati, OH
Panelists: Amelia F. Drake, MD FACS*, Chapel Hill, NC
David L. Steward, MD FACS*, Cincinnati, OH
David E. Tunkel, MD FACS*, Baltimore, MD
J. Paul Willging, MD FACS*, Cincinnati, OH
Robert F. Yellon, MD FACS*, Pittsburgh, PA
- 12:00 Adjourn**
Lunch in Exhibit Hall/View Posters

5:30 - 7:00 MEET THE AUTHORS POSTER RECEPTION
FOR TRIOLOGICAL, ABEA & ALA
Grand Sonoran Foyer

7:00 - 8:30 TRIOLOGICAL WINE TASTING RECEPTION
Ballroom Lawn
All COSM attendees are invited to attend. Business
casual dress.
Tickets may be purchased at www.cosm.md for \$70
Residents & Fellows \$25

30th Saturday
May

- 7:00 - BUSINESS MEETING (MEMBERS ONLY) - Grand**
7:50 Sonoran F

8:00 - 12:10 SCIENTIFIC SESSION
Grand Sonoran F

- 8:00 ANNOUNCEMENTS**
RECOGNITION OF POSTER WINNERS
- 8:10 - PANEL: ETHICAL ISSUES IN**
9:10 OTOLARYNGOLOGY/HEAD AND NECK SURGERY
Moderator: Harold C. Pillsbury, MD FACS*, Chapel Hill, NC
Panelists: Derald E. Brackmann, MD*, Los Angeles, CA

Gerald B. Healy, MD FACS*, Boston, MA
Paul A. Levine, MD*, Charlottesville, VA
Robert H. Maisel, MD FACS*, Minneapolis, MN

9:10 NIDCD Clinical Trial Initiatives and Funding Opportunities
Gordon B. Hughes, MD FACS*, Bethesda, MD

Basic Science Session

MODERATOR

Gerald S. Berke, MD FACS*, Los Angeles, CA

9:20 Characterization of HPV Specific Immune Responses against Recurrent Respiratory Papillomatosis (RRP)

Simon R. Best, MD, Baltimore, MD
Shiwen Peng, MD PhD, Baltimore, MD
Chien-Fu Hung, MD PhD, Baltimore, MD
Myriam Loyo, MD, Baltimore, MD
T.C. Wu, MD PhD, Baltimore, MD
Sara I. Pai, MD PhD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the development of a murine model of recurrent respiratory papillomatosis (RRP) and the generation of a novel DNA vaccine for use in the treatment of active recurrent respiratory papillomatosis (RRP) in humans.

Objectives: Human papillomavirus types-6 (HPV-6) and -11 (HPV-11) are associated with recurrent respiratory papillomatosis (RRP). Although a prophylactic vaccine has been developed which protects against infection with HPV, a therapeutic vaccine is still needed for those patients actively infected with and/or suffering from persistent disease. **Study Design:** We established a model for RRP by generating novel HPV-6 and -11 cell lines and characterized in vivo immunologic responses against E6 and E7 proteins after vaccination with novel therapeutic DNA vaccines. **Methods:** A murine cell line TC-1 was transduced with a retrovirus expressing either the fusion gene product HPV-6 E6/E7 or HPV-11 E6/E7. We then vaccinated C57BL/6 and HLA-A2 transgenic mice with DNA encoding the HPV-6 E6/E7 or HPV-11 E6/E7 genes. Splenocytes harvested from these animals were incubated with overlapping peptides spanning either the HPV-6 (E6 or E7) or HPV-11 (E6 or E7) protein. The frequency of peptide specific CD8+ T cell responses was then analyzed by flow cytometry. **Results:** Both HPV-6 and HPV-11 DNA vaccinated mice generated strong CD8+ T cell responses against the E6 aa41-70 peptide. No significant E7 peptide specific T cell responses were observed. **Conclusions:** We developed a novel vaccine which targets the E6 and E7 genes of HPV-6 and -11. Characterization of the immunologic responses elicited by these vaccines revealed that the E6 aa41-70 region was the most immunogenic for both viral types. Vaccination in HLA-A2 transgenic mice revealed that the HPV-6 E6 aa61-90 region may contain an HLA-A2-restricted T cell epitope making it a candidate epitope which can be used to monitor HPV specific immunologic responses in future vaccine clinical trials in RRP patients.

9:28 Scaffold Free, Tissue Engineered Cartilage Implants for Laryngotracheal Reconstruction

David A. Gilpin, MD, Cleveland, OH
Mark S. Weidenbecher, MD, Cleveland, OH
James E. Dennis, PhD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the properties of scaffold free tissue engineered cartilage with scaffold based tissue engineered cartilage and explain how they differ when used for laryngotracheal reconstruction.

Objectives: Donor site morbidity, including pneumothorax, can be a considerable problem when harvesting cartilage grafts for laryngotracheal reconstruction (LTR). Tissue engineered cartilage may offer a solution to this problem. This study investigated the feasibility of using autologous chondrocytes to tissue engineer scaffold free cartilage grafts for LTR in rabbits in order to avoid degradation that often arises from an inflammatory reaction to the scaffold carrier matrix. **Study Design:** Animal study. **Methods:** Auricular cartilage was harvested from 7 New Zealand white rabbits, the chondrocytes expanded, and loaded onto a custom made bioreactor for 7-8 weeks to fabricate autologous scaffold free cartilage sheets. The sheets were cut to size and used for LTR, and the rabbits were sacrificed 4, 8, and 12 weeks after the LTR and prepared for histology. **Results:** None of

the 7 rabbits showed signs of respiratory distress. A smooth, noninflammatory scar was visible intraluminally; the remainder of the tracheal lumen was unremarkable. Histologically, the grafts showed no signs of degradation or inflammatory reaction, were covered with mucosal epithelium, but did show signs of mechanical failure at the implantation site. **Conclusions:** These results show that autologous chondrocytes can be used to fabricate an implantable sheet of cartilage that retains a cartilage phenotype, becomes integrated, and does not produce a significant inflammatory reaction. These findings suggest that with the design of stronger implants, these implants can be successfully used as a graft for LTR.

9:36 **Optical Coherence Tomography of Cholesteatoma**

Marc Rubinstein, MD, Irvine, CA
Hamid R. Djalilian, MD, Irvine, CA
Edward C. Wu, BS, Irvine, CA
Brian J.F. Wong, MD PhD*, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the use of optical coherence tomography in imaging the middle ear and cholesteatomas.

Objectives: To image cholesteatoma using optical coherence tomography (OCT) and correlate the findings with clinical findings and conventional observations obtained using binocular microscopy. OCT is a high resolution optical imaging modality that generates cross-sectional images of turbid media such as tissue with resolution approaching that of light microscopy. OCT relies upon intrinsic differences in tissue optical properties for image contrast. **Study Design:** In vivo, prospective clinical study. **Methods:** Using a commercial OCT imaging system (Niris, Imalux, Cleveland, OH), we obtained cross-sectional images (~10 mm resolution, ~1 mm depth penetration) of cholesteatomas in consecutive patients undergoing otologic surgery. Images are obtained by raster scanning a single mode fiber across the interior of the probe. The imaging probe is sterilized and inserted into the middle ear or mastoid under microscopic guidance, and still images were obtained of the middle ear or mastoid mucosa and cholesteatoma when present. **Results:** OCT images of cholesteatomas demonstrate differences in signal intensity that are distinct from normal or inflamed middle ear/mastoid mucosa. Layered structures are observed in the mucosa, that distinguished cholesteatoma matrix from inflamed mucosa. **Conclusions:** This is the first study systematically using OCT to image cholesteatoma during otologic surgery. Cholesteatomas could be distinguished from normal or inflamed adjacent mucosa. In the future OCT imaging may provide a means to confirm the presence of cholesteatoma in the middle ear without the need for tympanostomy if a thin tympanic membrane is present and provide a method to detect subclinical or residual disease during surgery.

9:44 **Injectable Tissue Engineered Bone Repair of a Rat Calvarial Critical Sided Defect**

Scott J. Stephan, MD, Charlottesville, VA
Sunil S. Tholpady, MD PHD, Charlottesville, VA
Roy C. Ogle, MD, Charlottesville, VA
Stephen S. Park, MD*, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) explain the advantages and potential applications of injectable tissue engineered bone; and 2) discuss the experimental techniques used to analyze new tissue engineered bone.

Objectives: Advances in bone repair have focused on the minimally invasive delivery of tissue engineered bone (TEB). A promising biopolymer of chitosan and inorganic phosphates was loaded with bone marrow stromal cells (bMSC) and a bone growth factor (BMP-2) and evaluated in a rat calvarial critical sized defect (CSD). Fluorescent protein labeled bMSC are used to evaluate patterns cell viability and proliferation. **Study Design:** Prospective, controlled trial in an animal model. **Methods:** Eight mm calvarial CSD were created in 30 male rats, divided into 5 groups of six animals each. In the experimental groups, the defects were injected with either chitosan gel, chitosan loaded with bMSC (0.3x10⁶ cells/defect), chitosan loaded with BMP-2 (2µg/defect), or chitosan loaded with both bMSC and BMP-2. In the control group, the defect was left untreated. At four weeks, in vivo micro-CT analysis was performed. At 8 weeks, calvarial specimens were examined by micro-CT, histology, and confocal microscopy. **Results:** New areas of mineralized bone growth were seen in the defects all treated animals. A statistically significant time dependent increase in bone density (P <0.05) between the chitosan/AHP gel with bMSC and BMP-2 group and each of the other groups was shown using micro-CT analysis. Histological analysis confirmed this difference. Fluorescent protein labeled TEB was detected within the areas of new bone, indicating cell viability and contribution to new bone growth by the injected bMSC. **Conclusions:** This study demonstrates that an injectable form of TEB using a chitosan gel, bMSC, and BMP-2 can enhance bone formation in a rat calvarial CSD.

9:52 **Q & A**

9:56 **Break in Exhibit Hall/View Posters**

Sinus Session

MODERATOR

Stilianos E. Kountakis, MD PhD FACS*, August, GA

10:25 Computer Assisted Teaching of Epistaxis Management—A Randomized Control Trial

Jordan T. Glicksman, BSc, London, ON Canada
Michael G. Brandt, MD, London, ON Canada
Roger V. Moukarbel, MD, London, ON Canada
Brian Rotenberg, MD, London, ON Canada
Kevin Fung, MD FACS, London, ON Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role of computer assisted teaching in medical education in otolaryngology. Participants should be able to explain the advantages computer assisted learning affords over alternative educational interventions.

Objectives: To determine whether CAL is an effective tool for the instruction of technical skills. **Study Design:** Prospective, blinded randomized control trial. **Methods:** Prospective blinded randomized control trial conducted on a cohort of 47 first year medical students. Students were instructed on two techniques of nasal packing (formal nasal pack and nasal tampon) for the management of epistaxis using either a standard text based article or a novel computer based learning module. Students were evaluated on proper nasal packing technique using standardized subjective and objective outcome measures by three board certified otolaryngologists. Blinded assessments took place prior to and following instruction using the assigned learning modality. **Results:** There were 47 participants enrolled in the study. Both groups demonstrated improvement in performance of both packing procedures following training. A significant post-training difference favoring CAL learners over text based learners was observed using the global assessment of skill for both packing techniques ($p < 0.001$). Additionally, a significant post-training difference favoring CAL learners over text based learners was observed for all checklist items for the tampon pack and five of eight items on the formal pack checklist. The vast majority of students (94.6%) indicated that if given the choice, they would prefer to learn using CAL rather than by using text based learning materials. **Conclusions:** CAL learners demonstrated significantly greater improvement across both subjective and objective outcome measures when compared to the text based group. Additionally, students favored learning via the CAL modality which further suggests that CAL is a valuable means of imparting procedural knowledge to novice medical trainees.

10:33 Racial and Ethnic Disparities in Patients with Chronic Rhinosinusitis Presenting for Sinus Surgery

Jamie R. Litvack, MD MS, Portland, OR
Thomas J. Gibson, Portland, OR
Jess C. Mace, MPH, Portland, OR
Timothy L. Smith, MD MPH FACS*, Portland, OR

Educational Objective: At the conclusion of this presentation, the participants should be able to examine whether or not racial/ethnic disparities exist in the presentation of chronic rhinosinusitis in patients presenting for endoscopic sinus surgery.

Objectives: Minorities represent 25.1% of the US population, but only 14.3% of endoscopic sinus surgery (ESS) cases nationally. The reason for this difference is unknown. The objective of this study was to examine whether or not racial/ethnic disparities exist in the presentation of chronic rhinosinusitis (CRS) in patients preparing to undergo sinus surgery. **Study Design:** Cross-sectional analysis of a multi-institutional prospective cohort study. **Methods:** Four hundred thirty-five patients with CRS presenting for ESS were examined with minorities representing 13.6% of the population. Patients were self-designated as white ($n=376$), black ($n=19$), Asian ($n=22$), Hispanic ($n=10$), or other ($n=8$). Demographic data, CT and endoscopy scores, and two disease specific quality of life (QOL) instruments were measured. Univariate and multivariate analyses were performed. **Results:** Non-white patients were more likely to present with worse CT scores ($p=0.020$) than white patients. Non-white patients also reported worse QOL on the Rhinosinusitis Disability Index (RSDI) total scale ($p=0.002$) and physical ($p=0.001$), functional ($p=0.005$), and emotional ($p=0.034$) subscales than white patients. Hispanic patients trended towards worse endoscopy scores ($p=0.056$). Hispanics reported worse QOL on RSDI total scale ($p < 0.001$) and physical ($p < 0.001$), functional ($p=0.005$), and emotional ($p=0.006$) subscales than non-Hispanics. **Conclusions:** Non-white and Hispanic patients undergoing ESS for CRS present with worse disease severity and QOL scores than whites and non-Hispanics. Reasons for these disparities should be further investigated.

10:41 Clinical Outcomes after “Hybrid” Endoscopic Sinus Surgery (ESS)

Vincent Thomas Chan, MD, Burlington, MA
Mark K. Thong, MD, Burlington, MA
Peter J. Catalano, MD FACS, Burlington, MA

Educational Objective: At the conclusion of this presentation, the participants should be aware of the safety and efficacy profile of “hybrid balloon” dilation techniques.

Objectives: To report the efficacy and safety of the “hybrid” sinus procedure combining traditional endoscopic sinus surgery (FESS) with balloon dilation technology. **Study Design:** Prospective uncontrolled cohort study; tertiary medical facility. **Methods:** 85 consecutive patients presented to our clinic with indications for sinus surgery including chronic sinusitis, acute recurrent sinusitis, and barometric headache. Revision status, presence of polyps, allergies, and asthma were reported. All underwent preoperative CT imaging and baseline SNOT-20 assessments. The breakdown of surgical procedures will be presented. SNOT-20 was repeated at least 6 months after surgery and CT imaging was repeated if the overall SNOT-20 score did not improve > 0.3 . Pre- and postoperative scans were scored using the Lund-McKay scale. 77 patients who completed all assessments and imaging were included in subsequent analysis. **Results:** Clinical success as measured by improvement of SNOT-20 by >0.3 was achieved by 76.6% ($\pm 7.9\%$, CL 90%). Interestingly, those with Δ SNOT-20 < 0.3 had an improved average Lund-McKay score (0.86 ± 0.73 , CL 90%) after surgery; otherwise, no other differences were noted between groups. The overall success rate was similar in patients with polyps ($78.6\% \pm 12.8\%$, CL 90%), allergy ($85\% \pm 13.3$) and those undergoing revision surgery (80.1 ± 14.1 , 90% CL). No major complications occurred and one minor bleeding complication ($1.3\% \pm 2.1$, CL 90%) was encountered. **Conclusions:** Outcomes after “hybrid” sinus procedures is equivalent to traditional ESS. This technique can also successfully manage challenging cases complicated by polyps and previous surgery with minimal morbidity.

10:49 Optimizing the Endoscopic Approach to the Maxillary Sinus

Ashley B. Robey, MD, Omaha, NE
Erin K. O'Brien, MD, Iowa City, IA
Donald A. Leopold, MD FACS*, Omaha, NE

Educational Objective: At the conclusion of this presentation, the participants should be able to: 1) appreciate the mean percent volume of the maxillary sinus reached via an endoscopic approach through a small medial maxillary wall antrostomy; 2) identify an ideal medial maxillary sinus wall antrostomy (if any) and an ideal angled surgical microdebrider (if any) to optimize surgical reach within the maxillary sinus via an endoscopic approach; and 3) define subsites of the maxillary sinus and determine the success at reaching these various subsites via an endoscopic approach.

Objectives: Endoscopic sinus surgery has evolved to become the standard surgical approach to address the paranasal sinus disease. This project will identify the ideal “small” medial maxillary wall antrostomy (if any) and ideal angle of surgical microdebrider blade (if any) or combination thereof in order to maximize surgical reach within the maxillary sinus. **Study Design:** Prospective basic science study. **Methods:** Three different 4mm diameter surgical antrostomies were created for eight cadaveric maxillary sinuses: the natural ostium and an anterior and posterior antrostomy in the inferior meatus. The space reached by the tip of four different microdebrider blades (12, 60, 90 and 120 degrees) within each maxillary sinus was mapped utilizing an image guidance system. Intensity modulated radiation therapy planning software was utilized to calculate percent volume of the sinus reached and to objectively analyze the subsites reached within the sinuses. **Results:** Regardless of instrument or antrostomy combination, mean percent volume of maxillary sinus reached was 28% (range 24-34%). The anterior wall was rarely reached by any combination, with the best blade/antrostomy combination only reaching 28% of the anterior wall. Likewise the floor of the maxillary sinus was also poorly reached in general. The lateral and posterior maxillary sinus walls were most reliably reached with the roof and medial walls being intermediate. **Conclusions:** Using the endoscopic “small hole” approach to the maxillary sinus results in less than 1/3rd of the sinus being routinely reached regardless of antrostomy or angled microdebrider instrument selected. Further study and development of new technologies to reach these areas is warranted.

10:57 Gender Differences in Post-Traumatic Anosmia

Wendy M. Smith, MD, San Diego, CA
Norma J. Herrera, MA, San Diego, CA
Terence M. Davidson, MD FACS, San Diego, CA
Claire L. Murphy, PhD, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to characterize gender differences in patient demographics and olfactory impairment in post-traumatic anosmia and hyposmia.

Objectives: To determine if differences exist between males and females with post-traumatic anosmia in terms of clinical characteristics, symptom ratings and psychophysical measures of olfaction. **Study Design:** Retrospective chart review of 56

patients who presented to a university based nasal dysfunction clinic for evaluation of post-traumatic smell dysfunction. **Methods:** Workup included complete history, medical examination, psychophysical testing, and imaging. Symptom ratings, odor threshold scores, and odor identification scores were used to assess olfactory impairment. Data was analyzed using univariate analysis. **Results:** Fifty-six patients (M=29, F=27) were identified. The most common mechanism of injury in males was MVA (31%), whereas for females falls (29.6%) were most frequent. Males most often sustained injury in the frontal region (31%), while for females occipital injury (37%) was most common. The prevalence of phantosmias and parosmias was significantly higher in females ($F(1,52)=6.8, p<0.05$). Both genders reported similar rates of hypogeusia, dysgeusia, involvement in litigation, and time lapse between time of accident and presentation to the nasal dysfunction clinic. No significant difference was found between the two sexes for olfactory threshold or identification scores. **Conclusions:** Post-traumatic anosmia is a relatively rare but important sequelae of head injury for both males and females. Significant gender differences exist in terms of mechanism of injury, site of injury, and prevalence of dysosmias.

11:06 Q & A

Laryngology & Bronchoesophagology Session

MODERATOR

Gayle E. Woodson, MD FACS*, Springfield, IL

11:11 **Dysplasia and the Use of Cidofovir in Patients with Recurrent Respiratory Papillomatosis**

Hina H. Gupta, MD, Iowa City, IA
Lucy H. Karnell, PhD, Iowa City, IA
Henry T. Hoffman, MD FACS*, Iowa City, IA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the treatment of recurrent respiratory papillomatosis, particularly the use of adjuvant therapy such as cidofovir. Discuss potential side effects of cidofovir usage.

Objectives: Recurrent respiratory papillomatosis (RRP) is a benign disease characterized by recurrent lesions in the airway. The prevalence and degree of dysplasia that is present in the natural course of RRP is not well established. Adjuvant therapies, such as cidofovir, have been tried with the goal to decrease the interval between repeat surgical treatments, the mainstay of therapy. Cidofovir is a cytosine nucleotide analog with antiviral activity against herpes family virus, and off-label use to treat RRP has been common. There have been concerns regarding carcinogenic transformation following the use of cidofovir. This study aims to explore the association between increasing degree of papilloma dysplasia and the use of cidofovir in the context of the natural progression of dysplasia in RRP. **Study Design:** Retrospective case series. **Methods:** Demographic data and surgical history were obtained through chart reviews for this retrospective case series of 13 patients with RRP who had histopathologic biopsies done before and after exposure to cidofovir. Pathologic data collected over ten years from serial excisions at a single tertiary center were reviewed by a single pathologist, and the highest degree of dysplasia was noted per excision time. **Results:** Of the 176 specimens collected in these 13 patients with serial papilloma biopsies, 5.7% had no dysplasia, 57% had mild dysplasia (grade 1), 28% had moderate dysplasia (grade 2), and 8.5% had severe dysplasia (grade 3). A comparison of each patient's multiple biopsies across time suggested that the dysplastic grade was worse in 2 patients, better in 4 patients, and virtually unchanged in 7 patients. There was no clear cut pattern between the use of cidofovir and the degree of dysplasia over time. **Conclusions:** These results suggest that atypia is relatively common in the setting of RRP; however, the prognostic significance of this finding is unknown. Furthermore, the use of cidofovir did not correlate with worsening dysplastic change. Additional research is needed to delineate the natural progression of dysplasia and its clinical significance in RRP.

11:19 **Co-Prevalence and Quality of Life Impact of Dysphonia and Hearing Loss in the Elderly**

Seth M. Cohen, MD MPH, Durham, NC
Richard Turley, MD, Durham, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the prevalence of both hearing loss and dysphonia in the elderly, its quality of life impact, and the importance of simultaneous management of these communication problems.

Objectives: As the population ages, communication problems, such as dysphonia and hearing loss, become an increasingly common health burden. 1) Determine the co-prevalence of voice problems and hearing loss in the elderly; 2) explore whether hearing loss is a risk factor for dysphonia in the elderly; and 3) evaluate the quality of life impact of dysphonia and hearing loss

among the elderly. **Study Design:** Cross-sectional study of independent living residents in two retirement communities. **Methods:** Main outcome measures include prevalence of dysphonia and hearing loss, Voice Related Quality of Life (VRQOL), Hearing Handicap Inventory for the Elderly - Screening (HHIE-S), and the Center for Epidemiologic Studies Depression (CES-D) scale. Relationships between continuous variables were analyzed with Spearman correlation, between categorical variables with chi-square, and between categorical and continuous variable with ANOVA. **Results:** 248 residents responded with a mean age of 82.4 years. 19.8% had dysphonia, 50.0% had hearing loss, and 14.1% had both. Respondents with dysphonia were not more likely to have hearing loss than those without dysphonia ($p = 0.7$, chi-square). Worse VRQOL scores were associated with more impairment on the HHIE-S (Spearman correlation = -0.4 , $p < 0.001$). Respondents with both dysphonia and hearing loss had greater depression scores than those with neither symptom (mean CES-D score 14.5 versus 9.0, $p = 0.03$, ANOVA, $p < 0.05$, Bonferroni t-test). **Conclusions:** Voice problems and hearing loss are common in the elderly, adversely impact quality of life, and require simultaneous management.

11:27 Simultaneous Recording of Glottal Velocity, Subglottal Pressure and High Speed Imaging in Humans

Hideyuki Kataoka, MD, Yonago, Japan
Shiro Arii, PhD, Tottori, Japan
Kensaku Hasegawa, MD, Yonago, Japan
Hiroya Kitano, MD, Yonago, Japan

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the experimental evidence of glottal airflow during phonation.

Objectives: Detailed study of vocal fold vibration is believed to be important to elucidate mechanism of phonation. Thus, in the present study, experimental analysis of this vibration was made to clarify phonation mechanism and seek better modeling of vocal folds, focusing on direct measurement of subglottal pressure and glottal velocity just above the glottis and simultaneous recording of vocal fold movement by means of a high speed digital camera. **Study Design:** We developed a miniature, flexible, hot wire probe which was inserted into a flexible transnasal endoscope. The high speed motion pictures were taken using a flexible transnasal high speed camera and an auxiliary additional light source. **Methods:** The hot wire probe was placed some point around the glottis to measure the glottal velocity. Glottal velocity was captured instantaneously in the processor memories of the high speed imaging system to ensure accuracy of synchronization. The subglottal pressure signal was obtained by means of a miniature pressure transducer. **Results:** Vocal fold vibration, glottal velocity and subglottal pressure were recorded simultaneously. The experimental results prove that subglottal pressure increases in closing phase of vocal folds and decreases in opening phase. The glottal velocity just above the glottis results in closing phase. **Conclusions:** The results of the study indicate the glottal velocity and subglottal pressure were at its highest in the cycle during the closing phase of the glottis. The airflow was distributed and the velocity was decreased except above the glottis. This fact is important since it gives a crucial hint for better simulation model of phonation mechanism.

11:35 Modulation of Vocal Fold Scar Fibroblasts by Adipose Derived Stem/Stromal Cells in Vitro

Yoshihiko Kumai, MD PhD, Boston, MA
James B. Kobler, PhD, Boston, MA
Hyoungshin Park, PhD, Boston, MA
Marilyn B. Galindo, BS, Boston, MA
Victoria L.M. Herrera, MD, Boston, MA
Steven M. Zeitels, MD FACS*, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand that adipose derived stem/stromal cells can modulate vocal fold scar fibroblasts to adopt a less fibrotic profile, possibly by secretion of hepatocyte growth factor (HGF).

Objectives: To explore interactions between adipose derived stem/stromal cells and scar fibroblasts as a potential pathway for remodeling of vocal fold scar tissue. **Study Design:** Scar fibroblasts (SFs) and adipose derived stem/stromal cells (ASCs) from the ferret were cultured alone and in combination in a cell-contact-independent paracrine system. For co-culture experiments, the cells were combined in Transwell plates for 6 days, followed by 1 or 3 days of monoculture, at the end of which assays were performed. **Methods:** Scar fibroblasts were isolated from vocal folds electrocauterized two weeks previously. ASCs were isolated from lipoaspirated subcutaneous abdominal fat of two ferrets. To assay cellular interactions in co-culture system, we measured 1) the production of hyaluronic acid (HA) and collagen via enzyme linked immunosorbent assay (ELISA); 2) the secretion of HGF (ELISA) and; 3) the expression of alpha-smooth muscle actin (alpha-SMA), cell proliferation and apoptosis of SFs (via flow cytometry). Other experiments examined the effects of anti-HGF on cellular interactions. **Results:** Noncontact co-culture led to significant decreases for SFs in collagen production ($p < .05$), proliferation ($p < .05$), and alpha-SMA expression

($p < .05$), while HA production increased ($p < .05$). Co-culture also caused an increase in HGF secretion from the ASCs ($p < .05$). Blockade of ASC derived HGF by anti-HGF antibody treatment abolished the inhibitory effect of ASCs on SFs collagen synthesis ($p < .05$). **Conclusions:** ASCs influence SFs to adopt a less fibrotic profile, and it appears that HGF is at least one of the soluble factors responsible for this effect. Implanted ASCs could potentially ameliorate vocal fold scar by acting as a long term, intrinsic source of HGF.

11:43 Seeking Ideal Operative Posture: Ergonomic Analysis of Microlaryngoscopy

Melissa M. Statham, MD, Pittsburgh, PA
John C. Sok, MD PhD, Pittsburgh, PA
Libby J. Smith, DO, Pittsburgh, PA
Clark A. Rosen, MD FACS*, Pittsburgh, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand ergonomically favorable and ergonomically high risk operative postures for surgeons performing microlaryngeal surgery.

Objectives: To analyze three different operative positions to determine ergonomically optimal surgeon postures for laryngeal microsurgery. **Study Design:** Prospective case control study. **Methods:** Laryngologists were studied in three different microlaryngeal operative positions: a supported position in a chair with articulated arm supports, a supported position with arms resting on a Mayo stand, and a position with both arms unsupported. Operative positions were uniformly photographed from lateral, aerial, and anterior views. Neck, upper extremity, trunk, and lower extremity postural data was collected and analyzed using the Rapid Upper Limb Assessment (RULA) tool to calculate a risk score indicative of potential musculoskeletal misuse in these operative positions. **Results:** When adjusting for anthropometric subject variance, higher risk RULA scores were obtained with unfavorably adjusted eyepieces and lack of upper extremity support during microlaryngeal surgery. Any degree of neck extension leads to significantly higher risk scores ($p < 0.02$). Ideal ergonomic postures during microlaryngoscopy place the surgeon with upper extremities supported, with shoulders in an unraised, neutral anatomic position, with upper arms 20-45° from torso, lower arms 60-100° from torso, and wrists extended or flexed less than 15°. To achieve this position, the patient should be placed on the operating table, with use of Trendelenburg tilt and patient head flexion, in order to optimize operative view while employing this ergonomically favorable surgeon positioning. **Conclusions:** RULA has identified optimal surgeon positioning to be utilized during microlaryngeal surgery. Avoiding the identified high risk operative postures may lead to reduced occupationally related musculoskeletal fatigue and pain and may improve microsurgical motor control.

11:51 Use of Tissue Adhesives in Pediatric Single Stage Laryngotracheoplasty

Maulik B. Shah, MD, Bronx, NY
John P. Bent, MD*, Bronx, NY
Sanjay R. Parikh, MD FACS, Bronx, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate the benefit of tissue adhesives in open laryngeal and tracheal surgery.

Objectives: To demonstrate the benefit of tissue adhesives in open laryngeal and tracheal surgery. **Study Design:** Retrospective comparison study. **Methods:** Retrospective review was performed of all patients under 21 years old who had undergone open laryngeal or tracheal surgery at our institution. Institution review board approval was obtained prior to the start of this study. **Results:** Of the 42 procedures, tissue adhesives were used in 9 cases, all LTPs: 7 ss-LTPs, 2 ts-LTPs. 20/30 and 10/30 patients had LTP reconstruction with thyroid graft and rib graft, respectively. Comparing single stage LTP, the average operative time using a thyroid cartilage graft was 205 and 207 minutes with ($n=3$) and without ($n=14$) tissue adhesive use ($p=0.95$). The average length of intubation in ss-LTP with ($n=7$) and without ($n=14$) tissue adhesive use was 2.86 days and 2.93 days, respectively ($p=0.95$). The average postoperative time until discharge with ($n=7$) and without ($n=14$) tissue adhesive use was 15.7 days and 15.9 days, respectively ($p=0.97$). The complication rate in ss-LTP with and without tissue adhesive use was 4/7 and 5/14, respectively ($p=0.48$). Of the ss-LTP patients, all 7 with tissue adhesive application were decannulated; while 3/14 without adhesive were not; although these 3 failures were attributable to factors other than tissue adhesives. **Conclusions:** Despite appealing theoretical advantages that tissue adhesives offer in airway surgery, our experience does not show any statistically significant difference in operative time, length of intubation, length of hospitalization, or complications. Tissue adhesives in open laryngeal and tracheal surgery should be considered in select cases, but not as a matter of routine.

11:59 Q & A

12:04 INTRODUCTION OF PRESIDENT-ELECT

Frank E. Lucente, MD*, Brooklyn, NY

12:06 ADJOURN
Lunch in Exhibit Hall/View Posters

SCIENTIFIC POSTER PROGRAM

Poster Session with ALA & ABEA

Meet the Authors Poster Reception Friday, May 29th

General

1. Use of a Flexible Fiber CO2 Laser Delivery System in Otolaryngology-Head and Neck Surgery: Multi-Institutional Experience

Rima F. Abraham, MD, Albany, NY
Janel E. L'Official, BS, Albany, NY
Stanley M. Shapshay, MD FACS*, Albany, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) explain the current applications of the flexible fiber CO2 laser delivery system in otolaryngology; and 2) discuss the potential advantages and limitations of this new technology when compared with traditional surgical modalities.

Objectives: To examine current applications of the OmniGuide® BeamPath (OGBP) flexible CO2 laser fiber in otolaryngology-head and neck surgery. **Study Design:** Retrospective review of case data from three institutions. **Methods:** OGBP fibers were used in 153 otolaryngic cases between 11/2006 and 10/2008. Intraoperative data including surgical site, fiber type, power setting, and laser mode was analyzed. Surgeon opinions were assessed regarding the fibers' cutting, ablating, and coagulating capacities as well as their safety and efficacy when compared with alternative modalities. **Results:** OGBP fibers were used in 25 head and neck, 81 otology, 35 laryngology/airway, and 12 pediatric cases. The BeamPath-L (1.2mm fiber diameter) was primarily used in applications where precision and power were required, whereas the BeamPath-A (2.0mm) was more useful in ablative procedures due to its larger spot size. The BeamPath-S was preferred in otology due to its small profile (0.5mm) and needle tip feature. The majority of surgeons agreed that the OGBP offered superior cutting and ablation to traditional modalities and better flexibility and access than the CO2 laser micromanipulator. Improved pathologic margins were obtainable with the fiber because of its precision, safety for use near vulnerable structures, and greater access to nonline of site locations. These advantages resulted in shorter operative times in most applications. Complications in our series included four fiber failures; however none compromised the safety of patients or staff. **Conclusions:** The OGBP flexible CO2 laser fiber is a safe, versatile and effective tool with applications in all otolaryngic subspecialties.

2. Vasomotor Rhinitis Secondary to Sympathetic Damage after Thoracic Surgery

Khawaja A. Ahmed, MD, Jackson, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the clinical picture consistent with iatrogenic vasomotor rhinitis after thoracic surgery and have a heightened awareness of this rare diagnosis.

Objectives: To present a rare case of iatrogenic vasomotor rhinitis after an upper lung lobectomy. **Study Design:** Case report and review of the literature. **Methods:** A 68 year old female presented with right sided nasal congestion and clear rhinorrhea which would get worse with changes in temperature and while exercising. Her history was significant for a right lung upper lobectomy 2 years prior, and she was told that she had suffered from nerve injury during the procedure. She had since started noticing her sinonasal symptoms as well as drooping of the right eye. **Results:** Examination of the patient revealed a right sided Horner's syndrome with ptosis, miosis, and anhidrosis. The nasal exam was negative for any signs of gross purulence, nasal masses or polyps. Computerized tomography of the paranasal sinuses revealed well aerated sinuses with no signs of mucosal disease. She was started on ipratropium bromide spray to be used on a regular basis, as well as prior to exposure to any stimuli that triggered the symptoms in the past. There was an excellent response to this treatment regimen. **Conclusions:** Vasomotor rhinitis is a disease that is caused when there is a disturbance in the balance between the sympathetic and parasympathetic input to the sinonasal mucosa. While there are reports of iatrogenic Horner's syndrome secondary to sympathetic trunk damage after thoracic surgery, this is the first report of vasomotor rhinitis occurring in the same setting. The otolaryngologist must be aware of this entity in order to be able to establish the diagnosis in future.

3.

The Postoperative Use of Amoxicillin in Adult Tonsillectomy Patients

Marco A. Ayala, MD, San Diego, CA
Daniel G. Bruggers, MD, San Diego, CA
Jason T. Yarbrough, PA-C, San Diego, CA
Mark M. Scheurer, MD, San Diego, CA
Darrell H. Hunsaker, MD*, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the risks and benefits of using postoperative amoxicillin for adult tonsillectomy patients.

Objectives: The study was conducted to evaluate the potential benefits of administering amoxicillin with and without clavulanate potassium in adult post-tonsillectomy patients. **Study Design:** A randomized study was performed on adult patients who underwent tonsillectomy surgery at a large military tertiary care teaching hospital. **Methods:** Study patients were randomized, prior to surgery, to receive no antibiotics (group 1), amoxicillin (group 2), or amoxicillin with clavulanate potassium (group 3). Ninety patients completed followup. Pain level was assessed by visual analog scale (VAS) for the first 10 days following surgery. Other data points included the length of time for patients to return to a regular diet and normal activities and the total pain medications consumed during recovery. Complications, including adverse events from medications, were recorded. **Results:** One way analysis of variance of group 1 (N=32), group 2 (N=26), and group 3 (N=32) revealed no statistical difference in return to normal activities or return to regular diet. A significant increase in total consumption of pain medication was seen in group 2 when compared to group 1 (P=.023). Two way analysis of VAS during the 10 days following surgery revealed a small but significant lower pain assessment in group 2 (mean=5.6) compared to group 1 (mean=6.0) (P=.047). Adverse medication events were documented in groups 2 and 3. **Conclusions:** While amoxicillin may offer minimal reduction of pain during the first 10 days following tonsillectomy, the increase risk of adverse medication events may offset this advantage. These findings do not support the use of amoxicillin with or without clavulanate potassium in adults undergoing tonsillectomy.

4.

Descriptive and Preliminary Histological Analysis of Soft Palate in Patients with Obstructive Respiratory Sleep Disorders Compared to Patients without this Disorder

Joao R.P. Bastos, MD, São Paulo, SP Brazil
Denilson S. Fomin, MD, São Paulo, SP Brazil (Presenter)
Telma M.T. Zorn, MD, São Paulo, SP Brazil

Educational Objective: At the conclusion of this presentation, the participants should be able to compare histologically the apneic patients' soft palate with the nonapneic group one, besides that discussing about the metalloproteinases as being a probable cause to explain the alterations found in the apneic patients group.

Objectives: The aim of this paper is to carry out a descriptive and preliminary histological analysis of soft palate in patients with obstructive respiratory sleep disorders and compare to patients without this disorder. This analysis focuses on assessment of extracellular matrix components its composition and organization of palatopharynx muscle as well as the morphological aspects of these tissues. **Study Design:** Retrospective observational study. **Methods:** Structural morphological and immunocytochemical study was performed of soft palate fragments from ten patients with obstructive sleep apnea and five control patients submitted to uvulopalatopharyngoplasty and tonsillectomy, respectively. In this analysis, we compared a number of aspects of extracellular matrix and palatopharynx muscle of both groups. **Results:** The presence of more quantity of elastic fibers and collagen fibers in extracellular matrix of apneic patients' soft palate was observed when compared to nonapneic group. However, immunocytochemical study showed a clear structural change of such fibers in apneic patients, not presented in the control group. The analysis of the muscle tissue also showed an important structural change in palatopharynx muscle cells, as well as a less quantity of such muscle cells in apneic patients group when compared to nonapneic group. **Conclusions:** There is evidence of risk of extracellular matrix and muscle tissue among patients with sleep apnea when compared to nonapneic patients, although the factor that cause these alterations still undefined being further researches necessary in this area. We understand that metalloproteinases can be involved in this process due to the fact that literature shows a high presence of such molecules in apneic patients.

5.

Interventional Sialoendoscopy for Treatment of Radioiodine Induced Sialadenitis

Steven R. Bomeli, MD, Pittsburgh, PA
Barry M. Schaitkin, MD FACS, Pittsburgh, PA
Ricardo L. Carrau, MD FACS*, Pittsburgh, PA
Rohan R. Walvekar, MD, New Orleans, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the most common

salivary gland pathology encountered after radioactive iodine treatment, and to understand that patients with radioiodine induced sialadenitis may benefit from sialendoscopy.

Objectives: The purpose of this study is to review our experience with sialendoscopy for the management of radioiodine induced sialadenitis. **Study Design:** Retrospective chart review. **Methods:** Clinical information was reviewed from all patients with radioiodine induced sialadenitis treated with interventional sialendoscopy. **Results:** Twelve female patients with a mean age of 46.5 years (range: 25 to 77 years) underwent interventional sialendoscopy for the treatment of recalcitrant sialadenitis from radioiodine induced damage to the major salivary glands. Symptoms arising from the parotid gland were seen in 75% of patients while symptoms arising from the submandibular gland were seen in 50%. Both parotid and submandibular glands were symptomatic in 25% (3/12) of patients. The mean dose of radioiodine was 143 mCi (range, 101.9 to 185.7 mCi) received as a single dose prior to their referral. The mean duration from radioiodine ablation therapy to sialendoscopy was 10.4 months (range: 5 to 16 months). Thirty-two glands (20 parotid; 12 submandibular) were scoped with successful endoscopy in 27 glands (84.4%). Ductal stenosis (25%) and mucus plugs (37.5%) were the most common types of ductal pathology. Sialendoscopy was successful at improving symptoms in 75% (9/12) of patients with no serious complications reported in followup ranging from 2 weeks to 33 months (median: 6 months). **Conclusions:** Interventional sialendoscopy is an effective tool for the management of patients with radioiodine induced sialadenitis that is unresponsive to conservative therapy.

6. Airway Management in Patients with Ludwig's Angina

Nicole L. Bryan, MD, Carrollton, TX

Aaron R. Morrison, MD, Albuquerque, NM (Presenter)

Garth T. Olson, MD, Albuquerque, NM

Educational Objective: At the conclusion of this presentation, the participants should be able to understand different strategies for airway management in patients presenting with Ludwig's angina. Participants should be able to formulate a protocol for management of the airway, which involves anesthesiology colleagues. Additionally, participants should understand the expected hospital course for these patients based upon their airway interventions.

Objectives: There is currently no widely accepted airway protocol to provide guidance when managing a patient with Ludwig's angina. This study aimed to establish concepts of airway management in patients presenting with Ludwig's angina and to evaluate specific interventions on patient recovery. **Study Design:** This was a single center, retrospective chart review evaluating 22 consecutive patients who were admitted with a diagnosis of Ludwig's angina from 2001 to 2007. **Methods:** Chart review and statistical analysis was undertaken on the study subjects to determine presenting symptoms, procedures, and hospital course. **Results:** In our study population, 16/22 (73%) of patients required invasive airway management. Of this subset, 11/16 (69%) underwent tracheostomy. Average length of hospitalization was longer for these patients (8.8 days) versus fiberoptic intubation alone (6.0 days). Fiberoptic intubation preceded tracheostomy in 4/11 (36%) of patients undergoing this intervention. This decision is based on standing airway protocols formulated between the otolaryngology and anesthesiology services, which are discussed. All patients in the group in which airway intervention were performed underwent incision and drainage (I&D) and/or dental extractions. **Conclusions:** In early Ludwig's angina, observation in a monitored environment is safe and appropriate. Because Ludwig's angina can be rapidly progressing, a plan to progress to a more invasive form of airway management must be in place throughout the hospital course of conservatively treated patients. As the majority of patients will require invasive airway management, protocols should be established with anesthesiology to facilitate rapid and safe airway management. Tracheostomy as the final form of airway control was associated with a longer hospitalization.

7. Case Report: Deep Space Neck Infection following Intraoral Trauma to the Floor of Mouth

Jeffrey Cheng, MD, New York, NY

Satish Govindaraj, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of a more uncommon etiology for deep space neck infections.

Objectives: Review the literature and discuss the management of deep neck space infections caused by intraoral trauma to the floor of mouth. **Study Design:** Case report and retrospective review of the presentation and management of deep neck space infections caused by intraoral trauma to the floor of mouth. **Methods:** Published articles and case reports on deep neck space infections caused by intraoral trauma were found using an English key word search through PubMed using the search terms "floor of mouth" and "trauma". **Results:** A 27 year old female presented with left neck pain and swelling. Five days prior, patient reported physical assault with another person's hand and trauma to the floor of her mouth. On examination, the patient had trismus and neck erythema and induration. A CT scan demonstrated a left submandibular abscess. The patient was taken for surgical drainage and found to have a rent in the floor of mouth. It was closed primarily, the neck abscess was externally drained, and a Penrose drain was placed. Postoperatively, the patient was kept nothing by mouth for 5 days on enteral feeding and on intravenous antibiotics. The cultures grew out coagulase-negative staphylococcus. On postoperative day 5, the patient

underwent an oral trial of dyed liquid, and the neck was observed for signs of leak from the drain. No leak was discovered, and the patient's diet was advanced. She was discharged home with oral antibiotics. On followup examination 2 weeks later, the patient was found to be doing well without evidence of infection. Our English literature search in PubMed using the search phrase "floor of mouth" and "trauma" resulted in 25 matches from 1975 to 2007. One paper was deemed relevant. It was a series of four patients; two suffered floor of mouth injuries resulting in deep neck space infections. Those patients with floor of mouth injuries appeared to be more susceptible to deep neck space infections, and our case supports their results. **Conclusions:** Injuries resulting in violation of the floor of mouth are at high risk for deep space neck infection, highlighting the importance of clinical followup, use of antibiotics, and the role of surgical drainage. Clinicians should maintain a high level of suspicion for a floor of mouth injury after trauma with the presentation of a deep space neck infection.

8. A Comparison of Brain Abscesses from Otogenic and Rhinogenic Origins: Are Abscess and Primary Site Organisms Similar?

David B. Conley, MD FACS, Chicago, IL
David Yao, BA, Chicago, IL
Arvind Kumar, MD*, Chicago, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to better understand the bacterial differences between otogenic and rhinogenic brain abscesses.

Objectives: Despite potent antibiotics, the mortality and morbidity of brain abscesses secondary to otogenic or rhinogenic supuration continues to be high. The initial lack of information about the organism causing the abscess handicaps antibiotic selection. Cultures from the primary suppurative source do not necessarily correspond with the organism causing the abscess. The purpose of this study was to compare culture reports from brain abscesses with cultures from primary suppurative foci. **Study Design:** Analysis and review of the medical and scientific literature. **Methods:** Several Medline searches were made using the MESH terms "otitis media" and "brain abscess", "sinusitis" and "brain abscess", "bacteria/pathogenicity" and "sinusitis" and "otitis media". **Results:** The organisms in cholesteatomatous ears are, pseudomonas aeruginosa, staphylococcus aureus, bacteroides, Peptococcus and Peptostreptococcus. Proteus is the most common organisms cultured from associated abscesses. However, a recent French study reported that Enterobacter predominate. The most common organisms cultured from chronic sinusitis are coagulase negative staphylococci, S aureus, viridans group of streptococci, and gram negative bacilli. The organisms cultured from rhinogenic brain abscesses are similar. **Conclusions:** 1) The cultured organisms from chronic sinusitis and rhinogenic brain abscesses are similar. 2) In the case of otogenic brain abscesses and cholesteatoma, the organisms are distinctly different. 3) The treatment of rhinogenic brain abscesses can be guided by nasal cultures. However, in otogenic brain abscesses, even cultures from the middle and mastoid do not predict the putative brain abscess organisms. 4) The causative organisms of otogenic brain abscesses from the developed and developing world differ.

9. Claim Validity of Print Advertisements Found in Otolaryngology Journals

Anthony G. Delsignore, PharmD, Providence, RI
Jeffrey H. Spiegel, MD FACS, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the degree to which product claims made in print advertisements within prominent otolaryngology journals are supported by scientific evidence.

Objectives: To evaluate the accuracy and scientific evidence supporting product claims made in print advertisements within otolaryngology journals. **Study Design:** Cross-sectional survey with literature review, and multi-author evaluation. **Methods:** Fifty claims made within prominent otolaryngology journals between January 2007 and July 2008 were selected. References to support claims were provided within the advertisement or obtained through direct request of the manufacturer. Six academic otolaryngologists with varying training and geographic practice location reviewed the claims and supporting evidence. Each physician had significant experience as an editorial reviewer, and several had specific training in research methodology and scientific methods. **Results:** The reviewers determined the degree to which they felt each of the 50 claims was supported or not supported by the provided evidence and qualified the support on a scale from 1-5. Results for each claim individually, by journal, by product class, and as a group will be presented. **Conclusions:** Advertisers make claims that appear in respectable journals. The due diligence made by journal editors to review appropriateness of the advertisement's claims is reviewed, and the degree to which further scrutinization would be of benefit is discussed.

10. WITHDRAWN--Mechanical Reduction and Intraoral Fixation of the Tongue for Intractable Macroglossia after Prolonged Spine Surgery

Mark C. Domanski, MD, Washington, DC
Anjali Shah, BS, Washington, DC
Jeremy White, MD, Washington, DC
Ameet Singh, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) discuss possible etiologies of macroglossia after prolonged surgery in the prone position; 2) explain the dangers of postoperative macroglossia; 3) demonstrate tongue reduction and retention using our newly described, double mouth guard maxillomandibular fixation technique; and 4) explain how this new technique could be used in other situations such as angioedema and traumatic macroglossia.

Objectives: Macroglossia resulting in airway obstruction is a known complication of surgery in the prone position. We describe the challenges in management and suggest a simple method for tongue reduction and fixation in the intubated setting. **Study Design:** Case report and literature review. **Methods:** We reviewed the patient's medical record. We performed a PubMed search using the words "tongue edema", "tongue necrosis", "prone position", and "macroglossia". **Results:** A 51 year old patient with history of chronic renal failure, amyloidosis, gout, and congenital macroglossia underwent a spinal decompression and fixation for cervical spondylolysis and myelopathy in the prone position. Postoperatively, significant tongue edema resulted in airway obstruction and failure to extubate which ultimately required a tracheostomy. Intractable tongue edema resulting in venous congestion, ischemia and breakdown on the dorsal surface of the tongue. Mechanical reduction and fixation of the tongue using a simple double mouth guard maxillomandibular fixation technique was implemented which resulted in resolution of tongue edema and upper airway obstruction and decannulation. **Conclusions:** Few accounts of severe postoperative macroglossia and edema following surgery in the prone position exist in the literature. Reported complications include prolonged intubation, planned and emergent tracheotomy and hemiglossectomy. Early mechanical reduction and tongue fixation in the oral cavity can break the cycle of venous and lymphatic obstruction resulting in severe macroglossia, ischemia, necrosis, or hemorrhage. Our novel double mouth guard maxillomandibular fixation technique provides the clinician a simple method for tongue reduction and fixation. This technique may be useful in other settings of tongue edema such as traumatic tongue swelling and angioedema.

11. Beyond Surgical Cure for Obstructive Sleep Apnea: The Impact of Surgical Management on Quality of Life

Jayme R. Dowdall, MD, Detroit, MI
Senja Tomovic, BA, Detroit, MI
Ho-Sheng Lin, MD FACS, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the impact of site specific surgery for sleep apnea on the quality of life.

Objectives: Polysomnographic (PSG) measures are unable to capture all outcomes for surgical treatment of obstructive sleep apnea (OSA). We evaluate quality of life outcomes in patients who undergo site specific surgery for sleep apnea regardless of surgical cure. **Study Design:** Retrospective phone survey of patients diagnosed with OSA by PSG. **Methods:** All patients underwent site specific sleep surgery. Postoperative PSG were obtained to assess surgical cure in addition to quality of life variables using the Epworth Sleepiness Scale (ESS) and standardized quality of life questionnaire assessing twelve parameters. **Results:** Forty-five patients underwent both preoperative and postoperative polysomnography. Twenty-three patients obtained a surgical cure with greater than fifty percent reduction in AHI and with AHI less than twenty. Average preoperative ESS scores were 13, postoperative ESS scores were 6 for patients with surgical cure and 7 for patients who were not surgically cured. Standardized questionnaire results demonstrate a statistically significant improvement on all twelve QOL parameters. **Conclusions:** Quality of life parameters may be improved in patients with site specific regardless of surgical cure.

12. How To Make Us Smart: The Otolaryngologist's Role in Designing Clinical Decision Support Systems

David E. Eibling, MD FACS*, Pittsburgh, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the structure of embedded clinical decision support systems and to identify characteristics of both optimal as well as suboptimal systems. The participants will be given a checklist that they can use to assist in designing or modifying these systems in order to optimize decision making in the management of diseases of the head and neck.

Objectives: 1) Understand role of clinical decision support systems in optimizing care and prevention of medical error; 2) know basic structure of clinical decision support systems and intended processes, specifically as related to the practice of otolaryngology; 3) recognize challenges in designing optimal systems and strategies for mitigating some of these challenges; and 4) using a checklist, be able to advise system developers on optimal designs that enhance care of patients with diseases of the head and neck. **Study Design:** Literature review. **Methods:** Medical error and inappropriate care continue to challenge all healthcare delivery systems. Although some mistakes ("slips" or "lapses") are unintended, most occur due to faulty decision making. The traditional strategy of assigning blame to an individual and relying on education to prevent recurrence fails due to the inherent limitations of human cognition. External cognitive tools such as collated patient data, reference materials, and embedded clinical decision support (CDS) systems help to compensate for these limitations. Specific design characteristics of

such systems convey significant impact on their effectiveness, and thereby directly or indirectly impact decision making during care processes. CDS systems rely on specific input data, precise triggers, and evidence based rules to generate specific interventions, usually in the form of recommendations. Off-the-shelf systems are not specialty specific, hence cognitive support for decision making in the management of disorders of the head and neck is often suboptimal. **Results:** Examples will be utilized to demonstrate both optimal and suboptimal system characteristics. A “design checklist” for otolaryngologists who wish to participate in CDS system design for their practices and institutions will be presented, along with suggestions for strategies to enhance participation by otolaryngologists in the design or oversight process. **Conclusions:** Embedded clinical decision support systems have the potential to convey significant impact on decision making. Expert input is required during system design, purchase, or modification. Otolaryngologists knowledgeable in system design can play an active role in promoting optimal care for patients with disorders of the head and neck.

13. Miller-Fisher Syndrome Presents as an Acute Voice Change to Hypernasal Speech

Rebecca J. Howell, MD, Washington, DC
Matthew S. Clary, MD, Philadelphia, PA
Paul C. Frake, MD, Washington, DC
Houtan Chaboki, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to describe various clinical presentations of Miller-Fisher syndrome and to expand their differential diagnosis of an acute voice change with hypernasal speech. Additionally, current concepts in the management of Miller-Fisher syndrome will be elucidated.

Objectives: To report an alternative presentation of an already rare variant of Guillain-Barre syndrome in the otolaryngology literature. To discuss the differential diagnosis and early management of Miller-Fisher syndrome in an acute setting in order to make clinicians more aware of this previously recorded neurologic disease. **Study Design:** Case report and review of the literature. **Methods:** Medline was queried for Miller-Fisher syndrome, Guillain-Barre variants, acute vocal changes, hypernasal speech. The results were reviewed and articles were correlated with the topic under discussion. **Results:** The authors describe a 38 year old man who presented with hypernasality, perioral and acroparesthesias, tongue numbness, dyspnea, and dysphagia. Further evaluation revealed a diagnosis of Miller-Fisher syndrome. **Conclusions:** Miller-Fisher syndrome is a variant of Guillain-Barre syndrome previously described in neurological and critical care journals. While there are significant clinical findings in the head and neck, there is a paucity of literature concerning this disease in the otolaryngology literature. An acute change in voice can be as simple as post-intubation and post-infection or as complex as a neuropathy such as Guillain-Barre syndrome or Miller-Fisher syndrome. As such, clinicians should consider this in their evaluation of voice change, as in this condition, early diagnosis and subsequent treatment with IVIG are necessary.

14. Calcified Thyroid Nodule Mimicking a Foreign Body on Lateral Neck X-ray: An Interesting Case

Shirish R. Johari, MBBS DLO, Singapore
Mark Lichung Khoo, MBBS FRCS(Edin) FRCS(Glas), Singapore

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss value of lateral neck x-ray as a screening tool for upper aerodigestive foreign bodies.

Objectives: To report a case of calcified thyroid nodule masquerading as a foreign body on a lateral neck x-ray. **Study Design:** Case report. **Methods:** Retrospective review of case record of a patient in a tertiary care hospital setting. **Results:** A 53 years old lady presented with severe odynophagia after accidental ingestion of fish bone. Lateral neck x-ray revealed a triangular, sub-centimeter radio-opaque shadow against 6th cervical vertebra representing a foreign body. Rigid esophagoscopy was negative for intraluminal foreign body. A CT scan performed postoperatively showed a large calcified thyroid nodule in the right lobe of thyroid adjacent to the esophagus, which could be correlated to the radio-opaque shadow on lateral neck x-ray. **Conclusions:** Radiological workup is invariably needed to demonstrate the presence and location of impacted foreign bodies. Lateral neck x-ray is the first line investigation because of easy availability and cost effectiveness. Positive predictive value of lateral neck x-ray is between 66 and 72%. CT scan correlation is strongly recommended where plain x-ray alone shows a confusing picture.

15. Isolated Retropharyngeal Space Edema from Nephrotic Syndrome

Shirish R. Johari, MBBS DLO, Singapore
Pankaj Handa, MD MRCP, Singapore
Jin Keat Siow, MD FAMS(ORL) FRCSEd, Singapore

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss differential diagnosis of retropharyngeal space collection.

Objectives: Widening of the prevertebral space on a lateral neck radiograph is an indication of retropharyngeal effusion. Most often, this effusion is suppurative in nature. Noninfective isolated collection in retropharyngeal space is a rare phenomenon. We present a case of nephrotic syndrome manifesting as retropharyngeal effusion. **Study Design:** Case report. **Methods:** Study of case record of a patient diagnosed to have retropharyngeal space edema from nephrotic syndrome treated in a tertiary care hospital setting. **Results:** A 32 year old healthy gentleman presented with globus sensation. Clinical examination showed posterior pharyngeal wall bulging into the pharynx resulting in partial occlusion of laryngeal inlet. The systemic examination was unremarkable. There was significant widening of the prevertebral space on lateral neck radiograph. CT scan showed nonenhancing fluid in retropharyngeal space extending to parapharyngeal neck spaces bilaterally. No suppuration was found on exploration of the retropharyngeal space. Serum biochemistry showed marked hypoalbuminemia. A 24 hour urinary protein analysis showed extensive urinary protein loss suggestive of nephrotic syndrome. Renal biopsy clinched the diagnosis of minimal change nephropathy. **Conclusions:** This case report is to highlight other causes of retropharyngeal effusion besides common retropharyngeal abscess. Decision to drain neck is dependent on clinical signs available at time of evaluation. In view of danger posed by retropharyngeal suppuration one tends to err on side of caution and proceed to I & D.

16. In-Office Laser Septal Spur Removal

Yosef P. Krespi, MD FACS*, New York, NY
Victor Kizhner, MD, New York, NY
Cynthia Kamami, MD, Paris, France
Yves V. Kamami, MD, Paris, France

Educational Objective: At the conclusion of this presentation, the participants should be able to understand a unique minimally invasive surgical method for laser septal resection in an office setting.

Objectives: To evaluate the impact of nasal airway improvement, patient satisfaction, safety and complications following in-office, laser septal spur removal (LSSR). **Study Design:** Multicenter retrospective study of 1000 patients' charts from 1998—2008 was reviewed. Patient satisfaction, subjective outcome instrument and objective evaluation of nasal airway resistance/volume changes were recorded. Complications including perforation, crusting, synechia, bleeding, hematoma formation, altered smell sensation were collected. **Methods:** LSSR was conducted employing two different laser systems: 1) CO2 laser, articulated arm with nasal handpiece, or 2) 980nm diode laser with fiber delivery system. The surgical technique includes direct transmucosal ablation of anterior or posterior bony/cartilaginous spurs without incisions, mucoperichondrial flaps, therefore eliminating the need for post-op packing. The laser was chosen according to location of the spur with power settings of 4-8W at CW. Posterior spurs were endoscopically ablated with fiber and long handpiece. **Results:** Over 96% of patients reported subjective improvement of nasal airway and associated symptoms, according N.O.S.E. scale. Objective confirmation was achieved in some patients utilizing rhinomanometry. No septal perforation, hematoma or alteration of smell occurred. Loss of productivity was minimal. Minor bleeding occurred in eight patients and was easily controlled. Thirteen patients had temporary altered teeth sensation. Three patients developed synechia requiring secondary correction. **Conclusions:** In-office LSSR performed under local anesthesia was found to be a safe and effective procedure in carefully selected patients with nasal airway obstruction associated with septal spurs. Improvement in quality of life was achieved with minimal discomfort and complications.

17. Acute Isolated Bilateral Hypoglossal Nerve Palsy: An Unusual Presentation of a Rare GBS Variant

Maggie A. Kuhn, MD, New York, NY
Luc G. Morris, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss typical and atypical causes of hypoglossal nerve palsy and what may lead to isolated or bilateral hypoglossal nerve deficits.

Objectives: To describe an otolaryngologic presentation of a systemic neurological disease. **Study Design:** Case report. **Methods:** Clinical evaluation, literature review. **Results:** We present the case of a 58 year old man who came to our emergency room with acute onset of dysarthria and dysphagia. His exam was significant only for bilateral tongue immobility. A thorough workup ruled out vascular insult, neoplasm, trauma and infection as causes of the patient's neuropathy. Abnormal motor nerve conduction studies lead to the diagnosis of Guillain-Barre syndrome (GBS), specifically Pharyngeal-Cervical-Brachial (PCB) variant. He showed steady improvement with conventional treatment and was discharged from the hospital with complete recovery of bilateral hypoglossal nerve function. **Conclusions:** When considering the hypoglossal nerve, which is closely associated with other cranial nerves, receives signals from bilateral cortices and is prone to injury from neck or intraoral trauma, it is the exception to find it impaired bilaterally and in isolation among patients without history of recent trauma or neck manipulation. Causes of hypoglossal nerve palsy have been characterized in retrospective reviews and case reports but rarely have cases of bilateral or isolated neuropathy been described. Most occur due to tumors of the neck or skull base, cervical or orotracheal trauma, vascular events and infection. Oropharyngeal weakness is one component of PCB variant GBS which was first described in 1986, however a patient presenting with isolated bilateral hypoglossal nerve palsy has not been reported. Recognition of this entity is important for the otolaryngologist who is likely to evaluate patients with isolated or multiple cranial

18.

Intracapsular Tonsillectomy for Obstructive Sleep Disordered Breathing in Adults

Dara R. Liotta, MD, New York, NY
Erich P. Voigt, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to compare and discuss the relative risks and benefits of intracapsular tonsillectomy using the microdebrider versus total tonsillectomy using electrocautery performed for sleep disordered breathing in adults.

Objectives: To review the experience of a single surgeon performing intracapsular tonsillectomy using the microdebrider for the treatment of tonsillar hypertrophy causing obstructive symptoms in adults, and to determine whether intracapsular tonsillectomy was effective in relieving obstructive symptoms in this population. **Study Design:** Retrospective case series. The charts of adults who underwent intracapsular tonsillectomy and total tonsillectomy performed by a single surgeon between the years of 2003 and 2008 were reviewed. **Methods:** Results in 19 adults with a diagnosis of sleep disordered breathing who underwent intracapsular tonsillectomy with the microdebrider, with or without concurrent UPPP, were compared with the results in 19 adults who underwent standard total tonsillectomy performed with monopolar electrocautery, with or without UPPP, for the same indications. (38 patients total.) **Results:** There was no significant difference between the two groups in terms of intraoperative blood loss. There were no episodes of immediate postoperative bleeding in either group. One patient who underwent intracapsular tonsillectomy and two patients who underwent total tonsillectomies experienced delayed postoperative self-limited bleeding that did not require intervention. No patient in either group required readmission to the hospital postoperatively. Pre- and postoperative sleep studies were performed for one patient in group one and for two patients in group two. Studies showed improved AHI in all three cases. The effect of surgery on snoring was similar for the two groups. **Conclusions:** Intracapsular tonsillectomy is a feasible and safe alternative to standard tonsillectomy in relieving obstructive sleep disordered breathing in adults without increase in postoperative complications.

19.

Attitudes and Career Goals of MD-PhD Students Considering Otolaryngology: Analysis of the National MD-PhD SAGE (Students' Attitudes, Goals, and Education) Survey

Li-Xing Man, MD MSc, Pittsburgh, PA
Jaimo Ahn, MD PhD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the potential role of MD-PhD students considering otolaryngology in becoming clinician-scientists within our specialty.

Objectives: To assess the attitudes of MD-PhD students interested in otolaryngology regarding clinician-scientist careers. **Study Design:** Online survey of 868 students enrolled in 13 MD-PhD training programs nationally. **Methods:** Multiple choice questions assessed students' opinions and attitudes towards their education and future career goals. **Results:** The response rate was 56.7%. Twenty of the 492 respondents listed otolaryngology as one of their three strongest clinical interests. Respondents interested in otolaryngology were most likely to be also interested in neurology (30%), ophthalmology (30%), neurosurgery (25%), and/or internal medicine (25%). Both the twenty with a clinical interest in otolaryngology and the others without an interest in otolaryngology showed similar intent on becoming clinician-scientists (score of 2.60 and 2.77, respectively; scale 1 to 8) and interest in pursuing an academic career (85.0% and 90.5%, respectively). The otolaryngology group showed a trend towards having a greater interest in clinical care as a primary activity compared to the non-otolaryngology group (55.0% versus 31.8%; $P = .13$). Seventy-five percent of those interested in otolaryngology reported research as their most likely primary or secondary activity. In ranking the importance of factors influencing the choice of primary clinical field of interest, respondents interested in otolaryngology ranked procedures performed as more important ($P < .0001$) and placed less importance on protected time for academic activities ($P < .05$) and the ease of obtaining a residency position ($P < .005$). **Conclusions:** This study suggests that MD-PhD students considering otolaryngology have a strong interest in pursuing academic careers as clinician-scientists but may prefer patient care more than their peers.

20.

Subperiosteal Deep Granuloma Annulare of the Orbital Rim

Andrew R. Scott, MD, Boston, MA
Linda N. Lee, MD, Boston, MA
Lyn M. Duncan, MD, Boston, MA
David A. Kieff, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinical manifestations and histologic characteristics of deep granuloma annulare and how this entity can sometimes present on the face and scalp. Participants will also understand how through an understanding of facial plastic surgery techniques, the general otolaryn-

gologist can offer an optimal approach to excisional biopsy of nodules overlying the superior orbital rim through an upper lid blepharoplasty incision.

Objectives: To review the presentation of deep granuloma annulare and discuss prior reports of this relatively rare lesion in the head and neck area. **Study Design:** Case report and literature review. **Methods:** Retrospective review of a single case. **Results:** A 52 year old man with a history of rheumatoid arthritis was referred for evaluation of coalescent, nontender nodules overlying the left superior orbital rim. Magnetic resonance imaging (MRI) demonstrated an irregularly shaped lesion that appeared to be adherent to the periosteum. An upper blepharoplasty incision was made to approach the mass, which was sharply dissected free from the superior orbital rim. Histologic examination of the specimen was consistent with granuloma annulare vs. rheumatoid nodule. **Conclusions:** Subperiosteal granuloma annulare is a rare lesion in the head and neck area that has previously only been described in women and children; this is the first case reported in a man. Excisional biopsy of lesions of the upper lid and superior orbit via a blepharoplasty incision allows for sampling of ample tissue through a cosmetically favorable incision.

21. Community Acquired Methicillin Resistant Staph Aureus (CA-MRSA) Infection of the Head and Neck: Current Diagnosis and Treatment

Gary Y. Shaw, MD FACS, Kansas City, MO
Kristy K. Trimm, BS, Kansas City, MO
Michael R. Driks, MD, Lees Summit, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the unique features of CA-MRSA infection. Additionally be able to discuss current treatment recommendations for CA-MRSA based upon severity. Also have an understanding on where to esthetically place incisions for abscess drainage in the head and neck.

Objectives: The incidence of CA-MRSA has increased several fold in recent years. It is particularly important to promptly recognize and treat in order to avoid extensive soft tissue necrosis in the head and neck. The goal of this study is to review current guidelines on the diagnosis and management of CA-MRSA in the head and neck. **Study Design:** Representative case reports and literature review. **Methods:** Four recent cases of CA-MRSA (lip, chin, cheek, and scalp) are reviewed to exemplify proper diagnosis and management. Current national public health guidelines are reviewed. **Results:** All four were managed successfully. **Conclusions:** Given the significant increase of CA-MRSA infection and its particular penchant for subcutaneous soft tissue necrosis, it is incumbent for the community head and neck surgeon to promptly diagnose and treat this disease.

22. Evaluation of Adherence to Continuous Positive Airway Pressure in Treatment for Obstructive Sleep Apnea

Melissa L. Somers, MD, Detroit, MI
Kathleen L. Yaremchuk, MD*, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss predictors of continuous positive airway pressure compliance.

Objectives: To determine if patient age, gender, or apnea-hypopnea index (AHI) value will predict patient adherence to continuous positive airway pressure (CPAP) treatment in patients with obstructive sleep apnea. **Study Design:** Patients with AHI values greater than 15 who received CPAP machines were selected and compliance was measured at one month and one year. Compliance was defined as usage greater or equal to 5 hours per night either by patient reporting or readings on CPAP machines. **Methods:** A retrospective chart review was performed. Groups were analyzed by two sample t tests and by a logistic regression model. **Results:** One hundred and seven patients of 374 (29%) who received CPAP machines were noted to have documented compliance with CPAP use at one month. Forty-six patients (12%) were using their machines at one year while 49 patients were not. There were no significant differences between the ages or AHI values of these two groups when compared. Patients that were compliant were analyzed by a logistic regression model. There was no significance noted for females. For the male group at one year, the model demonstrated a significant AHI variable (p-value = 0.026) as a predictor of compliance if greater than 27.3 and a significant two way interaction between age and AHI (p=0.023). **Conclusions:** Older male patients with AHI readings greater than 27.3 are noted to be more compliant with CPAP use than younger males.

23. Pleomorphic Lipoma in a Neck Mass: Case Report of a Benign Neoplasm with Unusual Pathology

Kathy Yu, MD, New York, NY
Melanie Hood, BS, New York, NY
Diane Hamele-Bena, MD, New York, NY
Ian Storper, MD FACS, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the case presentation and histopathology of pleomorphic lipoma, in addition to explaining the importance of excisional biopsy rather than FNA in making a conclusive diagnosis.

Objectives: It is our purpose to present a case report, histopathology and literature review of pleomorphic lipoma of the neck, which is a rare, benign, soft tissue neoplasm presenting within the subcutis of the neck and shoulder in middle aged to elderly men. **Study Design:** This is a case report of a 56 year old man with a 1.5 cm right supraclavicular mass. Patient initially underwent fine needle aspiration of this neck mass, followed by excisional biopsy in the operating room. **Methods:** Histopathologic slides are provided, along with a literature review showing that there have been only four other cases reported. **Results:** Fine needle aspiration (FNA) of this mass revealed cells with large hyperchromatic nuclei, rare multinucleated giant cells in atypical floret-like arrangements, histiocyte-like cells, mature adipose tissue, and spindle cells. This suggested diagnosis of pleomorphic lipoma, however, due to the nuclear pleomorphism, surgical excision was recommended to ensure definitive diagnosis and management. **Conclusions:** The bizarre multinucleated giant cells with a distinctive floret pattern is a key feature in the diagnosis of pleomorphic lipoma, as well as the intimate admixture of variably sized fat cells. Bizarre pleomorphic cells may also be misdiagnosed as malignancy on FNA, although nuclear pleomorphism of this lipoma is less atypical than that encountered in malignancy. Cure rates are high when this neoplasm is treated with complete surgical excision with clear margins.

Head & Neck

24. Massive Intraoperative Carotid Artery Disintegration with Endovascular Stent Salvage

Mary Theresa A. Adams, MD, Tacoma, WA
Steven M. Hong, BS, Toledo, OH
Douglas M. Sorensen, MD FACS*, Tacoma, WA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify risk factors for carotid blowout, recognize a carotid blowout, and understand treatment options.

Objectives: See above. **Study Design:** Case report. **Methods:** Case report. **Results:** Case report. **Conclusions:** Our patient has a history of stage IV laryngeal squamous cell carcinoma who underwent total laryngectomy, bilateral neck dissection, and radiation therapy. Five years after initial treatment, he presented with laryngeal stoma radionecrosis, and osteomyelitis. The patient presented with massive internal carotid artery blowout in the operating suite during exam under anesthesia. The internal carotid artery disintegrated during deployment of the endovascular graft. Five months later the graft remains patent on angiogram, and the patient is alive without neurologic sequelae.

25. Carcinoma Expleomorphic Adenoma of the Base of Tongue: A Case Report and Review of Malignant Minor Salivary Gland Tumors

Patrick C. Angelos, MD, Portland, OR
Joshua S. Schindler, MD, Portland, OR
David A. Sauer, MD, Portland, OR

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the differential diagnosis of minor salivary gland tumors, compare the histopathologic characteristics of common tumors, explain what carcinoma expleomorphic adenoma is, and discuss the treatment options and outcomes for these tumors.

Objectives: To present a case of carcinoma expleomorphic adenoma (CXPA) arising from the base of tongue in a 61 year old male and to review the literature to elucidate the incidence, histopathologic characteristics, treatment, and outcomes in malignant minor salivary gland tumors. **Study Design:** Case report and literature review. **Methods:** The patient's medical record was reviewed and a literature search of PubMed was performed using the terms "carcinoma expleomorphic", "minor salivary tumors", and "malignant". **Results:** The patient presented with dysphagia and a base of tongue mass. This was confirmed on physical exam and CT of the neck. Panendoscopy and biopsy was performed with final pathology suggesting a low grade salivary neoplasm. Operative excision was performed with a CO2 laser and the final pathology demonstrated CXPA with microscopic extension to the specimen margin. The patient was subsequently treated with radiation therapy. A literature review revealed that salivary gland neoplasms represent approximately 2-3% of all head and neck malignancies with minor salivary glands accounting for 22% of these. Unlike parotid and submandibular gland tumors, the majority of minor salivary gland tumors are malignant. Adenoid cystic carcinomas and mucoepidermoid carcinomas are noted to be the most common histologic types. Surgery with or without postoperative radiation therapy is the mainstay of treatment for these carcinomas. Indicators significant to outcome include T stage, histologic type, cervical nodal or distant metastases, surgical margin status, and perineural invasion. **Conclusions:** Pleomorphic adenoma of the tongue base is extremely rare and to our knowledge this is the first report of

26. Surgical Approaches to the Submandibular Gland: A Cadaveric Dissection Study and Review of Literature

David D. Beahm, MD, New Orleans, LA
Laura L. Pelaez, MS, New Orleans, LA
Barry Schaitkin, MD FACS, Pittsburgh, PA
Daniel Nuss, MD FACS, New Orleans, LA
Rohan R. Walvekar, MD, New Orleans, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to get a perspective of the recent approaches described for submandibular gland excision and understand the relevant anatomy specific to each approach. Additionally, the indications, contraindications, technical challenges, and criteria for selection of each approach will be discussed.

Objectives: Surgical excision of the submandibular gland is commonly indicated in patients with neoplasms, and nonneoplastic conditions such as chronic sialadenitis, sialolithiasis, ranula and drooling. Traditional submandibular gland surgery involves a direct transcervical approach. In the recent past, alternative approaches to submandibular gland excision have been described in effort to offer minimally invasive options or better cosmetic results. The purpose of this article is to study the surgical approaches to the submandibular gland and present relevant surgical anatomy via cadaveric dissection a systematic review of literature to compare and contrast each technique. **Study Design:** Cadaveric dissection with fresh human cadaver heads with emphasis on key anatomic relationships followed by a review of the literature. **Methods:** Cadaver heads were dissected via both the transcervical and transoral approaches to the submandibular gland with the use of endoscopic assistance when indicated. Key landmarks and anatomic relationships were recorded via direct measurements and photodocumentation. A review of the literature was conducted using a Medline search for approaches to submandibular gland excision, including indications, results and complications. **Results:** While the traditional submandibular gland excision remains a direct transcervical approach, many other methods of excision are described that include open, endoscopy, and robot assisted resections. The approaches vary from being transcervical, submental, transoral or retroauricular. **Conclusions:** Alternative approaches to the SMG are feasible but should be tailored to the individual patients based on factors such as pathology, patient preferences, availability of technology, and the experience and skill of the surgeon.

27. Understanding the Mechanism of Late Sorafenib Failure in Iodine Refractory Metastatic Thyroid Cancer

Marc A. Cohen, MD, Philadelphia, PA
Changqing Ma, MD PhD, Philadelphia, PA
Yan Wang, MD, Philadelphia, PA
Waixing Tang, MD PhD, Philadelphia, PA
Jeffrey E. Olson, MSPH, Philadelphia, PA
Marcia S. Brose, MD PhD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to evaluate the immunohistochemical features of a patient who failed sorafenib treatment for unresectable, iodine refractory metastatic papillary thyroid cancer; this may lead to a better understanding of the mechanism of sorafenib in treatment of thyroid cancer.

Objectives: Sorafenib is a multi-kinase inhibitor that blocks tumor growth through targeting kinases known to be involved in cell proliferation and angiogenesis. Our goal is to investigate the mechanisms of sorafenib resistance in an unresectable, tall cell variant of papillary thyroid cancer. **Study Design:** We present our results following immunohistochemical staining of neck metastasis with signaling markers which indicate the blockade of kinase activities by sorafenib. Patient data for the case report was obtained retrospectively. **Methods:** We evaluated the tissue of a 31 year old patient with unresectable, advanced tall cell variant papillary thyroid cancer, status post-total thyroidectomy, multiple cervical lymphadenectomies, and craniotomy for resection of metastasis. The patient was stable for 7 months until progression of disease while on sorafenib. We stained the patient's neck nodes following progression, with antibody to phospho-Erk, phospho-AKT and phospho-p70 S6. **Results:** Our cervical lymphadenectomy specimen revealed a heterogenous expression of phospho-Erk, phospho-AKT, and phospho-p70 S6 with strong staining in the vasculature. This staining pattern is indicative of regions of specimen with tyrosine kinase blockade, as would be expected with sorafenib success, as well as regions that were resistant to sorafenib's inhibition of the oncogenic pathway. **Conclusions:** In this report, we assessed the immunohistochemical features of a patient who failed sorafenib treatment for unresectable, progressive papillary thyroid cancer. Our neck node specimen shows features of heterogeneity when stained with markers for BRAF, VEGFR, and mTOR signaling pathways. These results reflect the patient's progression of disease despite initial stabilization and gives insights to the possible molecular pathways for sorafenib resistance.

28. Late Stomal Recurrence 17 Years Post-Total Laryngectomy: Case Report and Review of Literature

Robert Hadi Deeb, MD, Detroit, MI
Mausumi N. Syamal, MS, Detroit, MI
Robert J. Stachler, MD FACS, Detroit, MI
Scott A McLean, MD PhD, Detroit, MI
Tamer A. Ghanem, MD PhD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the implications of vigilant followup for total laryngectomy patients and to discuss stomal recurrences in this patient population.

Objectives: To 1) present a case of a late stomal recurrence; 2) investigate the longest documented disease free interval in patients with late stomal recurrence post-total laryngectomy; 3) discuss the incidence, types and preventive strategies for stomal recurrences. **Study Design:** Case report and literature review. **Methods:** Literature review of late stomal recurrences, defined as new primaries at the site of the stoma or neopharynx occurring more than 5 years after total laryngectomy. **Results:** We present a case of late stomal recurrence occurring in the neopharynx 17 years post-salvage total laryngectomy. Based on our review of the current and past literature examining late recurrences this case will be the latest documented stomal recurrence in the world literature. Currently, the longest disease free interval post-total laryngectomy, specifically dealing with late stomal recurrence, is 6.5 years. **Conclusions:** Documentation of a case of stomal malignancy 17 years post-total laryngectomy is worthy of mention as it serves as a reminder to clinicians that while late stomal recurrence is rare, it is nonetheless a possibility of serious consequence. Thus, any new complaint, particularly dysphagia or difficulty breathing, in a patient with a history of laryngeal carcinoma warrant a complete and thorough workup.

29. Transmural Invasion of the Esophagus by Locally Invasive Papillary Thyroid Cancer: A Case Report and Review of Reconstructive Options

Paul C. Frake, MD, Washington, DC
Jeremy B. White, MD, Washington, DC
Joseph F. Goodman, MD, Washington, DC
Nader Sadeghi, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the variety of presentations of locally invasive thyroid cancer, the current recommendations for resection of tumor involving the trachea, esophagus, and recurrent laryngeal nerve, and explain the options for functional reconstruction of the esophagus.

Objectives: 1) To report a recent case of locally invasive thyroid cancer with intraluminal involvement of the esophagus; and 2) to review the literature with respect to presentation, diagnosis, and surgical treatment of locally invasive thyroid cancer. **Study Design:** Case report and literature review. **Methods:** Medline was queried for thyroid neoplasms, papillary carcinoma, neoplasm invasiveness, thyroidectomy, esophageal neoplasms, and reconstructive surgical procedures. The results were reviewed and articles were correlated with the topic under discussion. **Results:** A 68 year old female presented for evaluation of mild dysphagia. Barium esophagogram showed no abnormalities and CT scan of the neck showed a 4.7 x 2.7cm left thyroid mass that displaced the esophagus and trachea. The patient was taken for thyroidectomy and the thyroid enlargement was found to be invasive papillary carcinoma adherent to the trachea, encasing the recurrent laryngeal nerve, and penetrating into the lumen of the esophagus. The tumor was resected and a gastric pull through esophagectomy was performed. **Conclusions:** Invasive papillary carcinoma of the thyroid is a rare variant of a common cancer, invasion into the lumen of the esophagus is even more uncommon. It is important for the surgeon to be versed in the reconstructive options for locally invasive thyroid cancers. In the case of transmural invasion into the esophagus, there is no single best reconstructive procedure. Individualized anatomic and physiologic conditions should dictate which reconstructive procedure is used. Options include end to end anastomosis, gastric pull through, right colon interposition, and jejunal or radial forearm free flaps.

30. Benign Mixed Tumors of the Head and Neck: Chondroid Syringoma and Metastasizing Pleomorphic Adenoma

Gregg H. Goldstein, MD, New York, NY
Benjamin D. Malkin, MD, New York, NY
Michael Rivera, 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 describe the manifestations, diagnosis and treatment of chondroid syringoma and metastasizing pleomorphic adenoma.

Objectives: To describe a rare case of pleomorphic adenoma of the parotid gland with scalp metastases and compare these tumors to chondroid syringomas. **Study Design:** A case report and literature review was conducted to identify the clinical and pathological characteristics of these rare tumors. **Methods:** The patient chart was reviewed, along with imaging studies and pathology slides. A literature search was performed using PubMed. **Results:** The patient is a 28 year old man who presented with a third local recurrence of a pleomorphic adenoma of the right parotid gland. A revision parotidectomy was performed and the pathology revealed 4 separate benign pleomorphic adenoma tumors extending into the adjacent fat. The patient underwent an incomplete course of radiation therapy. He returned 1 year later with 2 small subcutaneous, well circumscribed nodules at the central forehead and right parietal scalp. FNA cytology was read as benign skin adnexal lesions, consistent with chondroid syringomas. The patient underwent excision of the lesions and the final pathology showed benign mixed tumors, consistent with chondroid syringomas or metastasizing pleomorphic adenomas. **Conclusions:** Chondroid syringoma and pleomorphic adenoma are both benign mixed tumors that arise in the head and neck. They share many clinical and histologic features but differ in their origins—chondroid syringomas from eccrine or apocrine glands and pleomorphic adenomas from salivary glands. Metastasizing pleomorphic adenoma is a rare and poorly understood entity that usually occurs after multiple local recurrences of the primary tumor. It can be confused with chondroid syringoma without adequate history or close pathologic examination.

31. Prognostic Value of CD4+ Regulatory T cell Subpopulations in Oropharyngeal Squamous Cell Carcinoma

Jason Morgan Guillot, MD, Jackson, MS
Gailen D. Marshall, MD PhD, Jackson, MS
Karen T. Pitman, MD FACS*, Jackson, MS
William H. Replogle, PhD, Jackson, MS

Educational Objective: At the conclusion of this presentation, the participants should be able to define subpopulations of RTCs according to their respective cell markers, to discuss the theorized role of regulatory T cell (RTC) subpopulations in the pathophysiology of head and neck squamous cell carcinoma (HNSCC), and to understand the prognostic value of these RTC subpopulations for HNSCC patients.

Objectives: Immunoregulatory dysfunction is hypothesized to play a role in the in vivo survival of cancer cells. Disparities in regulatory T cell (RTC) subpopulations may be a marker for, and possibly a cause of such dysfunction. RTC subpopulations have not been characterized in patients with oropharyngeal squamous cell carcinoma (OpSCC) nor have changes in RTC subpopulations been followed over time in these patients. **Study Design:** Prospective, longitudinal. **Methods:** This study was designed to examine the changes in RTC subpopulations before and after treatment relating those changes to smoking status, cancer remission, and survival. As a control population, the same data were collected on age similar smokers without a diagnosis of cancer. Multi-color flow cytometry was performed on peripheral blood mononuclear cells (PBMC) before and after treatment for OpSCC. RTC subpopulations studied included classical regulatory T cells (T_{reg}) defined as $CD3^+CD4^+CD25^{HIGH}FoxP3^+$, T regulatory type-1 (Tr1) cells defined as $CD3^+CD4^+CD25^{HIGH}IL10^+$, and T helper type 3 cells (TH3) defined as $CD3^+CD4^+TGF\beta^+$. Statistical significance was assessed using ANOVA, t-tests, and Chi-square where applicable. **Results:** 23 newly diagnosed OpSCC and 33 control subjects were enrolled. Despite a significant CD4+ T-cell lymphopenia in the patients, there were no significant differences between RTC subpopulations at diagnosis for the OpSCC subgroups compared to smoking controls. However, one year after enrollment and subsequent treatment, an overall decrease in T_{reg} from baseline was present in OpSCCs with no evidence of disease and controls (-4.10 ± 10.70 and -6.93 ± 12.16 , respectively) versus an overall increase in T_{reg} for OpSCCs who owned persistent disease ($+11.09 \pm 10.13$; $p = 0.045$). **Conclusions:** No prognostic significance was noted with RTC subpopulation values at OpSCC diagnosis. However, obtaining Treg values at baseline and after treatment may aid in predicting persistence versus remission of OpSCC following treatment.

32. WITHDRAWN--Endovascular Therapeutic Management of Carotid Blowout Syndrome in Head and Neck Cancer Patients

Steven S. Hong, MA, Toledo, OH
Jon M. Robitshek, MD, Honolulu, HI
Joseph C. Sniezek, MD FACS, Honolulu, HI

Educational Objective: At the conclusion of this presentation, participants should be able to demonstrate general knowledge of initial management and stabilization of a patient who presents with carotid blowout syndrome. They should also be able to state the appropriate use of the different modalities of endovascular management in carotid blowout patients.

Objectives: Discuss the endovascular treatments for carotid blowout in patients with advanced head and neck cancers and present a decision making algorithm for management at initial presentation and for choosing the appropriate endovascular technique. **Study Design:** Retrospective case review. **Methods:** Retrospective review of three cases of acute or imminent carotid hemorrhage managed with either endovascular stents or permanent endovascular occlusion. **Results:** One patient presented with acute carotid blowout, whereas two patients presented with probable sentinel bleeds. One patient was deemed appropri-

ate for undergoing a permanent balloon occlusion (PBO) after a carotid angiography revealed a small hemorrhagic pseudoaneurysm and after passing a balloon test occlusion. The other two patients were believed to be at significant risk for stroke if the carotid artery became occluded and were treated with stent placements. All patients achieved immediate hemostasis. The PBO patient exhibited no major complications including no rebleed episodes during 6 years post-occlusion. One patient suffered a stroke 2 months post-stent placement and died 4 months later of disease progression. The other patient suffered a rebleed episode one month post-stent placement and died of disease progression a month later. **Conclusions:** There are several technical limitations to either endovascular procedure, along with many confounding clinical variables that must be taken into consideration in choosing the appropriate endovascular treatment in carotid blowout syndrome. For short term control of hemorrhage, both occlusion and stenting have been shown to be quite effective, while the literature and our own experience suggest that endovascular occlusion provides a longer period of hemostasis and less complications than stent placement.

33. Outcomes of Intubation in Difficult Airways due to Head and Neck Pathology

Tim A. Iseli, MBBS FRACS PGDipSAnat, Birmingham, AL
Claire E. Iseli, MBBS MS PGDipSAnat, Footscray, Victoria Australia
J. Blake Golden, MD, Birmingham, AL
Virginia L. Jones, Birmingham, AL
Arthur M. Boudreaux, MD, Birmingham, AL
William R. Carroll, MD FACS, Birmingham, AL

Educational Objective: At the conclusion of this presentation, the participants should be able to evaluate the impact of intubation technique, subspecialty anesthesiologist supervision and surgical pathology on adverse outcomes from difficult intubation in head and neck surgery.

Objectives: To evaluate the impact of intubation technique, subspecialty anesthesiologist supervision and surgical pathology on adverse outcomes from difficult intubation in head and neck surgery. **Study Design:** Prospective observational cohort. **Methods:** 152 difficult airways patients were evaluated for: difficulty with or change of airway plan; minimum oxygen saturation during intubation; time from entry into operating room to endotracheal intubation and complications attributable to intubation. **Results:** A specialist head and neck anesthesiologist intubated 66.4% of cases, on average 3.3min faster ($p=0.507$), with higher minimum oxygen saturation (87.3% vs. 81.8% $p=0.016$) and changed airway plans less often ($p=0.001$). Factors found to significantly increase the likelihood of changed airway plan include cancer diagnosis ($p=0.021$), though stage was not significant, previous radiotherapy ($p=0.026$) and supraglottic lesions ($p=0.024$). Glottic/subglottic lesions caused the most intubation difficulty ($p=0.020$). Awake fiberoptic intubation was the most commonly used initial airway technique (44.7%) but frequently required a change of plan (8.8%). Gas induction had the highest mean minimum oxygen saturation ($p=0.014$). Awake tracheostomy was infrequently used (1.3%) and took the longest ($p=0.006$). **Conclusions:** Patients with difficult airways due to head and neck pathology require coordination between anesthesiology and surgical teams. A subspecialist anesthesiologist may improve intubation outcomes. Adverse intubation outcomes are higher in those with cancer, especially supraglottic or glottic, and those previously irradiated. Awake transnasal fiberoptic, gas induction and dilator cricothyrotomy techniques are safe and effective and allow awake tracheostomy to be used sparingly. A backup airway plan should always be made and may include surgical intervention.

34. Conditional Survival in Head and Neck Melanoma

Daniel Jethanamest, MD, New York, NY
Luc G.T. Morris, MD, New York, NY
Mark D. Delacure, MD FACS, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand conditional survival, the key factors influencing these probabilities, and be able to more accurately counsel head and neck melanoma patients who survive beyond the initial period following diagnosis.

Objectives: To report changes in survival probabilities as patients survive one or more years with head and neck melanoma, and to characterize prognostic factors for this conditional survival statistic. **Study Design:** Retrospective population based cohort study. **Methods:** All subjects from the Surveillance, Epidemiology and End Results (SEER 17) database of the National Cancer Institute with head and neck cutaneous melanoma were analyzed. Using the life table actuarial method, conditional 5 year disease specific survival (DSS) and relative survival were determined for patients surviving one to ten years after diagnosis. Grouped comparisons were performed for anatomic subsites within the head and neck and the rest of the body. Probabilities were also stratified by histologic subtype, thickness of invasion and lymph node status. **Results:** Five year DSS for scalp and neck melanomas increases from 83.1% to 93.9% for patients surviving five years, compared to an increase from 89.2% to 96.2% for other anatomic sites. Nodular melanoma displayed the worst initial survival among histologic subtypes (73.4%) but improves to 91% at five years. Conditional DSS for node positive patients improves from 47.9% to 83.1%. Survival at diagnosis is stratified by tumor thickness from 96.7% (T1) to 64.7% (T4), but tends to converge between five to ten years of survivorship. **Conclusions:** For patients with head and neck melanoma who have survived several years, conditional survival provides

accurate and useful prognostic information. In general, survival increases with time from diagnosis, and for low and high T-stage patients, conditional survival statistics converge over time.

35. WITHDRAWN--The Role of PET/CT in Evaluating Recurrent Head and Neck Cancer Patients

Jonathan H. Law, MD, Columbus, OH
Alfred J. Fleming Jr., MD, Columbus, OH (Presenter)
Stephen P. Smith Jr., MD, Columbus, OH
Amit Agrawal, MD FACS, Columbus, OH
David E. Schuller, MD FACS*, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to explain how PET/CT may be used as an adjunct to physical examination for head and neck cancer patients. The audience should understand the diagnostic implications that PET/CT has on determining the extent of recurrent disease and presence of regional and distant metastases. The results of this study should be added to the growing body of evidence to support PET/CT research and potentially improve head and neck cancer patient care and outcomes.

Objectives: The role of fused modality [18F]-2-fluorodeoxyglucose positron emission tomography (PET/CT) in diagnosing patients with recurrent and second primary head and neck cancer is evolving and the clinical implications need to be further defined. This study evaluates the positive predictive value of PET/CT on previously treated head and neck cancer patients with a clinical suspicion for recurrence. In studying neck dissection histopathology, sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated. **Study Design:** Retrospective cohort outcomes study at a tertiary cancer center. **Methods:** The authors identified 115 consecutive PET/CT examinations between March 2005 and January 2006 for patients clinically suspected to have recurrent head and neck cancer. PET/CT examinations were interpreted by one of three neuroradiologists. Ninety-nine of 115 patients had a histopathological diagnosis, and the sensitivity, specificity, PPV, NPV, and accuracy of PET/CT imaging were calculated. **Results:** A total of 140 lesions were identified by PET/CT and diagnosed by surgical specimen histopathology. PET/CT was true positive in 63.6% (89/140) and false positive in 9.3% (13/140), resulting in a PPV of 87.3%. Fourteen patients had neck dissections (12 unilateral, 2 bilateral), resulting in overall sensitivity of 66.7%, specificity of 90%, PPV of 80%, NPV of 81.8%, and accuracy of 81.3%. We will discuss how many patients had distant metastases and synchronous lesions detected by PET/CT. In addition, we will discuss how management was altered due to PET/CT findings. **Conclusions:** PET/CT is a promising tool for monitoring previously treated head and neck cancer patients for recurrence and second primary cancers. We have found that this modality assists the head and neck surgeon in evaluating the extent of recurrent disease, presence of regional and distant metastases, and presence of second primary malignancies.

36. Extramedullary Plasmacytoma of the Nasopharynx Treated with Surgery and Adjuvant Radiation: Case Report and Review of the Literature

Jason M. Leibowitz, MD, Philadelphia, PA
Marc A. Cohen, MD, Philadelphia, PA
Nazish Hashmi, MD, Karachi, Pakistan
Natasha Mirza, MD FACS*, Philadelphia, PA
Soo Kim Abboud, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the clinical presentation and workup of extramedullary plasmacytoma of the nasopharynx and have a clear understanding of treatment options.

Objectives: Extramedullary plasmacytoma (EMP) is a rare variant of non-Hodgkin's lymphoma that arises due to soft tissue infiltration of monoclonal plasma cells, in the absence of evidence of systemic disease. Although the head and neck is the most common location of EMP, there are only a handful of cases reported in the nasopharynx. This report conveys our recent experience with EMP of the nasopharynx in the context of the limited literature on this topic. **Study Design:** Report of a case and review of the literature. **Methods:** Report of a case and review of the literature pertinent to extramedullary plasmacytoma of the nasopharynx. **Results:** A 50 year old healthy male presented with a year long history of increasing bilateral nasal congestion unresponsive to medical therapy. Nasal endoscopy revealed a large exophytic mass filling both posterior nasal cavities. Imaging demonstrated a 3X3 cm mass arising from the nasopharynx and extending into the posterior nasal cavities bilaterally. A biopsy was performed, demonstrating extramedullary plasmacytoma of the nasopharynx. Metastatic workup was negative. The patient underwent surgical debulking followed by radiation therapy to the primary site and bilateral necks. He has not recurred to date and does not have evidence of progression to multiple myeloma. **Conclusions:** This report adds to the scant literature on EMP of the nasopharynx, which may mimic many benign nasal and sinus conditions. Although surgery is usually considered second line treatment for EMP of the head and neck, this case demonstrates the utility of surgical debulking in symptom palliation before definitive treatment with radiation.

37. Rhabdomyosarcoma of the Head and Neck in the Adult Population: A Distinct Entity from Childhood Rhabdomyosarcoma?

Laura A. Matrka, MD, Columbus, OH
Paul Wakely, MD, Columbus, OH
Amit Agrawal, MD FACS, Columbus, OH
Scott Cronin, BS, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) discuss differences in outcomes and clinical characteristics of children and adults with rhabdomyosarcoma of the head and neck; 2) understand why adults do more poorly than children with rhabdomyosarcoma; 3) understand the difficulty in advising surgery as part of the treatment regimen for adults; and 4) understand difficulties in confirming histologic diagnosis of rhabdomyosarcoma.

Objectives: To better characterize the nature of head and neck rhabdomyosarcoma in adults and determine the role of definitive surgery and causes for poor outcome. **Study Design:** A retrospective chart and pathologic review. **Methods:** Our database was searched for all cases of histologically confirmed rhabdomyosarcoma in patients over the age of 18 years. All slides were re-reviewed and myogenin staining was performed to confirm the diagnosis. Clinical information was collected with a systematic chart review. **Results:** 19 patients met initial criteria; 4 were found to be misdiagnosed upon pathologic review and 1 was excluded because of previous diagnosis at a younger age. 100% of the 14 patients meeting strict pathologic criteria for rhabdomyosarcoma showed the alveolar subtype; this compares to a rate of 20% for this subtype in children. 72% of adults had significant medical comorbidities with 54% requiring interruptions of treatment. 86% had advanced disease at diagnosis with an average survival of 12 months as compared to 13.6 months for those with stage I or II disease. Patients who underwent definitive surgery as initial therapy had an overall survival of 13 months as compared to 14.2 months for those who did not start treatment with surgery. **Conclusions:** Adults have worse outcomes than children with rhabdomyosarcoma, likely due to 1) higher rate of unfavorable histology; 2) medical comorbidities and treatment interruptions; 3) undefined treatment algorithms for adults; and 4) incorrect histologic diagnoses. Adding surgery to the treatment regimen does not clearly provide better outcomes.

38. Robotic Surgery of the Infratemporal Fossa

Ryan R. McCool, MD, Salt Lake City, UT
Frank M. Warren, MD, Salt Lake City, UT
Richard H. Wiggins, MD, Salt Lake City, UT
Jason P. Hunt, MD, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the technical feasibility of robotic surgery of the infratemporal fossa using a novel midline suprahyoid port placement.

Objectives: To develop a minimally invasive technique for robotic access to the infratemporal fossa and describe the technical feasibility of using surgical robotics in this application. **Study Design:** A feasibility study of robotic dissection of the infratemporal fossa using a novel, midline suprahyoid port placement. **Methods:** Six complete and two partial dissections of the infratemporal fossa were carried out on 1 fixed and 3 fresh cadaveric heads using the da Vinci Surgical Robot (Intuitive Surgical, Inc., Sunnyvale, CA). The suprahyoid port site enters the midline neck superior to the hyoid bone and passes into the oropharynx in the midline base of tongue. Dissections were performed through the lateral pharyngeal wall and carried out into the infratemporal fossa with identification and preservation of the lingual n., inferior alveolar n., internal and external carotid arteries, jugular vein, and CN IX-XII. Surgical clips were placed at the extent of dissection, and high resolution CT imaging provides objective evidence of access to the respective skull base foramina. **Results:** The transoral and midline suprahyoid port sites provide excellent access to the infratemporal fossa. The midline port site is minimally invasive and has excellent utility for accessing wide areas of the skull base bilaterally. CT imaging demonstrates surgical clips placed successfully at the skull base foramina of major neurovascular structures of the infratemporal fossa. **Conclusions:** Robotic surgery offers several advantages over traditional endoscopic surgery with the addition of tremor free, two handed technique and stable 3-D magnification. A midline, suprahyoid port placement provides minimally invasive access for excellent exposure of the infratemporal fossa bilaterally.

39. Concurrent Lingual Thyroid and Undescended Thyroglossal Duct Thyroid in a Patient without Orthotopic Thyroid Gland

Edward D. McCool, MD MPH, Brooklyn, NY
Egbert J. deVries, MD FACS, Brooklyn, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the appropriate presurgical evaluation of the patient with a thyroglossal duct anomaly, appreciate the embryologic association with lingual thyroid, and understand the role of surgical management of these conditions.

Objectives: 1) Describe the usual embryologic origins of common structural thyroid anomalies; 2) present an unusual case of lingual thyroid and undescended thyroglossal duct thyroid (UTGDT) occurring together in the absence of orthotopic gland; and 3) discuss clinical implications for surgical management of this entity. **Study Design:** Case report and literature review. **Methods:** We present the case of a 14 year old girl with a longstanding anterior neck mass. **Results:** Initial evaluation of the anterior neck mass with CT scan revealed a heterogeneously enhancing structure in the midline and an isodense mass at the foramen cecum, with an absence of orthotopic thyroid gland. Fine needle aspiration biopsy of the neck mass revealed normal thyroid tissue. Fiberoptic evaluation revealed a pink, hypervascular mass at the base of tongue. The presence of metabolically active thyroid tissue was confirmed in both locations by nuclear scan. Clinical and serologic evidence of hypothyroidism was present, and the patient was started on thyroid hormone replacement therapy preoperatively. The patient underwent an uncomplicated Sistrunk procedure, followed by postoperative hormone replacement therapy to correct hypothyroidism and promote involution of the lingual thyroid remnant. **Conclusions:** Lingual thyroid and UTGDT may each occur without functioning orthotopic thyroid gland, although the association of these anomalies together has been very rarely reported. Appreciation of the potential for abnormal function of ectopic thyroid tissue can help guide surgical management. Early evaluation by an endocrinologist is an important part of the therapeutic approach. The indications and outcomes of management of these conditions are further discussed herein.

40. Parapharyngeal Space Pleomorphic Adenoma: A 30 Year Review

Abie H. Mendelsohn, MD, Los Angeles, CA
Sunita M. Bhuta, MD, Los Angeles, CA
Thomas C. Calcaterra, MD FACS*, Los Angeles, CA
Elliot Abemayor, MD PhD FACS*, Los Angeles, CA
Maie A. St. John, MD PhD FACS, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the long term prognosis of parapharyngeal space pleomorphic adenoma. They should be able to understand the patient population in which this tumor presents. They should also be able to predict patients at a higher risk of recurrence.

Objectives: To evaluate the treatment results of pleomorphic adenoma (PA) of the parapharyngeal space at a single institution during a 30 year period. **Study Design:** A retrospective review of 44 patients with PA of the parapharyngeal space treated at a major academic institution from January 1975 to November 2005. **Methods:** This study was performed by examining the records and reviewing the pathology reports. **Results:** Of the 44 patients with PA, 35 patients underwent excision. 11 men and 24 women with an age range of 19 to 75 years (mean, 48 years) were treated surgically. Followup varied from 20 months to 180 months (mean, 93 months). There were 3 recurrences in 2 patients. Recurrence rates at 5 and 10 years were 2.9% and 8.6 % respectively. Mid-P exact and Student's t-tests were used to evaluate gender, age, tumor volume, pathologic surgical margin status, and prior resections as possible significant predictive factors. Only history of prior resection ($p < 0.01$) was significant for recurrence. Positive surgical margins ($p = 0.69$) proved a negative association. **Conclusions:** We report low recurrence rates in this patient population with two important prognostic indicators. Only history of prior resection is significant to predict recurrence. Interestingly, positive surgical margins are actually shown not to effect risk of recurrence. Local recurrence of the tumor is associated with further recurrence and less favorable prognosis.

41. Ascertainment Bias as a Cause of Increasing Thyroid Cancer Incidence: A Study of 514 US Counties

Luc G.T. Morris, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) define ascertainment bias; 2) compare different hypotheses for the increasing incidence of thyroid cancer; and 3) discern hypotheses for the role of access to health care in the diagnosis of thyroid cancer.

Objectives: The incidence of thyroid cancer in the west has apparently doubled in three decades. This may represent ascertainment bias, as diagnostic technology improves detection of a subclinical reservoir of disease. We examined the relationship between the incidence of thyroid cancer and socioeconomic indicators of health care access across the United States. **Study Design:** Ecologic analysis of 514 counties captured in the NCI SEER database (2000-2005) and Census Bureau insurance data. **Methods:** County age adjusted incidence of thyroid cancers were correlated with surrogate measures of health care access and utilization: median income and the percentage of the population uninsured, unemployed, with white collar occupations, living in poverty, linguistically isolated, non-white, or college educated. A stepwise population weighted multiple regression model was used to explore the association between thyroid cancer incidence and these variables. **Results:** All socioeconomic variables demonstrated significant correlation with the incidence of thyroid cancer, most strongly with the incidence of subclinical (<1.5cm) tumors. Insurance status had the highest partial correlation. A model for the total incidence of thyroid cancer was based on the predictors: uninsured, college degree, and non-white ($r=0.35$, $F=22.3$, $p<0.0001$). A papillary carcinoma incidence model was based on the predictors: uninsured, family income, college degree, poverty and language isolation ($r=0.37$, $F=12.4$, $p<0.0001$). A subclinical (<1.5cm) carcinoma model was based on the predictors: uninsured, family income, college

degree, non-white and white collar occupation ($r=0.35$, $F=12.9$, $p<0.0001$). **Conclusions:** The best available socioeconomic surrogates for health care access and utilization suggest a significant role for ascertainment bias, in the form of improved screening, in explaining the rising incidence of thyroid cancer across 514 surveyed counties in the United States.

42. Ischemic Necrosis of the Tongue in Patients with Shock

Luc G.T. Morris, MD, New York, NY
Benjamin Roman, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss end organ manifestations of shock in the head and neck, provide a differential diagnosis for tongue necrosis, and expound upon hypotheses for tongue necrosis in patients with shock.

Objectives: To present the first case series of patients who have experienced ischemic necrosis of the tongue as a sequela of shock. **Study Design:** Case series and review of the literature. **Methods:** Review of medical records and photodocumentation of 4 patients noted to develop gangrene of the tongue. **Results:** Four patients in our institution's cardiovascular surgery unit were noted to develop ischemic necrosis of the tongue. All 4 patients experienced protracted courses of profound cardiogenic shock requiring high dose vasopressor support and urgent cardiac surgery. Intraaortic balloon pump therapy was required in 3 of 4 cases. One patient developed synchronous carotid arterial occlusive disease requiring intervention. Duration of orotracheal intubation was variable. All patients had concomitant signs of poor end organ perfusion, including lower extremity ischemia and renal and hepatic failure. Ultimately, 3 of 4 patients died, with 1 patient surviving after sloughing of the entire oral tongue. **Conclusions:** We report the first case series of ischemic tongue necrosis as a sequela of shock. This end organ sign of a profound low flow state appears to portend a grave prognosis. Strategies for management are discussed.

43. Novel Closure of a Surgical Wound with Exposed Carotid Artery through the Use of a Wound Vacuum Assisted Closure Device and OASIS Wound Matrix

Ryan C. Murray, MD, Philadelphia, PA
Adam J. Luginbuhl, MD, Philadelphia, PA
Kyle W. Fisher, MD, Philadelphia, PA
Ryan N. Heffelfinger, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the use of the wound VAC and OASIS matrix in the closure of head and neck wounds with exposed carotid vasculature.

Objectives: The wound vacuum assisted closure (VAC) system has been shown to assist in the closure of some complex surgical wounds. The use of the wound VAC system has recently been described in limited wounds of the head and neck. OASIS a biologically derived extracellular matrix collagen has also been used in wound closure as a tissue substrate. We describe the novel use of the wound VAC system and OASIS in the closure of a complex orocutaneous fistula that involved an exposed carotid artery. **Study Design:** A retrospective chart review. **Methods:** First OASIS wound matrix was used to pack the fistula track as well to provide coverage directly on the area of exposed carotid artery. Next the wound VAC system was placed over the wound and allowed to apply 125 mmHg of continuous pressure. **Results:** One month following a partial pharyngectomy our index case, SC, developed an orocutaneous fistula that terminated in a 4 x 5cm area of skin breakdown. Exploration of the wound in the operating room revealed an area of exposed carotid artery covered with minimal amounts of granulation tissue. After 5 days of therapy the VAC system achieved almost full closure of the wound, closure of the orocutaneous fistula and resulted in complete tissue coverage of the previously exposed carotid artery. **Conclusions:** The wound VAC system with OASIS wound matrix can be used as an effective therapy for complex head and neck surgical wounds. In select situations VAC closure can be used safely for the closure of wounds involving exposed carotid artery.

44. Patterns of Recurrence and Survival of Adenoid Cystic Carcinoma of the Head and Neck after a Potentially Curative Resection

Agnes M. Oplatek, MD, Columbus, OH
Enver Ozer, MD, Columbus, OH
Amit Agrawal, MD FACS, Columbus, OH
Sumit Bapna, MD, Columbus, OH
Nur Hamamci, BS, Ankara, Turkey
David E. Schuller, MD FACS*, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to explain factors that impact recurrence and survival of patients undergoing potentially curative resection for adenoid cystic carcinoma of the head and neck.

Objectives: To determine factors impacting recurrence and long term survival of adenoid cystic carcinoma (ACC) of the head neck after a potentially curative resection. **Study Design:** Retrospective cohort study at an academic tertiary care hospital. **Methods:** A review of patients with ACC was performed. Patients not receiving surgery, or with metastatic disease were excluded. Clinicopathological data on each patient was collected. **Results:** Of 113 patients identified with ACC, 99 were studied. The median survival was 128 months (mean \pm SD, 94 \pm 79 months). AJCC tumor stage was an independent predictor of survival on multivariate analysis ($p=0.008$). Mean overall survival ($p=0.001$) and time to recurrence ($p=0.006$) was lower for patients with node positive disease (N+). Tumors in major salivary glands were associated with longer survival ($p=0.027$). The recurrence rate was 53% with a mean time to recurrence of 60 \pm 65 months. Presence of lymphovascular invasion predicted recurrence on multivariate analysis ($p=0.002$), with tumor stage IV predicting early (d36 months) recurrence ($p=0.013$). Among the 57 patients who received adjuvant radiation therapy, there was no difference in survival, rate of recurrence, or time to recurrence, when compared to patients treated with surgery alone. **Conclusions:** Clinicopathological variables including AJCC tumor stage, tumor site, presence of N+ disease, and lymphovascular invasion may be used as prognostic factors in predicting survival and recurrence after a potentially curative resection of ACC of the head and neck.

45. What Makes a Good Flap Go Bad? A Critical Analysis of the Literature of Intraoperative Factors Related to Free Flap Failure

Kavita M. Pattani, MD, Baltimore, MD

Jeremy D. Richmon, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the various factors related to poor outcome in free flap reconstructions.

Objectives: To understand what factors are and are not related to free flap failure. **Study Design:** Literature search. **Methods:** A review of the contemporary literature (1995 to present) on free flap reconstruction of the head and neck was undertaken. A literature search on PubMed using the search terms; head and neck, reconstruction, free flap, microvascular, failure, complications, fluids, intraoperative, hypertension, hypotension, nitrous oxide, temperature, and morbidity in various combinations was completed. Abstracts were evaluated for prospective and retrospective studies looking at free flap failures. Appropriate articles were selected and analyzed. **Results:** A paucity of evidence exists relating several intraoperative factors to free flap failure. These include greater than 7L intraoperative fluid administration, nitrate and bronchodilator treat, irradiated recipient site, prolonged operative time, and involvement of greater than 1 microvascular surgeon. No evidence exists supporting hypotension, pressors, colloids, and nitrous use. The most common cause of free flap problems relates to failure of proper surgical technique. **Conclusions:** Although various dogmas related to the intraoperative care of free flap patients exists including avoidance of hypotension and pressor use, there is no available evidence to support this. Based on the literature the most common cause of free flap complication is failure of surgical technique. Although free flap failure is increasingly uncommon, a better understanding of its causes is necessary to avoid this disastrous complication.

46. Medullary Thyroid Carcinoma Metastatic to the Parotid Gland

Stanley Pelosi, MD, New York, NY

Eric M. Genden, MD FACS*, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should demonstrate an understanding of the potential for metastatic disease to the parotid gland in patients with a history of malignancy.

Objectives: Clinicians should strongly consider metastatic disease in their evaluation of all patients with a parotid mass and history of malignancy. Medullary thyroid carcinoma is an aggressive cancer which can present with unusual patterns of metastasis both at the time of diagnosis and following treatment. **Study Design:** Case report. **Methods:** We present a rare case and review the associated literature. Our patient had a history of familial medullary thyroid cancer previously managed with total thyroidectomy and paratracheal neck dissection. She now presented five years later with a new right parotid mass. Laboratory values showed an elevated calcitonin of 1112 and a CEA of 36. Fine needle aspiration was consistent with metastatic medullary thyroid carcinoma. CT neck confirmed the presence of a right parotid mass but showed no cervical lymphadenopathy. PET, octreotide, and chest CT scans showed no lesions. **Results:** The patient was managed surgically with a superficial parotidectomy and right level II-IV selective neck dissection. Final pathology confirmed a diagnosis of metastatic medullary thyroid carcinoma in the parotid gland; no tumor was present in the contents of the right neck dissection. One year from the time of surgery she remained free of clinical disease. **Conclusions:** To our knowledge this is the second reported case of metastatic medullary thyroid carcinoma to the parotid gland. Early identification of recurrent disease is facilitated by knowledge of this malignancy's potential for unusual and aggressive patterns of spread. Metastatic disease should be strongly considered in all patients with a parotid mass and history of malignancy.

47. PET-CT Surveillance for the Node Positive Neck after Chemoradiotherapy: Feasibility and Results in a Community Based Setting

Amy G. Rabalais, MD, New Orleans, LA
Rohan R. Walvekar, MD, New Orleans, LA
Daniel W. Nuss, MD FACS, New Orleans, LA
Andrew J. McWhorter, MD, New Orleans, LA
Charles G. Wood, MD, Baton Rouge, LA
Anna M. Pou, MD FACS, New Orleans, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role of PET-CT in the post-treatment evaluation of node positive patients following chemoradiotherapy.

Objectives: To establish the feasibility of positron emission and computerized tomography (PET-CT) protocols for the management of the post-chemoradiotherapy neck in community settings. **Study Design:** Retrospective. **Methods:** 428 patients with advanced head neck squamous cell carcinoma treated with nonsurgical therapy and followed with post-treatment PET-CT surveillance of the neck from September 2002 to March 2007 were identified using the radiation therapy data base. Fifty-two patients meeting our inclusion criteria were analyzed. Sensitivity, specificity, negative predictive value (NPV), positive predictive value (PPV), and accuracy of PET-CT were calculated. **Results:** Ten patients had a positive post-treatment PET-CT for residual neck disease, and 42 patients had negative scans. The NPV and PPV was 100% and 40%, respectively. The sensitivity, specificity, and accuracy were 100%, 87.5%, and 88% respectively. **Conclusions:** Planned neck dissection can be deferred with a negative post-treatment PET-CT. Our results compare to those in current literature and validate the feasibility of PET-CT imaging protocols in community based cancer centers.

48. Endoscopic Coblation of Sinonasal Tumors

Ashley B. Robey, MD, Omaha, NE
Russell B. Smith, MD FACS, Omaha, NE

Educational Objective: At the conclusion of this presentation, the participants should be able to evaluate the clinical utility of endoscopic coblation for the extirpation of sinonasal tumors.

Objectives: To discuss the clinical utility of endoscopic coblation for the extirpation of sinonasal tumors. **Study Design:** Retrospective case series. **Methods:** A retrospective case series of six patients who underwent endoscopic coblation of their sinonasal tumors is reviewed. Four patients, age range 12-79, were diagnosed with the following: radiation induced sarcoma, juvenile nasopharyngeal angiofibroma, sinonasal angiofibroma, schwannoma, sinonasal melanoma and recurrent chordoma. Endoscopic coblation technique was utilized in tumor resection in addition to more traditional modalities. **Results:** Endoscopic coblation of sinonasal tumors is a useful surgical modality that allows meticulous resections, controlled bleeding and excellent visualization. Five of the six patients had tumors excised via a strictly endoscopic approach with coblator utilization. **Conclusions:** Sinonasal tumors can be safely and effectively excised utilizing endoscopic coblation techniques. Endoscopic coblation of sinonasal tumors has not been previously discussed in current literature; the findings from this case series suggest that this is a useful and successful modality for surgically excising tumors of the nose and paranasal sinuses.

49. Microbiological Spectrum of Cervical Wound Infections in Postoperative Head and Neck Cancer Patients

James M. Ruda, MD, Cleveland, OH
Susan J. Rehm, MD, Cleveland, OH
Daniel S. Alam, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) identify prevalent bacterial species present in cervical wound cultures of patients after head and neck surgery with postoperative infections; 2) recognize antibiotic sensitivity, resistance, and susceptibility patterns of organisms cultured from postoperative cervical wounds in head and neck cancer patients; 3) understand the likely effectiveness of commonly utilized prophylactic antibiotics, given in the postoperative setting, to prevent and treat cervical wound infections in head and neck cancer patients, based on established patterns of antibiotic sensitivities/resistances; and 4) determine if a previous history of radiation therapy or chemoradiation therapy affects the type of organism cultured from cervical wound infections.

Objectives: Cervical wound infections occur in postoperative head and neck cancer patients despite treatment with prophylactic antibiotics against traditional oropharyngeal flora. This study sought to identify the microbiology of postoperative wound infections in a tertiary care setting and susceptibility to standard oropharyngeal antibiotics. **Study Design:** Retrospective chart review. **Methods:** From 1995-2008, 41/1847 patients who developed postoperative cervical wound infection were identified at our institution by performing a search of common head and neck cancer ICD-9 codes that were cross-referenced by CPT code 87070 (routine upper respiratory aerobic culture). Cultures taken from patients within thirty days after surgery and relating only to postoperative cervical wound infections were studied. Cultures were analyzed for final species isolated, patterns of antibi-

otic sensitivities/resistances, susceptibilities to common postoperative antibiotics, interval delay until recognized infection, and effects from any previous treatment by XRT and ChemoXRT. **Results:** Species of staphylococcus, streptococcus, gram negative rods, and pseudomonas were encountered in 28%, 22%, 21%, and 15% of cultures, respectively. From all cultures, MRSA, pseudomonas aeruginosa, and streptococcus viridans were isolated most frequently. Prophylactic antibiotics with clindamycin, Unasyn, and Ancef was utilized in 46%, 17%, and 15% of patients. Resistance to clindamycin, Unasyn, Ancef, and Cipro was identified in 93%, 78%, 63%, and 58% of patients. Wound infections were noted, on average, at 8.8 days. XRT and chemotherapy did not affect wound culture isolates. **Conclusions:** Cervical wound culture isolates in postoperative head and neck cancer patients show marked heterogeneity and do not reflect normal oropharyngeal flora. Standard prophylaxis against oropharyngeal flora may not provide adequate antibiotic coverage postoperatively in these patients.

50. Secretion of bHCG from Squamous Cell Carcinomas of the Head and Neck

Justin N. Turner, MD, Baltimore, MD
Jeremy D. Richmon, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should understand the paraneoplastic syndrome of bHCG production by rare, aggressive strains of squamous cell carcinoma in the head and neck.

Objectives: To define the rare paraneoplastic syndrome of bHCG production by squamous cell carcinoma of the head and neck. **Study Design:** Case report and review of the literature. **Methods:** A case of a woman with a bHCG producing squamous cell carcinoma of the tongue base is presented and the relevant literature is discussed. **Results:** A 34 year old female presented with advanced base of tongue squamous cell cancer with diffuse metastatic disease including subcutaneous and brain lesions. bHCG levels of both urine and serum were elevated and presented the dilemma of a possible pregnancy, which was eventually ruled out. A review of the literature found two other reported cases of very aggressive squamous cell cancer of the head and neck producing bHCG, although both patients were men. **Conclusions:** Secretion of bHCG from squamous cell carcinomas of the head and neck is exceedingly rare. This case constitutes the third case reported in the literature, all of which have been very aggressive. bHCG production may present a diagnostic dilemma in female patients.

51. Determination of the Best Conditions of Scaffolds for Tissue Engineered Canine Skull Regeneration

Hiroo Umeda, MD, Kyoto, Japan
Shin-Ichi Kanemaru, MD PhD, Kyoto, Japan
Yoshiharu Kitani, MD, Kyoto, Japan
Shigeru Hirano, MD PhD, Kyoto, Japan
Hikaru Inoue, Tokyo, Japan
Juichi Ito, MD PhD, Kyoto, Japan

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the importance of adequate environments and scaffolds for the ideal bone regeneration, and also to understand that the better regenerative materials for the skull would be applicable for the clinical therapy in the near future.

Objectives: To evaluate which customizations of scaffolds are the better choice for the cranial bone regeneration. We previously reported skull regeneration using the composite of collagen and beta-tricalcium phosphate (beta-TCP), and the importance of adequate regenerative environments for ideal regeneration. We examined the best condition of scaffolds by checking various settings of scaffolds mainly made of collagen and beta-TCP for cranial bone regeneration. **Study Design:** Preliminary: an animal experiment. **Methods:** Adult beagle dogs were used for this experiment. Craniotomy was performed using the same method used in a clinical procedure. Bilateral hexagonal bone defects (1.2cm on a side) were created. Various composite scaffolds made of collagen or beta-TCP (block or granules) or autologous bone fragments with fibrin glue were used as a filler of each drilling hole of each angle respectively. Three or six months after the operation, histological examinations and 3D CT were performed. **Results:** New bone formation was dominantly observed in the materials made of block type of beta-TCP and/or collagen. The results of the fillers made of collagen and granule type of beta-TCP varied widely and the overall results of them are not always good for cranial bone regeneration. **Conclusions:** For constant good cranial bone regeneration, the materials mainly composed of block type of beta-TCP and/or collagen were important for cranial bone regeneration.

52. Inverted Papilloma of the Nasolacrimal Sac: Not Just a Disease of the Nose and Sinuses

Denise R. Wong, MD, Minneapolis, MN
Andrew R. Harrison, MD, Minneapolis, MN
Amy Anne D. Lassig, MD, Minneapolis, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the evaluation and management of inverted papilloma of the nasolacrimal sac.

Objectives: To describe a rare case of inverted papilloma involving the nasolacrimal sac. **Study Design:** Case report. **Methods:** Retrospective case review at a university medical center. **Results:** A 44 year old man presented with a history of work related trauma to the right eye that resulted in swelling and, over time, formation of an enlarging mass over the right medial canthus region. His symptoms included epiphora and intermittent blurry vision. The patient initially underwent a transcutaneous biopsy and resection of the lesion that was found to be squamous inverted papilloma with high grade dysplasia. He was then referred to our center, where computed tomography revealed a soft tissue mass in the region of the right lacrimal sac, lateralizing the globe and widening the nasolacrimal duct. Given the subtotal resection, positive margins, and concern for malignancy, a subsequent medial maxillectomy was performed to remove the mass en bloc. **Conclusions:** Inverted papilloma is a benign sinonasal tumor that has been well described and frequently treated in the nose and paranasal sinuses. However, involvement of the nasolacrimal system is an unusual occurrence, with only eight other cases reported in the literature. Given its aggressive behavior, likelihood for recurrence, and potential for malignant transformation, complete surgical excision is the treatment of choice. The evaluation and management of inverted papilloma of the nasolacrimal sac are discussed with radiologic and pathologic correlation, giving the practitioner knowledge to recognize and treat this clinicopathologic entity.

Laryngology-Bronchoesophagology

53. Posterior Cricoid Region Fluoroscopic Abnormalities

Jacqueline E. Allen, MBChB FRACS, Sacramento, CA
Cheryl J. White, MA, Sacramento, CA
Rebecca J. Leonard, MA, Sacramento, CA
Peter C. Belafsky, MD PhD, Sacramento, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify and categorize posterior cricoid abnormalities seen on videofluoroscopic studies in patients with dysphagia.

Objectives: The posterior cricoid region (PCR) is a challenging area to assess fluoroscopically. The purpose of this investigation is to critically evaluate the PCR on fluoroscopy and describe patterns of common abnormalities. **Study Design:** Case control study. **Methods:** All fluoroscopic swallow studies performed between 08/01/06 and 09/30/08 were evaluated for post-cricoid abnormalities. Information regarding patient diagnosis, age, and gender was abstracted. The posterior cricoid findings were analyzed, categorized and matched to the swallow studies from a normal control population. **Results:** Forty-four posterior cricoid abnormalities were identified from 886 fluoroscopic studies (5%). The mean age of the cohort was 57 years. 52.4% was female. The indication for the swallow study was dysphagia, globus, reflux, neurologic disease, and head and neck cancer. Three distinct groups were identified. 38.1% of patients demonstrated distinct immobile webs centered on C5. The second group (59.5%) demonstrated a mobile fluoroscopic irregularity that moved between C4 and C5. We call this the posterior cricoid jag. The third group (2.4%) demonstrated an immobile anterior indentation into the barium stream which is consistent with outlining of the posterior cricoid arch. We called this the posterior cricoid impression. 60 control studies were evaluated. There were no webs in the normal population. 21% demonstrated a posterior cricoid jag and 17.5% demonstrated a cricoid impression. **Conclusions:** A fluoroscopic finding, not previously described, termed the posterior cricoid jag was identified in 59.5% of patients with dysphagia. This finding is distinguished from upper esophageal webs and cricoid impressions. Its etiology is hypothesized.

54. Vocal Fold Augmentation with a New Gel Implant

Jacqueline E. Allen, MBChB FRACS, Sacramento, CA
Peter C. Belafsky, MD PhD, Sacramento, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to compare use of a new gel implant for vocal fold augmentation to previously used implants such as calcium hydroxyapatite, collagen or Gelfoam. Advantages of the new implant will be demonstrated and discussed.

Objectives: There are several implants available for injection medialization of the vocal folds. None are ideal. The purpose of this investigation is to evaluate the safety and efficacy of a new FDA approved implant for injection augmentation of the vocal folds (Novielle, Coapt Systems Inc, Palo Alto, CA). **Study Design:** Prospective cohort. **Methods:** Individuals undergoing injection augmentation of the vocal folds with Novielle from April 2008 to present were prospectively evaluated and followed. Patients underwent stroboscopy, acoustic analysis, and vocal assessment with the 10 item Voice Handicap Index. Pre- and post-injection data was compared with the matched pairs t-test. **Results:** 14 patients were prospectively evaluated. The mean age of the cohort was 65.5 years. 42% were female. The diagnoses were 6 unilateral vocal fold paralyses, 2 unilateral or bilateral vocal fold paresis, and 1 presbylarynx. The mean VHI at entry was 28.9 (+/- 7). This improved to a mean VHI of 17.1 (+/-

8) postoperatively ($p < 0.01$). The mean followup time was 49 days. There was no evidence of adverse reaction to the implant or procedure related complications. **Conclusions:** Initial data suggests that Novielle voice gel is a safe and effective implant for injection medialization of the vocal folds. Intermediate and long term followup is necessary to ensure enduring safety and efficacy.

55. Inflammatory Myofibroblastic Tumor of the Larynx

William H. Barber, MD FACS, Jackson, MS
Scott P. Stringer, MD FACS, Jackson, MS

Educational Objective: At the conclusion of this presentation, the participants should be able to identify clinical and pathologic features of inflammatory myofibroblastic tumors and describe appropriate clinical management.

Objectives: To describe a case report involving a rare inflammatory myofibroblastic tumor of the glottis and describe clinical and pathologic features of these tumors. **Study Design:** Case report. **Methods:** A case report is presented involving a 41 year old male who presented to our institution with stridor and dyspnea. He was found to have a left true vocal cord lesion on CT of the neck. He was taken to the operating room for tracheostomy and excision of the tumor and was diagnosed with an inflammatory myofibroblastic tumor of the larynx based on surgical pathology. **Results:** Following complete excision of the glottic tumor, the patient was decannulated and had no further airway complications. **Conclusions:** Inflammatory myofibroblastic tumor of the larynx is a very rare lesion with only 21 reported cases in the English literature. Its etiology is controversial, and the morphological features are varied. Based on the available literature, the most effective treatment for this benign tumor appears to be endoscopic excision, with or without postoperative steroids. Our experience supports endoscopic excision as appropriate treatment with return to premorbid function without recurrence. Otolaryngologists should be able to recognize this disease and include it in their differential diagnosis.

56. Supraglottic Neurofibroma Presenting as Obstructive Sleep Apnea: A Case Report and Review of the Literature

Philip G. Chen, MD, Charlottesville, VA
Enid D. Boeding, MD, Charlottesville, VA
Melissa M. Mortensen, MD, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the etiology of neurofibromas of the larynx, discuss the histopathologic findings, and compare surgical options for affected patients.

Objectives: Sleep disordered breathing and obstructive sleep apnea are commonly encountered in the pediatric population. In many cases it is secondary to hypertrophy of the adenoids and tonsils. Yet, not all sleep disordered breathing in pediatric and adolescent patients are from enlarged adenoids and tonsils. As clinicians it is imperative to determine who needs fiberoptic laryngoscopy in the clinic setting. The differential diagnoses of supraglottic masses in sleep disordered breathing needs to be considered in patients who fail conservative treatment, including rare entities like laryngeal neurofibromas. **Study Design:** Case report. **Methods:** We describe a 16 year old female presenting with snoring and obstructive sleep apnea (OSA) secondary to a neurofibroma of the aryepiglottic fold without associated neurofibromatosis type 1. **Results:** Neurofibromas of the supraglottis are extremely rare. Many of the patients with neurofibromas suffer from neurofibromatosis type 1 (NF1, von-Recklinghausen's disease), which is characterized by café-au-lait spots, neurofibromas of any type, Lisch nodules, and axillary freckles. Only one similar case of a patient presenting with OSA is believed to have been reported in the English literature. **Conclusions:** This is the first case of a pediatric aged patient of African descent diagnosed with a laryngeal neurofibroma. Her prolonged and failed treatments with asthma medications and attempt to treat her sleep apnea with CPAP emphasize the importance of considering the vast differential diagnosis of obstructive lesions in these situations.

57. Utility of Two Stage Laryngotracheal Reconstruction in the Management of Subglottic Stenosis in Adults

Nathan A. Deckard, MD, Detroit, MI
Michael W. Criddle, MD, Detroit, MI
Justin Yeh, BS, Rochester, MI
Robert Stachler, MD, Detroit, MI
James M. Coticchia, MD FACS, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the utility of laryngotracheal reconstruction in adults as a viable procedure for the treatment of subglottic stenosis.

Objectives: Acquired subglottic stenosis (SGS) is a complex condition with significant morbidity. Laryngotracheal reconstruc-

tion (LTR) has had a high success rate for treatment of this condition in children, but has had a lower reported success rate with adults. Partial cricotracheal resection (CTR) has seen greater success and is frequently used in adults. However, it also carries with it significant risks of major morbidities and mortality. Also, due to anatomic constraints the possibility of revision surgery is limited. We intend to show that laryngotracheal reconstruction is a viable option for adults with subglottic stenosis. **Study Design:** N/A. **Methods:** All patients who presented between 2003 and 2008 with SGS who underwent LTR were included in this retrospective series. All patients underwent a two stage LTR with autologous cartilage grafts. **Results:** Thirteen patients (ages 15-86) were included in the study and twelve were eventually decannulated (92.3%) and there were no major complications. The majority presented with grade 3-4 SGS. Three patients simultaneously underwent procedures for bilateral vocal cord paralysis. Three required a second LTR prior to decannulation. Of the twelve decannulated patients, only one has mild residual dyspnea on exertion with no stridor and one has residual dysphagia. **Conclusions:** With a decannulation rate similar to CTR, two stage laryngotracheal reconstruction is a viable option for adults with grade 3 to 4 stenosis. The advantages of this technique over CTR may include decreased morbidity and ease at revision. This technique can also be used in conjunction with arytenoidectomy and cord lateralization to manage patients with combined glottic and subglottic stenosis.

58. The Role of Proton Pump Inhibitors in Reducing Laryngeal Injury during Prolonged Intubation

Brad W. deSilva, MD, Columbus, OH
Michael D. Trudeau, PhD, Columbus, OH
Lowell Arick Forrest, MD, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the incidence of various laryngeal pathologies that occur following prolonged intubation and the role of proton pump inhibitor administration in reducing laryngeal injury.

Objectives: To determine the incidence of laryngeal complications seen following prolonged intubation and whether these complications are reduced with the administration of proton pump inhibitor. **Study Design:** Nonrandomized prospective cohort analysis. **Methods:** Adult subjects were prospectively enrolled and underwent video recorded transnasal fiberoptic laryngoscopy following extubation in the medical intensive care unit. Variables recorded include duration of intubation, size of endotracheal tube, and administration of proton pump inhibitor versus H-2 blocker during intubation. The laryngoscopy examinations were blindly reviewed and laryngeal injuries that were measured include presence of vocal fold paresis/paralysis, vocal fold granuloma, and laryngeal erythema or ulceration. **Results:** Laryngeal erythema was seen in 100% of patients, ulceration in 86%, vocal fold granuloma in 57%, and vocal fold immobility in 46%. With intubation greater than 5 days, there was a statistically significant higher incidence of vocal fold granuloma (86% vs 29%) $p=0.001$. There was increased laryngeal ulceration, erythema, and vocal fold immobility seen with intubation greater than 5 days. During intubation, 57% of patients were administered esomeprazole versus 43% receiving famotidine. There were decreased degrees of laryngeal erythema/ulceration, presence of vocal fold granuloma, and vocal fold immobility in those patients receiving esomeprazole but these findings were not statistically significant compared to those that received famotidine. **Conclusions:** Administration of proton pump inhibitor during prolonged intubation does not significantly reduce laryngeal injury following extubation compared to H-2 blocker. With such high incidence of vocal cord immobility (50%) and granuloma formation (86%) after prolonged intubation, it may be indicated for all patients to undergo formal laryngoscopy examination following extubation.

59. Laryngopharyngeal Reflux: Signs, Symptoms and 24 Hour Dual Sensor pH Probe Testing

Secundino Fernandez, MD PhD, Pamplona, Spain
Francisco Vazquez, MD PhD, La Coruna, Spain
Ruba David, MD, Pamplona, Spain

Educational Objective: At the conclusion of this presentation, the participants should be able to determine the value about laryngeal signs and symptoms in order to establish an empiric pharmacologic therapy that is warranted on the basis of a diagnosis of laryngopharyngeal reflux based on these signs and symptoms.

Objectives: Laryngopharyngeal reflux (LPR) has been extensively studied in patients with laryngeal signs and symptoms, and laryngitis secondary to gastric acid is a prevalent, yet incompletely understood otolaryngological disorder. Further characterization of the relationship between symptoms and signs and reflux severity is needed. We examined the correlation between the Reflux Symptom Index (RSI) and the Reflux Finding Score (RFS) and the relation with the results in 24 hour dual sensor pH probe testing. **Study Design:** Prospective clinical trial. **Methods:** One hundred and thirty-three randomly selected patients with one or more reflux laryngitis symptoms were included in the study. All patients were recruited to complete a symptom questionnaire—Reflux Symptom Index (RSI), videostroboscopy for the signs evaluation—Reflux Finding Score (RFS) and 24 hour dual sensor pH probe testing. Videostroboscopic samples for the study were reviewed and RFS rated by three experienced raters on two different occasions to evaluate the interrater reliability. This protocol was repeated every six months during two years after treatment with PPI. **Results:** This study demonstrates a high correlation between RFS and RSI. Throat cleaning,

hoarseness and dysphagia are the most intense symptoms. Posterior commissure hypertrophy, vocal fold edema and thick laryngeal mucus are the most intense signs. Dual sensor pH probe testing could not predict the severity of patient's reflux but is associated with specific signs and symptoms. Treatment with PPI improved dramatically RSI. We have observed that it is more difficult to reverse the tissue injury or perhaps an extended period of time may be required for it. **Conclusions:** This supports empiric treatment with PPI in patients with an abnormal RSI and RFS. Empiric pharmacologic therapy is warranted on the basis of a diagnosis of LPR based on RFS and RSI.

60. Endoscopic Repair of Anterior Glottic Web Using a False Vocal Fold Microflap as a Biological Keel

Murtaza T. Ghadiali, MD, Los Angeles, CA
Ronen Nazarian, BS, Los Angeles, CA (Presenter)
Dinesh K. Chhetri, MD, Los Angeles, CA
Gerald S. Berke, MD FACS*, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand a novel technique of using a false vocal fold microflap in the treatment of anterior glottic web and the possible benefits this technique may have over other methods of treatment.

Objectives: An endoscopic approach for keel placement has been previously proposed. However, keel placement introduces a foreign body to the airway which could dislodge and lead to airway obstruction. In our report, we present an alternative approach using an endoscopic repair of the web with placement of a false vocal fold rotational microflap without tracheotomy. This serves as a biological keel and eliminates the need of placing a foreign body in the airway. **Study Design:** Retrospective chart review. **Methods:** A retrospective chart analysis from 2005 to 2008 revealed a total of 5 patients who underwent lysis of anterior glottic webs with subsequent placement of a false vocal fold rotational microflap. Outcomes were determined regarding improvement in common symptoms of hoarseness and dyspnea. **Results:** False vocal fold microflaps were kept in place for an average of 2 weeks and then excised in a short second stage outpatient surgery. Presenting symptoms improved after the procedure in all 5 patients. There were no complications or recurrence of symptoms in any patients, with a mean followup of 16 months. One patient experienced a recurrence of laryngeal papillomatosis at the site of surgery. **Conclusions:** The use of false vocal fold microflaps for management of anterior glottic webs can be very effective. These microflaps serve as biological keels to prevent local fibrosis and recurrence. The microflap eliminates the risk of foreign body displacement in the airway from a silastic keel. To our knowledge this is the first description of this specific technique in the literature.

61. Laryngeal Mucous Membrane Pemphigoid (MMP): A Systematic Review and Pooled Data Analysis

Thomas S. Higgins, MD MSPH, Norfolk, VA
Justin C. Cohen, BS, Norfolk, VA
John T. Sinacori, MD FACS, Norfolk, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the current evidence for the epidemiology, nature history, and management of laryngeal mucous membrane pemphigoid (MMP).

Objectives: To perform a systematic pooled data analysis of literature data involving laryngeal mucous membrane pemphigoid (MMP). **Study Design:** A systematic review and pooled data analysis. **Methods:** We conducted a systematic literature search of Medline, Embase, Central, Cochrane, clinicaltrials.gov, and the National Guideline Clearinghouse databases without language restriction for studies including combinations of relevant terms. All authors independently screened the abstracts of the search results, identified articles eligible for review, and critically appraised the full text studies. Pooled data analyses and Kaplan-Meier survival analyses were conducted using SPSS. **Results:** Of the 2524 citations reviewed, the included articles consisted of 50 case reports and 12 case series reporting on 138 patients with laryngeal MMP. No clinical trials or comparative trials were found. The overall calculated prevalence of laryngeal MMP was 11.8% (95% CI, 11.2 to 12.4%) of cases of MMP or one in ten million persons in the general population. Mean age at MMP onset was 59.5 years (95% CI, 57.9 to 61.1 years), and the supraglottis was the most commonly affected site (84.8%, 95% CI, 82.5 to 87.2%). Distribution among genders was equivalent ($P=0.655$). The presence of anti-epiligrin autoantibodies was associated with increased laryngeal involvement (OR 7.9, 95% CI, 3.9 to 16.0). The overall 5 year relative survival rate was 92.4% (SE, 0.084) with a followup range of 1 to 221 months. Standard medical therapy alone occasionally improved the condition; however, relapses were frequent and 12.1% eventually required tracheostomy. Laryngeal surgical interventions seemed to be effective in severe cases. **Conclusions:** Laryngeal MMP is a rare condition that can be life threatening without proper treatment and frequent followup.

62. A Rare Case of Laryngeal Dystonia Associated with Neurosyphilis: Response to Botulinum Toxin Injection

Ki-Hong K. Ho, MD, Galveston, TX

Christopher C. Wright, BA, Galveston, TX
Michael P. Underbrink, MD, Galveston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the clinical characteristics of laryngeal dystonia in an adult with neurosyphilis and identify botulinum toxin injection as an effective treatment option.

Objectives: To present a case report of laryngeal dystonia associated with neurosyphilis and the therapeutic outcome of botulinum toxin injection. **Study Design:** Case report. **Methods:** A 43 year old male with neurosyphilis was evaluated for persistent strained and stuttering voice despite systemic penicillin therapy. MRI of brain revealed lesions in the basal ganglia. Initial videostroboscopy showed aperiodic mucosal waves, hyperfunction of the false vocal cords, and anterior-posterior compression consistent with laryngeal dystonia. **Results:** After two months of speech therapy with limited improvement, the patient received 2.5 units of botulinum toxin injection to each thyroarytenoid muscle. Post-injection videostroboscopy showed marked improvement of voice quality with bilateral periodic mucosal waves and resolution of false vocal cord hyperfunction. **Conclusions:** This is to our knowledge the first case report of laryngeal dystonia associated with neurosyphilis. Botulinum toxin injection provided significant voice improvement in this setting.

63. Stereoscopic High Speed Digital Imaging of Neoglottic Vibration in Esophageal Speech

Miwako Kimura, MD PhD, Dallas, TX
Hiroshi Imagawa, TB, Bunkyo-ku, Tokyo Japan
Ken-Ichi akakibara, MSc, Sapporo, Hokkaido Japan
Takaharu Nito, MD PhD, Bunkyo-ku, Tokyo Japan
Niro Tayama, MD PhD, Shinjuku-ku, Tokyo Japan
Roger W. Chan, PhD, Dallas, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to gain insight into the clinical value of using the novel approach of stereoscopic high speed digital imaging for studying neoglottic mucosal vibration in esophageal speech.

Objectives: To gain insight into the clinical value of using the novel approach of stereoscopic high speed digital imaging for studying neoglottic mucosal vibration in esophageal speech. The primary objective of the present study was to explore the strengths and limitations of this method for clinical voice examination. **Study Design:** Single subject case study. **Methods:** The subject was a 62 year old male proficient in esophageal speech, who underwent total pharyngolaryngoesophagectomy with reconstruction of a neoglottis by free jejunum transfer when he was 59 years old. Anatomical, morphologic, and vibratory characteristics of his neoglottic mucosa were examined by stereoscopic high speed digital imaging, using a custom built rigid stereoscope (Nagashima Medical Ltd.) coupled to a high speed digital camera (Photoron Fastcam 1024PCI), with a frame rate of 3750 frames per second and spatial resolutions of 768 pixels by 352 pixels. **Results:** Stereoscopic high speed digital imaging provided quantitative data complementary to those of normal high speed digital endoscopy, including the length and the area of the neoglottis. Three dimensional images and frames of neoglottic mucosal vibration were also obtained. The neoglottic area was 10.89mm² during phonation. In addition, the flow rate of the neoglottic phonation was also estimated from the rate of expansion of spherical bubbles of mucus formed at the neoglottis. The estimated mean flow rate was 32ml/ sec. **Conclusions:** Stereoscopic high speed digital imaging can provide additional insight into neoglottic vibratory characteristics that cannot be revealed with regular high speed imaging. Further studies involving the application of this novel technology for other types of laryngeal pathologies are warranted.

64. Suprahyoid Pharyngotomy for Excision of Supraglottic Cyst

Douglas D. Leventhal, MD, Philadelphia, PA
Maurits S. Boon, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) describe the clinical and radiologic presentation of supraglottic cyst; 2) discuss the management of this condition; and 3) review the existing literature.

Objectives: 1) Describe the clinical and radiologic presentation of supraglottic cyst; and 2) discuss the management of this condition. **Study Design:** Illustrative case report and literature review. **Methods:** This is a report of a 23 year old male with a history of juvenile rheumatoid arthritis who presented with dysphagia and globus sensation and was noted on examination to have a large mass overlying his supraglottic larynx that was causing airway encroachment. Computed tomography (CT) revealed a 2.1cm low density mass in the left supraglottic region causing greater than 90% compression of the airway and extending into the cervical esophagus. The patient was initially taken to the operating room for direct laryngoscopy with planned excision. However due to the patient's unstable cervical spine and trismus from rheumatoid arthritis involving the temporomandibular joints, this was unsuccessful. Airway edema necessitated a tracheostomy at that time. Since exposure was not

possible via an intraoral approach, a suprahyoid pharyngotomy was performed to facilitate complete excision. He was decannulated prior to his discharge. **Results:** Cysts in the upper aerodigestive tract are not uncommon. Although many of these may be asymptomatic, cysts in the supraglottis can cause stridor, dyspnea, and dysphagia. The standard treatment of symptomatic cysts consists of transoral excision using a microscope, endoscope, or direct visualization. This was a unique situation where exposure could not be gained transorally and a suprahyoid pharyngotomy was needed to excise the cyst. The patient suffered no adverse sequelae as a result of the surgery. **Conclusions:** To date, there has been nothing in our literature to describe a suprahyoid pharyngotomy for excision of a supraglottic cyst. This technique may be useful for lesions in this area that are incompletely visualized by direct laryngoscopy.

65. Endoscopic Repair of Zenker's Diverticulum Using Ultrasonic Cutting Shears: Introduction of a Novel Technique

James T. May, MD, Tampa, FL
Tapan A. Padhya, MD FACS, Tampa, FL
Thomas V. McCaffrey, MD FACS*, Tampa, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the technique of endoscopic repair of Zenker's diverticulum using ultrasonic cutting shears and compare its use with that of established techniques.

Objectives: Although endoscopic staple assisted esophagodiverticulostomy (ESED) has become the initial treatment of choice for most patients with Zenker's diverticulum (ZD), anatomical restraints prevent its use in all cases. We introduce a novel endoscopic approach for treating ZD using ultrasonic cutting shears, which can be utilized in certain cases where diverticulum anatomy precludes the use of the endosurgical stapler. **Study Design:** Retrospective case series. Four consecutive patients (mean age 73 years; range 68-79 years) with symptomatic ZD who underwent endoscopic repair of ZD using ultrasonic cutting shears were included. **Methods:** In each case, diverticulum anatomy prevented successful ESED. Rather than abort or convert to an open procedure, the ultrasonic cutting shears were used to divide the common wall between the diverticulum and esophagus. A nasogastric feeding tube was placed during surgery. After overnight observation, patients were discharged home with enteral feeding. Main outcome measures were time to resumption of oral diet, symptom resolution, and complications. **Results:** All patients (n=4) who underwent endoscopic repair of ZD using the ultrasonic cutting shears resumed an oral diet at initial followup visit after surgery (mean 7 days; range 4-9 days) and rated their symptoms as being completely resolved at subsequent followup (mean 3 months; range 1-8 months). There were no complications. **Conclusions:** Endoscopic repair of ZD using the ultrasonic cutting shears is a safe and efficacious procedure that allows for endoscopic treatment in certain cases that cannot be treated by ESED. Further study is warranted in larger series to determine efficacy and safety compared to established endoscopic techniques.

66. Evaluation of a Novel Device to Determine Tracheotomy Tube Cuff Pressure

Jeremy D. Meier, MD, Sacramento, CA
Peter C. Belafsky, MD PhD, Sacramento, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the potential of the PressureEasy® Cuff Pressure Controller as a novel device to determine tracheostomy tube cuff pressure.

Objectives: Elevated tracheotomy tube cuff pressures can cause long term damage to the trachea. Tighter control of cuff pressures may prevent morbidity in tracheotomized patients. The purpose of this study is to evaluate the accuracy of a novel device, the PressureEasy® Cuff Pressure Controller (PEC), (Medex, Carlsbad, CA) in determining tracheotomy tube cuff pressures. **Study Design:** Prospective. **Methods:** The estimated tracheotomy tube cuff pressure using the PEC was compared to a standard pressure gauge (SPG). Portex 7.0, 8.0, and 9.0 cuffed tracheotomy tubes (Smiths Medical—Portex Inc., Keene, NH) were used as in a previously published simulated tracheal model. Four PEC devices were tested. Cuff pressures at time zero (T0) were set at 25 cm H2O using the PEC. Pressures were recorded again at 2 minutes (T2). **Results:** Average pressure readings by the SPG at T0 were 27.5±0.7, 27.3±0.6, and 27.6±0.8 cm H2O (27.5±0.7 overall) in the Portex 7.0, 8.0, and 9.0 tracheotomy tubes, respectively. The difference between these readings and the PEC were statistically significant (p < 0.05). At T2, the average readings by the PEC were 23.5±2.5, 22.9±1.8, and 23.1±2.0 cm H2O (23.2±2.1 overall), compared to 23.7±4.2, 23.1±3.3, and 23.4±3.6 cm H2O (23.4±3.6 overall) by the SPG (P > 0.05). Eighty-eight percent (42/48) of all pressure readings were between 20 and 30 cm H2O. **Conclusions:** The novel device provides reliable estimates of tracheotomy tube cuff pressures in the simulated tracheal model. Eighty-eight percent of all pressure readings were between 20 and 30 cm H2O.

67. Coblation Removal of Laryngeal Teflon Granulomas

Danny M. Meslemani, MD, Detroit, MI
Michael S. Benninger, MD FACS*, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate the application of a coblator wand to successfully remove laryngeal Teflon granulomata with minimal invasiveness.

Objectives: The purpose of this study was to remove laryngeal Teflon granulomata transglottically using the coblator wand, and to preserve and improve each patient's voice handicap index. **Study Design:** Three patients were selected to undergo removal of their laryngeal Teflon granulomas using the coblator wand. Each patient was followed closely to measure their respective voice handicap indices pre- and postoperatively. **Methods:** The Arthrocare Procise LW Coblator was used to remove laryngeal Teflon granulomas of three patients using a microlaryngoscopic approach. Each patient's voice handicap indices were measured before and after surgery. **Results:** After removal of the laryngeal Teflon granuloma, each three patients' short term results revealed substantial subjective improvement of voice quality and statistically significant improvement in quality of life as measured by the voice handicap index. **Conclusions:** The removal of laryngeal Teflon granuloma can be safely and effectively removed with the Procise LW Coblator. Furthermore, the use of the coblator wand can save operating room time, decrease the risk of bleeding, and improve a patient's voice handicap index.

68. Endostitch Assisted Endoscopic Zenker's Diverticulostomy: An Approach for Difficult Cases

Brian D. Nicholas, MD, Philadelphia, PA
Sean M. Devitt, BS, Philadelphia, PA
David I. Rosen, MD, Philadelphia, PA
Joseph R. Spiegel, MD FACS, Philadelphia, PA
Maurits S. Boon, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand indications and describe a technique that can be used to facilitate endoscopic Zenker's diverticulum repair in patients that have anatomic factor that might otherwise require an open approach.

Objectives: This study describes an approach to endoscopic Zenker's diverticulostomy using endoscopically placed retention sutures developed for patients who have unfavorable anatomy that may otherwise be relegated to open repair. **Study Design:** Retrospective case series. **Methods:** Four patients underwent endostitch assisted endoscopic Zenker's diverticulostomy at a tertiary care center. Patient records were reviewed, including pre- and postoperative swallowing status, radiographic findings, operative findings and followup. **Results:** Four patients were reviewed, ranging in age from 61 to 75 with a mean age of 67. All patients had significant swallowing dysfunction preoperatively, each tolerating only small amounts of liquids. Diverticuli were documented with preoperative barium swallows, with sizes of pouches ranging from 2.4cm to 4cm in largest dimension. All patients were discharged on postoperative day one and all noted a marked improvement in swallowing function, both immediately following the procedure and on outpatient follow. Notably, in each case anatomical factors precluded the seating of the GIA stapler without the use of endoscopic retentions sutures. **Conclusions:** Endoscopic Zenker's diverticulostomy has been well described and is a reliable technique in the majority of cases. Further, the benefits of performing endoscopic repair when compared to open approaches have been well documented. Several groups have cited certain anatomic factors that preclude the use of an endoscopic approach, including long neck, prominent or anterior mandibular teeth, or shallow Zenker's pouches. We report our experience using a technique for difficult, or unfavorable cases, and suggest the employment of this technique as an alternative in patients with these limitations to traditional endoscopic repair.

69. Office Based Treatment of Vocal Fold Scarring with Transcutaneous Chordal Steroid Injections

Tetsuji Sanuki, MD PhD, Kumamoto, Japan
Eiji Yumoto, MD PhD, Kumamoto, Japan
Yutaka Toya, MD, Kumamoto, Japan
Narihiro Kodama, NA, Kumamoto, Japan

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the benefits of treating vocal fold scarring using transcutaneous chordal steroid injections over previous treatments.

Objectives: Scarring of the vocal folds can occur as the result of blunt laryngeal trauma or more commonly, as the result of surgical, iatrogenic injury after removal of vocal fold lesions. The scarring results in replacement of healthy tissue with stiff fibrous tissue and can irrevocably alter vocal function and lead to a decreased or absent vocal fold mucosal wave. Current treatments for this complex condition are inconsistent and often produce suboptimal results. This study reviews the results in 8 patients who underwent the new technique of transcutaneous chordal steroid injections with curved needles with vocal fold scarring in an office setting. **Study Design:** We conducted a retrospective review of 8 patients. **Methods:** Suspension corticosteroid (triamcinolone acetonide) was injected by transcutaneous chordal injection under local anesthesia. Results were evaluated by videostroboscopy, perceptual evaluation of the GRBAS scale, and acoustic analysis before and after the injections.

Results: Injections were given from 2 to 5 times. After procedure, treatment with steroid injections did not completely clear scar lesions in all patients, although the subjective result and videostroboscope were improved in 7 patients. In perceptual evaluation, all our cases experienced a progressive improvement of voice with the passage of time after the injections. In acoustic findings, jitter and HNR were significantly improved after the injections. There were no complications. **Conclusions:** Our experience showed a positive response of the scars to steroid injection therapy. Repeated transcutaneous chordal steroid injections using curved needles are significant improvement in the management of vocal fold scars.

70. Injection versus Medialization Laryngoplasty for the Treatment of Unilateral Vocal Fold Paralysis: Followup at Six Months

Kimberly N. Vinson, MD, Nashville, TN
Richard I. Zraick, PhD, Little Rock, AR
Felicia J. Ragland, MD, Rogers, AR

Educational Objective: At the conclusion of this presentation, the participants should be able to compare and contrast injection and medialization thyroplasty results at a six month followup time.

Objectives: To determine whether injection laryngoplasty or medialization laryngoplasty is more effective in the longer term treatment of unilateral vocal fold paralysis (UVFP). **Study Design:** A retrospective study of patients with UVFP who underwent either injection or medialization laryngoplasty at our institution between July 29, 2003, and November 18, 2005. **Methods:** The data analyzed included patient characteristics and type of intervention, along with the pretreatment and post-treatment parameters of videostrobolaryngoscopy, perceptual voice analysis, and patients' subjective assessment of voice handicap. **Results:** Thirty-four patients were evaluated, 15 new and 19 from a previous study. The average time from intervention to post-treatment evaluation in the new cohort was 4.8 months (range, 1.5-10.5 months). The average time from intervention to post-treatment evaluation in the combined cohort was 6.4 months (range, 1-24 months). Improvements were demonstrated in each of the measured voice parameters in both the injection and the medialization groups, and no significant differences were found in the degree of improvement between the two groups. Eight of the original cohort were followed up at six months. Six of these patients were found to have CAPE-V, SRI, and VHI outcomes comparable to those at three months. Limited data on aerodynamic and acoustic voice measurements showed a trend towards improvement in each treatment group. The two remaining patients experienced worse outcomes and required additional intervention. **Conclusions:** Injection and medialization laryngoplasty were comparable in achieving voice improvement at average long term follow up of 6 months.

71. Tracheal Segmental Reconstruction Using a Neotrachea

Mark S. Weidenbecher, MD, Cleveland, OH
David A. Gilpin, MD, Cleveland, OH
James E. Dennis, PhD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the significance of tracheal tissue engineering but also appreciate the challenges it is facing.

Objectives: Scaffold-free cartilage has been used to engineer a biocompatible and stable neotrachea that, when implanted into the abdomen, produces a vascularized neotrachea with excellent mechanical stability. The purpose of this animal study was to determine if neotracheal constructs implanted in the neck could successfully be used for segmental tracheal reconstruction. **Study Design:** Animal study. **Methods:** Auricular chondrocytes from New Zealand white rabbits were used to engineer scaffold-free cartilage. Engineered cartilage and a strap muscle flap were wrapped around a silicone tube and implanted paratracheally. Twelve and 16 weeks post-implantation neotracheas were used to reconstruct a 15mm tracheal defect. In 2 of the 6 rabbits, the neotrachea with its intraluminal situated strap muscle flap was dropped into the defect, followed by an end-to-end anastomosis; in 2 animals the muscle flap was partially resected prior to reconstruction; and in the remaining 2 animals, the muscle flap was completely removed, the silicone reinserted and the construct reimplanted to allow formation of a fibrous lining over the engineered cartilage endotracheally. Tracheal reconstruction was performed 4 weeks later. **Results:** All implanted neotracheal constructs were well vascularized and mechanically sound. Following tracheal reconstruction, none of the animals showed immediate signs of respiratory distress, however, 2 rabbits died after 48 hours due to extensive endotracheal muscle flap edema. The remaining 4 rabbits developed fibrous stenosis of the neotracheal lumen and died after 2 to 6 weeks. **Conclusions:** Tissue engineered neotracheas has demonstrated to have adequate stability but lacked adequate endotracheal lining which lead to neotracheal stenosis.

72. A Bovine Acellular Scaffold for Vocal Fold Reconstruction in a Rat Model: Controlled Release of Hepatocyte Growth Factor in vivo

Chet C. Xu, PhD, Dallas, TX
Debra G. Weinberger, MD FACS, Dallas, TX
Guy Efuno, MD, Dallas, TX

Roger W. Chan, PhD, Dallas, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the potential of the acellular scaffold loaded with hepatocyte growth factor for facilitating constructive tissue remodeling.

Objectives: Previous study in a rat model has shown that a biodegradable, acellular xenogeneic scaffold derived from the bovine vocal fold could facilitate active protein synthesis in the rat vocal fold. In addition, it has been reported that the hepatocyte growth factor (HGF) has a potent anti-scarring effect on the vocal fold. This study used the acellular scaffold as a timed release drug delivery system for HGF, in order to examine its potential for facilitating constructive tissue remodeling in a rat model. **Study Design:** Prospective animal experiment with control. **Methods:** Bilateral wounds were created in the posterior vocal folds of 20 rats, and acellular scaffolds loaded with HGF were implanted into the wounds unilaterally, with the contralateral vocal folds implanted with acellular scaffolds without HGF as control. At different time points following the surgery, the rats were humanely sacrificed and their larynges were examined histologically with different stainings. Digital image analysis of matrix proteins was performed on the laryngeal sections to assess the remodeling of the vocal fold. **Results:** The histological results indicated different host responses and protein synthesis for the scaffolds with or without the loading of HGF. All scaffolds were apparently fully degraded by 3 months. **Conclusions:** Optimal treatment has yet to be developed for the surgical reconstruction of vocal fold lamina propria deficiencies such as scarring. Results of the current study suggested that the bovine acellular scaffold might also facilitate the delivery of growth factors in vivo, resulting in a positive host response and tissue regeneration in the rat model of vocal fold injury.

73. Phonatory Functions after Arytenoid Adduction and that when Combined with Ansa Cervicalis to Recurrent Laryngeal Nerve Anastomosis or Type I Thyroplasty

Eiji Yumoto, MD, Kumamoto, Japan
Tetsuji Sanuki, MD, Kumamoto, Japan
Yutaka oya, MD, Kumamoto, Japan
Narihiro Kodama, Kumamoto, Japan

Educational Objective: At the conclusion of this presentation, the participants should be able to understand that arytenoid adduction would result in superior phonatory function when combined with ansa cervicalis to recurrent laryngeal nerve anastomosis.

Objectives: To compare the phonatory function after arytenoid adduction (AA) combined with ansa cervicalis (AC) to recurrent laryngeal nerve (RLN) anastomosis with AA alone and AA combined with type I thyroplasty (type I) in the treatment of unilateral vocal fold paralysis. **Study Design:** Retrospective. **Methods:** Patients who underwent either of AA with AC-RLN anastomosis (group I), AA alone (group II) or AA with type I (group III) were selected. Maximum phonation time (MPT), mean airflow rate during phonation (MFR), pitch range, jitter, shimmer, and harmonics-to-noise ratio (HNR) were measured before surgery, and more than 12 months after surgery in group I and more than 6 months after surgery in groups II and III. **Results:** The numbers of the subjects were 6 for group I, 8 for group II, and 10 for group III. Postoperatively, all parameters except HNR in group I, MPT and MFR in group II, and all parameters in group III significantly improved. One way analysis of variance did not show any significant differences for preoperative measurements of all parameters among the 3 groups, but showed significant differences for postoperative measurements of pitch range and jitter. Post-hoc test revealed that pitch range in group I was significantly greater than group II, and that jitter in group III was significantly smaller than group II. **Conclusions:** Groups I and III showed better phonatory function than group II. The ability to adjust pitch in group I was superior to that in group II. Further study is necessary to determine which operative method should be combined with AA.

74. Phonation Threshold Flow Measurements in Normal and Pathological Phonation

Peiyun Zhuang, MD, Madison, WI
Alicia J. Sprecher, BS, Madison, WI
Matthew R. Hoffman, BS, Madison, WI
Yi Zhang, MD FACS, Shanghai, China
Marios Fourakis, PhD, Madison, WI
Jack J. Jiang, MD PhD, Madison, WI

Educational Objective: At the conclusion of this presentation, the participants should be able to explain how phonation threshold flow is estimated as well as compare the phonation threshold flow of normal and pathological voices.

Objectives: To determine if phonation threshold flow (PTF) may provide a tool to assess laryngeal function and differentiate between normal and pathological voices. Both polyps and nodules may contribute to an increased PTF by creating an incomplete glottal closure and increased vocal fold mass and thickness. **Study Design:** Prospective study. **Methods:** The Kay Elemetrics Phonatory Aerodynamic System (PAS) was used to collect mean flow rate (MFR) and PTF measurements from 40

normal subjects, 21 patients with vocal fold nodules, and 23 patients with vocal fold polyps. Gender based differences were assessed using a t-test. The effect of vocal pathology on PTF and MFR was determined with an ANOVA. Diagnostic potential was evaluated using a receiver operation characteristics (ROC) analysis. **Results:** Both PTF ($p=0.047$) and MFR ($p=0.008$) were significantly affected by gender. Using a two way ANOVA and correcting for gender differences, the influence of pathology on PTF was determined to be significant ($p<0.001$). Post-hoc tests found a significant difference between normal and polyp subjects ($p<0.001$), but not normal and nodule subjects ($p=0.177$) or nodule and polyp subjects ($p=0.246$). ROC analysis found that PTF (AUC=0.691) and MFR (AUC=0.684) had a similar diagnostic utility. **Conclusions:** PTF can be used to differentiate between normal and pathological voices. As a parameter which is experimentally sensitive to the biomechanical parameters providing its theoretical basis, it could be used clinically to analyze laryngeal functionality. Future research could focus on measuring PTF in other pathologies, such as paralysis or scarring, which would also affect the effort required to produce voice.

Otology

75. The Length of the Short Process Incus Is a Predictor of the Mastoid Segment of the Facial Nerve

Wes A. Allison, MD, Louisville, KY
Arun K. Gadre, MD, Louisville, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the relationship of the length of the upper border of the incus to the location of the mastoid portion of the facial nerve. They should be able to use precise measurements of the short process and body of the incus as predictors of the location of the anterior and posterior limits of the facial nerve.

Objectives: To determine the precise length of the upper border of the short process and body of the incus in order to determine the location of the anterior and posterior limits of the facial nerve in the mastoid segment. **Study Design:** The length of the upper border of the short process of the incus is equal to the distance between the tip of the short process and a line drawn through the anterior limit of the facial nerve. **Methods:** 15 fresh adult cadaver temporal bones were used. The facial nerve was dissected using the facial recess approach. Using a digital Vernier caliper accurate lengths were obtained down to the hundredth of a millimeter for: 1) upper border of the short process of the incus; 2) upper border of the body and short process of the incus; 3) tip of the short process and the anterior border (A) of the descending facial nerve; and 4) tip of the short process of the incus and the posterior limit (P) of the facial nerve. Three measurements for each distance was obtained and averaged. A Bland-Altman Plot was used to compare measurements. **Results:** The length body and short process of the incus was on average 5.09 mm. This correlated closely with the distance (P). The upper border of the short process alone averaged 2.46 mm. This approximated the distance (A) which was 2.52 mm. This relationship was statistically tested and found to be extremely reliable for each bone. **Conclusions:** The length of the short process and body of the incus predicts the posterior, while the short process alone predicts the anterior limit of the mastoid segment of the facial nerve.

76. The Middle Fossa Approach to Vestibular Schwannomas - The First Ten Years at One Institution

Daniel H. Coelho, MD, Richmond, VA
George Alexiades, MD FACS, New York, NY
John G. Golfinos, MD, New York, NY
J. T. Roland Jr., MD*, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the advantages and disadvantages of the middle fossa approach with respect to hearing preservation and facial nerve function when compared to the retrosigmoid (RS) approach.

Objectives: To report one institutions' experience with the middle fossa craniotomy (MFC) approach for the treatment of vestibular schwannomas. **Study Design:** Retrospective chart review. **Methods:** Sixty-five adult patients underwent MFC for vestibular schwannoma by one surgical team since 1996 were compared with size matched patients who underwent retrosigmoid (RS) resection prior to the introduction of MFC at our institution. Main outcome measures included age, gender, side, size, nerve of tumor origin, pathology, pre- and >1 year postoperative audiometric testing (PTA, SRT, SDS), House-Brackman facial nerve grade, and complications. **Results:** These data support that since the introduction of the MFC approach at our institution in 1996, MFC affords better hearing preservation rates (51%) compared to size matched RS patients prior to 1996 (18%) ($p<0.0001$). Preservation of good facial nerve function (House-Brackman 1 or 2) was 83% and 95% for MFC and RS respectively ($p<0.02$). Comparing hearing preservation, facial nerve function, and complications between early (1996-2002) and more recent (2002-2006) MFC experience reveals no significant different in outcomes. **Conclusions:** At our institution, middle fossa craniotomy has proven a safe and effective approach for the removal of small vestibular schwannomas. MFC results in better

hearing preservation than RS for size matched tumors, though rates of good long term facial nerve function are lower.

77. Cochlear Implant Improved Performance in Children Implanted before 6 Months of Age

Liliana Anna Colletti, PhD, Verona, Italy
Marco Eugenio Carner, MD, Verona, Italy
Robert Virgilio Shannon, PhD, Los Angeles, CA
Sheila Giorgia Veronese, EG, Verona, Italy
Vittorio Vincenzo Colletti, MD, Verona, Italy

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss and compare the auditory results obtained at different age of cochlear implantation in children.

Objectives: The efficacy of cochlear implants (CIs) in infants fitted at an age inferior to 6 months is compared with children fitted at later age. The investigation aims to document whether very early implantation provides the opportunity to achieve age appropriate spoken language skills. **Study Design:** Retrospective study. **Methods:** Over the last ten years, 63 children aged below 36 months, received CIs in our department. Six children were younger than 6 months; 12 aged from 7 to 12 months; 21 children aged from 13 to 24 months and 24 from 25 to 36 months. Postoperatively auditory abilities were evaluated at the latest followup with: CAP, MAIS and PPVT-R. The results obtained in the first group were compared with those obtained in the groups of children implanted at later ages. **Results:** No complication has been observed so far. The highest score of CAP function is achieved in all the four groups but at different intervals from CI activation as function of age at CI implantation. The maximum score for MAIS is a function of age at CI implantation. The PPVT-R provides distinctive evidence that only the scores of the 1st and 2nd group overlap the line of normal hearing children. **Conclusions:** In this study the outcomes demonstrate that very early cochlear implantation (< 6 months) provides normalization of audio-phonologic parameters with no additional complication.

78. Effect of Cochleostomy Size on CSF Fistula Control

Catherine A. Craig, MD, Omaha, NE
Ashley B. Robey, MD, Omaha, NE
Rodney P. Lusk, MD*, Omaha, NE

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the leak rate around a 1.0 mm cochleostomy and a 1.5 cochleostomy, sealed with porcine periosteum. In addition, participants should be able to compare the leak rate when using a Nucleus Cochlear® Implant or a Med-El® Implant.

Objectives: To determine if a difference in the rate of CSF fistula during cochlear implantation exists between 1.0 and 1.5 mm cochleostomies. **Study Design:** Cadaveric study of temporal bones. **Methods:** Two temporal bones were drilled out utilizing canal wall down mastoidectomy to expose the promontory. 1.0 and 1.5 mm cochleostomies were drilled superior to the round window in the respective temporal bones. Cochlear implants were placed in the cochleostomy in standard fashion. Porcine periosteum was used to pack around the cochleostomy. A fixed 23 gauge needle was inserted into the cochlea to apply a fixed amount of pressure to the inner ear. The presence or absence of a leak was recorded for 10 different packings of each cochleostomy diameter at 0, 10, 15, 20 and 30 cm H2O. **Results:** When comparing the leak rate of the 1.0 mm and 1.5 mm cochleostomies, no leak was found at 0, 10, 15, or 20 cm H2O for either implant. At 20 cm H2O, the Nucleus implant demonstrated 20% rate with 1.0 mm cochleostomy and 0% rate with 1.5 mm cochleostomy ($p=0.47$). The Med-El demonstrated 10% rate with 1.0 mm cochleostomy and 0% with 1.5 mm cochleostomy ($p=1.0$). At 30 cm H2O, the Nucleus implant had a rate of 60% with 1.0 mm cochleostomy and 0% with 1.5 mm cochleostomy ($p=0.01$). Med-El implant had a rate of 20% with 1.0 mm cochleostomy and 0% with 1.5 mm cochleostomy ($p=.47$). **Conclusions:** 1.5 mm cochleostomies are associated with decreased risk of CSF fistula as compared to 1.0 mm cochleostomies at 30 cmH2O.

79. Inflammatory Pseudotumor of the Inner Ear

Joseph M. Curry, MD, Philadelphia, PA
Nancy King, BS, Philadelphia, PA
Robert O'Reilly, MD FACS*, Wilmington, DE

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the clinical presentation, radiologic appearance of inflammatory pseudotumor of the inner ear.

Objectives: To present a first case report of inflammatory pseudotumor of the inner ear in a child, discuss clinical management, and review the current literature on this very rare condition. **Study Design:** Case report. **Methods:** We report a case of a 2 1/2 year old male with a diagnosis of inflammatory pseudotumor of the inner ear. **Results:** A 2 1/2 year old male presented with

chronic right otitis media, with otalgia, transient vertigo, and fluctuating facial palsy partially responsive to myringotomy with tube. Workup for infectious and neoplastic processes was negative. Computed tomography (CT) and magnetic resonance imaging (MRI) of the temporal bone revealed diffuse enhancement of the middle ear, mastoid, inner ear and petrous apex with a bizarre dysmorphic appearance of the cochlea and labyrinth with widening of the fallopian canal. The patient's symptoms were transiently responsive to tympanomastoidectomy with histopathology revealing nonspecific inflammation without neoplasia. Cultures were unrevealing. Nuclear bone scan showed mild uptake in the right temporal area. Comparison of the patient's CT with a case series of adults with pseudotumor of the inner ear introduced this diagnostic possibility and prompted revision tympanomastoidectomy with labyrinthectomy. Pathologic analysis of the inner ear tissue was consistent with pseudotumor. The patient has been asymptomatic postoperatively and followup MRI revealed essential resolution of disease. We will discuss the complex management of this case and reintroduce the concept of pathognomonic CT changes found in inner ear pseudotumor regardless of age. **Conclusions:** Inflammatory pseudotumor of the temporal bone is extremely rare but needs to be considered in cases of refractory chronic otitis media with facial palsy particularly when certain changes appear on CT of the temporal bone.

80. Sudden Profound Bilateral Hearing Loss Associated with Polysubstance Narcotic Overdose

Ilaaf Darrat, MD, Detroit, MI
Vanessa G. Schweitzer, MD FACS*, Detroit, MI
Brad A. Stach, PhD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to evaluate sudden bilateral hearing loss secondary to drug overdose with potential need for cochlear implant.

Objectives: To present a rare case report of a teenager who developed sudden bilateral moderately-severe sensorineural hearing loss following a night of polysubstance abuse that resolved with pentoxifylline therapy. Presentation, audiologic findings, associated comorbidities, treatment options, and potential etiologies are discussed. **Study Design:** Case report and review of literature. **Methods:** Chart review of an 18 year old female who presented two days after a binge of polysubstance abuse with sudden onset bilateral hearing loss. Workup included MRI/CT brain imaging, lumbar puncture, and infectious disease/autoimmune screening. **Results:** The patient admitted to using heroin, benzodiazepines and cocaine two nights prior to developing bilateral moderately-severe sensorineural hearing loss (60 dB SRT/ 60% discrimination) initially treated with high dose oral prednisolone and antiviral therapy without resolution, followed by a six month course of pentoxifylline with subsequent hearing improvement no longer requiring hearing aid amplification (normal speech audiometry, 15dB SRT/90% discrimination) and only residual high frequency sensorineural hearing loss (3-8 kHz). **Conclusions:** This case report highlights the importance of recreational drug abuse history when evaluating patients with sudden hearing loss. Seven cases have been reported in the literature with sudden hearing loss requiring cochlear implantation following hydrocodone/acetaminophen abuse. Potential etiologies include altered pharmacokinetics, vascular spasm/ischemia, encephalopathy, acute intralabyrinthine injury and genetic polymorphisms of drug metabolizing enzymes.

81. Speech Intelligibility of Early Implanted Pediatric Cochlear Implant Users

Mirette G. Habib, BS, New York, NY
Bobby A. Tajudeen, BA, New York, NY
Mario A. Svirsky, PhD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the speech intelligibility of pediatric cochlear implant recipients before 12, 24 and 36 months of age. They will also be able to discuss speech intelligibility as a function of age at testing.

Objectives: To investigate the speech intelligibility of prelingually deaf pediatric cochlear implant recipients as a function of age at implantation. **Study Design:** Prospective cross-sectional study conducted at a tertiary referral center. **Methods:** Subjects were forty prelingually, profoundly deaf children who received cochlear implants between 8 and 40 months of age. Their age at testing ranged between 2.5 - 18 years. Children were recorded repeating the ten sentences in the Beginner's Intelligibility Test. These recordings were played back to normal hearing listeners who were unfamiliar with deaf speech and who were instructed to write down what they heard. They also rated each subject for intelligibility on a 5 point rating scale. The main outcome measures were the percentage of target words correctly transcribed and the intelligibility ratings, in both cases averaged across three normal hearing listeners. **Results:** The data showed a strong effect of age at testing, with older children being more intelligible. This effect was particularly pronounced for children implanted in the first 24 months of life, all of whom had intelligibility scores of 80% or higher when they were tested at age 5.5 years or older. This was true for only five out of nine children implanted in their third year. **Conclusions:** Profoundly deaf children who receive cochlear implants in the first two years of life achieve high levels of speech intelligibility before age 6. This is also true for most, but not all children implanted in their third year.

82. PC3 Expression in Normal Rat Cochlea

Momoko Hayashida, MD, Kumamoto, Japan
Ryosei Minoda, 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 PC3 may be a factor which regulates the differentiation of the spiral ganglion cells (SGCs).

Objectives: PC3 is known as a promotor of neuronal differentiation in the central neurons. Therefore, PC3 is highly suggested to act as a promotor of neuronal differentiation in the cochlea, as well as the other neuronal tissues. We hypothesized that PC3 may affect the differentiation of the cochlea. To determine this, we assessed protein expression and mRNA expression of PC3 in normal rat cochlea. **Study Design:** Immunohistochemistry and semiquantitative RT-PCR. **Methods:** The cochleae were obtained from E16-20 and P1 normal Wistar rats. Cryosection immunostaining was performed to visualize the localization of PC3 with anti-PC3 antibody. The twenty cochleae of E16, E18, and E20 were dissected, respectively, and the surrounding bony tissues and the stria vascularis of the cochleae were removed. The dissected cochleae were separated to two parts: apex and basal turns. Total RNA of each turn was isolated. The semiquantitative RT-PCR was performed on all samples (200ng total RNA/sample) using PC3 and β -actin primers. **Results:** PC3 was detected in the SGCs at E16-20 and P1 on immunohistostaining. On semiquantitative RT-PCR study, PC3 mRNA expression level in the apex was higher at E20 than E16 and E18. There is no difference of PC3 mRNA expression level in the basal among E16, E18, and E20. **Conclusions:** The differentiation of the SGCs begins in a gradient that extends from the base of the cochlear spiral to the apex, and the SGCs of the apex become postmitotic state around E17-18. Considering this, PC3 may affect the SGCs differentiation in the cochlea.

83. Vestibular Schwannoma and Trigeminal Neuralgia: Patient Counseling Issues for Stereotactic Radiosurgery

Michael Hoa, MD, Detroit, MI
Foaz Kayali, PhD, Detroit, MI
Rachel Golin, BA, Detroit, MI
Edwin M. Monsell, MD PhD*, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to understand important patient perspective issues among patients receiving stereotactic radiosurgery for vestibular schwannoma and trigeminal neuralgia.

Objectives: We hypothesized that patients chose radiosurgery primarily because it avoided major open surgery. **Study Design:** Tertiary academic referral center, questionnaire. **Methods:** A questionnaire was administered to 153 patients who had consecutively undergone stereotactic radiosurgery for vestibular schwannoma (VS) or trigeminal neuralgia (TN) from January 1996 to May 2007. **Results:** Questionnaires were completed by 39% (30/77) of VS patients and 46% (33/76) of TN patients. Patients used multiple sources of information in making treatment decisions. The reason “no cutting, no open surgery” was chosen by 92% of responding VS patients; 39% noted it was the primary reason. The corresponding results for TN patients were 89% and 46%, respectively. The other reasons related mostly to lower initial risks of specific complications, for example, facial paresis. Interestingly, the persistence of a non-growing tumor after therapy was of strong or moderate concern in 46% of VS patients. Control rates for VS and pain in TN were similar to other published studies. VS patients were satisfied with their pre-treatment counseling (79% of respondents) and were satisfied with treatment (83%). The corresponding results for TN patients were 83% and 73%, respectively. **Conclusions:** The primary reason patients chose stereotactic radiosurgery over microsurgery identified in this study was to avoid major open surgery. There were high rates of patient satisfaction with counseling and treatment in both groups; however, patient concerns about the persistence of vestibular schwannoma may be underestimated in clinical practice. Additional studies are needed to explore patient perspectives on radiosurgery and the effectiveness of counseling.

84. Intralabyrinthine Schwannoma: The Otologic “Bunny Sign”

Jacob W. Husseman, MD, San Diego, CA
Ritvik P. Mehta, MD, San Diego, CA
Roberto A. Cueva, MD FACS*, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the otologic “bunny sign” on coronal MRI and use this tool to help identify intralabyrinthine schwannomas.

Objectives: This case review will briefly overview intralabyrinthine schwannomas. At our institution, we have frequently noted on coronal MRI that tumor filling the vestibule (head) and semicircular canals (ears) depicts the image of a rabbit. We have thus adopted the “bunny sign” for identifying intralabyrinthine schwannomas and present a case review with imaging and pathology to highlight this distinguishing feature. **Study Design:** Case review. **Methods:** This is a case review of a 68 year old female who presented with complaints of several months of dizziness as well as progressive unilateral tinnitus and hearing loss. Her

audiogram confirmed complete left sided deafness. She underwent preoperative gadolinium enhanced MRI followed by transmastoid labyrinthectomy. The patient's imaging and pathologic specimen were reviewed to demonstrate the otologic "bunny sign" with regard to identifying intralabyrinthine schwannomas. **Results:** The patient underwent an uncomplicated transmastoid labyrinthectomy. During the procedure, a pale mass was found filling the vestibule and semicircular canals, making a cast of the labyrinth. Pathology confirmed a vestibular schwannoma. Facial nerve function remained intact. The patient has undergone uneventful recovery with improving vestibular function. The preoperative imaging and pathologic specimen both illustrate the otologic "bunny sign". **Conclusions:** Intralabyrinthine schwannomas historically have been rarely described in the literature, but are now more frequently recognized due to increased use of MRI. We describe the otologic "bunny sign" which provides a useful tool for identifying these tumors on MRI based on this distinguishing imaging characteristic.

85. Innovative Regenerative Treatment for the Tympanic Membrane Perforation

Shin-Ichi Kanemaru, MD PhD, Kyoto, Japan
Hiroo Umeda, MD, Kyoto, Japan
Yoshiharu Kitani, MD, Kyoto, Japan
Tatsuo Nakamura, MD PhD, 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 how to regenerate the tympanic membrane without conventional surgical therapy. This new tissue engineered treatment will change the former concept of the otological surgery.

Objectives: To establish the new treatment for regeneration of the tympanic membrane (TM) without conventional surgical therapy: tympanoplasty or myringoplasty. **Study Design:** Clinical pilot study. **Methods:** The patients with chronic TM perforation without active inflammation were randomly selected from 30 outpatients. Their ages ranged from 21 to 84, with the average age of 56. Materials for the TM repair were a gelatin sponge with basic fibroblast growth factor (b-FGF) and a fibrin glue. The effectiveness of this novel therapy for the TM repair was estimated 3 weeks after the procedures. After creating a mechanical disruption of the TM perforation edge under the microscope, a gelatin sponge immersed in b-FGF was placed over the perforation in contact with the residual TM. Fibrin glue was dripped over it. In case complete closure of the TM perforation was not achieved, the above same treatment was performed repeatedly. The final estimation was performed 3 months after the treatment. **Results:** Complete closure of the TM perforation was achieved in all patients within 3 time treatments. The number/rate of the cases whose the TM perforation were able to close completely by one treatment, 2 times and 3 times were 22 (73%), 6 (20%) and 2 (7%), respectively. Average hearing levels of all patients were improved. No inflammation/infection and sequela were observed in all patients. **Conclusions:** The study demonstrated that the combination of a gelatin sponge and a bFGF was effective for regeneration of the TM. This is the innovative regenerative therapy: easy, simple, cost effective and noninvasive method for outpatients.

86. Gorham-Stout Disease of the Temporal Bone

Sarah E. Mowry, MD, Los Angeles, CA
Rinaldo F. Canalis, MD FACS*, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the manifestations of this disease and demonstrate its finding in the temporal bone.

Objectives: 1) Present data regarding Gorham-Stout disease as manifested in the temporal bone; 2) review the literature regarding this rare bone disorder. **Study Design:** Case study and literature review. **Methods:** A case report from a tertiary university hospital is presented. A literature search using the terms "Gorham-Stout disease and head and neck", "massive osteolysis", and "temporal bone" was undertaken. **Results:** A 29 year old female with a diagnosis of Gorham-Stout disease was identified. She complained of aural fullness and tinnitus bilaterally. Demineralization and moth eaten changes of the osseous structures of the skull base and posterior fossa were prominent. The left mastoid air cells were opacified and erosion extended to the left jugular foramen, left hypoglossal canal, left stylomastoid process, and left eustachian tube. The histopathology and radiographic findings are presented. **Conclusions:** Gorham-Stout disease is a rare disease of the bone and is also known as massive osteolysis. Less than 200 cases have been reported in the world literature. This disease follows a rapidly progressive course resulting in resorption and replacement of bone with dense fibrous tissue. It typically presents in childhood or adolescence. Involvement within the head and neck is frequent but typically involves the calvarial bones. Involvement of the temporal bone is very rare. A review of the literature with a focus on head and neck manifestations of the disease and their management is presented.

87. Impact on Hearing of Routine Ear Suctioning at the Tympanic Membrane

Jeffrey J. Nelson, MD, Syracuse, NY

Andy Giraud, AuD, Syracuse, NY
Anthony J. Mortelliti, MD FACS, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to realize that routine patient interventions and procedures may have unrecognized risks. Current research and patient safety should be a primary concern in any patient management.

Objectives: Patient and equipment safety has become increasingly scrutinized in today's medical care. Routine otolaryngologic evaluation often involves suctioning with Frazier type suction devices in the ear canal for improved visualization, but data is limited on the potential for acoustic trauma with a suction device in the ear canal. This study intends to document the objective and subjective findings from ear canal suctioning in order to identify any risk for threshold shifts or other potential negative effects. **Study Design:** Prospective study on twenty-one healthy volunteers enlisted for evaluation. **Methods:** Pre-suctioning tympanogram, audiogram and otoacoustic emissions data were obtained. Spectrum analyses were recorded during suctioning in the ear canal with a probe microphone placed lateral to the tympanic membrane. Subjective data was recorded and followup audiogram and otoacoustic emissions were obtained to identify any temporary threshold shift (TTS). **Results:** Spectrum analyses revealed a high degree of variability between subjects. A peak intensity of 111 dB SPL was recorded. All patients were able to tolerate the suctioning and none reported hearing loss. No threshold shifts were observed. Subjective data failed to correlate with the objective recorded intensities. **Conclusions:** Clinicians and patients need to be acutely aware of potential risks and benefits from any medical intervention. Routine ear canal suctioning can be extremely loud and uncomfortable for patients. This study failed to document objective proof of detriment to hearing from ear canal suctioning, although the possibility exists during office and surgical intervention. Further study and potential alternatives suctioning methods deserve attention.

88. Cochlear Implantation in Congenital Cytomegalovirus Infected Children with Profound Sensorineural Hearing Loss

Hiroshi Ogawa, MD, Fukushima, Japan
Yoko Baba, MD, Fukushima, Japan
Naoko Yamada, PhD, Fukushima, Japan
Tatsuo Suzutani, MD, Fukushima, Japan
Koichi Omori, MD, Fukushima, Japan

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the utility of cochlear implantation in congenital cytomegalovirus infected children.

Objectives: Sensorineural hearing loss (SNHL) is one of the most frequent manifestations in patients with congenital cytomegalovirus (CMV) infection at birth. The late onset of SNHL and mental retardation in many patients with congenital CMV infection showing few clinical manifestations at birth makes the problem more complex, as determination of the causal relationship with CMV becomes impossible after 3 weeks from birth due to the possibility of postnatal infection. Using dried umbilical cord, we recently developed a PCR based assay for the retrospective detection of congenital CMV infection. In the cases for which CMV was detected we performed cochlea implantation and evaluated speech perception and acquisition, and language development. **Study Design:** Focus group study. **Methods:** Four cases have been found to be CMV positive using this method. Clinical review demonstrated that three of the cases were late onset SNHL cases, with one of the three cases having passed the newborn hearing screening examination. None of these subjects presented any extra auditory manifestations of CMV infection. **Results:** The age at implantation ranged from 2 years 1 month to 3 years 1 month, with the mean age of 2.6 years. All children were implanted with a Nucleus 24 device, and all underwent full insertion of the electrode array without surgical complications. Followup study of audiometric examination ranged from 13 to 25 months postoperatively. Speech perception and acquisition, and language development were improved postoperatively in all children. **Conclusions:** Cochlear implantation affords improved speech comprehension in children with CMV associated SNHL especially in asymptomatic cases.

89. Altered Tectorial Membrane Development and Outer Hair Cell Physiology in an Alpha Tectorin Transgenic Mouse

Alexander J. Osborn, MD PhD, Houston, TX
Simon S. Gao, BS, Houston, TX
Anping Xia, PhD, Houston, TX
Steve M. Maricich, MD PhD, Cleveland, OH
Frederick A. Pereira, PhD, Houston, TX
John S. Oghalai, MD FACS*, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to identify phenotypic characteristics of a mouse mutant in the tectorial membrane protein, alpha tectorin.

Objectives: To understand the physiologic, acoustic, and molecular consequences of a mutation in alpha tectorin. **Study Design:** We constructed a murine model of an autosomal dominant human hearing loss mutation by creating a C1509G mutation in alpha tectorin, a protein constituent of the tectorial membrane. **Methods:** In situ hybridization, RT-PCR, auditory brainstem response and otoacoustic emission measurements, light and electron microscopy. **Results:** In situ hybridization demonstrated normal developmental expression for alpha tectorin mRNA in both heterozygous and homozygous mutants. Nevertheless, an incompletely dominant phenotype was found in adult mice, in that the tectorial membrane contacted only one row of outer hair cells in heterozygotes and did not contact any outer hair cells in homozygotes. The auditory consequences of these anatomic changes were found to be moderate hearing loss and severe hearing loss, respectively, as shown by auditory brainstem response and distortion produced otoacoustic emission measurements. In addition, heterozygotes were found to suffer greater noise induced permanent threshold shifts than wild type animals. Surprisingly, electrically evoked otoacoustic emissions were larger in heterozygotes and homozygotes than in wild type mice. Quantitative RT-PCR of adult cochleae revealed that heterozygotes and homozygotes produced more prestin, an outer hair cell specific protein required for electromotility, than did wild type mice. **Conclusions:** This novel interaction between the tectorial membrane and prestin regulation in outer hair cells may represent an innate feedback mechanism designed to compensate for hearing loss.

90. Extent of Aeration in Congenital Aural Atresia

Alexander J. Osborn, MD PhD, Houston, TX

John S. Oghalai, MD FACS*, Houston, TX

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

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the role of middle ear aeration as an adjunct measure in the assessment of aural atresia and the determination of surgical candidacy for aural atresia patients.

Objectives: To determine the extent of middle ear aeration in patients with aural atresia and to assess how aeration increases with age. **Study Design:** Retrospective review of children with aural atresia in a tertiary academic pediatric otolaryngology practice. **Methods:** High resolution multiplanar CT scans of the temporal bones were analyzed for middle ear volume and staged according to existing clinical grading scales. Atretic ears were compared to the nonatretic ears of the same patient to determine the ratio of aeration. **Results:** The average age of patients at the time CT was performed was 5 years old (range 0.1-14 years). The average middle ear volume of the atretic ears was 0.37 cubic centimeters compared to an average of 0.51 cubic centimeters for the nonatretic ears. The mean ratio of the atretic to nonatretic volume was 0.71. Higher ratio of aeration was correlated with surgical candidacy. In patients who underwent serial scans, middle ear volume increased at a slower rate in atretic ears versus the nonatretic ear. Finally, middle ear volume measurement correlated well with clinical grading scales. **Conclusions:** The middle ear volumes expand over the course of child development; although at a slower rate in atretic ears. Middle ear aeration correlates with classification systems designed to assess operative candidacy. Guidelines for timing of CT scans in atresia patients are presented. The practitioner may be better able to assess surgical candidacy by supplementing classic atresia classification systems with middle ear volume measurements.

91. Balloon Dilation of the Cartilaginous Portion of the Eustachian Tube: Initial Safety and Feasibility Analysis in a Cadaver Model

Dennis S. Poe, MS FACS*, Tampere, Finland

Bassem M. Hanna, MS, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the feasibility of balloon dilation of the cartilaginous portion of the eustachian tube as a treatment for otitis media.

Objectives: Balloon catheter dilation of diseased sinus ostia has recently demonstrated efficacy and safety in the treatment of chronic sinus disease with two years followup. Similar to sinus surgery, initial studies of partial resection of inflamed mucosa from within the cartilaginous eustachian tube (ET) have demonstrated efficacy and safety in the treatment of medically refractory otitis media with effusion. Therefore, balloon dilation of the cartilaginous ET was investigated as a possible treatment modality for otitis media. **Study Design:** A protocol for sinus balloon catheter dilation was evaluated in each of the cartilaginous ETs in eight fresh human cadaver heads. **Methods:** CT scans and detailed endoscopic inspections with video or photo documentation were performed pre- and post-dilation and gross anatomical dissections were done to analyze the effects of treatment and to look for evidence of undesired injury. **Results:** Catheters successfully dilated all cartilaginous ETs without any significant injuries. There were no bony or cartilaginous fractures and three specimens showed minor mucosal tears in the anterolateral or inferior walls. Volumetric measurements of the cartilaginous ET lumens showed a change from an average of 0.16 to 0.49 cm³ (SD 0.12) representing an average increase of 357% (range 20—965%). **Conclusions:** Balloon catheter dilation of the nasopharyngeal orifice of the ET was shown to be feasible and without evidence of untoward injury. A significant increase in volume of the cartilaginous ET was achieved. A clinical study is now indicated to determine whether balloon dilation will demonstrate lasting benefits and safety in the treatment of otitis media.

92. Management of Temporal Bone Osteoradionecrosis: Surgical and Adjunctive Therapies

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Shawn C. Ciecko, MD, Durham, NC
Thomas M. Pilkington, MD, Durham, NC
David M. Kaylie, MD MS FACS, Durham, NC
Debara L. Tucci, MD FACS, Durham, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the goals of management of radiation induced ORN of the temporal bone including removal of all necrotic tissue, resolution of chronic infection, and viable tissue transfer to the wound bed. Participants should also be able to discuss adjunctive therapies in treating these patients including hyperbaric oxygen therapy. Additionally, participants should be able to explain the common complications and the management of these problems.

Objectives: To investigate surgical and adjunctive therapies and associated outcomes in patients with radiotherapy induced temporal bone osteoradionecrosis. **Study Design:** Retrospective case review. **Methods:** Five patients diagnosed with radiotherapy induced osteoradionecrosis (ORN) of the temporal bone treated between May 2007 and August 2008 represented the cohort for this study. The clinical history, therapeutic interventions and disease specific outcomes were retrospectively reviewed for the study patients. All five patients were treated with surgical therapy. Two patients underwent lateral temporal bone resection while two others underwent complete mastoidectomies. One underwent canaloplasty with meatoplasty. All five patients underwent pedicled tissue transfer to the resection site, 3 with temporalis muscle flaps, 1 with a temporoparietal fascial flap and 1 with epidermal transfer. Four patients underwent closure of the EAC. Three patients had preoperative hyperbaric oxygen therapy. All patients underwent prolonged courses of antibiotic therapy. **Results:** All five patients were free of temporal bone necrosis and infection at last followup. Mean followup was 10.5 months. One patient suffered partial necrosis of the external ear which was treated with regular in-office debridements and antibiotics. One patient developed an abscess in the cavity which resolved after drainage and antibiotics. One patient suffered wound dehiscence postoperatively which healed with conservative therapy. **Conclusions:** ORN of the temporal bone presents a difficult clinical problem which requires both surgical and medical therapies. Goals of treatment include removal of all necrotic tissue, resolution of chronic infection, and placement of viable tissue in the wound bed. Even with achievement of these goals, healing can take several months. Hyperbaric oxygen may be a useful adjunct to therapy but is not sufficient as a solo modality.

93. Glossopharyngeal Schwannomas: A 100 Year Review

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Mahmood Mafee, MD, San Diego, CA
Quyên T. Nguyen, MD PhD, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the typical clinical presentation and radiologic and audiologic findings in a patient with a glossopharyngeal schwannoma and be able to explain how this tumor can be distinguished from a vestibular schwannoma and other tumor types that can occur in the cerebellopontine angle.

Objectives: To review the literature on glossopharyngeal schwannomas with focus on clinical presentation, radiologic/audiologic characteristics, management options, and propose a mechanism explaining the nature of vestibulocochlear dysfunction seen with these tumors. **Study Design:** Contemporary review. **Methods:** English literature search for cases of primary isolated glossopharyngeal schwannomas and chart review of two new cases. **Results:** 42 glossopharyngeal schwannoma cases between 1908-2008 were reviewed. 84% presented with vestibulocochlear symptoms whereas only 30% presented with glossopharyngeal symptoms. Tumor can occur anywhere along CNIX; however, the majority of symptomatic cases are intracranial/intraosseous, which present with vestibulocochlear dysfunction. Reviewed cases typically described the caliber of CNVII and VIII on CT/MRI as normal. We present a case where notching and displacement of CNVIII by the tumor can be appreciated on MRI, allowing for the first correlation between clinical symptoms and imaging findings. Mid-frequency SNHL was prevalent in contrast to the high-frequency pattern typical of vestibular schwannomas. Tonotopic studies of CNVIII mapped low-to-mid frequency fibers along the posterior medial surface corresponding to the area of greatest compression by glossopharyngeal schwannomas. **Conclusions:** Glossopharyngeal schwannomas usually present with vestibulocochlear rather than glossopharyngeal symptoms, likely due to CNVIII compression and displacement by tumor, which can be better appreciated with modern imaging. The tumor's location posterior and medial to CNVIII combined with the complex CNVIII tonotopic organization may account for the preferential mid-frequency hearing loss seen in these patients.

94. Spontaneous Otogenic Posterior Fossa Pneumocephalus: Case Report and Review of the Literature

George B. Wanna, MD, Nashville, TN
Jadrian Young, MD, Nashville, TN
Justin Whitkopf, MD, Nashville, TN
Marc L. Bennett, MD, Nashville, TN
David Haynes, MD*, Nashville, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the mechanism of spontaneous pneumocephalus and consider it in the differential diagnosis in a patient who presented with sudden change of neurological status.

Objectives: Spontaneous pneumocephalus originating from temporal bone are very rare. Few cases are reported in the literature mainly in the temporal area. Most of the pneumocephalus are secondary to trauma or surgery and less commonly to ear infection and tumor. **Study Design:** Case report. **Methods:** Our patient is a 74 year old female with gradual worsening in mental status over 6-8 weeks. The patient has pacemaker and cannot undergo MRI, but a CT of the head demonstrated a 5x3 cm right posterior fossa pneumocephalus. She had no prior history of trauma, otologic surgeries, chronic ear or mastoid disease. This unusual location of pneumocephalus was reviewed by senior neurotology, neurosurgery and neuroradiology who agreed on the presence of small dehiscent locating superior to the vestibular aqueduct and communicating with the posterior fossa. **Results:** A transmastoid retrolabyrinthine approach to cerebellopontine angle with release of pneumocephalus and obliteration of mastoid using abdominal fascia was performed, the patient neurologic status improved shortly after surgery. **Conclusions:** Spontaneous pneumocephalus is a rare entity, correct diagnosis is crucial before surgical intervention. The goal of surgery is air decompression and sealing completely the communication between the intracranial and extracranial compartment. Patient will improve dramatically after decompression however long term followup is needed before drawing any conclusion on recurrences.

95. Cost Analysis of Asymmetrical Sensorineural Hearing Loss Investigations

Yushan L. Wilson, MD, New York, NY
Michele Gandolfi, BS, Yonkers, NY
Enid Ahn, MD, Seoul, South Korea
Guopei Yu, MD PhD, Minneapolis, MN
Tina C. Huang, MD, Minneapolis, MN
Ana H. Kim, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the diagnostic tools available to detect etiologies of asymmetrical sensorineural hearing loss and determine whether such tests are warranted.

Objectives: The purpose of this study is to critically evaluate the typical cost of asymmetrical sensorineural hearing loss (ASNHL) workup, and to compare the positive predictive value from this common presenting symptom. **Study Design:** Retrospective chart review from two major otolaryngology centers. **Methods:** We reviewed charts from patients presenting to two high volume otolaryngology practices between December 1, 2002 and November 30, 2007 with ASNHL. Diagnostic information included MRI and serum laboratory values (ANA, ESR, lyme, RPR, and TSH). We calculated positive rate according to each item of diagnosis. To estimate cost benefit, we further calculated average cost for identifying a patient with a positive result. **Results:** Total cost was \$263,535 while average cost for identifying a positive patient was \$14,640.81. Total lab cost was \$16,935 and total imaging cost was \$246,600. Average cost for identifying a positive patient based on MRI was \$61,650 and \$2,109 based on lab values. Of the 247 patients, only six patients (2.4%)—1 patient with acoustic neuroma, 2 patients with syphilis, and 3 patients with lyme—were identified with treatable pathology. **Conclusions:** A comprehensive ASNHL workup may not be applicable to all patients. The most valuable diagnostic tests were MRI for acoustic neuroma and serum test for syphilis and lyme.

96. Ideal Timing of Audiograms after Intratympanic Steroid Injections to Treat Sudden Sensorineural Hearing Loss

Benjamin J. Wycherly, MD, Washington, DC
Hung J. Kim, MD, Washington, DC
Jared J. Tompkins, BS, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to appreciate the role of intratympanic steroids for the treatment of idiopathic sudden sensorineural hearing loss and to better determine the timing of post-treatment audiograms to assess response to treatment.

Objectives: To review our experience with intratympanic steroids (ITS) for the treatment of idiopathic sudden sensorineural hearing loss (ISSNHL), emphasizing the ideal time to perform followup audiograms to assess treatment response. **Study**

Design: Retrospective case review. **Methods:** Patients diagnosed with ISSNHL from 2001-2008 were treated with 40mg/cc or 62.5mg/cc methylprednisolone with 2% lidocaine. A 0.3-0.5 mL volume was administered through a single tympanotomy. Injections were repeated weekly for a total of 3 injections. Improvement was defined as an improved pure-tone average \geq 20 dB or speech discrimination score \geq 20%. **Results:** Forty patients met the inclusion criteria: 20 women and 20 men. Average age was 61 (range 13-84). Average days from onset to treatment was 22.7 (range 1-120). Twenty-five patients were treated with oral steroids prior to ITS. Average days from treatment initiation to post-treatment audiogram was 33.2. Overall recovery rate was 43% (17/40). A significantly increased response rate was found in patients having an audiogram $>$ 5 weeks after initiation of treatment (9/13) over those tested \leq 5 weeks after initiation of treatment (8/27) ($P = .04$, Fisher exact test). There were no significant differences for age \geq 60, gender, steroid dose, treatment within 14 days, prior treatment with oral steroids, or presence of vertigo. **Conclusions:** Our study indicates that recovery from ISSNHL after ITS injections occurs more frequently $>$ 5 weeks after initiating treatment. This may be due to the natural history of sudden hearing loss or the prolonged effect of steroid in the inner ear. The ideal time to perform post-treatment audiograms may be several weeks after completing treatment.

Pediatrics/Plastics-Aesthetics/Sinus-Rhinology

97. Vascular Lesions of the Upper Airway: Characterization of Anatomic Distribution Ronda E. Alexander, MD, Houston, TX Teresa M. O, MD, New York, NY Nazaneen N. Grant, MD, Washington, DC Andrew Blitzer, MD DDS FACS*, New York, NY Milton Waner, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the spectrum of upper aerodigestive tract (UADT) anatomic sites affected by hemangiomas, venous malformations and lymphatic malformations.

Objectives: To characterize the anatomic distribution of vascular lesions of the larynx; to identify the levels of airway obstruction. **Study Design:** Retrospective chart review. **Methods:** We performed a retrospective chart review of patients with hemangiomas and vascular malformations at a tertiary care center over a 4 year period. We reviewed the distribution of these lesions within the upper airway and the treatment course of each patient. **Results:** Of 1,226 patients with cutaneous hemangiomas, 108 (9%) were segmental in distribution and the V3 (mandibular) segment was represented in 52%. Sixteen (29%) of these V3 lesions also had upper airway involvement. Seven required surgical tracheotomy or laser. Of 87 patients with venous malformations, 25 (29%) had intraoral findings; the majority had diffuse disease. Ten (11%) of these patients had laryngeal findings on exam. Venous malformations were distributed throughout the upper aerodigestive tract (UADT) up to the glottis. Three patients required tracheotomy and all patients with airway involvement received laser therapy to prevent continued hypertrophy. Of 138 patients with lymphatic malformations, 84 (61%) had intraoral disease, and 24 had UADT involvement. Five of 24 patients had hypopharyngeal or supraglottic involvement. These patients all showed V3 mandibular segment involvement. None had glottic or subglottic disease. Twenty-four patients required tracheotomy. Airway obstruction was associated with posterior 1/3 of tongue involvement causing vallecular obliteration and posterior displacement of the epiglottis. **Conclusions:** The airway may be affected by both hemangiomas and vascular malformations. Airway hemangiomas may be focal or segmental; segmental involvement may be transglottic. Vascular malformations are consistently supraglottic.

98. Indications and Utility of Intraoperative Mohs Surgery Agata K. Brys, MD, Rochester, NY Brad Hyatt, BA, Rochester, NY Marc D. Brown, MD, Rochester, NY Timothy D. Doerr, MD FACS, Rochester, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the criteria used by Mohs surgeons to treat patients in the operating theater.

Objectives: Frequently, Mohs resection and reconstruction is performed by an experienced Mohs surgeon on an outpatient basis. However, there exists a subgroup of patients who are deemed poor candidates for outpatient Mohs surgery and require intraoperative Mohs extirpation with reconstruction. The purpose of this study is to delineate criteria and clinical characteristics that predicted the need for Mohs resection in the operating room and to identify which patients benefit most from this approach. **Study Design:** Retrospective chart review from 2000 to 2008. **Methods:** The records for all patients diagnosed with skin cancers of the head and neck who were treated with Mohs micrographic surgery in the operating theater between July 2000 and September 2008 were retrospectively reviewed. Clinical characteristics of the tumor (tumor dimensions, location, histologic diagnosis, whether the tumor was a primary tumor or local recurrence, and total number of tumors treated), as well as patient related characteristics (age, sex, race, marital status, family history of skin cancer, use of tobacco or alcohol, history of radia-

tion therapy, history of immunosuppression, and patient's preference) were recorded. Univariate and multivariate analyses will be performed for statistical analysis. **Results:** This study will identify clinical characteristics of patients who are ideally suited for intraoperative Mohs resection and reconstruction. **Conclusions:** There exists a subgroup of patients who are deemed poor candidates for outpatient Mohs surgery and benefit from intraoperative Mohs extirpation and reconstruction. The criteria used to identify these patients are presented.

99. Emergent Airway Management in the Labor and Delivery Suite: A Case Series and Recommendations for Acute Airway Management

Paul C. Bryson, MD, Chapel Hill, NC
Carlton J. Zdanski, MD FACS, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) discuss airway abnormalities that may present at the time of delivery; 2) discuss a step wise and timely approach to airway management in the labor and delivery suite; and 3) be able to institute a standardized, multidisciplinary action plan for neonatal airway emergencies.

Objectives: Congenital airway obstruction and malformations are of varied etiology and uncommonly encountered. Prenatal care and imaging have enhanced detection of these abnormalities and allowed for multidisciplinary care planning prior to or at the time of delivery. Despite the availability and advances in prenatal imaging, airway abnormalities may not be identified until the time of delivery. Herein are discussed three labor and delivery room airway emergencies encountered over an eight month period. Clinical history will be correlated with autopsy findings, congenital upper airway and laryngotracheal anomalies will be reviewed, and recommendations for timely and efficient airway management in the labor and delivery suite will be discussed.

Study Design: Case series. **Methods:** Clinical and pathologic review of three neonates with airway abnormalities discovered at the time of delivery. **Results:** 2 term and 1 preterm infant were delivered and were unable to be ventilated. Nonsurgical and surgical attempts to establish a viable airway were unsuccessful. All three mothers received prenatal ultrasounds. No ultrasounds commented on laryngotracheal abnormalities. All three patients demonstrated tracheal stenosis, two had laryngeal atresia, and all had other developmental abnormalities. Attempts to secure a viable airway included direct laryngoscopy, rigid bronchoscopy, attempted intubation of the esophagus to ventilate through a possible tracheoesophageal fistula, and emergent tracheostomy. In light of the autopsy findings, none of the abnormalities were compatible with life. **Conclusions:** Despite appropriate prenatal care and imaging, laryngotracheal abnormalities are not necessarily apparent until the time of delivery. We recommend a method to activate appropriate personnel to manage the airway and a step wise approach to attempting to secure these challenging airways. We further recommend keeping small airway equipment available in every labor and delivery suite.

100. Radiographic Anatomical Measurements for the Endoscopic Modified Lothrop Approach

Collin M. Burkart, MD, Cincinnati, OH
Lee A. Zimmer, MD PhD FACS, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the use of preoperative radiographic analysis in the selection of patients for the endoscopic modified Lothrop procedure.

Objectives: Predicted success of the endoscopic modified Lothrop procedure (EMLP) is based on small, radiographic and cadaveric anatomical studies. The goal of the present study is to evaluate the radiographic anatomy of the frontal recess to determine if the cadaveric standard for frontal recess anatomy correlates with radiographic anatomy in a large population.

Study Design: Computed tomography (CT) anatomic study. **Methods:** CT studies from 97 patients were analyzed in the sagittal and coronal planes. Four anatomic parameters in the sagittal plane and two in the coronal plane were measured. Measurements were compared to previously published reports. **Results:** The midsagittal nasal beak thickness was 0.8 cm (0.3-1.4). The midsagittal beak to skull base distance was 1.0 cm (0.4-2.4). The left accessible dimension was 0.8 cm (0.3-1.4) and 0.8 cm (0.4-1.5) on the right. The left anterior/posterior (AP) diameter of the frontal sinus was 1.0 cm (0.3-1.8) and 1.1 cm (0.4-1.9) on the right. The anterior coronal width of the frontal sinus recess was 1.0 cm (0.3-2.2) and the posterior coronal width was 2.2 cm (1.1-3.1). Significant differences between men and women exist in the accessible dimension and AP dimension of the frontal sinus with females having smaller measurements in these parameters. Forty-three patients in the study qualify for the EMLP in all measured parameters. **Conclusions:** Radiographic analysis of the frontal recess can aid in the selection of patients for EMLP. A large portion of the population has anatomy excluding them from EMLP compared to previous published results.

101. Sinus Preservation Management for Frontal Sinus Fractures in the Endoscopic Sinus Surgery Era: A Systematic Review

Kenny B. Carter Jr., MD, Milwaukee, WI
David M. Poetker, MD, Milwaukee, WI
John S. Rhee, MD FACS*, Milwaukee, WI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role of sinus preservation protocols for the management of frontal sinus fractures and identify the common complications of various treatment options.

Objectives: To systematically review the existing literature supporting the efficacy and safety of sinus preservation management for frontal sinus fractures in the modern era of endoscopic frontal sinus surgery. **Study Design:** A systematic review of the English literature for the targeted objective was conducted using the PubMed database between January 1995 and August 2008. **Methods:** The PubMed database was queried using two major search terms of frontal sinus fracture or frontal sinus injury along with manual review of citations within bibliographies. Citations acquired from the primary search were filtered and relevant abstracts were identified that merited full review. Articles were identified that included any cohort of patients with frontal sinus fractures involving the frontal sinus outflow tract or posterior wall with sinus preservation management. **Results:** A total of 231 citations were generated and 54 abstracts were identified as potentially relevant articles. Sixteen articles merited full review, with 7 articles meeting inclusion criteria for sinus preservation. There were 515 total patients in the studies with 347 patients managed with frontal sinus preservation. Similar short term complications and effectiveness were found between fractures managed with sinus preservation and those with traditional management. **Conclusions:** Sinus preservation appears to be a safe and effective management strategy for select frontal sinus fractures. More transparent reporting of management strategies for individual cases or cohorts is needed. A standardized algorithm and categorization framework for future studies are proposed. Longer term followup and larger prospective studies are necessary to assess the safety and efficacy of sinus preservation protocols.

102. Efficacy of Contemporary Techniques for the Management of Lagophthalmos

Tarik Y. Farrag, MD MSc, Baltimore, MD
Lisa E. Ishii, MD, Baltimore, MD
Jeffery P. Neal, BS, Baltimore, MD
Patrick J. Byrne, MD FACS, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to have more understanding about the outcomes of the different procedures done around the eye for facial paralysis patients.

Objectives: To evaluate the efficacy of procedures performed for the management of paralytic lagophthalmos. **Study Design:** Retrospective chart review and survey based study. **Methods:** Retrospective review of patients with facial paralysis who underwent the surgical treatment of paralytic lagophthalmos in our department from July 2001—July 2007. Three outcomes measured: (I) clinical data; (II) quality of life facial paralysis survey; (III) evaluation of pre- and postoperative digital images for patients saved in our computer program. Procedures analyzed were: (1) upper eyelid loading; (2) canthopexy; (3) canthoplasty; (4) brow lift; and (5) tarsorrhaphy. **Results:** A total of 88 patients have been identified in our medical record system. 25 quality of life questionnaires have been currently received. The study is currently under way towards its completion. Results reveal the following: 90% reported improvement in their appearance; 65% reported decrease in their lubrication regimen; 80% reported improvement in their eyelid closure; 80% reported improvement in how their eyes feel; 90% reported improvement in their eyes' excessive lacrimation/dryness; 90% reported improvement in their ability to blink in the affected side; and 90% reported their satisfaction with the results of the procedures they had. Further evaluation has been done for each of the procedures, results by type of procedure performed, as well as the patients' pre-and postoperative images which will be presented. The common complications for each of the procedures are presented. Detailed description and comparison in between each of the procedures tested, failure rate, number of procedures needed, clinical presentation pre- and postoperatively, as well as comparison between gold weight vs. platinum chain implantation are also presented. **Conclusions:** Upper lid loading and associated procedures such as lateral canthopexy are effective procedures for paralytic lagophthalmos. Further discussion follows.

103. WITHDRAWN--MRSA: A Cause of Spontaneous Septal Necrosis

Esther D. Garazi, BS, Miami, FL
Ramzi T. Younis, MD, Miami, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the presentation, diagnosis and treatment of spontaneous septal necrosis and explain the pathogenesis of septal hematomas.

Objectives: 1) Discuss the clinical presentation, pathogenesis, diagnosis, and treatment of spontaneous septal necrosis (SSN) secondary to methicillin resistant staphylococcus aureus (MRSA); and 2) review previous literature on septal hematomas and SSN. **Study Design:** This study involves a comprehensive literature review as well as an illustrative case report. **Methods:** A literature review of septal hematomas and of SSN was performed. A unique case is described whereby a 14 year old male presented to our institution with a 3 day history of epistaxis and worsening nasal pain. He denied any history of major trauma to the face or nose. The patient reported no history of fever, illness, headaches, or vision changes. On examination, a nasal septal hematoma was identified. No neurological findings were elicited and the remainder of the exam was benign. The patient was scheduled for surgery. **Results:** The patient was taken to surgery for incision and drainage of the septal hematoma.

Intraoperative findings were consistent with necrotic cartilage and mucosal necrosis. Cultures were sent and grew MRSA. The patient was started on intravenous vancomycin and gentamicin postoperatively. A literature search revealed no prior reports of MRSA related SSN. **Conclusions:** We present the first documented case of spontaneous septal necrosis secondary to MRSA. Accordingly, MRSA may be capable of producing aggressive necrosis in the nasal septum without prior traumatic injury. We recommend that MRSA be considered in the differential diagnosis of any atypical presentations of SSN.

104. Evaluating the Safety of Frontal Sinus Trephination

Grant S. Gillman, MD, Pittsburgh, PA
Annie S. Lee, MD, Pittsburgh, PA (Presenter)
Barry M. Schaitkin, MD FACS, Pittsburgh, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the safety of frontal sinus trephination at different distances from the midline.

Objectives: The depth of the frontal sinus was measured using axial CT images to examine the safety of frontal sinus trephination at selected distances from the midline. **Study Design:** Review of two hundred consecutive sinus CT scans. **Methods:** Two hundred sinus CT scans (400 frontal sinuses) were reviewed to measure the frontal sinus depth at 5mm, 10mm and 15mm from midline. **Results:** Males had a significantly deeper frontal sinus than females at all measurement points ($p < 0.001$). The measurements revealed a considerable number of small but non-hypoplastic frontal sinuses, which were shallower than the length of standard frontal trephine instruments (7mm) and would therefore risk penetration of the posterior table of the sinus. Of all frontal sinuses studied, 9.46% were less than 7mm deep at 5mm from the midline, 10.03% at 10mm and 8.88% at 15mm from the midline. Overall, 15% of all frontal sinuses studied had at least one point at which the measured depth was less than 7mm. **Conclusions:** While the majority of patients have frontal sinuses deep enough to accommodate standard trephine instruments, surgeons should recognize that up to 15% of non-hypoplastic frontal sinuses may not be sufficiently deep at a given point to allow safe trephination without risking unintentional transgression of the posterior table. This study suggests that trephination consistently carried out at a given predetermined distance from the midline may be unsafe practice. Careful evaluation of the imaging is essential in every case to avoid inadvertent injury and to help select the safest distance from the midline for frontal sinus trephination.

105. Arytenoid Voice

Joseph F. Goodman, MD, Washington, DC
Anthony J. Anfusio, BS, Augusta, GA
Nader Sadeghi, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the morbidity of long-term intubation, its sequelae and treatment options in the pediatric population.

Objectives: We highlight the long term sequelae of injury to and treatment of the pediatric airway. Children are surviving at increasingly younger gestational ages, often requiring a prolonged NICU stay with intubation and ventilator support. Airway scarring, including glottic and subglottic stenosis, often necessitates a surgical procedure to reconstruct the airway and allow extubation. The natural history of these neonates as they grow into adulthood is not well described, but our case report sheds light on this issue. **Study Design:** We present an unusual case of neoglottis formation in a 21 year old female via redundant arytenoid mucosa approximating the base of epiglottis, providing her a functional voice and airway protection despite fixed, scarred vocal cords. She underwent a cricoid split operation at 2 months and required tracheostomy until age 7. **Methods:** Case report and review of the literature. **Results:** The patient presented with concerns for quality of voice but no overt dysfunction. Flexible fiberoptic laryngoscopy reveals anterior arytenoids with redundant mucosa, which at rest obscure the laryngeal inlet. On phonation, the arytenoids move inferomedially to contact the base of the epiglottis. The right arytenoid vibrates with exhalation, producing the characteristic "arytenoid voice". Further examination reveals a stenotic interarytenoid area and glottis stenosis. **Conclusions:** The patient has developed a functional airway despite major changes to the laryngeal anatomy. She can protect her airway and achieve a level of phonation that achieves a reasonable quality of life. This case illustrates the long term sequelae of laryngeal reconstruction.

106. Atypical Presentation of Necrotizing Fasciitis of the Ear

Jessica L. Gullung, BS, Jackson, MS
Jacob E. Smith, MD, Charleston, SC
April D. Hendryx, DO, Charleston, SC
Krishna G. Patel, MD PhD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize signs and symptoms of necrotizing fasciitis, radiographic and pathological findings, and detailed information on the medical and surgical treat-

ment of this potentially fatal disease.

Objectives: To report an atypical case of necrotizing fasciitis involving the ear. **Study Design:** Interventional case report. **Methods:** A 39 year old healthy male presented with postauricular drainage, blistering, and avulsion of his right ear along the postauricular sulcus. Laboratory studies, CT imaging, and frozen tissue biopsies were suggestive of necrotizing fasciitis. The patient received immediate wide local debridement and antibiotics including vancomycin and Zosyn. **Results:** Twenty-four hours after debridement, the patient corrected his leukocytosis and acidosis. Wound cultures grew staph. epidermidis and propionibacterium. During six days as an inpatient, the patient received local wound care, IV antibiotics, and eight hyperbaric oxygen treatments. At the time of discharge, the wound appeared healthy and free of infection. The patient underwent reconstruction two weeks postoperatively. **Conclusions:** Necrotizing fasciitis of the ear is a rare occurrence with only three case studies reported in current literature. It is an aggressive disease in which delay of treatment can lead to rapid demise and death. Therefore, early recognition, broad spectrum IV antibiotics and immediate surgical debridement are crucial to improving patient survival.

107. Delivery of Aerosolized Particles to the Ethmoid and Sphenoid Sinuses

Katherine K. Hamming, MD, Minneapolis, MN
Timothy S. Wiedmann, PhD, Minneapolis, MN
Frank L. Rimell, MD, Minneapolis, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the delivery of aerosolized particles to the ethmoid and sphenoid sinuses before and after sinus surgery.

Objectives: 1) Evaluate the delivery of aerosolized particles to the ethmoid and sphenoid sinuses before and after sinus surgery; and 2) improve understanding of aerosolized topical medication delivery to the paranasal sinuses. **Study Design:** Basic science. **Methods:** Three cadavers, six sinuses, were exposed to 1 micron diameter radio-labelled aerosolized particles before and after ethmoidectomy and sphenoidotomy. Cadaver heads were imaged with SPECT-CT. Distribution of radioactivity was measured on coronal images. **Results:** Delivery of aerosolized particles to the ethmoid and sphenoid sinuses was significantly increased in the postoperative sinus cavities. The preoperative ethmoid sinuses contained 0.09% of the delivered medication versus 2.8% in postoperative sinuses ($p=0.004$). Sphenoid delivery was 0.027% versus 0.62% ($p=0.05$). **Conclusions:** After ethmoidectomy and sphenoidotomy, significantly more aerosolized particles reached these sinus cavities than in non-operated sinuses. These results suggest that sinus surgery on ethmoid and sphenoid sinuses may improve delivery of topical medication. However, delivery to the sinus cavities continues to be a small percentage of the total dose and further study of delivery methods of topical medication is needed.

108. A Novel Animal Model for Hyaluronic Acid Filler Longevity

Alexander T. Hillel, MD, Baltimore, MD
Zayna S. Nahas, MD, Baltimore, MD
Jennifer J. Petsche, BS, Houston, TX
Shimon A. Unterman, BS, Baltimore, MD
Jennifer H. Elisseeff, PhD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the need for an accurate rapid preclinical testing of tissue filler materials and consider the rat subcutaneous space as a potential animal model for hyaluronic acid fillers.

Objectives: Tissue filler injections are among the most commonly performed procedures in facial plastic surgery. No single animal model has emerged as an accepted standard to evaluate tissue filler longevity. To validate a rat model three hyaluronic acid fillers with different known residence times in humans were tested. **Study Design:** In vivo animal study to compare residence time of three hyaluronic acid fillers to published residence times in humans. **Methods:** Two hundred microliters of Restylane ($n=20$), Captique ($n=19$), and Juvederm ($n=19$) were injected into the dermis of Sprague-Dawley rats. The three dimensions of the blebs were measured at day 0, day 1, and a weekly basis for 7 weeks. Volume, volume ratio, and filler thickness were analyzed. Histological and statistical analyses were also performed. **Results:** Histology demonstrated injections in the thin rat dermis with migration into the subcutaneous space. Captique's average residence time was 2 weeks, while Restylane and Juvederm had measurable volumes through 6 weeks. Both Restylane and Juvederm maintained significantly greater volumes and volume ratios than Captique through the duration of the study. **Conclusions:** Captique's residence time was significantly shorter than that of Restylane and Juvederm, which had comparable residence times. While the longevities of the three fillers were not of the same duration in the rat as human residence times, the relative duration of the fillers was comparable therefore establishing the rat as a valid animal model to compare various tissue filler materials. The shorter residence time in the rat dermis/subcutaneous space allows for accurate rapid preclinical testing of tissue filler materials.

109. The Use of Implants in Facial Augmentation for Hemifacial Atrophy

Judy W. Lee, MD, New York, NY
Richard A. Zoumalan, MD, New York, NY
Sam S. Rizk, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the characteristics of the disorder Parry-Romberg syndrome and discuss the reconstructive timing and strategy. The participants should also be able to explain how the senior author performed the reconstruction.

Objectives: We present a technique of volume replacement in patients with hemifacial atrophy due to Parry-Romberg syndrome. **Study Design:** Parry-Romberg syndrome is a rare disorder characterized by slowly progressive atrophy of the skin and soft tissues of half of the face (hemifacial atrophy). The onset of the disease begins between the ages of 5 and 15 years. The progression of the atrophy lasts a decade. Treatment for the atrophy is recommended after the quiescence of disease progression. Microsurgical reconstruction is considered the gold standard to restore facial symmetry. Given a free flap's morbidity and risk of complications, some patients opt for less extensive procedures. We present the case of a 30 year old male with a history of Parry-Romberg syndrome with resultant left hemifacial atrophy. Consistent with the usual pattern of atrophy, the onset of the patient's disease began at the age of 10 years. The progression of the atrophy lasted 12 years. At presentation, his atrophy had been stable for the previous 8 years. **Methods:** The senior author used a combination of a stacked AlloDerm cheek implant and submalar silicone implanted intraorally to produce volume and symmetric contour on the affected side. He was discharged home from the recovery room without complication. **Results:** The patient was followed for 7 years. He has had no complications and maintains excellent symmetric result. The patient is highly satisfied with his result and has not required any further surgery. Preoperative and postoperative photos at 6 years are presented. **Conclusions:** Less invasive treatment options exist for hemifacial atrophy from Parry-Romberg syndrome.

110. Bilateral Dacryocystoceles as a Cause of Neonatal Respiratory Distress

Douglas D. Leventhal, MD, Philadelphia, PA
Patrick C. Barth, MD, Wilmington, DE

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) describe the clinical and radiologic presentation of congenital dacryocystoceles; and 2) understand the surgical management of this condition.

Objectives: 1) Describe the clinical and radiologic presentation of congenital dacryocystoceles; 2) discuss the management of this condition; and 3) review the existing literature. **Study Design:** Illustrative case report and literature review. **Methods:** This is a report of a 2 day old term female who had progressively worsening episodes of desaturations throughout the first day of life. A #5 French catheter was passed through both nasal cavities into the nasopharynx, but a #8 French catheter could not be passed. The infant required endotracheal intubation for progressive respiratory distress. A computer tomography of the head revealed bilateral dacryocystoceles with superomedial deflection of the inferior turbinates. This caused significant narrowing of the nasal cavities bilaterally. The baby was taken to the operating room with otolaryngology and ophthalmology for marsupialization of the cyst and lacrimal duct probing with silicone tube placement. The patient was extubated immediately after the procedure and was discharged home shortly thereafter. **Results:** Neonates are obligate nasal breathers and as such, obstruction of the nasal airway may be life-threatening. Congenital dacryocystocele is a rare anomaly and when present bilaterally in the neonate, respiratory problems may ensue. Recognition of this entity is important as surgical management typically leads to immediate clinical improvement. Surgery typically consists of marsupialization of the cyst and probing with possible stenting of the lacrimal duct. **Conclusions:** Bilateral dacryocystoceles in the newborn is an unusual cause of neonatal respiratory distress. Neonatologists, pediatricians, ophthalmologists, and otolaryngologists need to be aware of this condition as surgical intervention is usually required. These patients do very well with endoscopic marsupialization and nasolacrimal duct probing.

111. Correction of Cleft Lip Nasal Deformity: A Comparison of Techniques

Devin M. Lonergan, MD, Stanford, CA
Robert Menard, MD FACS, Santa Clara, CA
Michael Friduss, MD, Santa Clara, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand a variety of approaches for correction of cleft lip nasal deformity. The laterally based lower lateral chondrocutaneous flap (Wang modification of Vissarionov technique) yielded superior results.

Objectives: Patients born with unilateral cleft lip and palate have secondary deformities of the nasal lobule and functional airway compromise due to the distracting forces of the dehiscent orbicularis oris muscle. The nasal deformity often cannot be corrected until after adolescence. There have been a number of techniques described for correction emphasizing the lack of consistent results. We have obtained a large patient base concentrated through an associated craniofacial clinic. A great experi-

ence with secondary cleft lip rhinoplasty has facilitated improved evaluation of treatment techniques. **Study Design:** Over a period of 4 years, 24 patients with unilateral cleft lip nasal deformity had corrective surgery. All patients were approached via open rhinoplasty. Four patients initially had division of the lower lateral cartilage to attempt correction of asymmetry. Twenty further patients were approached via lateral based chondrocutaneous flap i.e. Vissarionov technique. Criteria were established to evaluate the symmetry of the nasal lobule and functional airway improvement in cleft lip patients undergoing secondary rhinoplasty. Preoperative and postoperative pictures were compared between patient groups undergoing different surgical techniques. Inspection of the nasal vestibule and subjective patient feedback regarding nasal airway status allowed comparison of functional outcomes. **Methods:** Patients born with unilateral cleft lip and palate had primary repair in early childhood. They have had long term followup at our craniofacial clinic. Many young adults displayed secondary nasal deformities and functional nasal obstruction. Patients were collaboratively evaluated and operated on by the plastic surgery service and head and neck surgery service. Preoperative and postoperative pictures were taken at regular office visits. Assessment of functional airway improvements and postop photographs were documented in a standard fashion. **Results:** Initially, the surgical approach for aesthetic correction was via a medially based flap of the vertically divided lower lateral cartilage. Although some aesthetic improvement was noted, residual asymmetry and incomplete correction of nasal vestibular stenosis was observed. The most recent 20 patients were approached via the Vissarionov-Wang laterally based lower lateral cartilage flap. Superior long term and functional outcomes were consistently observed. **Conclusions:** The Wang modification of the Vissarionov technique allows for correction of the asymmetrical lower lateral cartilage with two point fixation while facilitating primary intention healing of the nasal vestibule. The previous stenotic nasal vestibule is corrected by the advancement of the alar web skin into the nasal vestibule. This allows for a more stable reconstruction resulting in superior aesthetic and functional outcome.

112. Potential Role of Biofilms in Deep Cervical Abscess

Jason G. May, MD, Detroit, MI
Livjot S. Sachdeva, MS, Detroit, MI
James M. Coticchia, MD FACS, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the possible role of biofilms in the development of deep neck space abscess.

Objectives: Neck abscesses are relatively common problems that are usually recalcitrant to antimicrobial therapy. The underlying pathogenesis of deep neck abscess is poorly understood and drainage of these abscesses remains the cornerstone of treatment. Recently, numerous infectious diseases have been linked to biofilm phenotypes. **Study Design:** Biofilms are unique lifestyle of microorganisms defined as an assemblage of microbial cells enclosed in an exopolysaccharide matrix and are recalcitrant to antimicrobial therapy. Biofilms due to their resistance to antimicrobial and host defenses are considered a model for chronic and recalcitrant infections. Recent work in other labs has demonstrated biofilm pods embedded intracellularly in adenoid specimens of patients with recurrent acute otitis media and chronic otitis media with effusion. **Methods:** We have recently taken biopsies of abscess walls of patients with deep neck space abscess. These specimens were imaged using scanning electron microscopy (SEM) and analyzed for the presence of biofilms. Specimens were fixed in glutaraldehyde immediately after they were obtained from the patient. The tissue specimens were prepared for imaging using the standard protocol. SEM images were analyzed using Carnoy image analysis software to quantify percentage coverage of biofilms on the tissues. **Results:** SEM imaging demonstrated organized microcolonies on the surface of these specimens. These images clearly demonstrated bacteria embedded within a 3 dimensional matrix. This type of architecture is consistent with mature biofilms. **Conclusions:** These findings suggest that biofilm phenotypes may play a role in the etiology of deep neck abscess.

113. Determining the Effect of Imiquimod on Human Endothelial Cells

Abby C. Meyer, MD, Minneapolis, MN
Beverly R.K. Wuertz, BS, Minneapolis, MN
James D. Sidman, MD*, Minneapolis, MN
Frank G. Ondrey, MD PhD FACS, Minneapolis, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the effects of imiquimod on proliferation, gene expression and protein production in a human endothelial cell line.

Objectives: There have been multiple reports reporting the success of using 5% imiquimod to treat hemangioma of infancy (HOI) lesions. There have been no published studies looking at the effect of imiquimod on these lesions on a molecular level. Therefore, we investigated the effect of imiquimod in a human endothelial cell line (HUVEC). **Study Design:** Basic science laboratory experiments. **Methods:** Human umbilical vein endothelial cells (HUVEC) were plated and treated with different concentrations of imiquimod. After treatment was complete, media was collected and the cells were harvested for RNA and protein isolation. ELISA, reverse transcriptase PCR and western blots were carried out using the harvested media, RNA, and protein respectively, and comparisons between treatment groups were made. Furthermore, cell proliferation in HUVEC cells treated with imiquimod was also evaluated using MTT assays. **Results:** In the HUVEC cells, there was a dose dependent decrease in cell proliferation with imiquimod treatment based on MTT assays. However, there were no differences in IL-8 or VEGF secre-

tion by ELISA, reverse transcriptase PCR revealed no difference in expression of IL-8, VEGF, Ki-67, MMP-9, Cyclin D1, Interferon-alpha, or Caspase-3 and western blot also showed no difference in amounts of Cyclin D1, Caspase-3, PARP, and PCNA between the treatment groups. **Conclusions:** Treatment of a HUVEC cell line with imiquimod resulted in decreased cell proliferation in a dose dependent response based on MTT analysis, however we were unable to identify a pathway for this as there was no difference in a number of molecular studies between the treatment groups.

114. Cervical Lymphadenitis in an Immunocompetent Child Caused by Mycobacterium Triplex: Case Report and Literature Review

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Huma A. Quraishi, MD, Newark, NJ
Brian Benson, MD, Hackensack, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to identify, discuss and manage cervical lymphadenitis caused by nontuberculous mycobacteria in children.

Objectives: To describe a novel case of cervical lymphadenitis in an immunocompetent child caused by mycobacterium triplex and to review the literature on cervical lymphadenitis caused by nontuberculous mycobacteria. **Study Design:** Case report and literature review. **Methods:** A description of the clinical presentation, course of disease, diagnosis, management, and definitive treatment of a patient with cervical lymphadenitis caused by mycobacterium triplex. A complete PubMed literature review of cases caused by mycobacterium triplex and of cervical lymphadenitis caused by nontuberculous mycobacteria was performed. **Results:** 4 case reports of mycobacterium triplex were reviewed, none of which caused cervical lymphadenitis. 46 articles on cervical lymphadenitis caused by nontuberculous mycobacteria were reviewed. **Conclusions:** Based on this case report, cervical lymphadenitis caused by mycobacterium triplex behaves similarly to other nontuberculous mycobacteria. A high index of suspicion of nontuberculous mycobacterial infection should be maintained when a young child presents with unilateral lymphadenitis that does not respond to oral antibiotics and has the typical CT findings of a rim enhancing lesion. In addition, the presence of one or more of the following: a positive AFB stain, positive histology of necrotizing granulomatous inflammation, or an intermediately positive PPD test, is further evidence of nontuberculous mycobacterial infection. In patients that do not respond to antibiotic therapy, surgical excision has shown the best disease resolution and the lowest rate of recurrence compared to incision and drainage or curettage.

115. Effect of Nimesulide and PGE2 Therapy, Alone and in Combination, in a Cutaneous Excisional Wound Model in Rats

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Dohar E. Joseph, MD, Pittsburgh, PA
Patricia A. Hebda, PhD, Pittsburgh, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate the effects of specific anti-inflammatory therapy in wound healing.

Objectives: To determine the combinational effects of nimesulide (cyclooxygenase-2 inhibitor) and prostaglandin-E2 (PGE2) on healing of full thickness skin wounds by clinical assessment and histologic evaluation. Nimesulide is an established anti-inflammatory molecule. PGE2 decreases fibrosis and promotes healing in several tissues including skin. The combination of these activities may work together to improve healing outcomes. **Study Design:** Experimental animal study. **Methods:** 36 rats underwent bilateral 8 mm excisional wounds in dorsal skin. Wounds were treated with topical nimesulide, PGE2 or vehicle, at 0, 24, 48 and 72 hours. Nimesulide and PGE2 were tested (high = 50µg/ml and low = 5µg/ul, for both), and combined (50µg/ml each); one group was untreated. For clinical assessment, wounds were photographed, measured, and the area calculated at postoperative day (POD) 7, 14 and 21. For histologic evaluation, wounds were harvested at POD 7, 14 and 21, and scored for organization, maturity and healing. **Results:** Nimesulide treated wounds were larger on POD 14 and 21, but did not reach statistical significance. Histological differences for both treatments were observed on POD 14, nimesulide causing vasodilatation, PGE2 affecting reduced inflammation and more fibroplasia. The combination was additive. **Conclusions:** Specific topical individual and combinational anti-inflammatory therapy resulted in promising microscopic changes, but no significant macroscopic-clinical changes. Further experimentation is underway focusing on collagen architecture and wound tensiometry.

116. The Potential Role of Biofilm Phenotypes in Chronic Otitis Media with Effusion (COME)

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Richard S. Berk, PhD, Detroit, MI
James M. Coticchia, MD FACS, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the role of biofilms in chronic otitis media with effusion.

Objectives: The role of bacterial infections in chronic suppurative otitis media and acute otitis media has been well established. There continues to be debate pertaining to the role of middle ear pathogens in chronic otitis media with effusion (COME). Recent work in our lab has demonstrated dense biofilms in the nasopharynx and has shown the presence of DNA from middle ear pathogens (MEPs) in middle ear effusions (MEEs) of patients with COME. Biofilms are bacterial colonies embedded within an extracellular matrix. Biofilms due to their resistance to antibiotics and host defenses are considered a model for chronic and recalcitrant infections. Planktonic shedding of biofilms releases pathogens which ultimately cause infection. **Study Design:** Adenoid specimens from 7 COME patients were evaluated using scanning electron microscopy (SEM). Obstructive sleep apnea (OSA) patients were used as controls. A subset of COME adenoid specimens and their matched MEEs were analyzed using polymerase chain reaction (PCR). **Methods:** COME and OSA specimens were imaged for biofilms using SEM. Biofilm density analysis was performed using Carnoy image analysis software. PCR was used to identify MEPs in the MEEs and matched adenoid specimens of COME patients. **Results:** COME specimens had 33.02% mean biofilm density versus 0.04% in OSA controls. All MEEs demonstrated the presence of DNA from MEPs which included *S. pneumoniae*, *M. catarrhalis*, *H. influenzae*. Any MEP identified in MEE was also identified in matched adenoid specimen. **Conclusions:** These data suggest that MEEs from patients with COME contain MEPs and the source for these MEPs may be resistant adenoid mucosal biofilms.

117. Platelet Rich Fibrin Matrix for Correction of Deep Nasolabial Folds

Anthony P. Sclafani, MD FACS, New York, NY
Yushan Lisa Wilson, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the preparation of, components of and characterize the advantages of autologous platelet rich fibrin matrix (PRFM). The participant should also be able to describe the application of PRFM for guided soft tissue generation for facial aesthetics.

Objectives: To determine the utility of autologous PRFM for correction of deep nasolabial folds (NLFs). **Study Design:** Prospective case series of patients with prominent NLFs who were treated with autologous PRFM and followed for 3 months. **Methods:** Five subjects with deep NLFs were treated intradermally and subdermally (alternate sides) with autologous PRFM (prepared using Fibrinet, Cascade Medical Enterprises, Inc., Englewood, NJ). NLF severity was assessed by the principal investigator before treatment, immediately after and at 1, 2, 6 and 12 weeks after treatment. Patients rated improvement of appearance immediately and 1, 2, 6 and 12 weeks after treatment. Subjects were specifically assessed for edema, ecchymosis, pain or excessive thickening of the treated areas. **Results:** All subjects were pleased with the effect of PRFM treatment of the NLFs. Although all subjects were treated to optimal appearance, most noted a partial loss of correction which stabilized in the first 1-2 weeks after treatment. However, additional correction became apparent and then plateaued at 6-8 weeks after treatment. No significant differences between the effects of intradermal or subdermal injection were noted. No subject noted any abnormal thickening or nodularity of the treated skin. **Conclusions:** PRFM appears to be a simple and readily applied method to correct deep NLFs without causing nodularity or excessive fibrosis. We postulate that the enhanced release and sustained function of platelet growth factors derived from PRFM stimulates neocollagenesis in the treated area. We are currently further evaluating the time course of soft tissue augmentation after treatment with PRFM.

118. Excision of Benign Lesions of the Forehead and Malar Regions Utilizing Endoscopic Browlift Techniques

Jennifer Setlur, MD, Syracuse, NY
Sydney C. Butts, MD, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate the anatomy of the fascial layers of the temporal region and forehead as well as the relevant neurovascular structures, and describe the capabilities of limited incisions with endoscopic guidance to access areas of the forehead and cheek in a comparable way to open techniques.

Objectives: Traditionally, excision of benign forehead and malar lesions has required open approaches via coronal or extended Blair incisions or incisions directly over the lesions. Such methods carry disadvantages including extensive scarring, soft tissue contour irregularities, hypesthesia, and alopecia. Endoscopic browlift techniques allow access to these regions while minimizing tissue trauma and blood loss and may allow for shorter recovery time. A diverse group of benign pathologies in the pediatric and adult populations can be approached in this way. **Study Design:** Case series. **Methods:** A series of five cases is reviewed. A CT and/or MRI was obtained for each patient preoperatively. A minimum of two incisions was made behind the hairline for placement of the browlift cannula and insertion of instruments. The plane of dissection utilized was based on a review of imag-

ing and physical examination findings. **Results:** The lesions resected with this approach included periorbital and nasal dermoids, a plexiform neurofibroma, a lipoma, and hyperostosis of the frontal bone. Conversion to an open approach was required during one case. In each case, the lesions were completely excised with no evidence of recurrence with a minimum of 12 months followup. All patients expressed satisfaction with the incisions, and no major complications were experienced by any patient. **Conclusions:** Endoscopic browlift techniques can be applied to the excision of a variety of benign lesions in the forehead and malar regions. Such methods offer several advantages without compromising therapeutic outcome. However, it may not be appropriate to use these limited access approaches for resecting malignant or recurrent lesions.

119. “Rhinotopical” Therapy for Post-ESS Sinusitis

Alan H. Shikani, MD FACS*, Baltimore, MD
Karim A. Chahine, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to learn about “rhinotopical” therapy, a relatively new and effective method of managing resistant post-ESS sinusitis.

Objectives: To assess the efficacy of topical antibiotic and corticosteroids therapy in the treatment of post-endoscopic sinus surgery (ESS) sinusitis that is resistant to conventional management. Post-ESS sinusitis may occur even if the sinus anastomoses are patent and is caused by microorganisms that are often resistant to oral antibiotics. Some rhinologists have suggested treatment with intravenous antibiotics, on the premise of an underlying submucosal osteitis. IV antibiotics are, however, expensive, associated with limited patient resistance, potential side effects and, in our experience, not always effective. **Study Design:** Prospective, open crossover clinical trial. **Methods:** Over a period of one year, 20 patients were included in this study. Inclusion criteria were 1) previous endoscopic sinus surgery; 2) recurrent sinusitis after sinus surgery and; 3) failure of oral antimicrobial treatment. “Rhinotopical” therapy consisted of topical antibiotics and corticosteroids preparations selected on the basis of expected bacteriology, and self-administered by the patients through a nebulizer for a period of 4 to 6 weeks (duration based on response to treatment). In addition, weekly endoscopic nasal toilet was performed by the rhinologist, followed by direct endoscopic installation of the topical preparations in the sinus cavities. **Results:** More than 95% of the patients showed significant improvement in symptoms and quality of life. **Conclusions:** “Rhinotopical” therapy is a relatively cheap, complication free, well tolerated and effective method of managing resistant post-ESS sinusitis.

120. The Use of Chitosan Coated Nasal Packing in the Management of Recalcitrant Epistaxis

Alan H. Shikani, MD FACS*, Baltimore, MD
Karim A. Chahine, MD, Baltimore, MD (Presenter)

Educational Objective: At the conclusion of this presentation, the participants should be able to learn about a new type of nasal packing that is effective in controlling complicated nasal bleeding, even in patients on blood thinners.

Objectives: To investigate the efficacy of chitosan coated nasal packing in controlling difficult spontaneous epistaxis and evaluate its effect on nasal mucosa. Epistaxis is a common reason for emergency department visits and otolaryngology referrals. Treatment methods include nasal packing, chemical or electric cauterization, and when necessary operative arterial ligation and arterial embolization. The ideal nasal pack should be efficient in controlling bleeding, have antimicrobial properties, and be well tolerated by the patient and the nasal mucosa. Currently, there is no perfect nasal pack, but some are closer to ideal than others. The usual duration of packing ranges from 48 hours to 5 days, depending on the status of the coagulation system and platelets function. Patients on blood thinners require longer packing periods and have a high percentage of rebleeding after pack removal. Chitosan is a naturally occurring, biocompatible polysaccharide that forms a tight coherent seal when it comes in contact with red blood cells and that has proven effective in controlling bleeding in gunshot wounds. This study will evaluate chitosan coated expandable nonabsorbable nasal packing in epistaxis patients. **Study Design:** This is an open prospective crossover clinical trial. **Methods:** Over a period of 6 months, 50 patients presenting with complicated epistaxis that did not respond to standard therapy were included in this study. Most of these patients had been on blood thinners. The patients were treated with the chitosan coated expandable nasal packing for 48 hours and followed endoscopically for 4 weeks after pack removal, checking for recurrence of the bleeding, for adhesions or any delayed mucosal reaction to the packing. **Results:** Chitosan coated packing resulted in effective and rapid hemostasis in all patients who had failed standard packing. The packing was well tolerated and successfully removed after 48 hours. **Conclusions:** Chitosan coated nasal packing is effective in controlling complicated nasal bleeding, even in patients on blood thinners. Mucosal healing following pack removal is rapid without any adhesions or noticeable side effects.

121. Midforehead Lift: Efficacy, Complications and Patient Satisfaction

Rizwan Siwani, MD, Rochester, MN
Oren Friedman, MD, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the effectiveness of the midforehead browlift in rejuvenation of the aging forehead. The study will objectively assess the aesthetic outcome following the procedure particularly with regards to the forehead incision.

Objectives: In this study we assessed patient satisfaction with the midforehead browlift procedure. We also carried out an objective assessment of the cosmetic results following the procedure. The study focused on the scar appearance following the forehead incision since this is the main criticism of the technique. **Study Design:** A retrospective chart review was carried out of patients treated for brow ptosis with the midforehead browlift at our institution. An independent panel of five evaluated pre- and postoperative photographs for symmetry, brow elevation, incision scar, and overall appearance. **Methods:** Following chart review, data on demographics, sun exposure, smoking history, postoperative complications and convalescence period was collected. A panel of five independent evaluators graded pre- and postoperative photographs on a scale of 1-4 ranging from poor to very good for each of the following aspects of forehead appearance: symmetry, brow elevation, incision scar, and overall appearance. Patient satisfaction with the procedure was assessed by a self administered questionnaire. **Results:** In all, 29 midforehead browlift operations were performed on 29 patients by the senior author over a five year period. An average score of 4 (very good) was given to each of the four aspects of the procedure being evaluated ($p = 0.002$). The patient score showed a high level of satisfaction with the results of the procedure. **Conclusions:** The midforehead brow lift was found to be a reliable technique for forehead rejuvenation. Patients and objective evaluators reported high levels of satisfaction with the postoperative scar and overall appearance.

122. The Rhinolift: A Uniquely Simple Technique to Address the Ptotic Nasal Tip

Frederick J. Stucker, MD FACS*, Shreveport, LA
Mark O. Dammert, MD, Shreveport, LA (Presenter)
Stewart C. Little, MD, Shreveport, LA
Timothy S. Lian, MD FACS, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to effectively recognize, evaluate, and treat the functional and cosmetic features of nasal tip ptosis.

Objectives: Nasal tip ptosis is a common problem, occurring in up to 72% of rhinoplasty patients. This is especially prevalent in older patients. The drooping tip may cause significant functional impediment of the nasal airway and is frequently a source of cosmetic concern. Our objective is to demonstrate a simple, effective approach to the management of nasal tip ptosis. **Study Design:** Retrospective review conducted at a tertiary care university based hospital and Veterans Affairs hospital. **Methods:** Twenty five patients undergoing corrective surgery of nasal tip ptosis were treated with the described technique between 1995 and 2008. The rhinolift involves removal of dorsal skin and subcutaneous tissues followed by resuspension. With careful placement of the transverse dorsal incision, the scar is camouflaged within the natural contour of the nasal subunits. Excision of this senile, inelastic skin is a necessary step to achieve good results. Direct visualization and manipulation of the cartilages, bony dorsum, and the septum may be achieved through this approach. Pre- and postoperative photographs were examined to assess cosmetic improvement. Functional improvement was assessed via review of postoperative chart documentation. **Results:** All patients noted significant improvement in the nasal airway. Cosmetic results were largely improved from both surgeon and patient perspectives. Followup ranged from 3 months to 12 years. **Conclusions:** In patients with senile elastosis, the soft tissue envelope must be addressed directly to achieve satisfactory results. The rhinolift, if performed on properly selected patients, is one of the most rewarding procedures in any facial plastic surgeon's armamentarium. The procedure is simple to master, expeditious, and has little morbidity.

123. A New Disease Paradigm - Mucosal and Stromal Intracellular Bacteria in the Upper Respiratory Tract

Ruth Thornton, BSc (Hons), Perth, Australia
Harvey L. Coates, FRACS FACS, Perth, Australia (Presenter)
Peter C. Richmond, FRACP, Perth, Australia
Shyan R. Vijayasekaran, FRACS, Perth, Australia
Paul J. Rigby, PhD, Perth, Australia
Selma P. Wiertsema, PhD, Perth, Australia

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the findings of intracellular bacteria in the stroma of the middle ear, adenoids, and tonsils. They will be able to explain the possible role of these intracellular bacteria in the apparent resistance to antibiotics of some chronic upper respiratory infections.

Objectives: Recently intracellular bacteria have been noted in the middle ear mucosa of children with recurrent acute otitis media (RAOM) and otitis media with effusion (OME). Intracellular mucosal bacteria have also been reported in the bladder mucosa and lower respiratory tract mucosa in children with cystic fibrosis. With evidence of bacterial biofilm being found com-

monly on the adenoids of children with rAOM and chronic sinusitis and within the crypts of the tonsillar fossae, the possibility of intracellular bacteria in the adenoid and tonsillar tissue is hypothesized. The objective is to determine presence of intracellular bacteria in the adenoid and tonsillar stromal tissues of children with rAOM and adenotonsillar hypertrophy and to determine bacterial types in these tissues. **Study Design:** Prospective study utilizing fluorescence in situ hybridization (FISH) coupled with confocal laser scanning microscopy. **Methods:** Fluorescence in situ hybridization coupled with confocal laser scanning microscopy of the adenoidal and tonsillar tissues of 5 children with recurrent tonsillitis and obstructive sleep disorder was performed. **Results:** Intracellular bacteria were found in the stroma of the adenoids and tonsils as noticed previously in the middle ear mucosa of children with rAOM. These were identified by FISH testing as being *S. pneumoniae*, *H. influenzae* and *M. catarrhalis* species.
