Message from the Vice Presidents

Welcome to New Orleans and our Triological Combined Sections Meeting. It has been a pleasure to serve the membership as the Section Vice Presidents and we are very proud of the outstanding program that has been assembled by our Program Chair, Dr. Paul Willging, and our Program Committee members. The ***Schedule at a Glance*** will give you an idea of the wide range of presentations and activities available to attendees. Concurrent sessions to maximize our attendees' educational experience will be held throughout the meeting. Be sure to join us for our Vice President's Welcome Reception on Thursday evening, a fun networking and social event. Sign up for a "walking tour" on Saturday evening, following our Meet the Authors poster reception. We would appreciate it if you would visit with the exhibitors who help support our meeting. Refreshments and lunch will be available in the exhibit hall throughout the meeting. Many activities are available on Friday afternoon at the conclusion of the morning's concurrent sessions, including our Triological Society Thesis Seminar for candidates, the annual golf outing, and our ever popular Resident Bowl. Attendees may also register for the American Society of Geriatric Otolaryngology's scientific session to be held on Friday afternoon.

For those of you who are not Triological Society members or Fellows, we welcome the opportunity to answer your questions regarding how you can become part of this noble organization. The Society awards nearly $500,000 per year in support of research efforts of otolaryngologist-head and neck surgeons, disseminates the latest basic science and clinical information in *The Laryngoscope*, and our Open Access journal, *Laryngoscope Investigative Otolaryngology* as well as sharing important and timely otolaryngology updates in *ENTtoday.* The Society continues to support resident, medical student and Fellow presenters through institutional travel awards.

We hope you enjoy all the educational and social aspects of our meeting. Thank you for attending.

Bert W. O'Malley Jr., MD
Eastern Section Vice President

Michael S. Benninger, MD
Middle Section Vice President

David J. Terris, MD
Southern Section Vice President

Andrew N. Goldberg, MD
Western Section Vice President

THURSDAY AT A GLANCE

Morning Session - Napoleon AB

8:00 - 9:10	Welcome and Introduction of Special Guests
9:10	Presidential Address
9:35 - 9:50	Thesis Presentations
9:50 - 10:15	Break with Exhibitors/View Posters
10:16 - 11:05	Triological Society Best Practices (TRIO BP) Session
11:05 - 12:00	How I Do It Video Session
12:00 - 1:00	Lunch/Visit Exhibits/View Posters

THURSDAY AT A GLANCE (cont'd)

Concurrent Sessions 1A & 2A - Napoleon AB

1:10 - 3:05 Head & Neck Papers and Panel
PANEL - HPV: How Status Affects Management of Head and Neck Malignancies

3:05 - 3:30 Break with Exhibitors/View Posters

3:30 - 5:20 Rhinology/Allergy Papers and Panel
PANEL - Skull Base Reconstruction - Options and Principles

5:20 Adjourn

5:30 - 7:00 Vice President's Welcome Reception - Armstrong Ballroom

Concurrent Sessions 1B & 2B - Rhythms Ballroom

1:10 - 3:10 Otology/Neurotology Papers and Panel
PANEL - Point/Counterpoint - Endoscopic Ear Surgery: Fad or New Standard?

3:10 - 3:30 Break with Exhibitors/View Posters

3:30 - 5:20 Laryngology/Bronchoesophagology Papers and Panel
PANEL - Unilateral Vocal Fold Paralysis: What, When, How and Why

5:20 Adjourn

5:30 - 7:00 Vice President's Welcome Reception - Armstrong Ballroom

FRIDAY AT A GLANCE

Triological Business Meetings (Fellows Only)

7:00 - 7:50 Southern Section - Borgne (3rd floor)

7:00 - 7:50 Western Section - Maurepas (3rd floor)

Concurrent Sessions 3A & 4A - Napoleon AB

8:05 - 10:00 Facial Plastic/Reconstructive Surgery Papers and Panel
PANEL - Facial Plastic Surgery: What I Do Differently Now Than I Did 10 Years Ago

10:00 - 10:30 Break with Exhibitors/View Posters

10:30 - 12:30 General and Rhinology/Allergy Papers and Panel
PANEL - Third Party Regulation: Current Requirements for Endoscope and Instrument Cleaning

12:30 Adjourn

FRIDAY AT A GLANCE (cont'd)

Concurrent Sessions 3B & 4B - Rhythms Ballroom

8:05 - 10:05 General/Sleep Medicine Papers and Panel
PANEL - Hypopharyngeal Procedures for OSA: Indications and Options

10:05 - 10:30 Break with Exhibitors/View Posters

10:30 - 12:30 Laryngology/Bronchoesophagology Papers and Panel
PANEL - Gastroesophageal Reflux Treatment: Problems with Medical and Surgical Treatment Options

12:30 Adjourn

Afternoon Activities

12:30 Golf Outing

12:45 - 1:30 Triological Thesis Seminar

1:00 - 2:15 Resident Bowl

12:45 - 2:45 Physician/Scientist Meeting

12:45 NOLA Tours

2:30 - 6:00 ASGO Scientific Session

SATURDAY AT A GLANCE

Triological Business Meetings (Fellows Only)

7:00 - 7:50 Eastern Section - Borgne (3rd floor)

7:00 - 7:50 Middle Section - Maurepas (3rd floor)

General Session - Napoleon AB

8:05 - 9:30 The Latest and the Greatest

9:30 - 10:00 Break with Exhibitors/View Posters

10:30 - 3:30 Concurrent Sessions (see next page)

3:30 - 5:15 General Papers and Panel
PANEL - Controversies in Otolaryngology

5:15 Adjourn

5:30 - 7:00 Meet the Authors Poster Reception

7:15 Witches, Ghosts, Vampires & Voodoo Walking Tour

SATURDAY AT A GLANCE (cont'd)

Concurrent Sessions 5A & 6A - Napoleon AB

10:10 - 12:00 General and Head & Neck Papers and Panel
PANEL - Shared Decisions: Can Head and Neck Surgeons Do It Better?

12:00 - 1:00 Lunch/Visit Exhibits/View Posters

1:10 - 3:05 Pediatric Otolaryngology Papers and Panel
PANEL - Pain Management in Post-Tonsillectomy Pediatric Patients

3:10 - 3:30 Break/View Posters

Concurrent Sessions 5B & 6B - Rhythms Ballroom

10:10 - 12:00 Otology/Neurotology Papers and Panel
PANEL - Hearing Loss Rehabilitation: Options in Unilateral vs Bilateral Loss

12:00 - 1:00 Lunch/Visit Exhibits/View Posters

1:10 - 3:10 General and Sleep Medicine Papers and Panel
PANEL - DISE (Drug Induced Sleep Endoscopy): Current Indications and Pitfalls

3:10 - 3:30 Break/View Posters

Evening Activity

5:30 - 7:00 Meet the Authors Poster Reception

7:15 Witches, Ghosts, Vampires & Voodoo Walking Tour

About the Triological Society
The American Laryngological, Rhinological and Otological Society, Inc., aka The Triological Society, was founded in 1895 in New York, NY. Since its founding, the Triological Society has attracted the best and brightest in academic and clinical otolaryngology. Membership in the Triological Society brings the distinction of being elected to the most prestigious society in otolaryngology. Active Fellowship is achieved by presenting a thesis in the field of otolaryngology considered acceptable to a panel of peers. For those entering the field of otolaryngology, the Society provides role models. For those who are committed to research and related scholarly activity, the Society offers fellowship with like-minded peers who share common values, interests, and concerns.

The Society disseminates scientific information by presenting the latest basic science and clinical information at scientific meetings and through publication of its scientific journals, *The Laryngoscope* and *Laryngoscope Investigative Otolaryngology*. The Society promotes research into the causes of and treatments for otolaryngic diseases by attracting promising physicians to scholarly otolaryngology research and supporting their development, providing financial support for the research efforts of young scientists, and promoting the highest standards in the field of otolaryngology-head and neck surgery.

Mission Statement
The mission of the Triological Society is to assist physicians and other health care professionals in maintaining and enhancing their knowledge of and skills in otolaryngology-head and neck surgery in pursuit of improved patient care.

Learning Objectives for This Activity
This activity is designed for otolaryngologists-head and neck surgeons and other health professionals. Upon completion of this course, participants will be able to:

- Implement a successful diagnostic procedure protocol for the evaluation of OSA, minimizing anesthetic induced artifacts;
- Discuss the benefits of providing facial rejuvenation procedures in an office setting;
- Identify when hypoglossal nerve stimulators are appropriate for the treatment of OSA;
- Implement a process for the cleaning of endoscopes that meets the requirements of third party regulators;
- Discuss the various options available for the rehabilitation of hearing loss;
- Manage postoperative pain safely in the pediatric age group following adenotonsillectomy;
- Describe the various methods of skull base reconstruction following extirpation of malignancies;
- Appropriately manage a patient with unilateral vocal cord paralysis, with respect to the timing of intervention, and type of intervention to employ.

Exhibits
Exhibitors will include representatives of pharmaceutical companies, instrument companies, diagnostic equipment companies, publishers, and others. We encourage attendees to visit the exhibit hall for information that may assist in their pursuit of improved patient care. Exhibitor arrangements are in compliance with the Accreditation Council for Continuing Medical Education (ACCME) Standards for Commercial Support.

Information presented by exhibitors and oral and poster presenters does not represent an endorsement by the Triological Society.

Disclosure Information
In compliance with the ACCME Accreditation Criteria, the American College of Surgeons, as the accredited provider of this activity, must ensure that anyone in a position to control the content of the educational activity has disclosed all relevant financial relationships with any commercial interest. All reported conflicts are managed by a designated official to ensure a bias-free presentation. Please see the insert to this program for the complete disclosure list.

Program Evaluation and CME Certificates

Participant comments on program evaluation forms assist Program Advisory Committees in determining the direction of future educational activities. We appreciate your input and request that you complete a program evaluation in exchange for a CME certificate of attendance. Records are maintained in the Administrative Office of the Society and maintained by the American College of Surgeons for Fellows of the College. Requests may be made by sending a self-addressed envelope to: Triological Society • 13930 Gold Circle, Suite 103 • Omaha, NE 68144 • 531-355-8900.

CONTINUING MEDICAL EDUCATION CREDIT INFORMATION

Accreditation

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of the American College of Surgeons and The American Laryngological, Rhinological and Otological Society aka The Triological Society. The American College of Surgeons is accredited by the ACCME to provide continuing medical education for physicians.

AMA PRA Category 1 Credits™

The American College of Surgeons designates this live activity for a maximum of **17.00** *AMA PRA Category 1 Credits™.* Physicians should claim only the credit commensurate with the extent of their participation in the activity.

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Guests of Honor

Eastern Section	Anne O'Malley
Middle Section	Brian B. Burkey, MD FACS
Southern Section	Willard E. Fee Jr., MD FACS
Western Section	Eugene N. Myers, MD FACS

Citation Awardees

Eastern Section
- Noam A. Cohen, MD PhD
- Steven J. Eliades, MD PhD
- Devraj Basu, MD PhD FACS

Middle Section
- Pierre Lavertu, MD FACS
- Peak Woo, MD FACS
- Kathleen L. Yaremchuk, MD MSA

Southern Section
- Stilianos E. Kountakis, MD PhD FACS
- Dennis H. Kraus, MD FACS
- Gregory W. Randolph, MD FACS

Western Section
- M. Stuart Strong, MD
- Jonas T. Johnson, MD FACS
- Andrew H. Murr, MD FACS

Middle Section George Adams Young Faculty Awardee

Chad A. Zender, MD FACS, University Hospitals-Case Medical Center, Cleveland, OH

Fifth Annual Patrick E. Brookhouser MD Award of Excellence

Charles M. Luetje, MD FACS, Olathe, KS

Resident Research Awardees

Eastern Section
- Sandeep S. Dhaliwal, MD - William W. Montgomery, MD Resident Research Award - Western University of Health Sciences
- Sidharth V. Puram, MD PhD - Richard J. Bellucci, MD Resident Research Award - Massachusetts Eye and Ear Infirmary
- Katie M. Phillips, MD - John J. Conley, MD Resident Research Award - Harvard Medical School

Middle Section
- Craig A. Bollig, MD - Dean Lierle, MD Resident Research Award - University of Missouri School of Medicine
- John D. Cramer, MD - Henry Williams, MD Resident Research Award - Northwestern University Feinberg School of Medicine
- Joseph Zenga, MD - Lawrence Boies, MD Resident Research Award - Washington University School of Medicine

Southern Section
- Sean P. Holmes, MD - Lester A. Brown, MD Resident Research Award - Louisiana State University Health Sciences Center
- Matthew G. Crowson, MD - G. Slaughter Fitz-Hugh, MD Resident Research Award - Duke University Medical Center
- Carrie L. Nieman, MD MPH - James Harrill, MD Resident Research Award - Johns Hopkins University School of Medicine

Western Section
- Timothy J. Cooper, MD - Vice President's Resident Research Award - University of Alberta Hospital
- Nicholas A. Dewyer, MD - Shirley Baron Resident Research Award - University of California

Triological Society Research Grant Programs

The Society promotes research into the causes of and treatments for otolaryngic diseases by providing financial support for the research efforts of young otolaryngologists-head and neck surgeons. The Society has awarded nearly $5 million to otolaryngologists-head and neck surgeons in support of clinical and basic research, clinical trials, translational research, outcomes research, and health services research. These competitive research grant programs include funding for career development grants and clinical scientist awards.

CAREER DEVELOPMENT AWARDS

The purpose of the Career Development awards is to provide support for the research career development of otolaryngologists-head and neck surgeons whose projects have specific application in the field of otolaryngology-head and neck surgery. Funding is $40,000 (non-renewable). Categories of projects that qualify for submission are:

1. Clinical Research - Prospective or retrospective clinical data collection with direct clinical application

2. Basic Research - Laboratory studies, in vivo, in vitro; animal studies, genetic studies

3. Health Services and Outcomes Research - Patient outcomes, health related QOL; epidemiology, diversity, population statistics; cost analysis, modeling, decision analysis, etc.

4. Technology/Procedure Development - Development, standardization, beta testing of new technology; equivalency studies

5. Otolaryngology Status and Trends - Resident and medical education; impact of health care delivery systems in society

6. Historical Perspectives - Medical history as it has influenced contemporary otolaryngology knowledge and practice

Letters of Intent were due December 1st and applications were due January 17, 2017. Call for proposals will be available later in 2017.

Guidelines and additional information are available at the Triological website - **www.triological.com/researchgrants.html.**

CLINICAL SCIENTIST DEVELOPMENT AWARDS

The Triological Society and the American College of Surgeons combined competitive grant program provides supplemental funding to otolaryngologists-head and neck surgeons who have received a new NIH Mentored Clinical Scientist Development Award (K08/K23) or have an existing award with a minimum of 3 years remaining in the funding period. This award is a means to facilitate the research career development of otolaryngologists with the expectation that the awardee will have sufficient pilot data to submit a competitive R01 proposal prior to the conclusion of the K award. This award provides financial support in the amount of $80,000 per year for up to five years, or for the remainder of the term of existing grants, to supplement the K08/K23 award.

Applications are due May 26, 2017.

Guidelines and additional information are available at the Triological website - **www.triological.com/researchgrants.html.**

Grant Awardees

THE 2016-2017 TRIOLOGICAL SOCIETY CAREER DEVELOPMENT AWARDEES AND THE FUNDED PROJECTS ARE:

- Alessandro de Alarcon, MD MPH - Development of Imaging Biomarkers for Voice after Pediatric Airway Reconstruction
- Alexander J. Langerman, MD FACS - Ethics and Logistics of Concurrent Cases: Perceptions and Practice in Head and Neck Surgery
- Thomas J. Ow, MD FACS - Dual Targeting of Apoptosis in HNSCC as a Mechanism to Overcome Treatment Resistance
- Babak Sadoughi, MD FACS - Evaluation of Laryngeal Motor Neuropathy Using Transcranial Magnetic Stimulation Mediated Evoked Potentials

THE 2016-2017 TRIOLOGICAL SOCIETY CLINICAL SCIENTIST AWARDEE AND THE FUNDED PROJECT IS:

- Steven J. Eliades, MD PhD - Cortical Mechanisms of Auditory-Vocal Interaction

THE 2016-2017 TRIOLOGICAL/AMERICAN COLLEGE OF SURGEONS CLINICAL SCIENTIST DEVELOPMENT AWARDEES (TRIO/ACS) AND THE FUNDED PROJECTS ARE:

New grant:

- Bradley John Goldstein, MD PhD FACS - Nasal Progenitor Cells and Olfactory Neurogenesis

Renewals:

- Devraj Basu, MD PhD FACS - Targeting Mesenchymal-Like Cells in Oral Cancer to Overcome Cetuximab Resistance
- Alexander Tell Hillel, MD - Immune Cell Modulation in Laryngotracheal Fibrosis
- Akihiro J. Matsuoka, MD PhD - Nanotechnological Regeneration of Spiral Ganglion Neurons with Human Stem Cells

THURSDAY, JANUARY 19
NAPOLEON BALLROOM AB

7:30 **Attendee Breakfast with Exhibitors -** *Napoleon CD*

8:00 **Welcome by Vice Presidents**

8:05 **Eastern Section Guest Introductions - Bert W. O'Malley, MD FACS, Philadelphia, PA**
Citation Awardees: Noam A. Cohen, MD PhD, Philadelphia, PA
Steven J. Eliades, MD PhD, Philadelphia, PA
Devraj Basu, MD PhD FACS, Philadelphia, PA
Guest of Honor: Anne O'Malley

8:20 **Southern Section Guest Introductions - David J. Terris, MD FACS, Augusta, GA**
Citation Awardees: Stilianos E. Kountakis, MD PhD FACS, Augusta, GA
Dennis H. Kraus, MD FACS, New York, NY
Gregory W. Randolph, MD FACS, Boston, MA
Guest of Honor: Willard E. Fee Jr., MD FACS, Stanford, CA
A Professor's Dream

8:35 **Western Section Guest Introductions - Andrew N. Goldberg, MD MSCE FACS, San Francisco, CA**
Citation Awardees: M. Stuart Strong, MD, Boston, MA
Jonas T. Johnson, MD FACS, Pittsburgh, PA
Andrew H. Murr, MD FACS, San Francisco, CA
Guest of Honor: Eugene N. Myers, MD FACS, Pittsburgh, PA
Reminiscing

8:50 **Middle Section Guest Introductions - Michael S. Benninger, MD FACS, Cleveland, OH**
Citation Awardees: Pierre Lavertu, MD FACS, Cleveland, OH
Peak Woo, MD FACS, New York, NY
Kathleen L. Yaremchuk, MD MSA, Detroit, MI
Guest of Honor: Brian B. Burkey, MD FACS
The Value of Engaging Good Mentors

Introduction of Middle Section GEORGE ADAMS, MD YOUNG FACULTY AWARDEE
Chad A. Zender, MD FACS, Cleveland, OH
Introduction by Michael S. Benninger, MD FACS, Middle Section Vice President

9:10 **PRESIDENTIAL ADDRESS - Charles W. Beatty, MD FACS, Rochester, MN**
"Why TRIO?"

9:25 **Presentation of FIFTH ANNUAL PATRICK E. BROOKHOUSER, MD AWARD OF EXCELLENCE -** ***Introduction by Charles W. Beatty, MD FACS, President***
Charles M. Luetje, MD FACS, Olathe, KS

9:30 **Tribute to Fred D. Owens, MD, Immediate Past President**
by Charles W. Beatty, MD FACS, President

9:35 **2016 Fowler Awardee Thesis Presentation**
The Color of Cancer: Margin Guidance for Oral Cancer Resection Using Elastic Scattering Spectroscopy (ESS)
Gregory A. Grillone, MD FACS, Boston, MA

Educational Objectives: At the conclusion of this presentation, the participants should be able to better understand the potential usefulness of elastic scattering spectroscopy in evaluating margins during oral cavity cancer resection.

Objectives: To evaluate the usefulness of elastic scattering spectroscopy (ESS) as a diagnostic adjunct to surgery in patients with diagnosed squamous cell carcinoma of the oral cavity. **Study Design:** Prospective, analytic study. **Methods:** Subjects for this single institution, IRB approved study were recruited from among patients undergoing surgical resection for squamous cell cancer of the oral cavity. A portable, elastic scattering spectroscopy (ESS) device with a contact fiberoptic probe was used to obtain spectral signals. Four to ten spectral readings were obtained on each subject from various sites including gross tumor and normal appearing mucosa in the surgical margin. Each reading was correlated with the histopathologic findings of biopsies taken from the exact location of the spectral readings. A diagnostic algorithm based on multidimensional pattern recognition/machine learning was developed. Sensitivity and specificity, error rate, and area under the curve (AUC) were used as performance metrics for tests involving classification between disease and non-disease classes. **Results:** Thirty-four (34) subjects were enrolled in the study. One hundred seventy six (176) spectral data point/biopsy specimen pairs were available for analysis. ESS distinguished normal from abnormal tissue with a sensitivity ranging from 84% to 100% and specificity ranging from 71% to 89%., depending on how the cut-off between normal and abnormal tissue was defined (i.e., mild, moderate or severe dysplasia). There were statistically significant differences in malignancy scores between histologically normal tissue and invasive cancer and between non-inflamed tissue and inflamed tissue. **Conclusions:** This is the first study to evaluate the effectiveness of ESS in guiding resection margins in oral cavity cancer. ESS provides fast, real time assessment of tissue without the need for pathology expertise. ESS appears to be effective in distinguishing between normal mucosa and invasive cancer and between "normal" tissue (histologically normal and mild dysplasia) and "abnormal" tissue (severe dysplasia and carcinoma in-situ) that might require further margin resection. Further studies, however, are needed with a larger sample size to validate these findings and to determine the effectiveness of ESS in distinguishing visibly and histologically normal tissue from visibly normal but histologically abnormal tissue.

9:42 **2016 Honorable Mention Award for Basic Science Thesis Presentation**
Biological Significance of Genome Wide DNA Methylation Profiles in Keloids
Lamont Randall-Desean Jones, MD, Detroit, MI

Educational Objectives: At the conclusion of this presentation, the participants should be able to describe the contribution of genome wide methylation and pathway analysis on keloid pathogenesis.

Objectives: To obtain biological insight into keloid pathogenesis and treatment using pathway analysis of genome wide differentially methylated gene profiles between keloid versus normal skin. **Study Design:** Prospective cohort. Level of evidence: NA. **Methods:** Genome wide profiling was previously done, Institutional review board approved, on 6 fresh keloid and 6 fresh normal skin, using the Infinnium Human Methylation450BeadChip®. The 197, keloid statistically significant differentially methylated, cytosine phosphodiester bond guanines (CpGs) mapped to 152 genes. These genes were uploaded into Ingenuity Pathway Analysis (IPA) software to identify biological functions or regulatory networks interacting together. The pathways (or "network") with an enrichment p value ≤ 0.01 were subjected to a heuristic filter of keywords associated with keloid pathogenesis. **Results:** Of the 197 CpGs, 191 were accounted for in the IPA database and annotated to 152 unique genes. The top 10 hypermethylated genes included *ACTR3C*, *LRRC61*, *PAQR4*, *C1orf109*, *SLCO2B1*, *CMKLR1*, *AHDC1*, *FYCO1*, *CCDC34,* and *CACNB2*. The top 10 hypomethylated genes included *GALNT3*, *SCML4*, *PPP1R13L*, *ANKRD11*, *WIPF1*, *MX2*, *IFFO1*, *DENND1C*, *CFH,* and *GHDC*. IPA identified 9 pathways with enrichment p values ≤ 0.01, of which 5 (histidine degradation V1, phospholipase C signaling, colorectal cancer metastasis signaling, P2Y purigenic receptor signaling, and Gαi signaling) were associated with keloid related keywords and contained "keloid genes" with p<0.05. **Conclusions:** Genes differentially methylated between keloid and normal tissue reside in known bionetwork pathways involved in critical biological functioning and signaling events in the cell. This information could be used to refine screening processes for biological significance to better understand keloid pathogenesis and for molecular targeted therapy.

9:50 - 10:15 Break with Exhibitors/View Posters

10:15 - 12:00 GENERAL SESSION - NAPOLEON AB

10:16 - 11:05 TRIOLOGICAL SOCIETY BEST PRACTICES (TRIO BP) SESSION
Moderator: Anil K. Lalwani, MD FACS, New York, NY
Panelists: Ashutosh Kacker, MD FACS, New York, NY
Maie A. St. John, MD, Los Angeles, CA
Scott E. Strome, MD, Baltimore, MD
Kathleen L. Yaremchuk, MD MSA, Detroit, MI

11:05 - 12:00 HOW I DO IT VIDEO SESSION
Moderator: Fred F. Telischi, MD FACS, Miami, FL
Panelists: **Endoscopic Approach to the Petrous Apex**
Joseph K. Han, MD, Norfolk, VA
Microinvasive Parathyroidectomy
David J. Terris, MD FACS, Augusta, GA
Hypoglossal Nerve Stimulator Implantation for OSA
B. Tucker Woodson, MD FACS, Milwaukee, WI
Ossicular Chain Reconstruction--No Prosthesis Is Necessary (95% of the time)
Michael D. Seidman, MD FACS, Celebration, FL
Sialendoscopy with Stone Removal
Henry T. Hoffman, MD FACS, Iowa City, IA

12:00 - 1:00 Lunch/Visit Exhibits/View Posters - *Napoleon CD*

1:10 - 3:10 CONCURRENT SESSION 1A
HEAD & NECK - NAPOLEON AB

Moderator: Pierre Lavertu, MD FACS, Cleveland, OH

1:10 Comparison of Facility Type Outcomes in Survival and Treatment for Oral Cavity Cancer: An Analysis of the National Cancer Database
Samuel J. Rubin, BA, Boston, MA; Michael B. Cohen, MD, Boston, MA; Diana N. Kirke, BSc MBBS FRACS, Boston, MA; Muhammad M. Qureshi, MBBS, Boston, MA; Minh Tam Truong, MD, Boston, MA; Scharukh Jalisi, MD MA FACS, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand trends in facility type and treatments used between 1998-2011 for oral cavity cancer to compare overall survival and predictors of survival.

Objectives: Determine trends in facility type and treatments between 1998-2011 for oral cavity cancer to compare both overall survival and predictors of survival. **Study Design:** Retrospective study design using the National Cancer Database (NCDB). **Methods:** Cases of oral cavity cancer between 1998-2011 were identified. Univariate analysis including analysis of variance and chi squared test was used to compare variables by facility (community cancer center (CCP), comprehensive community cancer program (CCCP) and academic center). Kaplan-Meier curve and multivariable cox proportional hazard models were used to compare predictors of survival. **Results:** There was a trend toward more subjects receiving care at academic centers over the study period (46.11% in 1998 vs 56.55% in 2011; β=0.7675). Furthermore, there has been an increase in patients undergoing surgery, plus/minus adjuvant therapy (71.48% in 1998 and 85.07% in 2011; β=1.2304). Subjects at academic centers were significantly more likely to receive surgery plus/minus adjuvant therapy compared to subjects treated at CCP and CCCP (83.59% vs.73.313% vs. 67.40 p<0.0001). Five year overall survival was significantly greater at academic centers (52.43%) compared to CCP (41.55%) and CCCP (47.33%) (p<0.0001). Surgery plus/minus adjuvant therapy at academic centers had significantly improved survival compared to nonsurgical treatment [HR=0.487 95% (0.462, 0.514)] after adjusting for age, sex, days from diagnosis to treatment, stage, and year of diagnosis. **Conclusions:** There has been a trend towards patients with oral cavity cancer receiving treatment at academic centers with a greater likelihood of receiving surgical therapy. There is also a greater 5 year overall survival of patients treated at academic centers compared to patients treated at CCP and CCCP.

1:17 **Treatment, Short Term Outcomes, and Costs Associated with Larynx Cancer Care in Commercially Insured Patients**

Andrew T. Day, MD, Baltimore, MD; Hsien-Yen Chang, PhD, Baltimore, MD; Harry Quon, MD, Baltimore, MD; Kevin D. Frick, PhD, Baltimore, MD; David W. Eisele, MD, Baltimore, MD; Christine G. Gourin, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the relationship between treatment, short term outcomes, and costs associated with larynx cancer care in commercially insured patients <65 years of age.

Objectives: To examine associations between treatment, complications, and costs in patients with laryngeal cancer. **Study Design:** Retrospective cross-sectional analysis of MarketScan Commercial Claim and Encounters data. **Methods:** We evaluated 10,969 patients diagnosed with laryngeal cancer from 2010-2012 using cross-tabulations and multivariate regression. **Results:** Chemoradiation was significantly associated with supraglottic tumors (RRR=5.9 [4.4-7.8]), pretreatment gastrostomy (RRR=4.0 [2.7-6.1]), and alcohol abuse (RRR=0.5 [0.3-0.9]). Treatment related complications occurred in 23% of patients with medical complications in 22% and surgical complications in 7%. Chemoradiation (OR=3.7 [2.6-5.2]), major surgical procedures (OR=4.9 [3.5-6.8]), reconstruction (OR=7.7 (4.1-14.7)], and advanced comorbidity (OR=9.7 [5.7-16.5] were associated with acute complications. Recurrent/persistent disease occurred in 23% of patients and was associated with high volume care (1.4 [1.1-1.8]). Salvage surgery was performed in 46% of patients with recurrent/persistent disease and was less likely for supraglottic disease (OR=0.5 [0.4-0.8]) and after chemoradiation (OR=0.4 [0.2-0.6]). Initial treatment and 1 year overall costs for chemoradiation were higher than all other treatment categories, after controlling for all other variables including complications and salvage. High volume care was associated with significantly lower costs of care for surgical patients but was not associated with differences in costs of care for nonoperative treatment. **Conclusions:** In commercially insured patients <65 years with laryngeal cancer, chemoradiation is associated with increased costs, an increased likelihood of treatment related complications, and a reduced likelihood of surgical salvage. High volume surgical care is associated with lower initial treatment and 1 year costs of care. These data have implications for discussions of value and quality in an era of healthcare reform.

1:24 **James Harrill, MD Resident Research Award (Southern Section)**
The Effect of Frailty on Short Term Outcomes after Head and Neck Cancer Surgery

Carrie L. Nieman, MD MPH, Baltimore, MD; Karen T. Pitman, MD, Baltimore, MD; Christine G. Gourin, MD MPH, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the potential role of frailty, as compared to comorbidity, in understanding and interpreting key outcomes among head and neck cancer patients. Participants should be able to compare frailty versus comorbidity and describe the differences between the two and the potential role each plays as a risk factor in in-hospital mortality, postoperative complications, length of hospitalization, and costs in head and neck cancer.

Objectives: To determine the relationship between frailty and comorbidity, in-hospital mortality, postoperative complications, length of hospitalization and costs in head and neck cancer (HNCA) surgery. **Study Design:** Cross-sectional analysis. **Methods:** Discharge data from the Nationwide Inpatient Sample for 159,301 patients who underwent ablative surgery for a malignant oral cavity, laryngeal, hypopharyngeal or oropharyngeal neoplasm in 2001-2010 was analyzed using cross-tabulations and multivariate regression modeling. Frailty was defined based on frailty defining diagnosis clusters from our adjusted clinical groups' frailty defining diagnosis indicator. **Results:** Frailty was identified in 7.4% of patients and was significantly associated with advanced comorbidity (OR=1.5[1.3-1.8]), Medicaid (OR=1.5[1.3-1.8]), major procedures (OR=1.6[1.4-1.8]), flap reconstruction (OR=1.7[1.3-2.1]), high volume hospitals (OR=0.7[0.5-1.0]), discharge to a short term facility (OR=4.4[2.9-6.7]), or other facility (OR=5.4[4.5-6.6]). Frailty was a significant predictor of in-hospital death (OR=1.6[1.1-2.4]), postoperative surgical complications (OR=2.0[1.7-2.3]), acute medical complications (OR=3.9[3.2-4.9]), increased length of hospitalization (mean, 4.9 days) and increased mean incremental costs ($11,839), and was associated with a higher odds of surgical complications and increased costs than advanced comorbidity. There was a significant interaction between frailty and comorbidity for acute medical complications and length of hospitalization, with a synergistic effect on the odds of medical complications and length of hospitalization in patients with comorbidity who were also frail. **Conclusions:** Frailty is an independent predictor of postoperative morbidity, mortality, and costs in HNCA surgery patients and has a synergistic interaction with comorbidity that is associated with an increased likelihood of medical complications and greater length of hospitalization in patients with comorbidity who are also frail.

1:31 **WITHDRAWN - Quality of Life Outcomes for Oropharyngeal Squamous Cell Carcinoma Patients Following Transoral Robotic Surgery with and without Adjuvant Radiotherapy**

James M. Taylor, MPH, Winston-Salem, NC; Michael H. Soike, MD, Winston-Salem, NC; Emory R. McTyre, MD MS, Winston-Salem, NC; Christopher A. Sullivan, MD, Winston-Salem, NC; Kathryn M. Greven, MD, Winston-Salem, NC; Joshua D. Waltonen, MD, Winston-Salem, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss and compare quality of life outcomes in patients with oropharyngeal squamous cell carcinoma treated with transoral robotic surgery (TORS). Further, participants will gain insight into the differences of quality of life scores between patients treated with TORS alone compared with TORS and radiotherapy with or without concurrent chemotherapy.

Objectives: To determine quality of life (QOL) outcomes in oropharyngeal squamous cell carcinoma (OPSCC) patients treated with transoral robotic surgery (TORS) and neck dissection (ND) alone compared with TORS/ND followed by adjuvant radiotherapy (RT) with or without concurrent chemotherapy. **Study Design:** Single institution prospective cohort study. **Methods:** OPSCC patients scheduled to undergo TORS were prospectively enrolled between June 2010 and September 2014. Patients were asked to complete the Head and Neck Cancer Inventory (HNCI) preoperatively as well as at 3 weeks, 3 months and 6 months postoperatively. QOL scores were stratified based upon treatment modality (TORS vs TORS+RT) and compared using Student's t-tests. **Results:** A total of 47 patients enrolled in the study. 38.3%, 23.4% and 38.3% had TORS only, TORS+RT and TORS+RT with chemotherapy, respectively. There were no statistically significant differences in any QOL metric at baseline or at 3 weeks postoperatively. At 6 months, patients treated with TORS alone had significantly higher QOL scores compared with patients receiving TORS followed by adjuvant radiotherapy. Specifically, TORS alone patients had higher mean QOL scores in the following domains: speech functional (TORS: 89.0, TORS+RT: 74.8, $p = 0.024$), eat functional (TORS: 75.3, TORS+RT: 49.3, $p = 0.001$), social disruption functional (TORS: 93.0, TORS+RT: 70.4, $p = 0.022$), speech attitudinal (TORS: 88.3, TORS+RT: 73.3, $p = 0.011$), eat attitudinal (TORS: 77.9, TORS+RT: 48.1, $p = 0.001$), and social disruption attitudinal (TORS: 96.7, TORS+RT: 80.2, $p = 0.004$). Prognostic factors including radiation technique, chemotherapy, and stage will also be correlated with outcomes. **Conclusions:** Patients with OPSCC treated with TORS alone maintain a higher QOL at 6 months postoperatively versus TORS+RT. These data can help manage patient expectations about QOL outcomes.

1:38 **Factors Contributing to Reoperation and Extended Length of Stay after Free Flap Surgery for Head and Neck Malignancy; A NSQIP Analysis**

William W. Thomas, MD, Philadelphia, PA; Jason A. Brant, MD, Philadelphia, PA; Jason G. Newman, MD, Philadelphia, PA; Ara C. Chalian, MD, Philadelphia, PA; Steven B. Cannady, MD, Philadelphia, PA

Educational Objective: Understand factors contributing to reoperation and extended length of stay predicted by the NSQIP database.

Objectives: To determine the rate of reoperation and its effect on length of stay (LOS) in free flap cases in the ACS-NSQIP data for 2012-2014 in surgical cases with diagnosis codes corresponding to malignancies of the head and neck. **Study Design:** Retrospective database analysis. **Methods:** ACS-NSQIP data from 2012-2014 was queried for ICD-9 codes for malignancies of the head and neck excluding thyroid. Cross-sectional analysis using multivariate logistic regression modeling was used to examine correlation of NSQIP variables with reoperation and LOS. Significance was determined using p-value < 0.05. **Results:** A total of 8609 head and neck cases met inclusion criteria with 1115 receiving free tissue transfers. Mean age of patients receiving flap surgery was 62.3 ± 12.5 years. Mean time from operation to discharge was 11.2 ± 7.8. Predictors of long length of stay included op time (OR 1.2; CI 1.1-1.3), smoking (OR 2.1; CI 1.5-3.1), clean contaminated wound (OR 2.2; CI 1.3-4), bony flap (OR 1.8; CI 1.2-2.8), age (OR 1.5; CI 1.2-1.7), and return to operating room (OR 4.8; CI 3.3-6-9). Reoperation occurred in 225 cases (20.2%) with the majority (180) occurring before discharge in a mean of 8 ± 7.7 days and most commonly for vessel repair (37) or incision and drainage of neck (35). **Conclusions:** NSQIP data allows for large database analysis of free flap transfer to the head and neck. Predictors for extended length of stay include return to operating room. The data above provides information to help guide surgeons on which patients will require longer stay in hospital and the most common reasons for return to OR.

1:45 **Risk Factors for Thirty Day Readmission Following Tissue Transfer Reconstruction of Oncologic Defects of the Head and Neck**

Heather A. Osborn, MD, Boston, MA; Vinay K. Rathi, MD, Boston, MA; Tjoson Tjoa, MD, Irvine, CA; Derrick T. Lin, MD, Boston, MA; Daniel G. Deschler, MD, Boston, MA; Marlene L. Durand, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) demonstrate an understanding of the importance of 30 day readmission as a marker of health quality; 2) describe risk factors for readmission in patients undergoing tissue transfer reconstruction of oncologic defects of the head and neck; and 3) understand how this information can be applied to improve prognostication and health outcomes in this patient population.

Objectives: Unplanned 30 day readmission rate is an important metric of healthcare quality. Patients who undergo tissue transfer to the head and neck region following oncologic resection are at high risk of readmission. The objective of this study was to identify perioperative risk factors that influence 30 day readmission rates. **Study Design:** Retrospective cohort study. **Methods:** All patients with active head and neck cancer who underwent resection with free or pedicled flap reconstruction during a 4.5 year period, 2009-2014, were reviewed. Readmissions within 30 days of discharge were noted. Univariate analysis was used to identify risk factors associated with an increased risk of readmission. Variables found to be significant were included in multivariate logistic regression. P values <0.05 were considered statistically significant. **Results:** Of 689 cases (86% clean-contaminated, 75% free flaps), 147 (21.3%) were readmitted ≤ 30 days after discharge. Surgical site infections (SSIs) that developed ≤ 30 days postoperatively, either at recipient (14.1% of cases) or donor (2.9%) sites, were significantly associated with readmission (56.4% with SSIs readmitted vs 14.2% without SSIs, p<0.0001). Other risk factors for readmission included free flap surgery (23.6% free vs 14.5% pedicled cases, p 0.013), and clean-contaminated surgery (22.9% clean-contaminated vs 11.6% clean, p = 0.015). Free flap reconstruction (vs. pedicled) and SSIs remained significant on multivariate analysis. Factors not associated with readmission included age ≥ 65, ASA class ≥ 3, female sex, operative time ≥ median, and prior radiation therapy. **Conclusions:** Thirty day readmission is an important metric of health quality. Surgical site infection and free flap reconstruction are major risk factors for readmission.

1:52 **Richard J. Bellucci, MD Resident Research Award (Eastern Section)**
Identifying Metrics and Factors Affecting Readmission Rate Following Head and Neck Cancer Surgery
Sidharth V. Puram, MD PhD, Boston, MA; Neil Bhattacharyya, MD FACS, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe national metrics for readmission following head and neck cancer surgery as well as factors that influence the readmission rate of these patients.

Objectives: Determine nationally representative readmission rates after head and neck cancer (HNCA) surgery and factors associated with readmission. **Study Design:** Cross-sectional analysis of admissions database. **Methods:** The 2013 Nationwide Readmissions Database was analyzed for HNCA surgery inpatient admissions and subsequent readmission within a 30 day period. The readmission rate, length of stay (LOS), disposition, mortality rate, and total charges were determined. Further analysis classified the diagnoses and procedures upon readmission. Demographic and clinical factors that were associated with readmission were determined. **Results:** 132,755 HNCA surgery inpatient admissions (mean age, 57.3 years; 52.2% male) were analyzed. Nationally representative metrics for HNCA surgery were mean LOS: 4.4±0.1 days, disposition: home without services 80.5%, home healthcare 10.9% and skilled facility 6.6%, mortality rate: 1.0±0.1%, and total charges: $53,106±1,167. The readmission rate was 7.7±0.2%, occurring at a mean of postoperative day 17.1±0.1, with readmission LOS: 5.6±0.1 days, mortality rate: 3.7±0.3%, and total charges of $49,425±1,548. The most common diagnoses at readmission included nutritional/metabolic disorders (10.1%), esophageal disorders (8.1%), electrolyte abnormalities (7.5%), infection/septicemia (7.2%), and gastrointestinal disorders (6.5%). In multivariate analyses, male sex and increasing all procedures diagnostic related group severity score were associated with readmission (odds ratios 1.12 [95% confidence interval, 1.04-1.20] and 1.40 [1.34-1.45], respectively), whereas age was not (p=0.440). **Conclusions:** HNCA surgery readmission is associated with a significant increase in services/skilled care on discharge, mortality and additional total healthcare cost. This national analysis identifies common readmission diagnoses that should be targeted to prevent readmissions after HNCA care while quantifying procedures occurring with readmission.

1:59 **Dean Lierle, MD Resident Research Award (Middle Section)**
Economic Impact of the 2015 ATA Guidelines on Frozen Section for Thyroid Nodules with the Cytological Diagnosis of "Suspicious for Malignancy"
Craig A. Bollig, MD, Columbia, MO; David R. Gilley, BS, Columbia, MO; David W. Lesko, BS, Columbia, MO; Laura M. Dooley, MD, Columbia, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the economic utility of the routine use of intraoperative frozen section in patients with a cytological diagnosis of Bethesda V in the context of the 2015 ATA guidelines.

Objectives: To investigate the economic impact of the 2015 American Thyroid Association (ATA) guidelines on intraoperative frozen section (iFS) in patients with a cytological diagnosis of Bethesda V. **Study Design:** Single institution case series, cost effectiveness analysis. **Methods:** Single institution case series was performed on patients undergoing thyroid surgery at a tertiary care hospital in which iFS was utilized between 2010-2015. Patient demographics, preoperative cytology, frozen pathology and final pathology were reviewed. The test performance of iFS and frequency of indicated completion/total thyroidectomies based on the 2015 ATA guidelines was calculated. A cost effectiveness analysis was then performed comparing lobectomy with iFS versus without iFS and the need for subsequent completion thyroidectomy. Costs were estimated using data from Medicare, the Bureau of Labor Statistics, and the Nationwide Inpatient Sample. Sensitivity analysis and a 1,000 iteration Monte Carlo simulation were used to examine uncertainty in this model.

Results: We identified 65 patients who met inclusion criteria. The malignancy rate was 61% and 45% of malignancies were identified on iFS. The specificity and positive predictive value (PPV) were 100%. The negative predictive value and sensitivity were 83% and 95%, respectively. Completion/total thyroidectomy was indicated in 6/65 patients, and 5/6 of these patients had findings on iFS that would have changed management. Monte Carlo simulation was performed to demonstrate how frequently the iFS strategy was cost effective. **Conclusions:** Information on the cost effectiveness of the routine use of iFS in patients with a cytological diagnosis of Bethesda V undergoing diagnostic lobectomy would be beneficial to surgeons.

2:06 **Q&A**

2:10 - 3:00 **HPV: HOW STATUS AFFECTS MANAGEMENT OF HEAD AND NECK MALIGNANCIES**
Moderator: **Christine G. Gourin, MD FACS, Baltimore, MD**
Panelists: Bruce H. Campbell, MD FACS, Milwaukee, WI
David W. Eisele, MD FACS, Baltimore, MD
Michael L. Hinni, MD FACS, Phoenix, AZ
Marilene B. Wang, MD FACS, Los Angeles, CA

3:00 **Q&A**

3:05 - 3:30 ***Break with Exhibitors/View Posters -*** *Napoleon CD*

1:10 - 3:10 CONCURRENT SESSION 1B
OTOLOGY/NEUROTOLOGY - RHYTHMS BALLROOM

1:10 - 2:05 **POINT/COUNTERPOINT - ENDOSCOPIC EAR SURGERY: FAD OR NEW STANDARD?**
Moderator: **Abraham Jacob, MD, Tucson, AZ**
Panelists: Michael E. Hoffer, MD FACS, Miami, FL
Lawrence R. Lustig, MD FACS, New York, NY
Alejandro Rivas, MD, Nashville, TN

2:05 **Q&A**

Moderator: Quyen T. Nguyen, MD PhD, San Diego, CA

2:10 **The Effect of Superior Canal Dehiscence and Its Repair on Bone Conduction**
Deepa J. Galaiya, MD, Boston, MA; Xiying Guan, PhD, Boston, MA; Y. Song Cheng, MD, Boston, MA; Hideko Heidi Nakajima, MD PhD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate the impact of third window phenomena on bone conduction and describe how using materials of increasing stiffness for SCD repair can improve its impact on bone conduction.

Objectives: The mechanism behind conductive hyperacusis and hypersensitivity to bone conduction at low frequencies is poorly understood in patients with superior canal dehiscence (SCD). This study describes the effects of SCD on intracochlear pressure in human cadaveric temporal bones during air conduction (AC) and bone conduction (BC) and demonstrates that repair of SCD with materials of increasing stiffness can result in more effective reversal of conductive hyperacusis. **Study Design:** Intracochlear pressures in the scala vestibuli (Psv) and scala tympani (Pst) were measured in human cadaveric temporal bones using microfiberoptic pressure sensors. Psv, Pst, differential pressure and stapes velocity evoked by both AC and BC were measured in five experimental stages: normal intact superior canal, SCD, repaired SCD with dental impression material (Jeltrate), repaired SCD with cement, repaired SCD with bone wax. **Methods:** Psv and Pst at the basal turn of 6 fresh human cadaveric temporal bones were measured using pressure sensors cemented to the otic capsule. SCD was simulated by drilling a 1mm opening in the superior semicircular canal. It was repaired using materials with differing degrees of stiffness: Jeltrate, cement and bone wax. Psv, Pst, differential pressure and stapes velocity evoked by both AC through a speaker and BC through a bone anchored hearing aid were measured in the five conditions described above. **Results:** In AC, SCD reduced both Psv and Pst and reduced the cochlear input drive at low frequencies. Patching the dehiscence with Jeltrate reversed this effect. In BC, SCD reduced Psv primarily with a corresponding reduction in cochlear input drive. When reversing the SCD, adding a layer of hard material over the Jeltrate patch improved the reversal of the intracochlear pressures. Bone wax had a variable impact on improving SCD reversal. **Conclusions:** Our results support the hypothesis that SCD mechanically increases cochlear sensitivity to bone conducted sound at low frequencies <600 Hz. It also shows that the stiffness of the material that is used to repair the SCD

impacts the degree to which the bone conduction effects can be reversed. The material stiffness does not seem to have a meaningful impact in reversing air conduction effects.

2:17 **Semicircular Canal Dehiscence among Idiopathic Intracranial Hypertension Patients**

Phoebe Kuo, BA, New Haven, CT; Kenneth A. Bagwell, MD, New Haven, CT; Christopher A. Schutt, MD, New Haven, CT; Gino Mongelluzzo, MD, New Haven, CT; Babar Khokhar, MD MBA, New Haven, CT; John F. Kveton, MD, New Haven, CT

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the association between superior canal dehiscence and intracranial hypertension.

Objectives: The cause of superior canal dehiscence (SSCD) is unknown. Because of a demonstrated association with tegmental defects and obesity, some have suggested idiopathic intracranial hypertension (IIH) could contribute by elevated intracranial pressure eroding the bone over the canal and resulting in SSCD. However, an association between IIH and SSCD has not previously been evaluated. Our objective was to evaluate an association between idiopathic intracranial hypertension (IIH) and SSCD. **Study Design:** Retrospective cohort. **Methods:** A retrospective study was performed of opening pressures for consecutive patients presenting at a lumbar puncture clinic between August 2012 and October 2015. Imaging for patients who also had thin sectioned CT imaging was reviewed for the presence of radiographic SSCD. Association between IIH and SSCD was evaluated using Student's t-test and multivariate logistic regression. **Results:** 121 patients had both a lumbar puncture performed and thin sectioned CT imaging available, of which 24 patients (19.8%) met criteria for IIH with an opening pressure >25 cm H20. The remaining 97 patients (80.2%) did not have elevated opening pressures and served as the control cohort. 0/24 patients with IIH had radiographic SSCD, while 8/97 patients (8.2%) without IIH had radiographic SSCD. The average opening pressure in patients without radiographic SSCD was 20.2 cm H20 compared to 19.3 cm H20 in patients with radiographic SSCD (p=0.521). In multivariate logistic regression controlling for age, BMI, gender, and comorbidities (hypertension, diabetes, hyperlipidemia), opening pressure was not a significant predictor of radiographic SSCD. **Conclusions:** The results of this retrospective pilot study do not suggest an association between IIH and SSCD.

2:24 **Round Window Plugging in the Treatment of Superior Semicircular Canal Dehiscence: A Single Institution Experience**

Eric F. Succar, MD, Danville, PA; Sara Wing, BA, Scranton, PA; Periakaruppan V. Manickam, MD, Danville, PA; Jeffrey Walter, DPT, Danville, PA; Joseph Scott Greene, MD, Danville, PA; William James Azeredo, MD, Danville, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the latest evidence describing the use of round window plugging (RWP) for the treatment of superior semicircular canal dehiscence (SCCD).

Objectives: To describe the use of round window plugging (RWP) for superior semicircular canal dehiscence syndrome (SCCD) at a single institution. To review further recommendations regarding the procedure based on our experience and to compare results with recent reported literature on RWP. **Study Design:** Retrospective case series. **Methods:** Fourteen patients underwent RWP for SCD at our institution from May 2012 through August 2015. Twelve were treated by a single surgeon and two by a second surgeon. All patients underwent the same surgical procedure. Available preoperative and postoperative subjective and objective data was reviewed, including dizziness handicaps score (DHI), audiograms, vestibular evoked myogenic potentials (VEMP), and vestibular exam testing specific for SSCD. **Results:** Fourteen patient charts were reviewed. Eight patients (57%) were males and six patients (43%) were females. Mean age was 57 years (range 32-81). Four of 14 patients (29%) showed both subjective and objective improvement. Five of 14 (36%) showed only subjective improvement. Five of 14 (36%) did not demonstrate any improvement. **Conclusions:** RWP has been described as a less invasive treatment option for patients with SSCD. While the procedure did benefit some of our patients, the outcomes were not predictable. We continue to offer RWP as a treatment option in select patients who wish to avoid or cannot undergo superior semicircular canal resurfacing through a middle cranial fossa approach. In order to further assess the efficacy of RWP, we recommend a standardized preoperative and postoperative assessment.

2:31 **Audiovestibular Symptoms as Predictors of Sports Related Concussion Severity**

Stephen R. Chorney, MD MPH, Syracuse, NY; Brian Nicholas, MD, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the rates of audiovestibular symptoms after sports related concussions and the association between these symptoms and concussion severity.

Objectives: We looked to determine the rates of audiovestibular symptoms following sports related concussions among collegiate athletes. Additionally we correlated these symptoms with concussion severity. **Study Design:** Retrospective analysis of the National Collegiate Athletic Association Injury Surveillance System (NCAA-ISS). **Methods:** The

NCAA-ISS was queried from 2009 through 2014 for 7 men's and 8 women's sports across Divisions 1, 2, and 3. Injuries resulting in concussions were analyzed for audiovestibular symptoms, duration of symptoms, and return to participation times. **Results:** From 2009-2014 there were 1647 recorded sports related concussions, with athletes reporting dizziness (68.2%), imbalance (35.8%), disorientation (31.4%) noise sensitivity (29.9%), and tinnitus (8.5%). Symptoms resolved within 1 day (15.3%), within 1 week (44.9%), within 1 month (23.2%), or persisted over 1 month (6.3%). Return to participation occurred within 1 week (36.8%), within 1 month (51.0%), or over 1 month (8.3%). Using Mann-Whitney U testing symptom duration and return to competition time were significantly increased when any of these symptoms were present ($p<0.05$). When applying multiple ordinal regression modeling, concussion symptoms persisted longer when dizziness ($p=0.043$) and noise sensitivity ($p=0.000$) were present and athletes took longer to return to participation if they complained of imbalance ($p=0.011$) and noise sensitivity ($p=0.000$). **Conclusions:** Select audiovestibular symptoms are common complaints among collegiate athletes sustaining concussions. Dizziness and noise sensitivity correlated with the duration of concussions, while imbalance and noise sensitivity was correlated with prolonged return to competition time.

2:38 **Contemporary Analysis of Otologic Methicillin Resistant Staphylococcus Aureus Infections**

Elliott D. Kozin, MD, Boston, MA; Maria Duarte, BA, Boston, MA; Paulo Bispo, PhD, Boston, MA; Michael S. Gilmore, PhD, Boston, MA; Aaron K. Remenschneider, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, participants will better understand the growing incidence of otologic methicillin resistant staphylococcus aureus infections. They will be able to explain risk factors in specific patient groups and compare clinical course and treatment options for patients with typical pathogens versus MRSA.

Objectives: Otologic methicillin resistant staphylococcus aureus (MRSA) infections have traditionally been infrequently encountered, but given the rise in community acquired MRSA, prevalence rates may be changing. Herein, we aim to understand the prevalence of MRSA in otologic cultures from patients with acute and chronic otitis externa (AOE and COE) and otitis media (AOM and COM). **Study Design:** Retrospective review of an institutional microbiologic database. **Methods:** A retrospective analysis was performed on serial culture isolates taken from the ear at a quaternary care hospital from January 2014 to April 2016. The causative pathogen and antibiotic sensitivity was determined by culture isolation and end point mean inhibitory concentration (MIC) testing. Medical records were reviewed to document chronicity of infection and previous treatments. **Results:** Over the study period, 488 otologic cultures were identified with 201 (48%) growing staphylococcus aureus (SA). Of SA infections, 54 (27%) were MRSA. The average age of MRSA patients was older than patients with methicillin sensitive SA (MSSA) (44.4 ± 24.2 vs 32.3 ± 24.9, $p=0.002$). For pediatric SA cases, 16% grew MRSA. Stratified by diagnosis, 14/170 (8.2%) of AOE were MRSA compared to 2/14 of COE. For OM, 9/81 AOM cases were MRSA versus 23/134 of COM. Patients with MRSA were significantly more likely to have had prior antibiotic exposure than were patients with MSSA (70.4% vs 48.3%, $p=0.008$). **Conclusions:** Contemporary ear culture isolates from patients with otologic infections show significant rates of MRSA compared to historical reports in the literature. Community acquired otologic MRSA is a growing public health concern.

2:45 **Comorbidities Affecting Outcomes of Surgery for Otic Capsule Dehiscence Syndrome: Outlier Analysis**

P. Ashley Wackym, MD, New Brunswick, NJ; Heather T. Mackay-Promitas, PsyD, Portland, OR; David A. Siker, MD, Portland, OR; Dale M. Carter, MD, Portland, OR; Martin S. Gizzi, MD PhD, Portland, OR; Shaban Demirel, PhD, Portland, OR

Educational Objective: At the conclusion of this presentation, the participants should be able to understand how comorbidities can affect outcomes of surgery for otic capsule dehiscence syndrome and the tools to recognize these comorbidities preoperatively.

Objectives: Patients with otic capsule defects and superior semicircular canal dehiscence (SCD) symptoms whose surgical outcomes placed them as outliers were systematically studied to determine comorbidities that were responsible for their poor outcomes. **Study Design:** Prospective patient series in a tertiary referral center. **Methods:** 12 adult patients with clinical SCD spectrum underwent surgical management and had outcomes that were worse than expected. Neuroimaging including diffusion tensor imaging, MRI CSF flow studies, NeuroQuant analysis, MRI with CISS sequences for confirmation of superior canal plugging and fluoroscopic guided lumbar puncture to determine CSF opening pressure was completed. Two neurologists, one specializing in migraine and the other a neuro-ophthalmologist, completed comprehensive evaluations. Neuropsychology test batteries included: the Millon Behavioral Medicine Diagnostic; Patient Health Questionnaire and Generalized Anxiety Disorder Screener; Adverse Childhood Experiences Scale; Pain Catastrophizing Scale; Delis-Kaplan Executive Function System; Wechsler Adult Intelligence Scale; and the Wide Range Assessment of Memory and Learning, including the four domains of verbal memory, visual memory, attention/concentration and working memory. **Results:** There was a high rate psychological comorbidity (n=5); traumatic brain injury was also a confounding element. One patient had elevated CSF pressure requiring ventriculoperitoneal shunting to control the recurrence of dehiscence and one patient with a drug induced Parkinson s-like syndrome. **Conclusions:** The Millon Behavioral Medicine Diagnostic results suggest that components of this instrument would be useful as a screening tool preoperatively to identify psychological comorbidities that could affect outcomes. The identification of these simultaneous psychological

as well as other neurological degenerative disease processes led to alternate clinical management pathways for these patients.

2:52 **Outcomes of Cholesteatoma Surgeries Utilizing Otoendoscopy**
Marlon M. Maducdoc, MD, Irvine, CA; Yaser Ghavami, MD, Irvine, CA; Hossein Mahboubi, MD, Irvine, CA; Harrison W. Lin, MD, Irvine, CA; Hamid R. Djalilian, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the value of otoendoscopy in cholesteatoma surgery.

Objectives: To assess outcomes of cholesteatoma surgeries involving otoendoscopy after uniform utilization of otoendoscopy. **Study Design:** Retrospective study. **Methods:** Cholesteatoma cases performed by a single surgeon from 2006 to 2013 were reviewed. All primary cases that utilized otoendoscopes with at least one year followup were included. Pediatric patients were excluded. Patient demographics, procedure type, and surgical findings were analyzed. Outcomes tracked include residual cholesteatoma after primary surgery, planned second look rates, unplanned second look rates and recurrent cholesteatomas. **Results:** Fifty-seven cholesteatoma cases utilizing otoendscopy were reviewed. Fifty-four patients (62.9% male) with an average age of 47.5 years old were included in the study. Average length of followup was 3.0 years. Three patients had bilateral disease. Out of the 57 cases, 33 (57.9%) residual cholesteatomas were discovered and removed during primary surgery. Overall 11 ears (19.3%) underwent second look surgeries with 9 (81.8%) planned cases and 2 (18.2%) unplanned cases. Forty-six cases (80.7%) had non-echoplanar DWI MRI (HASTE sequence) once a year for 3 years. Recurrent cholesteatomas were present in two second look cases (3.5%). **Conclusions:** Otoendoscopy may play a role in cholesteatoma management by reducing second look rates and recurrent cholesteatoma.

2:59 **Plasmacytoma of the Temporal Bone: Report of 7 Cases and Comprehensive Review of the Literature**
Alex D. Sweeney, MD, Houston, TX; Jacob B. Hunter, MD, Nashville, TN; S. Vincent Rajkumar, MD, Rochester, MN; John I. Lane, MD, Rochester, MN; Dragan Jevremovic, MD PhD, Rochester, MN; Matthew L. Carlson, MD, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the clinical presentation and radiological features of patients with plasmacytoma of the temporal bone versus similar appearing tumors in this location. Additionally, participants should be able to discuss the systemic evaluation and expected outcomes of patients with a plasmacytoma of the temporal bone.

Objectives: To describe the clinical presentation, radiological features, and outcome of patients with plasmacytoma of the temporal bone. **Study Design:** Multicenter retrospective chart review and literature review. **Methods:** Patients diagnosed with plasmacytoma of the temporal bone between 1990 and 2015 were analyzed. Additionally, a comprehensive literature review of previously published cases was performed. **Results:** A total of 7 patients (average age 57.3 years, 57% female) met inclusion criteria. 43% had a known history of multiple myeloma (MM). The common symptoms at presentation included otalgia, headache and vertigo (43%, each). Five patients (71%) presented with a vascular appearing middle ear mass visible on otoscopy. Four of these patients did not have an established history of multiple myeloma (MM) and were referred with presumptive diagnoses of paraganglioma or endolymphatic sac tumor. The average maximum tumor diameter was 3.7cm (median 3.5cm, range 0.9 - 6.6cm) and the most common temporal bone subsites involved were the middle ear and the mastoid (71% each). MM was ultimately diagnosed in 6 cases (86%). In addition to the new cases presented herein, 18 previously published reports were analyzed. In the 25 aggregate cases, 44% of cases were associated with MM, and the mastoid (72%) and middle ear (53%) were the most commonly involved temporal bone subsites. **Conclusions:** Plasmacytoma of the temporal bone is rare, and the clinical presentation can closely mimic that of other temporal bone tumors. It is imperative to have a high index of suspicion for temporal bone plasmacytoma, even when radiological features suggest an alternate diagnosis.

3:06 **Q&A**

3:10 - 3:30 ***Break with Exhibitors/View Posters -*** *Napoleon CD*

3:30 - 5:20 CONCURRENT SESSION 2A
RHINOLOGY/ALLERGY - NAPOLEON AB

Moderator: Pete S. Batra, MD FACS, Chicago, IL

3:30 **Characterization of Primary Rat Nasal Epithelial Cultures in CFTR Knockout Rats as a Model for CF Sinus Disease**

Kiranya E. Tipirneni, MD, Birmingham, AL; Daniel F. Skinner, BS, Birmingham, AL; Shaoyan Zhang, PhD, Birmingham, AL; Do-Yeon Y. Cho, MD, Birmingham, AL; Bradford A. Woodworth, MD, Birmingham, AL

Educational Objective: At the conclusion of this presentation, the participants should be able to better comprehend the clinical implications and pathogenesis of CF related sinus disease in novel CFTR knockout rats.

Objectives: The objectives of the current experiments were to develop and characterize primary rat nasal epithelial (RNE) cultures and evaluate their usefulness as a model of sinonasal transepithelial transport and CFTR function. **Study Design:** Laboratory in vitro and animal studies. **Methods:** CFTR-/- and CFTR+/+ rat nasal septal epithelia (RNSE) were cultured on semipermeable supports at an air liquid interface to confluence and full differentiation. Parameters of mucociliary clearance were evaluated with micro-optical coherence tomography (μOCT). Monolayers were mounted in Ussing chambers for pharmacologic manipulation of ion transport and compared to similar filters containing murine (MNSE) and human sinonasal (HSNE) epithelia. Histologic analyses of nasal septa and cultured RNE monolayers were performed. **Results:** Forskolin stimulated anion transport (-Isc in μA/cm2) was significantly greater in epithelia derived from the WT when compared to CFTR-/- animals (108.9+/-2.1 vs. 10.5+/-0.9, p<0.0001). Amiloride sensitive ISC was equivalent (-47.9+/-1.0 vs. -46.1+/-2.3). No inhibition of CFTR mediated Cl- secretion was exhibited in CFTR-/- epithelia with the addition of the specific CFTR inhibitor INH-172. However, calcium activated Cl- secretion (UTP) was significantly increased in CFTR-/- RNE (WT - 21.5+/-0.9 vs. CFTR-/- - 106.8+/-1.6; p<0.001). All responses were significantly larger in RNSE when compared to CFTR+/+ and CFTR-/- (or F508del/F508del) murine and human cells (p<0.05). ASL depth by μOCT in CFTR+/+ and CFTR-/- rat nasal septa was 9.93+/-0.87μm vs. 5.18+/-0.34 μm, respectively (p<0.001). **Conclusions:** The successful development of the CFTR-/- rat will enable improved evaluation of CF sinus disease based on characteristic abnormalities of ion transport and mucociliary clearance defects.

3:37 **Socioeconomic and Racial/Ethnic Disparities in Allergic Rhinitis**

Paul Zhang, MD MPH, Los Angeles, CA; Kevin Hur, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) determine the prevalence of allergic rhinitis (AR) in adults in the United States across racial, ethnic, and socioeconomic categories, and 2) identify healthcare disparities among those with AR.

Objectives: To describe the epidemiology of allergic rhinitis (AR) in the Unites States as it relates to racial/ethnic and socioeconomic factors. **Study Design:** Cross-sectional population level study. **Methods:** Data extracted from the 2014 Centers for Disease Control and Prevention Integrated Health Interview Series (IHIS), an annual cross-sectional household survey, were used to identify the prevalence of those with allergic rhinitis in racial/ethnic subpopulations and association with socioeconomic status and healthcare utilization. **Results:** The total weighted sample size was 313.090,247. Overall, 7.9% of respondents reported having AR. Respondents with AR compared to the population without AR were more likely to be white, have higher socioeconomic status (SES), and private health insurance. In comparative analysis, those with AR who identified as Black or American Indian/Native American were more likely to report a history of asthma, to be uninsured, unable to afford medication, and experience delay in receiving medical care due to cost. Those with AR who identified as Hispanic were also more likely to be uninsured, unable to afford medication, and experience delay in receiving medical care due to cost. **Conclusions:** Allergic rhinitis is prevalent across all racial/ethnic groups in the United States. Despite existing evidence that those with AR tend to come from higher SES and have increased access to healthcare among the general population, subgroup analyses suggest that Black, American Indian/Native American, and Hispanic populations with AR tend to have lower SES and decreased access to healthcare. Initiatives targeting these health disparities should be developed.

3:44 **Sinus Procedure Trends in the Medicare Population from 2000-2014: A Recent Explosion of Balloon Sinuplasty Procedures**

Nathaniel E. Calixto, BA, Irvine, CA; Twyla Gregg-Jaymes, BS, Washington, DC; Jonathan Liang, MD, Oakland, CA; Nancy Jiang, MD, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the practice patterns of endoscopic sinus surgery, as well as balloon sinuplasty between 2000-2014. The participant should be able to describe the increase in balloon sinuplasty procedures over the past few years in conjunction with the decrease

in non-balloon cases. The participant should also be able to describe the type of providers performing balloon sinuplasty, as well as the places in the United States where this is done most frequently.

Objectives: To describe sinus procedure trends from 2000-2014, particularly following the introduction of balloon sinuplasty CPT codes in 2011. **Study Design:** Retrospective review of Medicare data available to the public. **Methods:** Procedure and beneficiary data from 2000-2014 and provider data from 2012-2014 were obtained online from the Center for Medicare and Medicaid Services. Sinus CPT codes were classified as balloon sinus procedures (BSP) or non-balloon sinus procedures (nBSP). Providers billing for sinus procedures were categorized as BSP only, nBSP only, or both. For comparison, data on septoplasty and thyroid lobectomy procedures from 2000-2014 were obtained. **Results:** From 2000-2014, the total number of sinus procedures per 10,000 beneficiaries (PP10K) nationwide increased by 3.7% annually; from 2011-2014, nBSP PP10K decreased by 3.1% annually and BSP PP10K increased annually by 59%. Septoplasty and lobectomy PP10K changed by <1% annually between 2000-2014. States with the highest BSP PP10K from 2012-2014 were Kansas, Texas, and Louisiana. Providers performing sinus procedures increased by 30.9% from 2012-2014. There was a 244% increase in BSP only providers, a 0.7% increase in nBSP only providers, and an 83.3% increase in providers using both; septoplasty and lobectomy providers increased by 4.1% and 8.1% respectively. **Conclusions:** While the number of sinus and other otolaryngology procedures increased from 2000-2014, the number of BSP increased at a substantially greater rate since the introduction of CPT codes for these procedures in 2011. Nationwide increases in sinus providers were driven by new providers performing balloon guided procedures.

3:51 **How Often Is Sinus Surgery Performed for Nasal Polyps versus Chronic Rhinosinusitis?**
Elisabeth H. Ference, MD MPH, Los Angeles, CA; Jeffrey D. Suh, MD, Los Angeles, CA; Bruce K. Tan, MD MS, Chicago, IL; Stephani S. Smith, MD MS, Chicago, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the rates of surgery for CRS with and without nasal polyps and how resource utilization differs depending on the disease.

Objectives: To determine the number of endoscopic sinus surgeries (ESS) occurring for chronic rhinosinusitis with (CRSwNP) or without (CRSsNP) nasal polyposis. **Study Design:** Cases identified by CPT codes as either balloon or traditional ESS were extracted from the State Ambulatory Surgery Databases 2009-2011 for California, Florida, Maryland and New York. **Methods:** Patient demographics, extent of surgery, mean charge and OR time were compared. **Results:** 97,228 ESS were performed in the four states over a 3 year period. 29.3% of surgeries were for patients with CRSwNP (ICD-9 471.X), 66.0% of cases for CRSsNP (ICD 473.X), and 4.8% for other indications. Patients with CRSwNP had more sinuses opened, and were more likely to have surgeries with image guidance and in a hospital based rather than a free-standing surgery center ($p<0.0001$ for all). Patients with CRSwNP were less likely to have a balloon procedure compared to patients with CRSsNP ($p<0.0001$). There were no significant differences in the rates of middle turbinate resection. The percentage of surgeries for CRSwNP varied across state, with California having the highest at 34.6% and Maryland the lowest at 26.4% ($p<0.0001$). There was no significant difference in charges, but patients with CRSwNP had significantly longer OR times (average 9 minutes for ESS of maxillary and anterior ethmoids, 14 minutes for ESS involving all four sinuses, $p<0.0001$ for both) compared to those with CRSsNP. **Conclusions:** Almost 30% of all ESS were performed for patients with polyps, and these cases on average are more extensive and utilize greater resources than those for patients without polyps.

3:58 **Impact of Liver Disease on Outcomes of Patients Hospitalized for Epistaxis**
Andrey Filimonov, PharmD, Newark, NJ; Michael J. Sylvester, AB, Newark, NJ; Omar M. Mohamed, BA, Newark, NJ; Michael Zaki, MD, Newark, NJ; Soly Baredes, MD FACS, Newark, NJ; Jean Anderson Eloy, MD FACS, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the implications of liver disease on morbidity and mortality associated with epistaxis.

Objectives: Liver disease (LD) often results in coagulation abnormalities that may predispose to more severe epistaxis. The purpose of this analysis was to examine characteristics of patients hospitalized for epistaxis with LD and explore the impact of LD on patient outcomes. **Study Design:** Retrospective analysis of National Inpatient Sample (NIS) database. **Methods:** The 2002-2013 NIS was queried for cases of epistaxis. Cases with additional codes meeting Agency for Healthcare Research and Quality's definition of LD were identified and compared to the non-LD cohort. **Results:** Out of 39,879 cases meeting inclusion criteria 3.6% had LD. LD was associated with younger age (55.7 years vs. 67.5 years; $P<0.001$), longer hospital stay (3.9 days vs. 3.2 days; $P<0.001$), and greater hospital charges ($26,141 vs. $18,200; $P<0.001$), compared to the non-LD cohort. LD patients had higher rates of alcohol abuse, coagulopathy, chronic blood loss anemia, obesity, and renal failure. LD patients also had higher rates of sepsis, urinary/renal complications, respiratory failure, and infectious pneumonia. LD was associated with decreased rates of ligation (4.2% vs. 5.9%; $P=0.010$), embolization, cauterization, and posterior packing. In our multivariate logistic regression model correcting for age, gender, and race, LD was associated with 2.369 (2.117 - 2.651; $P<0.001$) greater odds of transfusion and 3.195 (2.049 - 4.981; $P<0.001$) greater odds of in-hospital mortality. **Conclusions:** Among patients hospitalized for epistaxis, LD resulted in greater morbidity and mortality. Clinicians should be aware of the particular risk that LD bears on the hospitalized epistaxis

patient. Future research may reveal whether increased utilization of arterial ligation improves patient outcomes.

4:05 **Socioeconomic Status Associated with Nasal Packing for Management of Epistaxis in United States Emergency Departments**

Rosh K.V. Sethi, MD MPH, Boston, MA; Elliott D. Kozin, MD, Boston, MA; Nicholas B. Abt, MD, Boston, MA; Regan Bergmark, MD, Boston, MA; Stacey T. Gray, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to characterize national trends in epistaxis presentation and management in United States emergency departments and describe key predictors of nasal packing use.

Objectives: There is limited data on epistaxis presentation and management patterns in United States emergency departments (ED). We aim to characterize patients who present to the ED with epistaxis and identify factors associated with nasal packing use. **Study Design:** Retrospective review of Nationwide Emergency Department Sample (NEDS) from 2009 to 2011. **Methods:** NEDS was queried for patient visits with a primary diagnosis of epistaxis (ICD9 code 784.7). Patient demographics, comorbidities and hospital characteristics were obtained. Predictors of nasal packing were determined by multivariable logistic regression. **Results:** There were 1,234,267 ED visits for epistaxis. The highest proportion of patients was seen in the winter (37.2%) at non-trauma hospitals (76.9%) and was discharged home (95.5%). Fifteen percent of patients were on long term anticoagulation, 33% had hypertension and 0.9% had a coagulopathy. Nasal packing was utilized in 243,268 patients (19.7%). Predictors strongly associated with nasal packing included lower socioeconomic quartile (odds ratio [OR] 1.30, 95% confidence interval [CI]=1.10-1.53), hospital located in geographic south (OR 1.62, CI=1.12-2.34), non-trauma hospital (OR 1.56, CI=1.19-2.05). Other factors included long term anticoagulation (OR 1.21, CI=1.10-1.33), winter season (OR 1.20, CI=1.12-1.23), male gender (OR 1.14, CI=1.10-1.17), and older age (OR 1.01, CI=1.01-1.02). Mean ED charge was greater for patients who were packed ($1,473 vs. $1,048, p<0.0001). **Conclusions:** Several factors, including lower socioeconomic status, geographic location and non-trauma hospital designation, predict use of nasal packing. These results raise concerns about potential treatment disparities that may result in increased patient morbidity and costs.

4:12 **Vice President's Resident Research Award (Western Section)**
Objective and Subjective Sinonasal and Pulmonary Outcomes in Aspirin Desensitization Therapy: A Prospective Cohort Study

Timothy J. Cooper, MD, Edmonton, AB Canada; Samuel R. Greig, MD FRACS, Edmonton, AB Canada; Robert P. Seemann, MD FRCSC, Edmonton, AB Canada; Erin D. Wright, MDCM Med FRCSC, Edmonton, AB Canada; Harissios Vliagoftis, MD, Edmonton, AB Canada; David W.J. Côté, MD MPH CCFP FRCSC, Edmonton, AB Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the effect of aspirin desensitization on objective and subjective sinonasal and pulmonary outcomes.

Objectives: To examine objective and validated, disease specific subjective sinonasal and pulmonary outcome measures to determine the efficacy of aspirin (ASA) desensitization therapy in Samter's triad patients. **Study Design:** Prospective cohort study in an academic tertiary center. **Methods:** Samter's triad patients with a history of chronic rhinosinusitis with nasal polyposis (CRSwNP), prior diagnosis of asthma, and history of a sensitivity reaction to ASA were eligible for inclusion. Patients underwent ASA desensitization using an established institutional protocol and continued with a maintenance dose of 650mg twice daily. Baseline Sinonasal Outcomes Test (SNOT-22) and Asthma Control Questionnaire (ACQ) responses, as well as acoustic rhinometry, peak flow readings, and endoscopic scoring of nasal polyps were recorded prior to desensitization and after 6 months of maintenance therapy. **Results:** Twelve patients were recruited for participation and underwent desensitization. Eight patients continued maintenance therapy and followup at 6 months. At baseline, patients reported bothersome sinonasal symptoms with a median SNOT-22 score of 32 ± 40 (interquartile range (IQR)). There was significant improvement after 6 months of maintenance therapy to a median SNOT-22 score of 20 ± 15 (p=0.043, Wilcoxon signed rank test). Acoustic rhinometry, endoscopic scores, ACQ and forced expiratory volume values remained stable at 6 months. **Conclusions:** Samter's triad patients may benefit from ASA desensitization with subjective sinonasal symptom improvement at 6 months and stable asthma and objective sinonasal measures. Further discussion is needed in the otolaryngology community regarding the place of ASA desensitization in the management of CRSwNP in Samter's patients.

4:19 **Q&A**

4:25 - 5:10 **SKULL BASE RECONSTRUCTION - OPTIONS AND PRINCIPLES**
Moderator: **Bert W. O'Malley Jr., MD FACS, Philadelphia, PA**
Panelists: Alexander G. Chiu, MD, Kansas City, KS
Samuel C. Levine, MD, Minneapolis, MN
Bradford A. Woodworth, MD, Birmingham, AL
Adam M. Zanation, MD, Chapel Hill, NC

5:10 **Q&A**

5:20 **ADJOURN SESSION**

5:30 - 7:00 **VICE PRESIDENT'S WELCOME RECEPTION (for all attendees) -** *Armstrong Ballroom*

3:30 - 5:20 CONCURRENT SESSION 2B
LARYNGOLOGY/BRONCHOESOPHAGOLOGY - RHYTHMS BALLROOM

3:30 - 4:20 **UNILATERAL VOCAL FOLD PARALYSIS: WHAT, WHEN, HOW AND WHY**
Moderator: **Michael S. Benninger, MD FACS, Cleveland, OH**
Panelists: Karen M. Kost, MD, Montreal, QC
Albert L. Merati, MD FACS, Seattle, WA
Robert T. Sataloff, MD DMA FACS, Philadelphia, PA

4:20 **Q&A**

Moderator: Donald T. Donovan, MD FACS, Houston, TX

4:25 **Selective Recurrent Laryngeal Nerve Stimulation Using a Penetrating Electrode Array in the Feline Model**
Yarah M. Haidar, MD, Irvine, CA; Ronald Sahyouni, BS, Irvine, CA; Omid Moshtaghi, BS, Irvine, CA; Hamid R. Djalilian, MD, Irvine, CA; Sunil Verma, MD, Irvine, CA; Harrison W. Lin, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the ability of an interneural penetrating electrode array to selectively stimulate restricted fiber populations within the RLN and selectively elicit contractions of discrete laryngeal muscles in the larynx in the feline model.

Objectives: Laryngeal muscles are controlled by the recurrent laryngeal nerve (RLN), injury of which can result in vocal fold paralysis (VFP). We aim to demonstrate selective stimulation of laryngeal muscles with graded muscle contraction responses and introduce a potential bioelectric approach to laryngeal rehabilitation. **Study Design:** Acute experiments in cats. **Methods:** The study included four anesthetized cats. Three laryngeal muscles [thyroarytenoid, posterior cricoarytenoid (PCA), and cricothyroid muscles] were monitored with a standard electromyographic (EMG) nerve monitoring system with needle electrodes. The RLN was exposed in the tracheoesophageal groove, and a 4 or 16 channel penetrating microelectrode array was placed into the nerve. Electrical current pulses were delivered to each stimulating electrode individually. Elicited EMG voltage outputs were recorded for each muscle. Direct videolaryngoscopy was performed for visualization of vocal fold movement in one cat. **Results:** Stimulation through individual channels led to selective activation of restricted nerve populations, leading to selective contraction of individual laryngeal muscles. Increasing current levels resulted in rising EMG voltage responses. Typically, activation of individual muscles, including the PCA, was successfully achieved via single placement of the multi-electrode array by selection of appropriate stimulation channels. Vocal fold abduction was predominantly observed on direct laryngoscopy with electrode stimulation. **Conclusions:** We demonstrated the ability of a penetrating electrode array to selectively stimulate restricted fiber populations within the RLN and selectively elicit contractions of discrete laryngeal muscles in the cat larynx. These results may suggest a potential role for intraneural microelectrode implantation in the management of VFP.

4:32 **Nerve Transection Repair Using Chitosan Biopolymer in a Rat Model**
Neel K. Bhatt, MD, St. Louis, MO; Taleef R. Khan, BA, St. Louis, MO; Christopher Mejias, BA, St. Louis, MO; Randal C. Paniello, MD PhD, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the problems with using microsuture to repair transected nerves. The participants should also be able to discuss the potential advantages of using chitosan biopolymer.

Objectives: Cranial nerve transection during head and neck surgery is conventionally repaired with microsuture. Previous studies have demonstrated recovery with laser nerve welding (LNW), a novel alternative to microsuture. LNW has been reported to have poor tensile strength, however. Chitosan, an adhesive biopolymer, may promote nerve recovery while enhancing the tensile strength of the repair. Using a rat posterior tibial nerve injury model, we compared four different methods of nerve repair in this pilot study. **Study Design:** Animal study. **Methods:** Animals underwent unilateral posterior tibial nerve transection. The injury was repaired by KTP laser alone (n=20), KTP + chitosan (n=12), microsuture + chitosan (n=12), and chitosan alone (n=14). Weekly walking tracks were conducted to measure functional recovery (FR). Tensile strength (TS) was measured at 6 weeks. **Results:** At 6 weeks KTP laser alone had the best recovery (FR=93.5%±8.3%). Microsuture + chitosan, KTP + chitosan, and chitosan alone all showed good FR (87.4±13.5%, 84.6±13.0%, and 84.1±10.0%, respectively). One way ANOVA was performed (F(3,56)=2.6, p=0.061). A tensile strength threshold of 3.8 N was selected as a control mean recovery. Three groups -- KTP alone, KTP + chitosan, and microsuture + chitosan -- were found to exceed control threshold in 60% (95% CI 17.06-102.94%), 70% (95% CI 41.6-98.4%) and 100% of cases, respectively. **Conclusions:** In the posterior tibial nerve model, all repair methods promoted nerve recovery. LNW with chitosan as a biopolymer anchor provided good tensile strength and appears to be a novel alternative to microsuture. This sutureless repair may have utility following cranial nerve injury during head and neck surgery.

4:39 **Multidose Botox for Intralaryngeal Injection: A Cost Analysis**

Mark R. Gilbert, MD, Pittsburgh, PA; Jackie L. Gartner-Schmidt, PhD, Pittsburgh, PA; VyVy N. Young, MD, Pittsburgh, PA; Libby J. Smith, DO, Pittsburgh, PA; Clark A. Rosen, MD, Pittsburgh, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the costs of botulinum toxin administration and the advantages of multidose Botox compared to single use.

Objectives: Botox injection is the mainstay treatment for laryngeal dystonias, including spasmodic dysphonia. Botox labeling states that reconstituted toxin should be used within four hours on a single patient despite several studies that have demonstrated multidose Botox to be safe and effective. Many insurance carriers mandate the use of an outside pharmacy which requires a single use approach. This study compares the cost savings of multidose Botox for laryngeal dystonia compared to single use. **Study Design:** Retrospective review and projected cost savings analysis. **Methods:** Medical records and billing information were reviewed for patients receiving Botox for intralaryngeal injection at a single laryngology division in 2015. Inclusion criteria included CPT 64617 or J0585; exclusion criteria were CPT 64616. **Results:** 142 patients were seen for intralaryngeal Botox injection at 337 visits over one year. The average Botox dose per visit was 2.86 units with an average of 3.06 procedure visits per year. The average wholesale price for a Botox 100 unit vial is $670 ($2050 per patient per year). If billed instead for $7/unit with 5 units wastage charge per visit, the yearly per patient charge is $166. The potential cost savings for multidose Botox is tenfold compared to single use Botox administration. When estimated for yearly prevalence of spasmodic dysphonia, the national cost savings from per unit billing would be almost 100 million dollars annually. **Conclusions:** Multidose Botox application utilizing per unit billing is significantly less expensive than per single use vial billing and would save the healthcare system significant money without any sacrifice in safety or effectiveness.

4:46 **Botulinum Toxin in Management of Synkinesis in Patients with Unilateral and Bilateral Vocal Fold Paralysis**

Sean M. Lewis, MD, New York, NY; Peak Woo, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand that synkinetic reinnervation may occur in the setting of unilateral and bilateral vocal fold paralysis. Participants will be able to demonstrate that botulinum toxin may be used in the treatment of patients that have exertional stridor or have a tracheostomy for unilateral or bilateral paralysis and prevent the need for further and permanent surgical treatment or for prolonged tracheostomy placement.

Objectives: Describe a novel use of botulinum toxin (Botox) for treatment of synkinetic reinnervation of unilateral or bilateral vocal fold paralysis. **Study Design:** Retrospective case series with chart review. **Methods:** 12 consecutive patients (2008-2015) have received BOTOX injection after UVCP or BVCP. 10 were identified by laryngeal electromyography (LEMG) to have synkinesis defined as activation in the thyroarytenoid muscle (TA) during the inspiratory cycle. Botox was injected into patients' thyroarytenoid muscle using LEMG. Patients were followed serially and offered surgical treatment if patients had continued exertional stridor. **Results:** Botox was used in 3 patients with UVCP. All had exertional stridor. 2 patients were confirmed on LEMG to have biphasic LEMG activity with phonation and respiration. Repeated Botox injections, (mean=6, total 18) have been requested by all 3 patients to relieve exertional stridor. 9 patients had BVCP with TA LEMG activity during respiration demonstrated in 8. Botox was used to improve the respiratory airway before definitive myectomy or to facilitate decannulation. 2/3 patients that had tracheostomy were decannulated. 2/8 patients did not receive adequate improvement and underwent further surgical procedures. 6/8 patients have had repeated injections (mean=5.33, total=48). **Conclusions:** Paradoxical closure or isometric closure of the vocal folds on deep inspiration can cause stridor and airway obstruction after UVCP and BVCP. It is rarely observed by flexible laryngoscopy. LEMG helps to document synkinesis of the TA muscle and its activation during inspiration. Botox injection is a valuable adjunct in both diagnostic and management of suspected laryngeal synkinesis after UVCP or BVCP.

4:53 **Making the Transition: Testosterone, Thyroplasty, Voice Therapy? A Systematic Review of Outcomes for the Female to Male Transgendered Voice**

Brian A. Nuyen, MD, Stanford, CA; Alexis F. Lopez, MD MPH, New York, NY; Christopher G. Tang, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to summarize the published vocal outcomes of medical, surgical, and behavioral techniques to transition the female to male (FtM) transgendered voice as well as specify existing gaps in the literature on these treatments.

Objectives: To appraise the vocal outcomes of techniques to transition the female to male (FtM) transgendered voice, and to critique the methodological quality of the existing data. **Study Design:** A systematic review with a methodological index for nonrandomized studies (MINORS) criteria analysis. **Methods:** A Medline and Scopus search was performed for English language, primary research articles that featured hormonal, surgical, and/or behavioral therapy to lower pitch for FtM patients. Studies were excluded if they lacked outcomes measured by quantitative acoustical evaluation. Three independent reviewers assessed search results, prospectively extracted data from final screened studies, and critiqued methodological quality. **Results:** The search terms yielded 278 articles, of which four non-duplicated longitudinal and three cross-sectional studies met eligibility/screening criteria and included 113 FtM patients. The majority (96%) of patients applied testosterone for vocal transition, while one exclusively used speech therapy, and 12 utilized both. Most patients showed quantitative declines in fundamental frequency over time and/or post-transition voices that satisfied male self-perception and/or independent listeners' gendered assessment. No quantitative vocal outcomes for laryngeal surgery were encountered in the systematic search. No studies were randomized or comparative in type of transition technique. Only one study was controlled. The modal MINORS score for studies was 11 (range 9-13) out of 16. **Conclusions:** This systematic review demonstrates the association of hormonal therapy in FtM vocal transition with pitch lowering outcomes. Studies comparing vocal gender transition technique and studies that document quantitative outcomes for pitch lowering surgery are lacking. Increasingly, there is a call for speech therapy to reduce vocal handicap and enhance masculine presentation for FtMs.

5:00 **Outcomes in Bilateral Vocal Fold Immobility**

Shekhar K. Gadkaree, MD, Boston, MA; Alexander H. Gelbard, MD, Nashville, TN; Simon R. Best, MD, Baltimore, MD; Lee M. Akst, MD, Baltimore, MD; Martin B. Brodsky, PhD, Baltimore, MD; Alexander T. Hillel, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to identify predictive risk factors that may influence tracheostomy free survival and procedure interval in BLVFI (bilateral vocal fold immobility), explain the role of smoking on glottic stenosis, compare glottic stenosis with bilateral vocal fold paralysis, and evaluate the efficacy of surgical techniques for managing BLVFI.

Objectives: This study aims to identify factors that influence tracheostomy free survival and procedure interval and to evaluate efficacy of surgical interventions in achieving decannulation in BLVFI (bilateral vocal fold immobility). **Study Design:** Retrospective cohort analysis. **Methods:** Review of adult patients with glottic stenosis or BLVFP (bilateral vocal fold paralysis) was performed between 2004-2015. Multiple logistic regression analysis was performed to determine factors associated with tracheostomy dependence and time to second procedure. Decannulation rates were examined following disparate surgical treatments. **Results:** Participants in the glottic stenosis cohort had significantly increased procedures per year when compared with the BLVFP cohort (3.1 ± 5.1 vs. 0.8 ± 1.4, p=0.045). Intubation was the most common cause of glottic stenosis (91%), while surgical nerve injury was the most common cause of BLVFP (86%) (p<0.001). Smoking was negatively associated with tracheostomy free survival at last followup (OR=0.24 [0.07-0.82], p=0.023) Overall, there was a 38% decannulation rate, 41% in the PGS cohort and 29% in BLVFP. In patients who had an operative attempt to be decannulated, there was a 62% overall decannulation rate (61% in the PGS cohort and 67% in BLVFP). **Conclusions:** Assessment of procedural outcomes demonstrates that BLVFI patients with a tracheostomy were unlikely to be decannulated without surgical intervention and that rates of decannulation increased with more invasive surgical procedures. Tobacco use was associated with more severe outcomes for glottic stenosis, and patients should be counseled that smoking increases risk of tracheostomy dependence and the need for future procedures.

5:07 **When Is Surgery Used to Treat Polypoid Corditis in Active Smokers?**

Tirth R. Patel, BS, Columbus, OH; Laura Matrka, MD, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to describe characteristics associated with surgical treatment in patients with polypoid corditis.

Objectives: Polypoid corditis is a condition nearly exclusive to smokers in which the superficial lamina propria of the vocal fold is remodeled and enlarged in response to irritant exposure. Recurrence rate after surgery is high in active smokers, but surgery is sometimes required nonetheless. It is currently unclear which factors lead to surgery in active smokers; this study aims to identify them. **Study Design:** Retrospective chart review. **Methods:** Medical records of 103

patients diagnosed with polypoid corditis were reviewed. Data was collected regarding demographics, medical and smoking history, presence of leukoplakia, and presence of a dominant unilateral lesion. Still images were graded for severity of polypoid corditis by a panel of voice clinic providers. **Results:** Fifteen percent of patients (15/103) were offered surgery. Higher polypoid corditis grade (p<.01), presence of leukoplakia (p=.04), and presence of a dominant unilateral lesion (p<.01), even with a low polypoid corditis grade (p=.04), were associated with increased likelihood of receiving surgery. Patient age (p=.67), sex (p=.29), race (p=.77), smoking status (p=.45), and pack-year history (p=.78) were not associated with likelihood of receiving surgery. Fifteen percent of active smokers (12/80) in this study were offered surgery. Of active smokers, those who received surgery were more likely to have higher polypoid corditis grade (p<.01) and a dominant unilateral lesion (p<.01) than nonsurgical patients. **Conclusions:** Patients with more severe polypoid corditis or a dominant unilateral lesion more often receive surgery, even in active smokers. It is unknown whether respiratory concerns or traditional laryngology teaching regarding unilateral polyps as a surgical condition underlie this association.

5:14 **Q&A**

5:20 **ADJOURN SESSION**

5:30 - 7:00 **VICE PRESIDENT'S WELCOME RECEPTION (for all attendees) -** *Armstrong Ballroom*

Thursday

FRIDAY, JANUARY 20

7:00 - 7:50 **Business Meetings (Triological Fellows Only)**
Southern Section - Borgne (3rd floor)
Western Section - Maurepas (3rd floor)

7:30 **Attendee Breakfast with Exhibitors -** *Napoleon CD*

8:00 - 10:05 CONCURRENT SESSION 3A
FACIAL PLASTIC/RECONSTRUCTIVE SURGERY - NAPOLEON AB

8:00 **Announcements by Vice Presidents**

Moderator: Stephen S. Park, MD, Charlottesville, VA

8:05 **Polydioxan (PDS) Plate Grafts Are Safe and Effective in Functional Septorhinoplasty**
Jennifer C. Fuller, MD, Boston, MA; Patricia A. Levesque, BS, Boston, MA; Robin W. Lindsay, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain when PDS plates are useful in functional septorhinoplasty and discuss the clinical outcomes of PDS use.

Objectives: To evaluate the safety and efficacy of polydioxan (PDS) plate grafts in functional septorhinoplasty. **Study Design:** Retrospective analysis of a prospective cohort. **Methods:** Patients who underwent functional septorhinoplasty for nasal obstruction between January 2013 and December 2015 were administered the Nasal Obstruction Symptom Evaluation (NOSE) scale pre and postoperatively. Patients who had PDS plate grafts used during their surgery were identified. This cohort's demographics, reason for PDS use, and outcomes were analyzed. **Results:** 81 patients (40 males, 41 females) with an average age (SD) of 34.3 (15.6) years underwent open functional septorhinoplasty with PDS plates. 52 patients (64%) had a history of a nasal fracture and 30 (37%) had undergone prior septoplasty or septorhinoplasty. Of the 16 (19.7%) patients who had no history of septoplasty or nasal fracture, all were noted intraoperatively to have either fractured septal cartilage, poor quality septal cartilage, or severe c-shaped deformities of the dorsal septum and/or caudal septum. There was one complication (1.23%), a septal abscess. 52 patients completed both pre and postoperative NOSE score evaluations. The average preoperative NOSE score (SD) of 65.7 (23.6) decreased to 21.3 (22.8) at an average of 6.5 months (range 2-24 months) postoperatively, a clinically and statistically significant ($p<0.0001$) improvement. **Conclusions:** The use of PDS plate grafts is a safe and effective alternative in functional septorhinoplasty for patients with fractured, inadequate, or poor quality septal cartilage. The use of PDS plate may also decrease the need for rib grafting in patients with a c-shaped septal deformity and a history of previous septoplasty.

8:12 **Repurposing of Vascular Pedicles in Secondary Reconstructive Surgery in the Vessel Depleted Neck**
Kimberly J. Atiyeh, MD, New York, NY; Zahrah M. Taufique, MD MBA, New York, NY; Jamie P. Levine, MD, New York, NY; Adam S. Jacobson, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role of accessing, harvesting, and using previously utilized recipient vessels and pedicles from prior flap reconstructions in a vessel depleted neck.

Objectives: Head and neck patients commonly require multiple reconstructive surgeries, whether for functional, aesthetic, or oncologic purposes. This presents a challenge in regards to adequacy of recipient vessels, due to fibrosis, prior sacrifice or use, extensive radiation changes to the vessels, and/or atherosclerotic disease. We present a scantly described technique in which the pedicle of prior reconstructive tissue is reused as a recipient vessel for subsequent flaps. **Study Design:** Retrospective case series and review of the literature. **Methods:** The surgical technique of 10 patients is described. Intraoperatively, the commonly utilized native recipient vessels are harvested. If these vessels are deemed inadequate, the vascular pedicle of prior reconstructive tissue is explored. Viability of the prior flap is ensured by temporarily occluding the arterial pedicle for several minutes and observing the color and bleeding of the tissue it supplies. The pedicle is then ligated and routine techniques are employed to anastomose the new flap to the reused vasculature. **Results:** Patients underwent routine postoperative care and followup with the primary microsurgeon. No partial or complete flap failures of either primary or subsequent flaps have been encountered with a median

followup of 38 months. No revision surgery was required. Representative operative photographs are included. **Conclusions:** While algorithms exist for managing the vessel depleted neck, there is scant literature about the use of a prior pedicle. We demonstrate the validity of this technique as a backup for patients who have undergone several head and neck reconstructions and/or external beam radiation. This technique conveys the additional benefit of a generally favorable location without need for an interposition graft. It should be considered part of an armamentarium of techniques in treatment of complex head and neck patients.

8:19 **Characterization of Postoperative Changes in Nasal Airflow Following Butterfly versus Spreader Grafts Using a Cadaveric Computational Fluid Dynamics Model**

Bryan M. Brandon, MD, Chapel Hill, NC; Saikat Basu, PhD, Chapel Hill, NC; Grace K. Austin, MD, Chapel Hill, NC; Julia S. Kimbell, PhD, Chapel Hill, NC; William W. Shockley, MD FACS, Chapel Hill, NC; J. Madison Clark, MD, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) discuss management strategies in treating nasal obstruction as a result of nasal valve compromise; and 2) describe the role of computational fluid dynamic techniques in quantifying changes in nasal airflow resistance and mucosal cooling.

Objectives: Comparison of interventional effects of two surgical methods, butterfly graft and spreader grafts, on nasal airflow resistance and mucosal cooling (heat flux). **Study Design:** Cadaveric computational fluid dynamics (CFD) models. **Methods:** Four fresh cadaver heads underwent both spreader graft and butterfly graft surgical interventions. Each head underwent both procedures in alternating sequence as an internal control. Pre-surgery and post-surgery computed tomographic scans were used to generate 3D models of the nasal airway. These models were then used to run steady state CFD simulations of airflow and heat transfer during inspiration. **Results:** Reductions in nasal airflow resistance ranged from 20 to 51% and 2 to 29% of pre-surgery values in the butterfly graft group and spreader graft groups, respectively. The butterfly graft produced a greater reduction in nasal airflow resistance in all cases. Change in heat flux, a biophysical CFD variable which correlates to the subjective sensation of nasal patency, ranged from -4% to 11% and -10 to 9% of preoperative values in the butterfly graft group and spreader graft groups, respectively. **Conclusions:** The results of this study suggest that the more recently developed technique of butterfly graft may be at least as effective as the spreader graft in improving nasal airflow in the setting of nasal valve compromise. Both interventions produced comparable changes in heat flux. As this study only addresses static internal nasal valve collapse, we would anticipate even greater differences between the two techniques in a dynamic model. Further investigation in human subjects is warranted.

8:26 **Brief Electrical Stimulation after Facial Nerve Crush Injury: A Randomized Prospective Animal Study**

Adrian I. Mendez, MD, Edmonton, AB Canada; Hadi Seikaly, MD FRCS(C), Edmonton, AB Canada; Vincent Biron, MD FRCS(C), Edmonton, AB Canada; Lin-Fu Zhu, Edmonton, AB Canada; David W. Cote, MD FRCS(C), Edmonton, AB Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) understand the principles of brief electrical stimulation; and 2) know how to treat peripheral nerve injuries.

Objectives: The objective of this study is to examine the effect of BES on accelerating facial nerve functional recovery from a crush injury in the rat model. **Study Design:** A prospective randomized animal study using a rat model was performed. **Methods:** Two groups of 9 rats underwent facial nerve surgery. Both group 1 and 2 underwent a facial nerve crush injury at the main trunk of the nerve, with group 2 additionally receiving BES on postoperative day 0 for 1 hour using an implantable stimulation device. Primary outcome was measured using a laser curtain model which measured amplitude of whisking at 2, 4, and 6 weeks postoperatively. **Results:** At week 2 the average amplitude observed for group 1 was 14.4 degrees. Showing a statistically significant improvement over group 1, the group 2 mean was 24.0 degrees at 2 weeks postoperatively (p=0.0004). At week 4 group 1 showed a minimal amplitude loss with an average of 11.6 degrees, while group 2 remained relatively unchanged with an average of 23.2 degrees. Group 1 had an average amplitude of 15.8 degrees at 6 weeks from surgery. Group 2 had an average amplitude of 21.8 degrees. There was no statistically significant difference between the two groups at 6 weeks after facial nerve surgery. **Conclusions:** This is the first study to use an implantable stimulator for serial BES following a crush injury in a validated animal model. Results suggest performing BES after facial nerve crush injury is associated with accelerated facial nerve function in a rat model compared with a control group.

8:33 **Age Related Histologic and Biochemical Changes in Auricular and Septal Cartilage**

Kiersten L. Riedler, MD, Los Angeles, CA; Alireza Shokrani, MD MS, Los Angeles, CA; Alexander Markarian, MD, Los Angeles, CA; Jon-Paul Pepper, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the histologic and biochemical changes that occur in auricular and septal cartilage with aging and discuss the clinical implications.

Objectives: To evaluate the histologic and biochemical properties of auricular and septal cartilage, and to analyze changes associated with age. **Study Design:** Cross-sectional study of auricular and septal cartilage from 33 fresh cadavers. **Methods:** Auricular and septal cartilage was harvested from 33 fresh cadavers. After decalcification specimens were stained using safranin O for glycosaminoglycans (GAGs), Verhoeff's elastic stain for elastin, and Masson's trichrome for collagen. The cell density and percentage of tissue stained for collagen, GAGs, and elastin was quantified using ImageJ software. We evaluated the association between age and tissue staining using regression analysis. **Results:** The mean age of the 33 cartilage donors was 75 years (SD 11, range 55-93). There were 16 males and 17 females. Increasing age was associated with fewer glycosaminoglycans and elastic fibers. In auricular cartilage each one year increase in age was associated with a 0.88% decrease in safranin O staining ($p<0.0001$) and a 0.85% decrease in elastin staining ($p<0.0001$). In septal cartilage an increase in age by one year was associated with a 1.98% reduction in safranin O staining ($p<0.0001$). Collagen staining did not show a significant association with age. Interestingly staining for GAGs decreased more than twice as much per year in septal cartilage compared to auricular cartilage. **Conclusions:** Age related decreases in glycosaminoglycan and elastin content in auricular and septal cartilage may affect biomechanical properties and tissue viability. These findings have implications for graft choice in nasal reconstructive surgery and septorhinoplasty.

8:40 **Free Tissue Transfer for Reconstruction of Total Auriculectomy Defects: Functional Outcomes in a 10 Year Single Institution Experience**

Patrick T. Tassone, MD, Philadelphia, PA; Varun A. Patel, BS, Philadelphia, PA; Michael C. Topf, MD, Philadelphia, PA; Joseph M. Curry, MD, Philadelphia, PA; Howard D. Krein, MD PhD, Philadelphia, PA; Ryan N. Heffelfinger, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe and explain the reconstructive challenges of total auriculectomy defects and discuss options for functional restoration of the facial nerve and serviceable hearing.

Objectives: Total auriculectomy, especially when combined with parotidectomy or lateral temporal bone resection, requires complex reconstruction to restore function to this important region of the head and neck. Facial nerve function and hearing are frequently affected by extended total auriculectomy. We review our use of free tissue transfer to reconstruct these defects, with particular attention to functional results following surgery. **Study Design:** Retrospective chart review. **Methods:** We reviewed medical records of 24 consecutive patients undergoing free flap reconstruction for total auriculectomy from 2007 to 2016. In addition to information on flap survival and routine patient followup, we reviewed audiologic facial nerve function outcomes. **Results:** In all cases, auriculectomy was performed for malignant neoplasm. Cutaneous malignancy, in particular squamous cell carcinoma, was the most common pathology. An anterolateral thigh free flap was used in 22 (92%) patients. Average followup was 27 months and seven patients (29%) had disease recurrence. Restoration of a patent external auditory canal (EAC) was a reconstructive challenge and failed in early patients. This lead the authors to change to EAC obliteration with future bone conduction hearing device which was successfully achieved in four patients. The facial nerve was sacrificed in 11 (46%) cases and was accompanied by facial reanimation either at the time of primary surgery or at a later date. **Conclusions:** Total auriculectomy defects represent a challenge for the reconstructive head and neck surgeon. Free tissue transfer is a reliable method to restore protective tissue bulk to this area, and with effective multidisciplinary collaboration, functional restoration can be achieved.

8:47 **The Submental Island Flap Is a Viable Reconstructive Option for a Variety of Head and Neck Ablative Defects**

Blair M. Barton, MD, New Orleans, LA; Charles A. Riley, MD, New Orleans, LA; Christian P. Hasney, MD, New Orleans, LA; Brian A. Moore, MD, New Orleans, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the variety of options for reconstruction in the head and neck using a robust submental island flap.

Objectives: The submental island flap (SIF) is a recently described pedicled flap based upon the submental artery and vein. Its utility in reconstruction following ablative head and neck procedures has been applied to various subsites including skin, lip, buccal mucosa, retromolar trigone, and tongue. Objective of this study was to review the submental island flap review options for reconstruction and evaluate postoperative complications. **Study Design:** Retrospective chart review. **Methods:** Retrospective chart review was performed on twenty-four consecutive patients undergoing SIF reconstruction following ablative surgery for malignancy of the head and neck. Preoperative variables, surgical procedures, and postoperative outcomes were examined. **Results:** Twenty-four patients met inclusion criteria. Nineteen were male and five were female; the average age was 60.7 (± 13.4) years. Thirteen cancers involved the oral cavity, seven involved skin, and four in the oropharynx. The average size of SIF was measured 68.3 cm2 (± 42.9 cm2). Three partial flap losses occurred; none of these required revision flap surgery. The average length of stay of these patients was 7.8 (± 4.1) days. **Conclusions:** The SIF is a robust flap that can be reliably utilized for a variety of head and neck defects following tumor ablation with an acceptable rate of donor and flap related complications.

8:54 **Wound Closure Tension Comparison between V-Y and Rotation Flap for Similar Sized Defect**
Jacqueline R. Booth, BA, Charlottesville, VA; Matthew Q. Miller, MD, Charlottesville, VA (Presenter); Catherine M. Meller, MBBS, Charlottesville, VA; John J. Christophel, MD MPH, Charlottesville, VA; Stephen S. Park, MD, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the differences in wound closure tension between V-Y flap and cheek rotation flap closure of medial cheek defects.

Objectives: To design a simple experiment used to quantify closure tension of a V-Y flap versus a cheek rotation flap for closure of medial cheek defects. **Study Design:** Soft tissue medial cheek defects were created in a soft cured cadaver head and closed using a cheek rotation flap on one side and a V-Y advancement flap on the other. Tension of closure was measured. **Methods:** A 2cm circular medial cheek defect was created on each side of a soft cured cadaver head. The defects extended superiorly to 5mm below the inferior orbital rim and medially to 5 mm lateral to the nasal facial sulcus. An inferiorly based cheek rotation flap was designed and raised to close the right defect; area undermined 8.5 x 5 cm. An inferiorly based V-Y flap was elevated on the contralateral side. The flaps were advanced to close the defects and closure tension was measured at the area of greatest defect length using a tensiometer (Ohaus Co., Parsippany, NJ). **Results:** The tension required to approximate the cheek rotation flap was 1.716 Newtons (175 grams). The V-Y flap wound closure tension was 0.122 Newtons (12.5 grams). **Conclusions:** Wound closure tension is an important variable in both cosmetic and functional outcomes for local flaps. Minimizing tension optimizes scar appearance, decreases the risk of distorting important anatomic structures, and decreases the risk of distal flap compromise. We demonstrate V-Y flap closure of medial cheek defects has significantly less wound closure tension than cheek flap closure. Further study may correlate wound closure tension with clinical outcomes for different local flaps.

9:01 **Q&A**

9:05 - 9:55 **FACIAL PLASTIC AND RECONSTRUCTIVE SURGERY: WHAT I DO DIFFERENTLY NOW THAN I DID 10 YEARS AGO**
Moderator: **Robert M. Kellman, MD FACS, Syracuse, NY**
Panelists: J. Jared Christophel, MD MPH FACS, Charlottesville, VA
Terry Y. Shibuya, MD FACS, Anaheim, CA
William W. Shockley, MD FACS, Chapel Hill,
Brian J.F. Wong, MD PhD FACS, Irvine, CA

9:55 **Q&A**

10:00 - 10:30 ***Break with Exhibitors/View Posters -*** *Napoleon CD*

8:00 - 10:05 CONCURRENT SESSION 3B
GENERAL/SLEEP MEDICINE - RHYTHMS BALLROOM

8:00 **Announcements by Vice Presidents**

8:05 - 9:00 **HYPOPHARYNGEAL PROCEDURES FOR OSA: INDICATIONS AND OPTIONS**
Moderator: **Kathleen L. Yaremchuk, MD MSA, Detroit, MI**
Panelists: Jimmy J. Brown, MD, Augusta, GA
M. Boyd Gillespie, MD, Memphis, TN
Erica Thaler, MD, Philadelphia, PA

9:00 **Q&A**

Moderator: David E. Eibling, MD FACS, Pittsburgh, PA

9:05 **William W. Montgomery, MD Resident Research Award (Eastern Section)**
Construction of a Computer Model of the Upper Airway in Obstructive Sleep Apnea Patients Using Finite Element Techniques
Sandeep S. Dhaliwal, MD, London, ON Canada; Seyyed M. Hesabgar, MEng, London, ON Canada; Seyyed M.H. Haddad, MSc, London, ON Canada; Hanif Ladak, BA Sc MEng PhD, London, ON Canada; Abbas Samani, BSc MSc PhD, London, ON Canada; Brian W. Rotenberg, MD MPH FRCSC, London, ON Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to outline the difficulties of existing methods in diagnosing sites of airway collapse in sleep apnea patients and have a general concept of the utility a computer model has in generating patient specific surgical treatment.

Objectives: The use of computer simulation to develop a high fidelity model has been proposed as a novel and cost effective alternative to help guide therapeutic intervention in sleep apnea surgery. We describe a computer model based on patient specific anatomy that enables removal of airway components to test airflow simulations and help determine an optimal airway configuration for obstructive sleep apnea (OSA) patients. **Study Design:** Basic science computer model generation. **Methods:** Three dimensional finite element techniques were undertaken for model development. Magnetic resonance imaging (MRI) was used to capture patient anatomy and software employed to outline critical anatomical structures. A finite element mesh was applied to the volume enclosed by each structure. Mechanical properties for various subsites (tonsils, uvula, soft palate, and tongue base) were determined using an inverse finite element technique. **Results:** Three dimensional models based on patient specific anatomy obtained from MRIs were generated. Each model underwent computer simulation to determine the degree of displacement on various structures within the upper airway. Comparisons made with endoscopic visualization showed a high degree of qualitative agreement with respect to site of maximal airway collapse. Biomechanical testing of surgical specimens removed during OSA surgery was employed to determine linear and hyperelastic soft tissue properties. **Conclusions:** Patient specific modeling of the upper airway in OSA patients is feasible and holds promise in aiding patient specific surgical treatment.

9:12 **Effectiveness of Pediatric Drug Induced Sleep Endoscopy for REM Predominant OSA**
Stacey L. Ishman, MD MPH, Cincinnati, OH; David F. Smith, MD PhD, Cincinnati, OH (Presenter); Shan He, MD, Cincinnati, OH; P. Vairavan Manickam, MD, Danville, PA; Nithin Peddireddy, BS, Cincinnati, OH; Christine Heubi, MD, Cincinnati, OH; Sally R. Shott, MD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to determine the effectiveness of pediatric drug induced sleep endoscopy (DISE) for children with REM predominant infant obstructive sleep apnea (OSA) or REM predominant OSA after adenotonsillectomy (AT).

Objectives: To determine the effectiveness of pediatric drug induced sleep endoscopy (DISE) for children with REM predominant infant obstructive sleep apnea (OSA) or REM predominant OSA after adenotonsillectomy (AT). **Study Design:** Retrospective case series. **Methods:** We included children with OSA undergoing DISE at a tertiary pediatric hospital from October 2013 to September 2015 who underwent subsequent surgery to address OSA and had polysomnography (PSG) both before and after surgery. The primary outcome was successful identification of site of obstruction on DISE. Analysis was carried out with Wilcoxon signed ranks tests, paired t-tests and Mann-Whitney U tests. **Results:** The study included 56 patients with mean age of 5.6±5.4 years (range 0.1-17.4) and mean BMI of 20.3±7.4 kg/m2 (76±29 percentile). At least one site of obstruction was identified in 100% of the patients, regardless of REM or NREM predominance. Mean oAHI improved from 12.6±10.7 to 9.0±14.0 events/hour for children with REM predominant disease (P=0.013) and 21.3±18.9 to 10.3±16.2 events/hour for those with NREM predominant disease (P=0.008). The proportion of children with postoperative oAHI<5 was 53% and 55% for REM predominant and NREM predominant OSA, respectively. When compared to children with NREM predominant disease, children with REM predominant disease also had a significant improvement in saturation nadir (P<0.001), total sleep time (P=0.006) and sleep efficiency (P=0.015). **Conclusions:** DISE was useful to predict at least one site of obstruction for all children with REM predominant disease and outcomes based upon this evaluation revealed significant improvements in oAHI, proportion with oAHI<5, total sleep time, sleep efficiency and saturation nadir after surgery for children with REM predominant disease.

9:19 **A Preliminary Study Comparing the Efficacy of Facebook to Other Modes of Recruitment for Clinical Trials in Otolaryngology**
Richard H. Law, MD, Detroit, MI; John S. Muus, BS, Charleston, SC; Marion B. Gillespie, MD, Memphis, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to appreciate the efficacy of Facebook, compared to other modes of recruitment, in recruiting subjects for clinical trials in the field of otolaryngology.

Objectives: The goal of this study is to demonstrate the efficacy of Facebook in recruiting subjects for clinical trials compared to other methods. This study also aims to encourage participants from other otolaryngology training institutions to consider Facebook as a powerful source of recruitment if they have not done so already. **Study Design:** This is a preliminary observational study. **Methods:** Research patients were recruited for a phase three implantable hypoglossal nerve stimulator clinical trial using online and offline modes of communication. Online recruitment was recorded in the Galen Gateway website, where patients were asked whether they found the trial through Facebook or web search as well as other trial related information. All patient information was populated in an Excel spreadsheet, which included demographic information, recruitment method and consent status. **Results:** Facebook was the dominant mode recruitment at 69 of the 110 patients who expressed interest in the clinical trial thus far (63%). Of those who consented, the Facebook referral source had the highest consent at 55%, followed by physician referral at 32%, friend/family at 9%, web search at 5%, radio at 0%, and other at 0%. **Conclusions:** Facebook advertising is a viable and powerful source for recruiting patients to enroll in this phase three clinical trial. It is expected that the use of social media to recruit patients to enroll in otolaryngology clinical trials will only continue to grow.

9:26 **Complications and 30 Day Hospital Readmission Rates of Patients Undergoing Tracheostomy: A Prospective Analysis**

Emily A. Spataro, MD, St. Louis, MO; Nedim Durakovic, MD, St. Louis, MO; Dorina Kallogjeri, MD MPH, St. Louis, MO; Brian Nussenbaum, MD, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to know the inpatient and outpatient tracheostomy complication rates, 30 day hospital readmission rates and causes, and risk factors associated with these events.

Objectives: To determine inpatient tracheostomy complication rates, 30 day post-discharge complications and hospital readmission rates, and to assess patient and procedural risk factors associated with complications and readmissions. **Study Design:** Prospective cohort study. **Methods:** Adult patients undergoing tracheostomy at a single academic hospital performed by any service, for any indication, were enrolled in this study during the course of one academic year. All patients had complete 30 day followup after discharge to track complication and hospital readmission rates. Logistic regression was used to assess patient and procedural risk factors associated with these events. **Results:** 100 patients were enrolled in the study. The overall inpatient tracheostomy complication rate was 47% (95% CI, 37-57%), a majority causing temporary harm (35%; 95% CI, 26-44%). Of decannulated patients 13% (95% CI, 4-22%) required a revision tracheostomy. The all cause 30 day hospital readmission rate was 33% (95% CI, 24-42%) averaging 12 days after discharge. The tracheostomy specific readmission rate was 13.6% (95% CI, 7-20%). The outpatient rate of a new complication was 14.8% (95% CI, 8-22%). The overall mortality rate during the study period was 11% (95% CI, 5-17%) with one tracheostomy related mortality. The risk factors associated with all cause 30 day readmission are a history of diabetes, length of hospital stay after tracheostomy, and presence of a tracheostomy at 30 day followup. **Conclusions:** Patients undergoing tracheostomies are at high risk for both inpatient and outpatient complications as well for 30 day hospital readmission. Understanding patient and procedural risk factors associated with these events will help guide interventions for quality improvement.

9:33 **Ultrasound Guided Fine Needle Aspiration Biopsy (USG-FNAB) of First 1,000 Consecutive Unselected Thyroid Nodules - A Single Surgeon Experience**

Jagdish K. Dhingra, MBBS, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the basics of setting up an ultrasound clinic as part of their endocrine and head and neck surgery practice.

Objectives: To describe a single surgeon's experience in setting up ultrasound clinic and performing USG-FNAB thyroid nodules. **Study Design:** A dedicated USG-FNAB clinic operated by a single surgeon was established in October 2013. The surgeon had no prior experience in ultrasonography. Results of USG-FNAB on the first 1,000 unselected consecutive thyroid nodules performed over a 3 year period were analyzed in this retrospective study. **Methods:** Chi square analyses were used to assess statistical significance of nodule characteristics between diagnostic and nondiagnostic samples. A multivariate regression analysis was conducted to determine which of the nodule characteristics were predictive of adequacy of USG-FNABs. The learning curve was determined by calculating successful biopsy rate across 10 data points derived from cohort of 100 patients each and analyzed utilizing Fischer's exact test. **Results:** Specimen adequacy on the first attempt increased from 83% in the first cohort to 91% in the 10th cohort. (Fischer's Exact Test, $p < 0.05$). Cystic and complex (>50% cystic) nodules were found to yield higher rates of nondiagnostic samples. Solid or predominantly (>75%) solid nodules are predictive of obtaining an adequate biopsy as seen in a multiple regression analysis ($p < 0.001$) There was no correlation found between the size and adequacy of the specimens for nodules greater than 1 cm in size. Success rate of repeat biopsies following an initial nondiagnostic sample was 45%. **Conclusions:** USG-FNAB is a safe procedure with a rapid learning curve that is easily incorporated into an office based practice. Cystic and complex (>50% cystic component) nodules account for majority of the nondiagnostic samples.

9:40 **Referral Patterns from Emergency Department to Otolaryngology Clinic**
Jonathan C. Garneau, MD, New York, NY; Isaac Wasserman, MPH, New York, NY; Neeraja Konuthula, BA, New York, NY; Benjamin D. Malkin, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the characteristics of patients referred for otolaryngology followup after visiting the emergency department and identify areas for improvement in their care.

Objectives: Patients who present to the emergency department (ED) with various otolaryngologic disorders are frequently referred to an otolaryngologist for followup care. There is a paucity of literature regarding this specific referral pattern. Our aim was to further characterize this group of patients. **Study Design:** Cross sectional, retrospective study. Level of evidence; 3. **Methods:** Retrospective chart review of patients seen during an 18 month period in an urban public hospital trauma center ED and referred to an otolaryngology clinic for followup care. **Results:** During the study period, 740 patients were seen and referred; the most common diagnoses made by ED practitioners were peripheral vertigo (12%), otitis externa (8%) and nasal fractures (8%). 9% of patients were evaluated during their ED visit by an otolaryngology practitioner. Three hundred seventy-four (51%) patients returned for their otolaryngology clinic visit; facial trauma patients were least likely to return. The most common diagnoses made by otolaryngology practitioners were otitis externa (12%), peripheral vertigo (12%), nasal fractures (7%). There was 71% agreement on patients' diagnoses between ED and otolaryngology practitioners. The most common differences between them were otitis media vs. externa (21%) and pharyngitis vs. laryngopharyngeal reflux (15%). 34% of followup patients underwent an in-office procedure, most commonly flexible fiberoptic laryngoscopy, cerumen removal and nasal endoscopy. **Conclusions:** Our analysis reports comprehensive characteristics of this referral group, identifying areas of focus for improvement in patient management, resident education and efficiency. Otolaryngologists covering EDs should be familiar with this patient population in terms of types of cases and potential to augment a practice.

9:47 **Differential Management of Peritonsillar Abscess in Pediatric and Adult Patients**
Punam A. Patel, BA, Boston, MA; Kevin Wong, BA, Boston, MA; Jessica R. Levi, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss differences in the diagnosis, treatment, and outcomes of peritonsillar abscess (PTA) in pediatric patients and adults.

Objectives: Evaluate the patterns of diagnosis and treatment of PTA in pediatrics and adults. Also evaluate outcomes of surgical versus nonsurgical management in children. **Study Design:** Literature review and meta-analysis. **Methods:** A PubMed search was performed using the terms "peritonsillar abscess adult" and "peritonsillar abscess children". Article inclusion criteria included 1) mention of PTA in the abstract; 2) in English; and 3) published between 2006 and 2016. From these, we selected articles that discussed incidence, diagnosis, and management of PTA. We excluded articles that did not stratify data by age. Thirteen articles met inclusion criteria. **Results:** All adults were treated surgically, however pediatric patients were treated equally between surgical and nonsurgical methods. CT scans were ordered more frequently in children (78.3% vs 17.2%, $p<0.0001$) whereas ultrasounds were ordered more frequently in adults (95% vs 1.2%, $p<0.0001$). Medical management in children was associated with a higher rate of primary treatment failure (27.3% vs 3.8%, $p<0.0001$) however surgical management led to more recurrence (8.5% vs 1.6%, $p=0.005$). **Conclusions:** Conservative management of PTA in children is a reasonable first step, though clinicians should be mindful of the higher risk for treatment failure. For diagnosis CT scans are highly sensitive and ultrasound may also be considered, though further studies are warranted.

9:54 **Epidemiology of Firearm and Other Noise Exposures in the United States**
Jay M. Bhatt, MD, Irvine, CA; Harrison W. Lin, MD, Irvine, CA; Neil Bhattacharyya, MD FACS, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss patterns of firearms and other noise exposures in the United States along with the use of hearing protection.

Objectives: Identify contemporary noise exposures and hearing protection use among adults. **Study Design:** Cross-sectional analysis of national health survey. **Methods:** Adult respondents in the 2014 National Health Interview Series hearing survey module were analyzed. Potentially harmful exposures to occupational and recreational noises in the past 12 months were extracted and quantified. Patterns of hearing protection use were also analyzed. **Results:** Among 239.7 million adults, loud and very loud occupational noise exposures were reported by 5.3% and 21.7%, respectively. Of those exposed to loud or very loud sounds at work only 18.7% and 43.6%, respectively, always used hearing protection. 38.2% (1.9 million) of those with very loud occupational exposures never used hearing protection. Frequent (>10/year) loud and very loud recreational noise exposures were reported by 13.9% and 21.1%, respectively, most commonly to lawn mowers (72.6% and 55.2%, respectively). When exposed to recreational loud/very loud noise only 11.4% always used hearing protection, while 62.3% (6.3 million) never used any protection. Lifetime exposure to firearm noise was reported by 36.6% of adults, 11.5% of which had used firearms in the prior 12 months. Of those only 58.5% always used hearing protection, while 21.4% (7.4 million) never used hearing protection. **Conclusions:** Substantial noise exposures with potentially seri-

ous long term hearing health consequences are frequently occurring in occupational and recreational settings and with use of firearms. Only a minority of those exposed are consistently using hearing protection. Healthcare providers should actively identify and encourage the use of hearing protection with those patients at risk.

10:01 **Q&A**

10:05 - 10:30 ***Break with Exhibitors/View Posters -*** *Napoleon CD*

10:30 - 12:30 CONCURRENT SESSION 4A
GENERAL & RHINOLOGY/ALLERGY/SINUS - NAPOLEON AB

10:30 - 11:25 **THIRD PARTY REGULATION: CURRENT REQUIREMENTS FOR ENDOSCOPE AND INSTRUMENT CLEANING**

Moderator: **Natasha Mirza, MD FACS, Philadelphia, PA**

Panelists: Soly Baredes, MD, Newark, NJ
Sigsbee W. Duck, MD FACS, Rock Springs, WY
Julio E. Figueroa, MD, New Orleans, LA
Willard C. Harrill, MD FACS, Hickory, NC

11:25 **Q&A**

Moderator: Ralph B. Metson, MD FACS, Boston, MA

11:30 **John J. Conley, MD Resident Research Award (Eastern Section)**
Time Dependent Improvement in Chronic Rhinosinusitis Symptomatology with Smoking Cessation
Katie M. Phillips, MD, Boston, MA; Lloyd Hoehle, BA, Boston, MA; David S. Caradonna, MD DMD, Boston, MA; Stacey T. Gray, MD, Boston, MA; Ahmad R. Sedaghat, MD PhD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss that smoking cessation is associated with improved chronic rhinosinusitis symptomatology in a time dependent manner.

Objectives: Smoking is associated with greater sinonasal symptomatology in chronic rhinosinusitis (CRS). The impact of smoking cessation on sinonasal symptomology remains unclear. The objective was to better define this relationship. **Study Design:** Prospective cross-sectional study of 43 patients who were ex-smokers with CRS. **Methods:** Sinonasal symptomatology was quantified using the 22 item Sinonasal Outcomes Test (SNOT-22) survey. The number of years since each participant quit smoking was recorded. Characteristics collected included age, gender, intranasal steroids use, aeroallergen hypersensitivity, comorbid asthma, polyp status and total number of pack years. Linear regression, controlling for the above characteristics, was performed to seek association between the number of years since smoking cessation and SNOT-22 score. **Results:** Of the 43 participants, mean age was 59.5 years, 41.9% were female, 65.1% were using intranasal steroids, 46.5% had a history of aeroallergen hypersensitivity, 48.8% had nasal polyps and 27.9% had comorbid asthma. Participants had a mean history of 13.7 pack years, quit smoking with a mean 24.1 years ago and had a mean SNOT-22 score of 42.5. We found that the number of years since smoking cessation was negatively associated with the SNOT-22 score (adjusted [β] = -1.2, 95% CI: -1.8 -- -0.6, p=0.001). **Conclusions:** Smoking cessation is associated with lower SNOT-22 score. For CRS patients who are former smokers, every year after cessation is associated with greater than a one point decrease in SNOT-22 score. This may be used as direct evidence for the continually increasing benefit of smoking cessation on sinonasal symptomatology in CRS.

11:37 **The Value of Frontal Sinusotomy for Chronic Rhinosinusitis with Nasal Polyps: A Cost Utility Analysis**
George A. Scangas, MD, Boston, MA; Ashton E. Lehmann, MD, Boston, MA; Brooke M. Su, MD, Los Angeles, CA; Aaron K. Remenschneider, MD, Boston, MA; Ralph Metson, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the cost effectiveness of frontal sinusotomy in CRS patients with nasal polyps.

Objectives: The number of surgical procedures performed for frontal sinusitis and the associated costs have increased dramatically over the past decade. The purpose of this study was to evaluate the cost effectiveness of endoscopic frontal sinusotomy in patients with chronic rhinosinusitis with nasal polyposis (CRSwNP). **Study Design:** Cohort style Markov decision tree economic model with a 36 year time horizon. **Methods:** Matched cohorts of CRSwNP patients who under-

went sinus surgery with (n=149) and without (n=49) non-balloon frontal sinusotomy were compared with a similar cohort of patients (n=149) from the national Medical Expenditures Survey Panel (MEPS) database who underwent medical management for CRS. Multi-year utility scores were calculated from responses to the EQ-5D instrument in all three cohorts. The primary outcome measure was incremental cost per quality adjusted life year (QALY). **Results:** Surgery for CRSwNP with frontal sinusotomy yielded an incremental cost effectiveness ratio (ICER) for ESS versus medical therapy alone of $14,938.94 per QALY. The reference case for CRSwNP without frontal intervention yielded an incremental cost effectiveness ratio for ESS versus medical therapy alone of $8,155.94 per QALY. These results were robust to one way analysis and probabilistic sensitivity analysis. **Conclusions:** The performance of sinus surgery with or without frontal sinusotomy remains a cost effective intervention compared to medical therapy alone for the management of CRSwNP patients who elect to undergo surgery. The surgeon's decision to forego frontal sinusotomy in select patients with CRSwNP results in decreased cost without sacrificing gains in health utility.

11:44 **Sinonasal Inflammation and Depression among Adults in the United States**

Sheng Zhou, BS, Los Angeles, CA; Kevin Hur, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) discuss the relationship between common inflammatory sinonasal diseases (sinusitis and allergic rhinitis) and depression; and 2) describe the health disparities associated with these sinonasal diseases.

Objectives: Examine the relationship between depression and allergic rhinitis (AR) and sinusitis in adults and describe the epidemiology of AR and sinusitis in the United States. **Study Design:** Cross-sectional analysis of 2014 National Health Interview Survey (NHIS) data. **Methods:** Adult cases of AR and sinusitis were extracted from the 2014 NHIS in addition to demographic, socioeconomic, and related depressive symptom data. The dataset was analyzed with paired t-tests and multivariate regression. **Results:** There were 11.3 ± 0.29 million adult AR cases and 13.5 ± 0.28 million adult sinusitis cases. Of these there was a 2.4% and 13% increase in depression symptoms in the past 12 months for those with AR or sinusitis, respectively ($P < 0.001$). Both diseases were also associated with significantly fewer mean hours of sleep a night (AR: 6.99 vs. 7.13, $P < 0.001$; sinusitis: 6.96 vs. 7.14, $P < 0.001$) and greater mean days of work missed (AR: 4.79 vs. 3.63, $P < 0.01$; sinusitis: 5.97 vs. 3.42; $P < 0.001$). On multivariate analysis, the prevalence of AR and sinusitis had statistically significant differences dependent on sex, geography, race/ethnicities, and education. Only the prevalence of sinusitis varied depending on income and age. **Conclusions:** Allergic rhinitis and sinusitis are associated with an increased likelihood of depressive symptoms, shorter sleep duration, and more workdays missed. The prevalence of both is influenced by geography, race/ethnicity, education, and sex. Targeted initiatives should be developed to address these health disparities and comorbidities associated these common inflammatory sinonasal diseases.

11:51 **Intervention for Elevated Intracranial Pressure Improves Success Rate after Repair of Spontaneous CSF Leaks: A Systematic Review**

William M. Teachey, BS, Mobile, AL; Jessica W. Grayson, MD, Birmingham, AL; Do Y. Cho, MD, Birmingham, AL; Kristen O. Riley, MD, Birmingham, AL; Bradford A. Woodworth, MD, Birmingham, AL

Educational Objective: At the conclusion of this presentation, the participants should be able to compare outcomes of endoscopic repair of spontaneous CSF leaks between patients who undergo intervention for elevated intracranial pressure and those who do not.

Objectives: Spontaneous cerebrospinal (CSF) fluid leaks are associated with increased intracranial pressure (ICP) and considered a manifestation of idiopathic intracranial hypertension. Although postoperative acetazolamide and placement of CSF shunt systems are considered valuable interventions for elevated ICP, the impact on recurrence rate remains unclear. The objective of this study is to systematically review evidence from reported literature to evaluate whether postoperative ICP management reduces recurrence rates after primary endoscopic repair. **Study Design:** Prospective case series and systematic review. **Methods:** Demographics, defect location, success rates, and ICP management in spontaneous CSF leak patients were prospectively collected over 8 years. A search was also conducted in PubMed to identify studies reporting cases of spontaneous CSF rhinorrhea. **Results:** Sixty articles with non-duplicated data were identified and combined with a prospective series of 108 patients for a total of 767 patients treated for spontaneous CSF rhinorrhea. Average age was 50.4 years with 77% female. Average BMI was 35.8 kg/m2. Defects were most commonly located in the sphenoid sinus (n=334) followed by the ethmoid (n=318) and the frontal sinus (n=46). Successful primary repair was 92.8% in patient cohorts where intracranial pressure evaluation and intervention with acetazolamide or CSF shunt systems was performed, but was significantly decreased to 81.9% in series with no active management of elevated ICP ($p<0.001$). **Conclusions:** Evaluation and intervention for elevated ICP in spontaneous CSF leaks is associated with significantly improved success rates following primary endoscopic repair.

11:58 **Impact of Body Mass Index on Outcomes of Endoscopic Pituitary Surgery**

Yung-Jae Lee, BS, Newark, NJ; Anni Wong, MS, Newark, NJ; Andrey Filimonov, PharmD, Newark, NJ; Sei Yeon Chung, BS, Newark, NJ; Soly Baredes, MD, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) evaluate the impact of body mass index on perioperative outcomes of endoscopic pituitary surgery; and 2) apply this information towards management of obese patients undergoing endoscopic pituitary surgery.

Objectives: Endoscopic pituitary surgery (EPS) is increasingly being used for the treatment of pituitary lesions. Obesity is a growing epidemic in our nation associated with numerous comorbidities known to impact surgical outcomes. We present a large, multi-institutional study evaluating the association between body mass index and postsurgical outcomes of EPS. **Study Design:** Retrospective database analysis. **Methods:** Patients who underwent EPS from 2005 to 2013 were identified from the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database. Preoperative variables, comorbidities, and postoperative complications were analyzed. **Results:** A total of 471 patients were analyzed of which 235 were obese (BMI ≥ 30) (49.9%). No difference between the two groups in reoperation rate ($p = 1.000$) or unplanned readmission rates ($p = 1.000$) was found. A higher overall complication rate was observed in the obesity group compared to the nonobese counterparts ($p = 0.010$). However, when complications were separated into surgical complications (4.7% vs. 1.7%, $p = 0.065$) and medical complications (6.0% vs. 3.0%, $p = 0.125$), there was no statistically significant difference between the obese group and nonobese group. **Conclusions:** Endoscopic pituitary surgery may be a safe treatment option for pituitary lesions in the obese population. Although obese patients undergoing EPS are at increased risk for overall complication rate, when stratified into overall surgical and medical complications, no statistical significance was demonstrated. Reoperation rate or unplanned readmission rates between the obese and nonobese patient groups did not differ.

12:05 **Do Geographic Differences or Socioeconomic Disparities Affect Survival in Sinonasal Squamous Cell Carcinoma?**

Sei Y. Chung, BS, Newark, NJ; Varesh R. Patel, BA, Newark, NJ (Presenter); Albert H. Zhou, BS, Newark, NJ; Aykut A. Unsal, DO, Newark, NJ; Soly Baredes, MD, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to identify geographical variations in demographics, socioeconomic factors, treatment modality, and survival of sinonasal squamous cell carcinoma.

Objectives: Squamous cell carcinoma is the most common cancer in the sinonasal tract, accounting for 50% to 60% of these malignancies. We present the first population based analysis that examines geographic differences in demographic and clinicopathologic characteristics, socioeconomic factors, treatment modality, and disease specific survival (DSS) of this entity. **Study Design:** Retrospective analysis. **Methods:** Using data from the Surveillance, Epidemiology, and End Results registry from 1973 to 2013, 6,094 patients diagnosed with SNSCC were identified. Patients were stratified by geographic location and characteristics such as demographics (age, gender, race, urban-rural status, and median household income), primary site of tumor, stage at diagnosis, and treatment modality were compared. Survival data were generated using Kaplan Meier regression analysis. **Results:** 6,094 patients were identified, of which 15.3% were from the east, 16.3% from the midwest, 19.3% from the south, and 49.1% from the west. The south had a higher proportion of patients who were black ($P<0.001$), lived in non-metropolitan areas ($P<0.001$), and presented with localized disease ($P<0.001$). Patients from the south also had the lowest median income ($P<0.001$). The south exhibited the lowest 20 year disease specific survival (DSS) compared to all other regions ($P<0.001$). **Conclusions:** SNSCC patients from the south had the poorest long term DSS, despite being most likely to present with localized disease. A higher proportion of patients in the south was black, lived in rural or urban towns, had the lowest median income, and received neither surgery nor radiotherapy, compared to the east, midwest, and west.

12:12 **Use of Pharyngeal Packs in Functional Endoscopic Sinus Surgery: A Randomized Controlled Trial**

Ross W. Green, MD, New York, NY; Neeraja Konuthula, BA, New York, NY; Maximilliano Soberero, BA, New York, NY; Alok Saini, MD, New York, NY; Satish K. Govindaraj, MD, New York, NY; Alfred-Marc C. Iloreta, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand whether a pharyngeal throat pack has an effect on postoperative pain, nausea, and/or vomiting.

Objectives: To determine if pharyngeal packs have an effect on postoperative pain and postoperative nausea and vomiting. The placement of pharyngeal packs during functional endoscopic sinus surgery is controversial. Theoretically, pharyngeal packs may prevent postoperative nausea and vomiting by preventing ingestion of blood during sinus surgery.

However, prior studies have not conclusively demonstrated this to be the case. Additionally, pharyngeal packs have been associated with complications including throat pain, aspiration and death. The objective of this randomized control trial was to determine the effect of pharyngeal packs on postoperative nausea and vomiting and throat pain. **Study Design:** Forty-six patients scheduled for routine endoscopic sinus surgery were recruited into this study. The anesthetic plan was standardized for study purposes. The patients were randomly allocated to have or not to have pharyngeal packing prior to surgery. Patients were blinded to intervention. Postoperatively, throat pain and nausea/vomiting scores were recorded in the post-anesthesia care unit as well as 24 hours after the procedure. **Methods:** Patients were blinded to intervention. Postoperatively, throat pain and nausea/vomiting scores were recorded in the post-anesthesia care unit as well as 24 hours after the procedure. **Results:** No significant demographic differences were found between groups. There was no significant difference in mean throat pain at 4 hours following surgery ($p = 0.860$). At 24 hours after surgery, patients without pharyngeal packing experienced more pain than those who had a throat pack placed ($p = 0.002$). There was no significant difference in level of nausea at 4 hours after surgery ($p=0.315$) or at 24 hours after surgery ($p=0.315$). **Conclusions:** We found no significant difference in level of nausea and vomiting at 4 and 24 hours after surgery. Therefore, we recommend against the routine use of placing pharyngeal packs during functional endoscopic sinus surgery.

12:19 **Acellular Human Dermal Allograft as a Graft for Nasal Septal Perforation Reconstruction**
Dustin J. Conrad, MD, Edmonton, AB Canada; Han A. Zhang, MD, Toronto, ON Canada; Dave W. Côté, MD, Edmonton, AB Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to conceptualize the use of acellular human dermal allograft as a material for nasal septal perforation reconstruction and the technique used.

Objectives: Nasal septal perforations pose a troubling source of morbidity for patients and a difficult problem for the otolaryngologist. Multiple surgical techniques have been employed with inconsistent success. Prosthetic nasal buttons also have limitations, including patient intolerance and dissatisfaction. Acellular human dermal allograft, AlloDerm (LifeCell Branchburg, NJ) has been previously described as an alternative material for septal perforation repair. We aim to demonstrate objective and subjective outcomes of septal perforation repair with AlloDerm. **Study Design:** Prospective cohort study. **Methods:** Eight patients with 1-2 cm anterior septal perforations were recruited from a tertiary care practice. Patients with admitted smoking or cocaine use in the previous three months, vascular or granulomatous diseases were excluded. Subjective SNOT-22 scores along with objective nasal endoscopy and acoustic rhinometry measures were collected at baseline and 2, 4, and 12 weeks postoperatively. Data was normalized against baseline values and analyzed using ANOVA and Tukey range test. **Results:** All patients had complete successful closure of their perforations, confirmed with rigid nasal endoscopy. Nasal symptom scores (SNOT-22) were significantly reduced from baseline by an average of 31% at 4 weeks (95%CI [8.0%-54.0%]; $p<0.05$) and further reduced by an average of 76% (95%CI [55.9%-96.6%]; $p<0.01$) at 12 weeks postoperatively. Acoustic rhinometry confirmed perforation closure, demonstrating a mean reduction in cross-sectional nasal area from baseline of 52% (95%CI [37.7%-66.8%]; $p<0.01$). **Conclusions:** This is the first study to use objective and subjective measurements to confirm success with acellular dermis allograft as an adjunct for septal perforation repair. Results demonstrate a statistically significant reduction in patient nasal symptoms following repair.

12:26 **Q&A**

12:30 **ADJOURN SESSIONS (see next page for afternoon activities)**

10:30 - 12:30 CONCURRENT SESSION 4B
LARYNGOLOGY/BRONCHOESOPHAGOLOGY - RHYTHMS BALLROOM

Moderator: Peak Woo, MD FACS, New York, NY

10:30 **Inpatient Vocal Fold Medialization for Postoperative Vocal Fold Movement Impairment Following Extent I and II Thoracic Aortic Aneurysm Repair**
Diane W. Chen, MD, Houston, TX; Ankita Patro, BS, Houston, TX; Nelson E. Liou, MD, Houston, TX; Donald T. Donovan, MD, Houston, TX; Julina Ongkasuwan, MD, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize postoperative laryngologic complications following thoracic surgery and discuss treatment options for vocal fold movement impairment in the inpatient setting.

Objectives: Vocal fold movement impairment (VFMI) due to neuronal injury is a known complication following thoracic aortic dissection or aneurysm repair that can impair pulmonary toilet function and recovery. This study reports clinical outcomes of patients undergoing medialization for VFMI in the inpatient setting after aortic surgery. **Study Design:** Retrospective cohort study. **Methods:** A 10 year review (2005-2014) of 213 patients with postoperative VFMI sampled from an institutional aortic surgery registry was conducted. Data included demographics, surgery characteristics, laryngologic

evaluation, postoperative complications, LOS, and mortality. VFMI was diagnosed after flexible nasolaryngoscopic visualization for patients who presented with postoperative dysphonia. Vocal fold medialization procedures consisted of type 1 thyroplasty and injection laryngoplasty. Patients with extent III or IV repair, outpatient medialization or no laryngoscopic exam were excluded. Statistical analysis was performed via SPSS. **Results:** Of the 197 VFMI patients (median age 60, 70% male) who met study criteria, 195 (98%) had left VFMI. Inpatient medialization was performed for 149 (75%) patients with median time-to-medialization of 7 days from surgery. For the medialization group, 51 (34%) had pulmonary complications with the most prevalent being reintubation due to respiratory failure (17%) and need for therapeutic bronchoscopy (17%), followed by aspiration pneumonia (3%) and tracheostomy (9%). Patients who underwent medialization had fewer pulmonary complications compared to patients without VFMI (p=0.02). Median hospital LOS at 13 days and 11 days, respectively, did not significantly differ between patients with normal vocal fold mobility and patients who underwent medialization (p=0.33). **Conclusions:** Patients with postoperative VFMI who underwent inpatient medialization did not demonstrate an increased risk for pulmonary complications after aortic arch surgery. Further prospective studies on timing and technique of inpatient medialization are warranted.

10:37 **Development of Otolaryngology Flexible Bronchoscopy Skills and Tasks Assessment Tool (BSTAT)**

Karuna Dewan, MD, Los Angeles, CA; Dinesh K. Chhetri, MD, Los Angeles, CA; Avraham H. Mendelsohn, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the key skills necessary to perform flexible bronchoscopy and understand the value of simulation.

Objectives: Flexible bronchoscopy is an essential skill for otolaryngologists and is often required in cases of airway emergency or impending obstruction. However, otolaryngology training curriculums do not routinely offer training opportunities in the non-emergent setting of this critical skill. In this study we aim to develop a training curriculum specifically for flexible bronchoscopy along with the evaluation of objective skills assessment tool for adaptive learning curves. **Study Design:** This is a prospective resident training experience. **Methods:** Prospective resident training experience utilizing the bronchoscopy trainer. **Results:** Ten otolaryngology residents of varied experience level are asked to perform three tasks on the bronchoscopy simulator. The three tasks include flexible bronchoscopy, removal of foreign body and biopsy of a tracheal lesion. The training group is compared to four expert faculty otolaryngologists based on time to task completion as well as their scores on a novel bronchoscopy skills and tasks assessment tool (BSTAT). Additionally two independent evaluators assess the bronchoscopy skills. The participants scoring in the lower 50th percentile on the BSTAT then undergo a flexible bronchoscopy teaching module in which they are allowed to practice with the simulator which provides immediate feedback, along with instruction from faculty supervisor. Bronchoscopy skills are then compared with pre-training levels. **Conclusions:** Given the importance of competency based assessment and adaptive learning in today's postgraduate training, the incorporation of a flexible bronchoscopy skill trainer and assessment tool will also be a critical aspect in resident education. Herein we describe early experience with a novel curriculum and availability of adaptive training methods for flexible bronchoscopy.

10:44 **Isolated Neurosarcoidosis Presenting as Unilateral or Bilateral Vocal Fold Paralysis**

Tara J. Wu, BA, San Francisco, CA; Sean M. Lewis, MD, New York City, NY; Peak Woo, MD, New York City, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to describe a rare initial presentation of isolated neurosarcoidosis with vagal paralysis. They should explain the appropriate workup and clinical course for a patient with potentially severe and progressive laryngeal symptoms. Participants should know the mechanism of vocal cord paralysis in the setting of neurosarcoidosis. They should perform and compare followup laryngeal examinations over the course of disease, with and without surgical management.

Objectives: Neurosarcoidosis (NS) affecting the central nervous system occurs in 5-13% of sarcoidosis cases, while isolated NS represents only 1% of cases. Diagnosis from laryngeal manifestation is unusual because 50% of all NS patients are diagnosed prior to systemic sarcoid presentation. No case of isolated NS presenting initially as vocal cord paralysis has been reported. **Study Design:** We report a case series of three patients who presented with unilateral or bilateral vocal fold paralysis in the setting of NS. **Methods:** The presenting symptoms, diagnosis, clinical course, detailed laryngeal findings from laryngoscopy and laryngeal electromyography (EMG), and operative results are discussed. **Results:** Isolated NS presented initially as idiopathic left vocal cord paresis, with two cases progressing to bilateral vocal cord paralysis. Paralysis was attributed to high vagal injury on laryngeal EMG. Diagnosis was made with correlative brain MRI findings and biopsy. All cases showed basilar meningeal inflammation on brain MRI. Isolated NS was associated with progressive vagal injury, including severe dysphonia, pharyngeal paresis with dysphagia, and palatal weakness. This led to recurrent aspiration pneumonias in one patient. In all three cases, voice symptoms improved minimally with steroids. Injection laryngoplasty or medialization laryngoplasty provided better improvements in voice quality but not swallow. **Conclusions:** This case series is the first to report isolated NS presenting with unilateral or bilateral vocal cord paralysis. Vagal paralysis due to NS can lead to severe medical complications (recurrent aspiration pneumonias) and impairments in quality of life (aphonia or dysphagia requiring PEG). Otolaryngologists must be ready to diagnose and manage laryngeal

NS manifestations.

10:51 **Continuous Quality Improvement: Reevaluating a Standardized Sedation Wean Protocol Following Pediatric Laryngotracheal Reconstruction**
Sarah N. Bowe, MD, Boston, MA; Alessandra Colaianni, MD, Boston, MA; Christopher J. Hartnick, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the Institute for Healthcare Improvement's guide to implementing system wide change and apply the basic principles within their own healthcare settings to initiate process redesign.

Objectives: Pediatric laryngotracheal reconstruction has evolved to include a variety of surgical techniques including rib cartilage grafting. Perioperative management with adequate sedation and analgesia with or without neuromuscular blockade is vital to success. Using principles of continuous quality improvement, we will discuss 1) process and outcome failures in our standardized sedation wean protocol; and 2) step by step redesign to improve patient safety and satisfaction. **Study Design:** Cross-sectional analysis. **Methods:** A standardized sedation wean protocol was previously developed and instituted in February 2013. To address notable healthcare system wide issues, Institute for Healthcare Improvement methodology was utilized to form a team, identify opportunities for improvement, develop clear aims, design and test standard work for key changes, and identify failures and redesign the process, display measures over time, and implement and spread the revised process. **Results:** Due to implementation of a new electronic medical record system, the previous standalone wean document was no longer accessible, resulting in roadblocks to communication and medication ordering. Increased readmissions for withdrawal symptoms were also noted. A team comprised of otolaryngologists, intensivists, hospitalists, nurses, pharmacists, and family members of a readmitted patient was formed. Notable improvement opportunities, including the development of a standardized electronic order set, as well as incorporation of parental behavioral assessment to assist with tailoring of the wean schedule will be provided. **Conclusions:** Quality improvement is meant to be a continuous process in which reevaluation of standard care practices is regularly performed. System wide redesign can be achieved using a formal methodological approach.

10:58 **Revisits after Pediatric Tracheotomy: Airway Concerns Result in Returns**
Sophie Grace Shay, MD, Los Angeles, CA; Nina L. Shapiro, MD, Los Angeles, CA; Neil Bhattacharyya, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to cite reasons why pediatric patients with tracheotomy return to the hospital or emergency department following discharge. Participants should be able to discuss areas of care for pediatric patients with tracheotomy that need to be targeted to minimize postoperative complications and readmissions.

Objectives: Investigate the incidence and characteristics of revisits following pediatric tracheotomy. **Study Design:** Cross-sectional study using national databases. **Methods:** The State Inpatient Databases and State Emergency Department Databases for California, Florida, Iowa and New York 2010-2011 were linked and examined for cases of pediatric tracheotomy and corresponding subsequent 30 day post-discharge revisits. Demographic and descriptive data were analyzed determining the revisit rate, revisit diagnoses, procedures, and discharge dispositions. **Results:** 2248 pediatric tracheotomy cases were extracted (60.6% male, mean age 8.3 years). There were 373 inpatient or emergency department revisits (30 day revisit rate, 16.6%), of which 34.3% occurred in the first day after discharge. Of these 59.2% were inpatient readmissions. There were ≤ 10 deaths during these revisits (30 day revisit mortality rate, ≤ 2.7%). The most common primary revisit diagnoses were "fitting of prosthesis and adjustment of devices" (25.7%, likely representing adjustment/replacement of the tracheotomy tube), respiratory failure (11.0%), intracranial injury (5.4%), pneumonia (4.0%), "other upper respiratory disease" (3.8%), and "complications of surgical procedures or medical care" (3.8%). The most common revisit procedures were endotracheal intubation (11.4%), mechanical ventilation (8.8%), and replacement of tracheostomy tube (2.4%). Children discharged to a skilled care facility (47.1%) were more likely than those discharged to home (52.9%) to have a revisit (23.3% versus 12.0%, respectively; $p<0.001$). **Conclusions:** As a particularly vulnerable population, children undergoing tracheotomy have a substantial 30 day revisit rate, most notably during the first day after discharge, often involving tracheotomy tube or pulmonary complications. Improvements in discharge planning should target prevention of these complications.

11:05 **Laryngectomy and Smoking: An Analysis of Postoperative Risk**
Jacob S. Brady, BA, Newark, NJ; Meghan M. Crippen, MS, Newark, NJ; Andrey Filimonov, PharmD, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ; Soly Baredes, MD, Newark, NJ; Richard C. Park, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to evaluate smoking's impact on postoperative complications after undergoing a laryngectomy.

Objectives: To investigate the association between smoking and complication rates following laryngectomy. **Study Design:** Retrospective analysis using the National Surgical Quality Improvement Program (NSQIP) database. **Methods:** NSQIP was queried for all laryngectomies between 2005 and 2014. Patients were identified as smokers (n=676) or non-smokers (n=582) and compared via univariate and multivariate analyses. A propensity score generating algorithm was used to build a subpopulation (n=688) of matched cases based on significantly associated comorbidities and evaluated in a similar manner. Additionally pack year data was available for select cases and analyzed appropriately. **Results:** Smoking was found to be significantly associated with increased rates of wound disruption (RR=1.68, p=0.041) and surgical complications (RR=1.19, p=0.041) as well as decreased rates of medical complications (RR=0.71, p=0.019). However, on multivariate analysis accounting for age, sex, race, and significant comorbidities, smoking was found to be an independent risk factor for wound disruption (OR 4.458, p=0.046). In the propensity matched population smoking remained associated with wound disruption on both univariate (RR 1.92, p=0.045) and multivariate (OR 11.67, p=0.029) analysis. Pack year data was available for 396 patients. Postoperative ventilation for more than 48 hours, sepsis, and overall medical complications were significantly associated with >40 pack years of smoking. **Conclusions:** Smoking plays a significant role in wound disruption following laryngectomy and on extensive analysis the strength of this association increases with the deceasing influence of confounders. Additionally, rates of postoperative ventilation, sepsis, and medical complications significantly increase with increasing pack years of smoking.

11:12 **A Validation Study of a Silver Oxide Dual Valve Voice Prosthesis Designed for Tracheoesophageal Voice Restoration Following Total Laryngectomy**

Benjamin P. Brownlee, BS, Oklahoma City, OK; Saniya Ahmad, MD, Oklahoma City, OK; Tracy L. Grammer, MS CCC-SLP, Oklahoma City, OK; Greg A. Krempl, MD, Oklahoma City, OK

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the effectiveness of the dual valve voice prosthesis to the single valve voice prosthesis and discuss the benefits of using the dual valve voice prosthesis in select laryngectomy patients who have experienced early valve failure.

Objectives: A dual valve voice prosthesis is one in which valves are located at both the tracheal and esophageal ends of the prosthesis shaft. This study compares the overall durability, speech pressure, and speech quality achieved by the dual valve to those achieved by the single valve prosthesis currently used in a select population of patients who have demonstrated early valve failure. **Study Design:** Prospective phase IV study. **Methods:** Fourteen patients were asked to respond to questions about speech pressure and quality with their single valve prostheses. A total of seventeen dual valves were inserted during routine visits for valve replacement. The time intervals from insertion to replacement and the subjectively measured speech quality and speech pressure for the dual valve were compared to results from use of the single valve prostheses. **Results:** Mean duration of the single valve was 60 days with a standard deviation of 52 days, and median duration was 51 days with a standard deviation of 52 days. Mean duration of the dual valve was 164 days with a standard deviation of 156 days, and median duration was 84 days with a standard deviation of 151 days. Both sets of data were statistically significant, with mean P-value of 0.0169 and a median P-value of 0.0131. Speech pressure was increased in two patients (14.3% of patients). Speech quality was not significantly affected. **Conclusions:** In our study, the Blom-Singer dual valve prosthesis increased the longevity of valve life in select patients without significantly altering speech pressure and quality for 85.7% of patients.

11:19 **Quality Indicators of Laryngeal Cancer Care in Commercially Insured Patients**

Christopher J. Britt, MD, Baltimore, MD; Hsien-Yen Chang, PhD, Baltimore, MD; Harry Quon, MD, Baltimore, MD; David W. Eisele, MD, Baltmore, MD; Kevin D. Frick, PhD, Baltimore, MD; Christine G. Gourin, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the associations between quality, complications, and costs in commercially insured patients <65 years of age treated for laryngeal cancer.

Objectives: To examine associations between quality, complications, and costs in commercially insured patients treated for laryngeal cancer. **Study Design:** Retrospective cross-sectional analysis of MarketScan Commercial Claim and Encounters data. **Methods:** We evaluated 10,969 patients diagnosed with laryngeal cancer from 2010-2012 using cross-tabulations and multivariate regression. Using quality indicators derived from guidelines for recommended care, summary measures of quality were calculated for diagnosis, initial treatment, surveillance, treatment for recurrence, performance, and an overall summary measure of quality. **Results:** High quality care in the initial treatment period was associated with lower odds of short term mortality (OR=0.21, 95% CI [0.04-0.98]), surgical complications (OR=0.39 [0.17-0.88]), and medical complications (OR=0.68 [0.49-0.96]). The overall summary measure of quality was not associated with cost differences. Mean incremental 1 year costs were higher for high quality diagnosis ($20,126 [$14,785-$25,466]), initial treatment ($17,918 [$10,481-$25,355]), and surveillance ($25,424 [$20,014-$30,834]) quality indicators, while costs were lower for higher quality performance measures (-$45,723 [-$56,246- -$35,199]) after controlling for all other variables. Among surgical patients lower costs were observed for high quality initial treatment ($-37,303 [-$68,832- -$5,775]) while nonoperative treatment was associated with higher costs for high quality initial treatment ($26,742 [$18,614- $34,871]). **Conclusions:** High quality larynx cancer care in commercially insured patients was associated with lower short term

mortality and morbidity and lower costs associated with high quality performance, but was associated with higher costs for high quality diagnosis, treatment, and surveillance. High quality initial treatment was associated with lower costs for surgical treatment and higher costs for nonoperative treatment. These data have implications for defining value in an era of healthcare reform.

11:26 **Q&A**

11:30 - 12:25 **GASTROESOPHAGEAL REFLUX TREATMENT: PROBLEMS WITH MEDICAL AND SURGICAL TREATMENT OPTIONS**
Moderator: **Seth H. Dailey, MD, Madison, WI**
Panelists: Joel H. Blumin, MD FACS, Milwaukee, WI
H. Peter Doble II, MD FACS, Twin Falls, ID
C. Gaelyn Garrett, MD MMHC, Nashville, TN

12:25 **Q&A**

12:30 **ADJOURN SESSIONS**

AFTERNOON & EVENING - LEISURE OR ACTIVITIES - ALL ATTENDEES

12:30 **GOLF OUTING (pre-registration required) - Audubon Golf Club**

12:45 - 1:30 **TRIOLOGICAL THESIS SEMINAR (pre-registration required)**

1:00 - 2:15 **RESIDENT BOWL (pre-registration required)**

12:45 - 2:45 **PHYSICIAN/SCIENTIST MEETING (by invitation)**

12:45 **NOLA Tours - Mardi Gras World, walking tours (attendees on their own)**

2:30 - 6:00 **AMERICAN SOCIETY OF GERIATRIC OTOLARYNGOLOGY SCIENTIFIC SESSION (registration with ASGO required)**

Friday

SATURDAY, JANUARY 21

7:00 - 7:50 **Business Meetings (Fellows Only)**
Eastern Section - Borgne (3rd floor)
Middle Section - Maurepas (3rd floor)

7:30 **Attendee Breakfast with Exhibitors**

8:00 - 9:45 GENERAL SESSION - NAPOLEON AB

8:00 **Announcements by Vice Presidents**
Introduction of Vice Presidents-Elect by Section Vice Presidents

8:05 - 9:30 **THE LATEST AND THE GREATEST**
Moderator: Ronald G. Amedee, MD FACS, New Orleans, LA
Panelists: **Novel Drug Delivery Vehicles to the Ear**
Daniel I. Choo, MD FACS, Cincinnati, OH
Hybrid Cochlear Implants Long Term Result: A Look into the Future
Bruce J. Gantz, MD FACS, Iowa City, IA
Eustachian Tube Ballooning
Dennis S. Poe, MD PhD FACS, Boston, MA
Vagal Stimulation during Thyroidectomy
Gregory W. Randolph, MD FACS, Boston, MA

9:30 - 10:00 ***Break with Exhibitors/View Posters -*** *Napoleon CD*

10:00 - 12:00 CONCURRENT SESSION 5A GENERAL & HEAD & NECK - NAPOLEON AB

10:00 - 11:00 **SHARED DECISIONS: CAN HEAD AND NECK SURGEONS DO IT BETTER?**
Moderator: Jonas T. Johnson, MD FACS, Pittsburgh, PA
Panelists: William B. Armstrong, MD FACS, Irvine, CA
Carol R. Bradford, MD FACS, Ann Arbor, MI
Dale H. Brown, MD, Toronto, ON
Mark S. Persky, MD FACS, New York, NY

11:00 **Q&A**

Moderator: Daniel G. Deschler, MD FACS, Boston, MA

11:05 **Lawrence Boies, MD Resident Research Award (Middle Section)**
Incidence and Complications of Postoperative Hemorrhage after Transoral Robotic Surgery
Joseph Zenga, MD, St. Louis, MO; Jasmina Suko, BA, St. Louis, MO; Patrik Pipkorn, MD, St. Louis, MO; Brian Nussenbaum, MD, St. Louis, MO; Kallogjeri Dorina, MD MPH, St. Louis, MO; Ryan S. Jackson, MD, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the incidence of postoperative hemorrhage after TORS and understand the complications related to postoperative hemorrhage along with risk factors and some possible preventative measures.

Objectives: To investigate the incidence and complications related to postoperative hemorrhage (POH) after TORS. **Study Design:** Retrospective review of the State Inpatient Database (SID), the State Ambulatory Database (SASD), and the State Emergency Department Database (SEDD) from the Healthcare Cost and Utilization Project (HCUP). **Methods:** Patients were identified from the SID, SASD, and SEDD for the states of Florida, New York, and California from 2005 to 2015 who had an ICD-9 code for a surgical procedure on the upper aerodigestive tract in association with a code for robotic assisted surgery. **Results:** Five hundred nine

patients underwent TORS. Mean age was 60 years and 361 (71%) were male. Indications for surgery included neoplastic disease in 452 (89%) and sleep apnea in 74 (15%). Forty-one (8%) patients had an episode of POH at a median of 9 days postoperatively (range 0 to 21 days). Twenty-four (5%) patients required an intervention related to their POH. Sixteen (3%) required return to the operating room for control of hemorrhage while 11 (2%) had a severe complication which included embolization or tracheostomy. In univariable analysis, only a Charlson Comorbidity Score of 3 or greater was significantly associated with postoperative hemorrhage (OR 3.02, 95% CI 1.45-6.30). **Conclusions:** The incidence of postoperative hemorrhage after TORS was low and few of these patients had a severe complication related to this event. Medical comorbidity may be an independent risk factor for postoperative hemorrhage. These data provide a benchmark for informed decision making in TORS and a basis for further study.

11:12 **The Efficacy of Elective Neck Dissection in Maxillary Sinus Squamous Cell Carcinoma**

Neel R. Sangal, BA, Newark, NJ; Yung-Jae Lee, BA, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ; Soly Baredes, MD, Newark, NJ; Richard C. Park, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to determine who may benefit from an elective neck dissection in patients with maxillary sinus squamous cell carcinoma.

Objectives: This study is designed to analyze the role and survival benefits of elective neck dissection (END) in patients with node negative maxillary sinus squamous cell carcinoma (MS-SCC). **Study Design:** The aim of this retrospective database study was to evaluate whether an elective neck dissection improves survival in patients with MS-SCC. **Methods:** This study is a population based, retrospective database analysis of patients diagnosed with N0M0 MSCC from 2004-2013. Data were acquired from the Surveillance, Epidemiology, and End Results (SEER) database. Kaplan-Meier and Cox regression models were used to analyze survival outcomes. **Results:** There were a total of 927 MS-SCC cases found within the database between 2004 and 2013. Out of this cohort, 624 underwent surgical therapy for their maxillary cancer. An END was performed in 153 of these patients, while the rest only had surgery at the primary site. Statistically significant improvements in 5 year disease specific survival were seen in univariate Kaplan-Meier analysis. When performing a Cox multivariate regression to account for cofounders, END was found to improve survival in patients with moderately differentiated (HR=0.308, p=.003), AJCC T-stage III (HR=0.406, p=.035) and IVa (HR=0.475, p=.017) tumors. Interestingly there has been a statistically significant increase in the percentage of MS-SCC surgeries that have been accompanied by END since SEER started collecting this data (p=.004). **Conclusions:** END improves disease specific survival in patients with moderately differentiated and advanced T-stage (AJCC TIII & TIVa) MS-SCC. Therefore, surgeons performing maxillectomies should consider an elective neck dissection for those with advanced T stages.

11:19 **Racial and Socioeconomic Disparities in Salivary Gland Malignancy Treatment Outcomes**

Ayaka J. Iwata, MD MS, Detroit, MI; Amy M. Williams, PhD, Detroit, MI; Andrew R. Taylor, MA, Detroit, MI; Steven C. Chang, MD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the effect of race, gender, and socioeconomic status on survival outcomes of patients with salivary gland malignancies.

Objectives: Race has been reported to influence the survival of patients with salivary gland malignancies (SGMs). However, African Americans often constitute a minority of the patients in these studies, and the data on effect of treatment on survival has been scant. This study sought to determine whether racial and socioeconomic disparities in 5 and 10 year survival outcomes exist for patients with SGMs treated at a single large academic institution with a large African American population. **Study Design:** A retrospective cohort study was performed of all patients with SGMs, from January 1990 to December 2015, from a large academic medical center. **Methods:** Data extracted includes age, race, gender, primary site of malignancy, mode of treatment, clinical staging, surgical pathology, post-treatment survival, median household income, percentage above or below poverty level, and education level based on census tract and block information from the U.S. census data. Standard statistical analysis was performed using Kaplan-Meier survival curve analysis and Cox proportional hazard models. **Results:** There were a total of 117 males and 115 females. Overall survival was performed relative to socioeconomic factors, demographics, and pathology. Preliminary data demonstrated that African Americans with SGMs who received treatment had approximately a 15% higher probability of survival at 10 years compared to non-African Americans who received treatment. Females had approximately a 20% higher probability of survival at 10 years compared to males. **Conclusions:** This study, to date, is the first study that identifies the African American race and female gender as positive predictors of survival amongst patients with SGMs.

11:26 **Oral Sensory Dysfunction Following Radiotherapy**

Shethal Bearelly, MD, Nashville, TN; Steven J. Wang, MD, Tucson, AZ; Steven W. Cheung, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to further understand the impact of radiation therapy on oral tactile sensation.

Objectives: To assess differences in oral tactile sensation between subjects who have undergone radiation therapy (XRT) compared to healthy controls. **Study Design:** Cross-sectional cohort comparison. **Methods:** 34 subjects with a history of XRT were compared with 23 healthy controls. There was no difference in age (p = 0.23), but there were slightly more males in the XRT cohort (p = 0.03). The mean time after XRT completion was 3.84 years (SD 4.84). 56% of the XRT group received chemotherapy. Using our previously validated methodology to measure oral tactile sensory threshold quantitatively with Cheung-Bearelly monofilaments, sensory thresholds of 4 subsites (anterior tongue, buccal mucosa, posterior tongue, soft palate) were compared for the two cohorts. **Results:** Site by site comparisons showed higher threshold forces needed for stimulus detection in the oral cavity and oropharynx among subjects in the XRT cohort compared to healthy controls. Mean force (grams) and standard deviation (SD) for XRT versus control cohorts were: anterior tongue - 0.39 (1.0) vs 0.02 (0.006); buccal mucosa - 0.42 (0.94) vs 0.06 (0.05); posterior tongue - 0.76 (1.46) vs 0.10 (0.07); soft palate - 0.86 (1.47) vs 0.08 (0.05); p < 0.001 for all comparisons. Combining all 4 subsites to assess an overall level of oral tactile dysfunction into a single metric, the XRT cohort had reduced sensation by 9.7 dB (p < 0.001). **Conclusions:** After radiation therapy, the oral cavity and oropharynx exhibit global tactile sensory dysfunction, manifested by increased tactile forces required for stimulus detection. The magnitude of change is on the order of 10 dB.

11:33 **Utility of Preoperative Fine Needle Aspiration in Guiding Surgical Management of Parotid Gland Lesions**

Danielle F. Eytan, MD, Baltimore, MD; Linda Yin, BA, Baltimore, MD; Zahra Maleki, MD, Baltimore, MD; Ralph P. Tufano, MD MBA, Baltimore, MD; David W. Eisele, MD, Baltimore, MD; Christine G. Gourin, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the diagnostic accuracy and utility of FNA in parotid neoplasms.

Objectives: Preoperative fine needle aspiration (FNA) of parotid lesions is often used to guide surgical decision making, but remains controversial with varying accuracy and sensitivity reported. We sought to evaluate the role of preoperative FNA in guiding surgical management. **Study Design:** Retrospective study. **Methods:** The medical records of patients who underwent parotidectomy at a single tertiary medical center were reviewed from 2000-2015. Patients who had a preoperative FNA comprised the study cohort. **Results:** A total of 1074 consecutive patients underwent parotidectomy during the study period. Of these, 477 had a preoperative FNA and comprised the study population. FNA was nondiagnostic in 26 cases. There were 16 false positives (3.5%), 42 false negatives (9.3%), 121 true positives (26.8%), and 272 true negatives (60.3%). The sensitivity and specificity of FNA were 74.2% and 94.4%, respectively, with a positive predictive value of 88.3% and a negative predictive value of 86.6%. The overall accuracy of preoperative FNA was 82.4%, including nondiagnostic cases. The preoperative FNA resulted in a change in the surgical plan in 79 (17.5%) of cases. In 68 cases (15.1%) surgery was extended to include neck dissection at time of resection, in 6 cases (1.3%) FNA led to surgical management over surveillance, and in 5 cases (1.1%) FNA helped to limit the extent of surgery needed to an excisional biopsy. **Conclusions:** Preoperative FNA is a valuable adjunct in the surgical management of parotid lesions with high specificity for the detection of malignant disease.

11:40 **Desmoplastic Melanoma of the Head and Neck: Incidence and Survival 1992-2013**

Fatima Khan, BS, Rochester, NY; Alexis Strohl, MD, Syracuse, NY; Paul D. Allen, PhD, Rochester, NY; Timothy Doerr, MD, Rochester, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the incidence, survival, and prognostic factors surrounding desmoplastic melanoma of the head and neck; describe and understand the variations in survival amongst desmoplastic melanoma of the head and neck, conventional melanoma of the head and neck, and desmoplastic melanoma of other sites.

Objectives: To describe the epidemiological characteristics and survival of desmoplastic melanoma of the head and neck (DMHN) and discuss the factors influencing survival variation among DMHN, DM of other sites (DMnHN) and conventional melanoma of the head and neck (CMHN). **Study Design:** Retrospective cohort study using the Surveillance, Epidemiology, and End Results (SEER) registry (years 1992- 2013). **Methods:** Incidence and survival data for patients with DMHN, DMnHN, and CMHN were obtained from the SEER 13 and 18 databases for the years 1992-2013. Kaplan-Meier and Cox proportional hazards regression models were used to calculate survival outcomes. **Results:** 1095 patients with DMHN, 1139 patients with DMnHN and 41,352 patients with CMHN were identified from SEER 18. Patients with DMHN were diagnosed at greater Breslow thickness (P<0.001), stage (P<0.001), and Clark's level (P<0.001) compared to DMnHN and CMHN. Kaplan-Meier survival analysis demonstrated disease specific survival (DSS) at 5- and 10- years for DMHN to be 80.5% and 74.7%, respectively, compared with 89.1% and 86%, respectively, for DMnHN and 88.1% and 83%, respectively, for CMHN (log- rank test; P <0.001). On multivariate Cox regression analysis, Breslow depth >4.00 mm (P=0.006), lymph node status (P<0.001) and presence of ulceration (P<0.001) were found to be independent predictors of DSS for DMHN. **Conclusions:** The increasing incidence and poor survivability of DMHN compared to DMnHN and CMHN is parsimoniously explained by the later stage of disease and depth of invasion at diagnosis, highlighting the importance of improved diagnosis and awareness of DMHN.

11:47 **A Modular Polymer Platform that Delivers Recombinant Cytokines and Cisplatin Allows for De-escalation of Radiation Therapy in an Animal Model of Head and Neck Squamous Cell Carcinoma**

Maie A. St. John, MD PhD, Los Angeles, CA; Zachary D. Taylor, PhD, Los Angeles, CA; Warren L. Grundfest, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand a novel modality for local drug delivery and de-escalation of RT requirements.

Objectives: To evaluate the safety and efficacy of a novel modular polymer platform for head and neck squamous cell carcinoma (HNSCC). 50% of HNSCC patients fail primary management, and salvage of patients with recurrent disease is of paramount importance. We had previously shown the antitumor efficiency of this novel polymer in delivering chemokines (CCl21) and cisplatin in an animal model of SCCHN. Here we evaluate the safety and efficacy of this polymer in combination with radiation therapy (RT) in an effort to see if this combination allows for a de-escalation of RT. **Study Design:** Animal model. **Methods:** SCCVII/SF tumors were established in in C3H/HeJ mice. Tumors were then treated with either: 1) no polymer; 2) plain polymer; 3) CCl21-polymer; 4) cisplatin polymer; and 5) combination CCl21 and cisplatin secreting polymer. The mice were then treated with three different doses of RT. Tumor size was measured every day until the mice were euthanized. Four weeks later, necropsy was performed to evaluate for vascular or nerve damage and to assess tumor size and weight. **Results:** Cisplatin-polymer, CCL21-polymer and the combination CCl21-cisplatin polymer effectively reduced SCCVII/SF tumors in the C3H/HeJ mice by over 16 fold ($P < 0.01$) as compared to control and plain polymer groups. Additionally, treatment with cisplatin-polymer, CCL21-polymer and the combination CCl21-cisplatin polymer allowed for a 4 fold reduction in the dose of RT required. Histopathology revealed no adverse tissue effects when the cisplatin-polymer was inserted in direct contact with the carotid artery, jugular vein or vagus nerve. **Conclusions:** Cisplatin-polymer, CCL21-polymer and the combination CCl21-cisplatin polymer effectively reduced SCCVII/SF tumors in the C3H/HeJ mice by over 16 fold ($P < 0.01$) as compared to control and plain polymer groups. Additionally, treatment with cisplatin-polymer, CCL21-polymer and the combination CCl21-cisplatin polymer allowed for a 4 fold reduction in the dose of RT required. Histopathology revealed no adverse tissue effects when the cisplatin polymer was inserted in direct contact with the carotid artery, jugular vein or vagus nerve.

11:54 **Q&A**

12:00 - 1:00 ***Lunch/Visit Exhibits/View Posters -*** *Napoleon CD*

10:00 - 12:00 CONCURRENT SESSION 5B
OTOLOGY/NEUROTOLOGY - RHYTHMS BALLROOM

Moderator: Peter A. Weisskopf, MD FACS, Phoenix, AZ

10:00 **Clinical Implications of Preoperative Cochlear Implant Evaluations in Noise**

Emily A. Franko-Tobin, BS, Charleston, SC; Kathryn L. Kreicher, BA, Charleston, SC; Elizabeth L. Camposeo, AuD, Charleston, SC; Meredith A. Holcomb, AuD, Charleston, SC; Ted A. Meyer, MD PhD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss implications of performing cochlear implant evaluations in quiet and in background noise and what has been published in the literature.

Objectives: 1) Conduct a systematic review of preoperative CI sentence testing in background noise; and 2) review our practice and clinical outcomes for patients who have been evaluated preoperatively in background noise. **Study Design:** Systematic review of literature and retrospective chart review. **Methods:** Multiple databases were searched for studies reporting pre and postoperative CI sentence testing (English) in background noise. A retrospective chart review of adults with standard CIs unilaterally implanted at our institution was conducted to obtain preoperative and 12 month postoperative speech perception data. **Results:** Five studies were included in systematic review. The chart review included 193 adults. Patients were evaluated in quiet with either HINT sentences at 70 dB (n=55), HINT sentences at 60 dB (n=31), or AZBio sentences at 60 dB (n=87). The remaining 20 patients were tested in noise with AzBio sentences at 60 dB (+10 dB SNR). All groups performed significantly better on speech recognition measures with a CI postoperatively ($p<0.001$). All but 5 patients performed better postoperatively on the same sentence test used preoperatively (3 patients evaluated in quiet 2 in noise). Patients who were tested with AZBio sentences in noise improved from 13.8% preoperatively to 51.4% postoperatively. These patients also scored 79.9% on AzBio sentences in quiet postoperatively. **Conclusions:** Preoperative CI evaluation using AzBio sentences presented in noise (+10 dB S/N) more realistically represents day to day communication. Significant performance improvements occur postoperatively for nearly all patients undergoing cochlear implantation. Patients who meet criteria at +10 dB S/N should be considered for cochlear implantation.

10:07 **Greater Angular Depth of Insertion Is Associated with Better Speech Perception in Patients Implanted with MED-EL Electrode Arrays**

Brendan P. O'Connell, MD, Nashville, TN; Jacob B. Hunter, MD, Nashville, TN; David S. Haynes, MD, Nashville, TN; Matthew M. Dedmon, MD PhD, Nashville, TN; Jack H. Noble, PhD, Nashville, TN; George B. Wanna, MD, Nashville, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to better understand differences in angular insertion depths for lateral wall electrodes made by a single device manufacturer. The audience will also gain insight into the relationship between angular insertion depth and audiologic outcomes after cochlear implantation.

Objectives: 1) Examine angular insertion depths and scalar location of MED-EL lateral wall electrodes; and 2) determine the relationship between angular insertion depth and postoperative speech perception while controlling for scala tympani electrode position. **Study Design:** Retrospective review of prospectively acquired data. **Methods:** Post-lingually deafened adults undergoing cochlear implantation with MED-EL Flex 24, Flex 28, and standard electrode arrays were identified. Patients underwent preoperative and postoperative CT scans, such that electrode location and angular insertion depth could be determined. The primary outcome measures of interest were 1) scalar electrode location, 2) angular insertion depths, and 3) speech perception performance 1 year postoperatively. **Results:** Forty patients (48 implants) were included for analysis. All electrode arrays (48/48) were positioned entirely within the scala tympani. The median angular insertion depth was 408° (IQ range 373-449°) for Flex 24 electrodes, 575° (IQ range 465-584°) for Flex 28 electrodes, and 584° (IQ range 368-643°) for standard electrode arrays. Speech perception was assessed at an average of 11.7±2.4 months postoperatively. The average postoperative CNC score was 43.7% ±21.9. A positive correlation was observed between greater angular insertion depths and better CNC performance ($r=0.48$, $p<0.001$). Age at implantation ($r= -0.23$, $p=0.10$), preoperative residual hearing ($p=0.16$), and postoperative hearing preservation ($p=0.45$) did not significantly impact postoperative CNC scores. **Conclusions:** Favorable rates of scala tympani insertion were observed with Flex 24, Flex 28, and standard electrodes. While neither preoperative residual hearing nor postoperative functional hearing preservation were associated with speech perception performance, a highly significant correlation between greater angular insertion depth and CNC score was observed.

10:14 **Can Electrocochleography Help Predict Cochlear Implant Speech Perception Outcomes in Children with Auditory Neuropathy Spectrum Disorder?**

Tatyana E. Fontenot, MD, Chapel Hill, NC; Christopher K. Giardina, BS, Chapel Hill, NC; Holly F.B. Teagle, AuD, Chapel Hill, NC; Kevin D. Brown, MD PhD, Chapel Hill, NC; Harold C. Pillsbury, MD, Chapel Hill, NC; Douglas C. Fitzpatrick, PhD, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role of electrocochleography (ECochG) in predicting cochlear implant (CI) speech perception outcomes of children with auditory neuropathy spectrum disorder (ANSD).

Objectives: Assess how inner ear electrophysiology affects CI speech perception outcomes in children with ANSD. **Study Design:** Prospective cohort observational study. **Methods:** During CI procedure children with ANSD (<18 years old) underwent electrocochleography using 0.25-4kHz 90 dB nHL stimuli. Presence of the compound action potential (CAP) at the onset of response was noted and the total response (ECochG-TR) calculated as the sum of spectral peaks of responses across frequencies. PB-k was the outcome measure. Paired t-test and linear regression and Cook's distance analysis was performed using SPSS 24. **Results:** Thirty-three subjects meeting inclusion criteria had a mean PTA of 89.9±17.3 dB nHL and mean ECochG-TR of 14.97±15.7 dB re:1uV. Twenty-four (72.7%) achieved speech perception testing within average of 1.46±0.66 years with a mean PB-k score of 63.4±20.7%. Nine subjects failed to acquire speech perception despite mean of 3.19±1.05 years of experience with CI ($p=0.001$). A CAP was detected in 54.5% of the subjects' signals. Absence of a CAP predicted lack of speech perception acquisition with sensitivity of 0.67 (95% CI:0.31-0.91), specificity of 0.63 (95% CI:0.41-0.80). Negative predictive value was 0.83 (95% CI:0.58-0.96) and positive predictive value was 0.4 (95% CI:0.17-0.67). ECochG-TR accounted for 37.6% of score variability PTA accounted for 32.1% ($n=16$, $p=0.012$, $p=0.022$). Multivariable regression did not increase the R2. **Conclusions:** Children with ANSD have higher ECochG-TR values than previously reported average for pediatric CI recipients. Using CAP evidence of neural activity could be detected in more than half of these subjects and may be a good way to rule out individuals at low risk for poor outcomes with CIs.

10:21 **Shirley Baron Resident Research Award (Western Section)**
Automated Smartphone Audiometry: Validation of a Word Recognition Test Program

Nicholas Alexander Dewyer, MD, San Francisco, CA; Patpong Jiradejvong, MS, San Francisco, CA; Jennifer Henderson Sabes, AuD, San Francisco, CA; Charles J. Limb, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe this automated smartphone word recognition test and determine whether it accurately approximates clinical audiometric word

recognition testing.

Objectives: Develop and validate an automated smartphone word recognition test. **Study Design:** Cross-sectional case control diagnostic test comparison. **Methods:** An automated word recognition test was designed as an app for use on a smartphone with insert headphones. Patients with recent audiograms and various levels of hearing loss were recruited from an audiology clinic to take the app word recognition test. Word recognition scores from the app and gold standard clinical audiometry were compared. **Results:** Test scores for 37 ears were analyzed. Word recognition scores determined by the smartphone app and clinical audiometry were in agreement, with 86% of the data points within a clinically acceptable margin of error and a linear correlation value between test scores of 0.89. **Conclusions:** This automated smartphone app accurately determines word recognition scores.

10:28 **Audiometric and Otologic Phenotype in Children with Diabetes**

Kathryn L. Kreicher, BA, Charleston, SC; Ted A. Meyer, MD PhD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the prevalence, type of hearing loss, and otologic findings in children with diabetes mellitus.

Objectives: The purpose of this study was to evaluate hearing impairment in children with diabetes type 1 (DM1), type 2 (DM2), and secondary diabetes (SDM). **Study Design:** This is a retrospective analysis of the AudGen database generated by the Children's Hospital of Philadelphia. **Methods:** Audiograms were analyzed for type of hearing loss (HL), pure tone average (PTA), laterality, and change in hearing over time. Medical charts were reviewed to identify factors that influence development and progression of hearing loss. **Results:** 269 patients with diabetes (DM) were included in this study. 532 individual ears were tested (6 ears were not tested). Most recent audiogram was chosen for analysis (mean age = 13.2 years). 194 (36.5%) ears had hearing loss on most recent audiogram. 22.7% of ears with hearing loss were of moderate or worse in severity. The most common type of hearing loss was undefined (45.3%) followed by mixed (18.6%), conductive (16.5%), combined (13.9%), and sensorineural (5.7%). Mean PTA of ears in children with DM2 (34.9 ± 23.9 dB) and SDM (41.3 ± 32.2 dB) was significantly worse than in those with DM1 (25.7 ± 15.9 dB) (ANOVA, $F(3,173)= 4.415$, $p=0.005$). **Conclusions:** To the best of our knowledge, this is the largest comprehensive analysis of hearing loss in children with diabetes. Our data suggest that hearing loss is common in children with diabetes and greater among patients with DM2 and SDM than children with DM1. Children diagnosed with diabetes should be monitored closely for development of hearing loss.

10:35 **Systematic Review of Facial Nerve Outcomes after Middle Fossa Decompression versus Transmastoid Decompression for Bell's Palsy with Complete Paralysis**

Geoffrey C. Casazza, MD, Salt Lake City, UT; Seth R. Schwartz, MD MPH, Seattle, WA; Richard K. Gurgel, MD, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should be able to compare outcomes of transmastoid decompression versus middle fossa decompression for severe Bell's palsy with complete paralysis.

Objectives: The surgical timing and approach for patients with Bell's palsy and complete facial paralysis is controversial. A previous meta-analysis demonstrated no benefit from surgical decompression, however only transmastoid decompression (TMD) was investigated. No study has compared the outcomes of TMD to middle fossa decompression (MFD). **Study Design:** Systematic review of all studies reporting outcomes of MFD and TMD for severe Bell's palsy. **Methods:** A literature search was performed to identify all studies meeting inclusion criteria and published between 1985 and 2015. Mean final House-Brackmann (HB) scores were calculated and compared for TMD, MFD, and their respective nonoperative control populations. Studies were included if preoperative electroneurography showed > 90% facial degeneration in all patients. **Results:** Final HB scores for MFD and TMD were 1.97 and 2.24 respectively ($p = 0.025$). 75.24% of patients underwent MFD in ≤ 14 days, while TMD was performed between 15 and 120 days (2 studies did not report time to decompression). When MFD was performed at > 14 days final HB score was 2.58, vs. 2.24 for TMD ($p = 0.02$). Final HB scores for MFD vs. MFD nonoperative control were 1.97 vs. 2.50 ($p = 0.0014$) and final scores for TMD vs. TMD nonoperative control were 2.24 vs. 2.50 ($p = 0.25$). Final HB scores for MFD control vs. TMD control were 2.50 vs. 2.40 ($p = 0.63$). **Conclusions:** MFD is superior to TMD when performed under 14 days. Further studies are needed to investigate outcomes of TMD in less than 15 days and MFD in greater than 14 days.

10:42 **Malignant Otitis Externa Outcomes: A Study of the University HealthSystem Consortium Database**

Michael J. Bauschard, MD, Charleston, SC; Kathryn L. Kreicher, BA, Charleston, SC (Presenter); Christopher F. D'Esposito, BS, Charleston, SC; Jonathan Hatch, MD, Charleston, SC; Ted A. Meyer, MD PhD, Charleston, SC; Theodore R. McRackan, MD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to explain factors affecting inpatient length of stay, complications, and mortality of malignant otitis externa.

Objectives: Characterize factors that impact outcomes for patients with malignant otitis externa (MOE). **Study Design:** Retrospective review utilizing the University HealthSystem Consortium national inpatient database. **Methods:** We searched for all inpatients admitted with a diagnosis of MOE from September 2012 to October 2015. Patient demographics, comorbid conditions, complications, procedures, and mortalities were analyzed. Continuous variables were analyzed with independent t-test or ANOVA. Nominal variables were compared using chi-squared of Fisher's exact test. **Results:** A total of 786 patients with MOE were identified with a mean length of stay (LOS) of 18.6 days (SD = 19.7). The overall mortality rate was 2.5% (n = 20) and complication rate was 4.3% (n = 34). Surgical intervention was performed in 19.2% of all patients. Facial nerve palsy or paresis was present in 15.5% of patients and associated with a significantly longer LOS of 12.9 days (SD = 19.6, p = 0.0098) and nonsignificant increase in mortality rate (4.9% vs. 2.2%, p = 0.0534). Increasing age significantly and positively correlated with incidence of MOE (r = 0.979, p < 0.0001). Males, patients with diabetes, and patients with MRSA infection had significantly longer LOS (p < 0.05). African Americans had a greater incidence compared to Caucasians (OR = 2.4). A significantly increased rate of mortality was associated with sepsis (OR = 18.5), congestive heart failure (OR = 3.0), weight loss (OR = 8.9), and coagulopathy (OR = 7.6). **Conclusions:** The low incidence of MOE makes it ideal for evaluation through a multi-institutional database. As such, this is the largest study to date on outcomes. Several factors have been identified that are associated with an increased length of stay and increased rates of mortality.

10:49 **Q&A**

10:55 - 11:55 **HEARING LOSS REHABILITATION: OPTIONS IN UNILATERAL VS BILATERAL LOSS**
Moderator: **Craig A. Buchman, MD FACS, St. Louis, MO**
Panelists: Brian J. McKinnon, MD MBA FACS, Memphis, TN
Alan G. Micco, MD FACS, Chicago, IL
J. Thomas Roland, MD, New York, NY

11:55 **Q&A**

12:00 - 1:00 ***Lunch/Visit Exhibits/View Posters -*** *Napoleon CD*

1:10 - 3:10 CONCURRENT SESSION 6A
PEDIATRIC OTOLARYNGOLOGY - NAPOLEON AB

Moderator: Laura J. Orvidas, MD FACS, Rochester, MN

1:10 **Laryngotracheal Reconstruction and Swallowing: A Review**
Jennifer F. Ha, MBBS FRACS, Ann Arbor, MI; Lynn Driver, MS-CCC SLP, Ann Arbor, MI; David A. Zopf, MD, Ann Arbor, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the impact of laryngotracheal reconstruction on voice and swallowing. They will be able to explain and discuss with the patients the effect of surgery on these functions and the investigations as well as management of the swallowing dysfunction.

Objectives: Significant advances in laryngotracheal reconstruction (LTR) over the last few decades have revolutionized the management of pediatric patients with complex congenital or acquired airway stenosis. The primary aim of LTR has focused primarily on airway and surgery specific outcomes, often at the expense of voice, as well as swallowing function, which are all intricately related. There is currently a paucity of data on swallowing outcome. The goal of this paper is to review and discuss the existing research on the impact of LTR on swallowing. **Study Design:** Narrative review. **Methods:** A literature search was conducted on the PubMed, Medline, CINAHL, Embase, Web of Science and Google Scholar databases based on the keywords laryngotracheal reconstruction, swallow, dysphagia and aspiration. **Results:** Successful and safe oral feeding in children requires a highly complex and integrated sensorimotor system for proper timing and coordination, beginning with a well coordinated suck-swallow-breathe sequence in infancy. Factors to consider include the normal laryngeal anatomy, nutrition as a stimulus and the development of feeding skills on swallowing, the underlying etiology and other risk factors, LTR procedures and their adjuncts. All these impact on the children's growth. Swallow assessments and rehabilitation is therefore an important part of the postoperative care. **Conclusions:** As airway reconstructive surgeries have improved in airway and surgery specific outcomes, swallowing function is an important secondary outcome that impacts on the children's and their family's life. Management in a multidisciplinary manner will optimize the outcome and improve their quality of life.

1:17 **Reducing Delays in Care by Instituting a Dedicated Add-on Operating Room**

Andrew J. Redmann, MD, Cincinnati, OH; Kyle S. Robinette, DO, Madison Heights, MI; Charles M. Myer IV, MD, Cincinnati, OH; Alessandro D. de Alarcon, MD MPH, Cincinnati, OH; Aimee M. Veid, MHA, Cincinnati, OH; Catherine K. Hart, MD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the impact of instituting a dedicated operating room block on delays to surgical care for inpatient pediatric patients requiring otolaryngology interventions.

Objectives: 1) Determine the impact of instituting an otolaryngology specific operating room (OR) on the time between initial inpatient consultation to surgery; and 2) examine the utilization of add-on OR time. **Study Design:** Retrospective review. **Methods:** We performed a retrospective review of all inpatient otolaryngology consultations requiring a non-emergent operative procedure from June 1 2015 - March 31, 2016 at our pediatric tertiary care hospital. In August 2015, we instituted a once weekly block of OR time dedicated for inpatient otolaryngology consults. Prior to this, cases were placed on an add-on list shared between all surgical services. We compared time from initial consultation to OR before and after the institution of a dedicated OR block. We calculated OR utilization by dividing scheduled OR time by actual OR time utilized. Adjusted OR utilization accounted for scheduling factors beyond our control (delays from other services). **Results:** 191 inpatient add-on cases (67 ICU patients) were scheduled during the study period. The most common cases performed were microlaryngoscopy/bronchoscopy (59%) and tracheostomy (10%). Mean time between consultation and OR was 7.8±1.6 days prior to establishing the add-on room, and 4.4±1.3 days after it was established (P=0.003). Total utilization of the block time was 74% and adjusted OR utilization was 86%. **Conclusions:** Instituting a dedicated otolaryngology add-on room significantly reduces time between initial consultation and operative care by approximately 3 days. The use of a dedicated add-on room maintains a high level of OR utilization and positively impacts operating room flow and timeliness of inpatient care.

1:24 **Development of an Epithelial Raft Cell Culture System for Pediatric Recurrent Respiratory Papillomatosis**

David F. Smith, MD PhD, Cincinnati, OH; Marion G. Brusadelli, MS, Cincinnati, OH; Alessandro de Alarcon, MD MPH, Cincinnati, OH; Najim Ameziane, PhD, Cincinnati, OH; El Mustapha Bahassi, PhD, Cincinnati, OH; Susanne I. Wells, PhD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the importance of epithelial organotypic raft cultures from pediatric patients with RRP as a means to study the neoplastic transformation in vitro.

Objectives: Recurrent respiratory papillomatosis (RRP) is a potentially devastating disorder of the airway caused by specific strains of the human papillomavirus (HPV). It is the most common benign neoplasm of the larynx in children but little is known about development of disease. Our objective was to construct epithelial organotypic raft cultures from pediatric patients with RRP to study the neoplastic transformation in vitro. **Study Design:** This is a proof of concept project to establish technical feasibility of a specialized cell culture system derived from pediatric patients with RRP. **Methods:** After IRB approval five children with RRP were recruited. RRP and normal tissue samples were collected. Specimens were rinsed and trypsinized. Samples were grown in 2D on feeder fibroblasts in select medium and then grown in 3D at the liquid air interface. After formation of stratified epithelium tissue was harvested for hematoxylin/eosin staining. Raft sections and sections taken from original tumor were tested for the presence of low risk HPV genomes by in situ hybridization. **Results:** Raft cultures were successfully grown from RRP samples and normal tissue. RRP samples displayed papillomatous features, including increased proliferation and hyperplasia, when compared to those from normal adjacent tissue. RRP specimens were positive for HPV 11. **Conclusions:** A reproducible epithelial organotypic raft culture has been established from pediatric patients with RRP. These rafts display differentiation properties that reflect its natural human counterpart. Future work will involve whole genome and RNA sequencing for the identification of potential targets and individualized candidate drug testing to pursue therapies selected for optimal tumor eradication tailored to each child.

1:31 **Systematic Review on Treatment Efficacy and Rebound Growth Rate with Propranolol Treated Subglottic Hemangioma**

Robert H. Chun, MD, Milwaukee, WI; John Faria, MD, Milwaukee, WI (Presenter); Tyler Schwartz, BS, Milwaukee, WI; Sachin Pawar, MD, Milwaukee, WI; Dawn Siegel, MD, Milwaukee, WI

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the efficacy of propranolol for subglottic hemangioma, incidence of surgical treatment of subglottic hemangioma, and rebound growth of propranolol treated subglottic hemangioma.

Objectives: Propranolol has recently become the treatment of choice for management of subglottic and airway hemangiomas. This systematic review aims to determine the success rate of propranolol for managing these lesions as well as the rate of rebound growth following propranolol treatment cessation. **Study Design:** Literature search involved MED-

LINE and Scopus to identify English language articles. **Methods:** Studies were identified using hemangioma, subglottic or airway, and propranolol for search terms. Studies were eligible for inclusion if they reported the type of treatment used and individual de-identified patient data and without medical or surgical treatment prior to propranolol therapy. **Results:** Initial review included 110 abstracts with twenty-five articles including case reports and case series that met inclusion criteria were included in the qualitative analysis. Forty-nine patients were included. Twenty-eight (57%) were treated with propranolol alone and 20 (41%) were treated with a combination of propranolol and a corticosteroid. Thirty-seven (76%) patients were treated with a dose of 2 mg/kg/day of propranolol. The initial treatment was successful in 43 (88%) of patients. Rebound growth occurred in 4 (9%) of patients. Overall 6 (12%) patients underwent surgical resection. **Conclusions:** Propranolol is effective for treating subglottic hemangiomas. Rebound growth does occur in a small subset of patients during the propranolol wean. Close observation for children during and weaning of propranolol therapy for subglottic hemangioma is essential. Adjunctive management strategies need to be used in patients with rebound growth.

1:38 **Incidence of Juvenile Onset Recurrent Respiratory Papillomatosis before and after Approval of the Gardasil Human Papilloma Virus Vaccine: Where Are We Now?**

Lori M. Guillot, MD, Birmingham, AL; Do Y. Cho, MD, Birmingham, AL; Nicholas J. Smith, MD, Birmingham, AL

Educational Objective: At the conclusion of this presentation, participants should have an understanding of the incidence of juvenile onset recurrent respiratory papillomatosis (JORRP) in the United States, current vaccine usage, barriers to vaccine coverage, and how the vaccine is affecting the incidence of JORRP at this time. Using the vaccine as an adjunctive therapy for patients with preexisting JORRP will also be discussed.

Objectives: To examine the incidence of juvenile onset recurrent respiratory papillomatosis (JORRP) before and after approval and use of the Gardasil HPV vaccine. **Study Design:** Retrospective review. **Methods:** Retrospective review of data from 2001-2015 in patients who underwent operative procedures for RRP. **Results:** Our database contained a total of 108 patients with JORRP and a total of 548 procedures completed. Age of patients ranged between <12 months to 17 years with a mean age of 6.05 years. Mean age at diagnosis was 5 years. There were 58 males and 50 females included in the study for a M:F ratio of 1.16:1. The overall incidence of JORRP declined when comparing pre- and post-vaccine data but not sufficiently to support statistical significance ($p<0.089$). Other results showed similar down trending but fell short of statistical significance. **Conclusions:** Although the Gardasil vaccine has great potential to affect the incidence of JORRP, we cannot confirm this with the current study. The lack of statistical significance in relation to vaccine use could be explained by several mechanisms including lag time from vertical transmission and poor vaccine awareness and coverage. Efforts should be focused on raising awareness on importance of vaccination and consider Gardasil as an adjunctive treatment to patients with preexisting JORRP.

1:45 **New Data Challenges the Benefit of Perioperative Otic Drops for Tube Patency**

Joseph E. Dohar, MD, Pittsburgh, PA; Dean E. Hakanson, MD, San Diego, CA; Carl Lebel, PhD, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) evaluate objective data regarding tube patency gathered from the largest pediatric tube surgery study to date; 2) utilize recent trial data to consider a change in current practice patterns; and 3) make more informed decisions on appropriate therapies as part of the most commonly performed ambulatory surgery in the US.

Objectives: Many surgeons instill perioperative otic drops to maintain tube patency. In the largest clinical program for pediatric tube surgery conducted to date, a primary analysis of tube patency was determined in phase 3 trials comparing OTO-201 thermosensitive gel (OTIPRIO, 6% ciprofloxacin otic suspension) to patients who received tubes alone. Patients who developed otorrhea, regardless of treatment assignment, received otic drops. A secondary analysis of tube patency was conducted to compare patients who did (DR) and did not receive (DNR) otic drops. **Study Design:** Two prospective, randomized, double blind, phase 3 trials enrolled 532 children (6 months - 17 years) with confirmed middle ear effusion on the day of tympanostomy tube (TT) surgery and then randomized to sham (TT alone) or OTO-201 and studied over a 29 day observation period. **Methods:** Patients with observed otorrhea were provided otic drops. This combined analysis of two studies evaluated tube patency, determined by pneumatic otoscopy, at all study visits. **Results:** In total at least 92% of patients had both tubes patent at each time point with no difference between OTO-201 and TT alone. Tube patency ranged from 87-95% for DR patients and from 96-99% for DNR patients. No differences were observed between OTO-201/TT alone DR and OTO-201/TT alone DNR. **Conclusions:** Tympanostomy tube occlusion is not increased in OTO-201 treated patients. Tympanostomy tube occlusion is caused primarily by perioperative otorrhea since patency rates approached 99% without this complication. Strong evidence now exists which challenges current clinical practice for use of otic drops to maintain tube patency.

1:52 **Resident Triage of After Hours Patient Phone Calls: A Missing Core Competency?**
Ashton E. Lehmann, MD, Boston, MA; Elliott D. Kozin, MD, Boston, MA; Rosh K. Sethi, MD MPH, Boston, MA; Kevin Wong, BA, Boston, MA; Stacey T. Gray, MD, Bostn, MA; Michael J. Cunningham, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to better understand the types of phone calls residents receive after hours and be able to identify critical opportunities for improvement in preparation for phone call management and reporting such interactions to other providers.

Objectives: Otolaryngology residents are responsible for triaging after hours patient calls. However, residents receive little training on this topic, and data are limited on the clinical content of patient calls specific to otolaryngology. This study aims to characterize the concerns residents handle by phone and their reporting. **Study Design:** Retrospective review. **Methods:** After hours patient call logs (9/2013-7/2014; n=500) were reviewed in a pediatric hospital staffed by 16 otolaryngologists and 12 residents from four otolaryngology programs. Demographics, callers, concerns, surgical history, recommendations, and emergency department (ED) visits were collected. **Results:** On average 5.1 calls occurred per shift with the majority on weekends (58.6%). Mean patient age was 6.6 ± 0.24SEM years. Most calls were postoperative (61.4%) following tonsillectomy and adenoidectomy (T&A; 49.7%) or tympanostomy tube placement (28.9%). Mothers (71%) called most frequently. Most postoperative calls occurred within three days (54.9%) and were for bleeding (19.5%), although 12.0% questioned routine care/expectations. Residents recommended ED evaluation for 17.4% of patients, of which 20.7% returned to the primary institution. ED evaluation was recommended most frequently following T&A (51.7%) or for bleeding (32.2%). When reporting calls 32.8% of medical record numbers were absent, 11.8% had name errors, and 2% of patients could not be found in the medical record. **Conclusions:** This is the first study to analyze management and reporting of pediatric otolaryngology patient calls. ED evaluation is infrequently recommended, suggesting problems are often triaged by phone contact alone. When reporting calls, residents commonly omit key information. Results have implications for resident education and patient care.

1:59 **Low Rate of Positive Bronchoscopy for Suspected Foreign Body Inhalation in Infants**
Cameron C. Sheehan, BS, Columbus, OH; Joseph Lopez, MD, Columbus, OH; Charles Elmaraghy, MD, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to describe our institution's low rate of positive bronchoscopy in infants suspected of inhaling a foreign body.

Objectives: To describe our institution's low rate of positive bronchoscopy in infants suspected of inhaling a foreign body. **Study Design:** Retrospective chart review. **Methods:** A retrospective review was performed of patients at a tertiary children's hospital with suspected inhalation of a foreign body. Charts were reviewed for demographic information, comorbidities, radiologic findings, and operative reports were reviewed. **Results:** Eleven pediatric patients under 12 months of age were identified from 2008-2015 with a diagnosis of possible airway foreign body inhalation who underwent emergent bronchoscopy. Of these patients, only one was found to actually have a foreign body present in the airway. The remaining 10 children were found to have unobstructed airways on bronchoscopy. Seven patients were found to have a respiratory virus such as adenovirus, rhinovirus, or parainfluenza. Five patients were found to have a bronchoalveolar lavage culture positive for Moraxella, Stenotrophomonas, or haemophilus species. Five patients were found to have a structural airway abnormality such as subglottic narrowing, tracheomalacia, or findings of chronic bronchitis with associated airway edema. **Conclusions:** Our institution has a low rate of positive bronchoscopy for highly suspected foreign body inhalation in a group of patients less than 12 months of age. Patients presenting with respiratory distress, stridor, or other airway symptoms were often found to have an underlying viral or bacterial respiratory infection which, coupled with an unclear history, would increase the suspicion for an airway foreign body and subsequent decision to perform a bronchoscopy. In stable patients, diagnostic evaluation for an underlying respiratory infection should be performed in these cases.

2:10 - 3:00 **PAIN MANAGEMENT IN POST-TONSILLECTOMY PEDIATRIC PATIENTS**
Moderator: Charles M. Myer III, MD FACS, Cincinnati, OH
Panelists: Laura J. Orvidas, MD FACS, Rochester, MN
David E. Tunkel, MD FACS, Baltimore, MD

3:00 **Q&A**

3:10 - 3:30 ***Break/View Posters -*** *Napoleon CD*

1:10 - 3:10 CONCURRENT SESSION 6B
GENERAL & SLEEP MEDICINE - RHYTHMS BALLROOM

1:10 - 2:05 **DISE (DRUG INDUCED SLEEP ENDOSCOPY): CURRENT INDICATIONS AND PITFALLS**
Moderator: **Stacey L. Ishman, MD MPH, Cincinnati, OH**
Panelists: Jolie L. Chang, MD FACS, San Francisco, CA
David L. Steward, MD FACS, Cincinnati, OH

2:05 **Q&A**

Moderator: C. Ron Cannon, MD FACS, Jackson, MS

2:10 **Outcomes of Sialendoscopy Assisted Duct Surgery (SASDS) for Salivary Duct Stenoses Using the COSS Questionnaire: A Prospective Study**
Elise A. Delagnes, MA BA, San Francisco, CA; Annick Aubin-Pouliot, MD, San Francisco, CA; Melissa Zhang, BA, San Francisco, CA; Jolie L. Chang, MD, San Francisco, CA; William R. Ryan, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand what characteristics of stenoses may predict symptom improvement and resolution after SASDS.

Objectives: To prospectively assess symptom impact after sialendoscopy assisted salivary duct surgery (SASDS) specifically for duct stenoses. **Study Design:** Prospective cohort study. **Methods:** In patients with symptomatic sialadenitis who were found to have intraoperative duct stenosis without sialolithiasis, we assessed symptom change using the 20 symptom based Chronic Obstructive Sialadenitis Symptoms (COSS) questionnaire (scored 0-100) completed prior to SASDS and three months postoperatively. **Results:** For 30 glands (15 patients) with duct stenosis, the mean COSS score significantly decreased after SASDS by 13.1 points (standard deviation (SD) 20.7) to 25.3 (range 0-74.5) ($p<0.001$). Mean COSS scores significantly decreased for: parotid glands (n=20) by 13.6 (SD 19.8) to 22.7 (range 0-74.5) ($p<0.005$); radioactive iodine (RAI) sialadenitis (n=14) by 13.2 (SD 26.8) to 30.0 (range 0-74.5) ($p<0.05$); and idiopathic swelling (n=13) by 16.3 (SD 13.7) to 20.8 (range 0-49) ($p<0.0005$). For distal duct stenoses (n=25) treatments with significant symptom improvement included: dilation only (all partial stenoses) (n=17 (68%)) by 21.1-points (SD 17.9) to 24.1 (range 15-66.5) ($p<0.0005$) and sialodochoplasty (4 complete; 1 partial stenosis) (n=5 (20%)) by 14.6-points (SD 5.8) to 15 (range 17-28.5) ($p<0.005$). A multivariate analysis showed dilation to be a significant predictor of partial resolution (score <20 points) ($p < 0.05$). Distal stenoses not amenable to treatment (n=3) and treated proximal (n=3) and parenchymal (n=1) stenoses showed no significant improvement. **Conclusions:** SASDS for stenoses generally improves symptoms usually with only partial resolution. Symptom improvement appears more likely possible in parotid glands, RAI and idiopathic sialadenitis, and distal stenoses that can undergo dilation or sialodochoplasty.

2:17 **Resident Undercoding as a Revenue Opportunity in an Academic Otolaryngology Department**
Warren C. Swegal, MD, Detroit, MI; Kathleen L. Yaremchuk, MD, Detroit, MI; Michael C. Singer, MD, Detroit, MI

Educational Objective: At the conclusion of this presentation, participants will have a better understanding of the discrepancies between attending and resident coding decisions and be better equipped to overcome the issue.

Objectives: Financial viability and reimbursement are concerns in the medical community. Accurate billing and coding is a critical component of the revenue cycle. This study was devised to assess differences between the level of service (LOS) coding of attending and resident physicians in an academic otolaryngology department. **Study Design:** Retrospective chart review, academic medical center. **Methods:** Electronic medical billing records for patients seen for new outpatient visits were reviewed from December 2015 to May 2016. All patients had the LOS, procedure and diagnostic codes assigned by attending staff or by resident physicians in an attending clinic. The number of encounters, LOS, and the coding physician was identified. Audits performed by certified coders were used to determine billing accuracy. **Results:** The LOS for 6494 patients was evaluated. Attending staff coded for 3869 encounters and residents coded for 2625. The attending physicians' LOS distribution was 42% level 3 and 49% level 4. The residents' LOS distribution was 57% level 3 and 22% level 4. ($p<0.001$) External audits revealed that attending coding was appropriate in 82% of charts and 73% for residents ($p<0.0001$). **Conclusions:** This study demonstrates that resident and attending physicians assign different level of service codes at new outpatient visits with residents potentially undercoding in many instances. In academic settings this discrepancy may result in missed revenue opportunities. To optimize clinical revenue academic departments should review resident coding and provide training for accurate coding of clinical encounters.

2:24 **Adjunct Steroids in the Treatment of Peritonsillar Abscess: A Systematic Review**

Kevin Hur, MD, Los Angeles, CA; Sheng Zhou, BS, Los Angeles, CA; Lynn Kysh, MLIS, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the efficacy of adjuvant corticosteroids in the treatment of peritonsillar abscess.

Objectives: This study systematically reviews the existing literature on the efficacy of adjuvant corticosteroids in improving clinical outcomes after peritonsillar abscess (PTA) drainage. **Study Design:** Systematic review. **Methods:** We performed a literature search in Medline, Cochrane Library, CINAHL, Web of Science, Scopus, Embase, and ClinicalTrials.gov from inception to June 2016. Inclusion criteria were randomized control trials (RCT) evaluating adjuvant corticosteroids after PTA drainage. Data was systematically collected on study design, patient demographics, and clinical characteristics. Two independent investigators reviewed all manuscripts and summarized the data. **Results:** 3 RCTs comprising 153 patients were included. The results were not pooled due to heterogeneity in the method in which outcomes were measured and reported. The trials also varied on the type of steroid administered and method of drainage (incision vs. aspiration). All 3 RCTs reported statistically significant improvement in body temperature from adjuvant steroid administration compared to placebo. Pain scores, mouth opening, time to painless oral intake, and duration of hospitalization were significantly improved in one out of the three RCTs between the steroid and control group, but were not statistically different in the other 2 RCTs. No adverse side effects from steroid administration were reported. **Conclusions:** Steroids as an adjunct therapy to the treatment of peritonsillar abscess may result in faster recovery. However, further investigation with larger randomized control trials and standardized outcomes are warranted.

2:31 **Novel Candidate Variant in the ACSS2 Gene Associated with Nonsyndromic Cleft Lip and Palate in Two Independent Hispanic Populations**

Sonam Dodhia, BA, New York, NY; Alana Aylward, MD, Salt Lake City, UT; Yi Cai, BA, New York, NY; Katrina Celis, MD, New York, NY; Wendy K. Chung, MD PhD, New York, NY; Joseph Haddad, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the findings supporting the association of a novel candidate variant of the ACSS2 gene (rs59088485) with NSCLP in two independent Hispanic populations.

Objectives: A candidate variant (p.Val496Ala) of the ACSS2 gene (T>C missense, rs59088485 variant at chr20: bp37 33509608) was previously found to consistently segregate with non-syndromic cleft lip and/or palate (NSCLP) in three Honduran families. Objectives of this study were (1) investigate the frequency of this ACSS2 variant in Honduran unrelated NSCLP patients and unrelated unaffected controls and (2) investigate the frequency of this variant in Colombian unrelated affected NSCLP patients and unrelated unaffected controls. **Study Design:** Case control study design in objective 1. **Methods:** Sanger sequencing of 99 unrelated Honduran NSCLP patients and 215 unrelated unaffected controls for the p.Val496Ala ACSS2 variant was used to determine the carrier frequency in NSCLP patients and controls. Sanger sequencing of 230 unrelated Colombian NSCLP patients and 146 unrelated unaffected controls for the p.Val496Ala ACSS2 variant was used to determine the carrier frequency in NSCLP patients and controls. **Results:** In the Honduran population, the odds ratio of having NSCLP among carriers of the p.Val496Ala ACSS2 variant was 4.0 ($p = 0.03$) with a carrier frequency of 7/99 (7.1%) in unrelated affected and 4/215 (1.9%) in unrelated unaffected individuals. In the Colombian population, the odds ratio of having NSCLP among carriers of the p.Val496Ala ACSS2 variant was 2.6 (p value 0.04) with a carrier frequency 23/230 (10.0%) in unrelated affected and 6/146 (4.1%) in unrelated unaffected individuals. **Conclusions:** These findings support the role of ACSS2 in NSCLP in two independent Hispanic populations from Honduras and Colombia.

2:38 **Radiocontrast Dye Extravasation during Sialography**

Kristy H. Truong, MD, Iowa City, IA; Henry T. Hoffman, MD, Iowa City, IA (Presenter); Joan E. Maley, MD, Iowa City, IA

Educational Objective: At the conclusion of this presentation, participants will understand the clinical significance of ductal extravasation of radiocontrast during sialography.

Objectives: Conventional sialography includes cannulation of a salivary duct to instill radiocontrast material to image the internal architecture. The objective of this study is to identify the pathophysiology of contrast extravasation. **Study Design:** Sequential case series. **Methods:** Chart review of 255 sialograms performed by single surgeon from 2008 to 2016 identified radiocontrast (iopamidol 755mg/mL solution) extravasation reported from the duct adjacent the cannula into the vestibule, from leakage though acini, from extravasation of contrast needle holes created by ultrasound guided fine needle aspiration biopsy, and from defects in main salivary ducts. Study with radiographic review and clinical correlation was limited to those identified with main ductal extravasation into adjacent soft tissue. **Results:** 12 sialograms (5% of total) were identified with ductal extravasation. Ductal stenosis was implicated as a cause for extravasation in all

cases as was supported by clinical history and in the 6 cases that had sialendoscopy with or without sialadenectomy. The 4 cases evaluated with ultrasound demonstrated ductal stenosis in 3 of 4 cases (75%) and in only 10% of the 10 cases examined with computed tomography scan. The single case with an MR sialogram identified ductal stenosis. All extravasations were associated with either stricture alone or stricture with stone (1 case). There were no complications associated with radiocontrast extravasation. **Conclusions:** Extravasation of radiocontrast material in the course of performing sialography is a clinical finding helpful in defining pathophysiology. The relative frequency of its occurrence warrants use of absorbable water soluble contrast agents to avoid soft tissue exposure to oil emulsion.

2:45 **Neck Abscess: An Unusual Clinical Presentation of Mycobacterium Abscessus Infection of a Second Branchial Cleft Cyst**

Divya A. Chari, MD, San Francisco, CA; Eric J. Formeister, MD, San Francisco, CA; Chase M. Heaton, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify rare pathogens of branchial cleft cysts and describe the treatment algorithm for the management of infected branchial cleft cysts.

Objectives: We present the case of a second branchial cleft cyst infected with mycobacterium abscessus, a rapidly growing, multidrug resistant non-tuberculous mycobacteria (NTM). M. abscessus can cause skin and soft tissue infections after trauma or surgical procedures and disseminated diseases in immunocompromised patients. To our knowledge, it has never been documented as the causative organism in infection of a congenital head and neck anomaly. **Study Design:** Case report and review of relevant literature. **Methods:** We report the case of a 33 year old man with a four year history of a left neck mass who developed acute left neck swelling with associated fevers, rigors, and diarrhea while traveling in Mexico. Aspiration of the mass was performed with a needle stick of unknown sterility. The patient subsequently developed a persistently draining fistula with an area of overlying necrotic skin. Upon return to the United States, he underwent imaging and fine needle aspiration of the mass, both of which favored the diagnosis of a super infected second branchial cleft cyst. **Results:** The second branchial cleft cyst was excised along with the overlying necrotic skin. Tissue culture grew mycobacterium abscessus. The patient was successfully treated with a prolonged course of oral and parenteral antibiotics. **Conclusions:** Non-tuberculous mycobacteria are ubiquitous organisms and widely distributed in the environment, particularly in wet soil, streams, and rivers. Human disease, however, remains rare in immunocompetent hosts. Here, we suspect a contaminated needle seeded the branchial cleft cyst with this organism. Clinicians should be aware of this rare entity so that an appropriate treatment plan may be initiated.

2:52 **Successful Ablation of Plunging Ranula by Ultrasound Guided Percutaneous Ethanol Injection**

Michelle-Linh T. Nguyen, BA, Stanford, CA; Lisa A. Orloff, MD, Stanford, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand and discuss the technique and advantages of ultrasound guided percutaneous ethanol injection for ablation of plunging ranula.

Objectives: To describe our technique and initial experience of ultrasound guided percutaneous ethanol injection for treatment of plunging ranula. **Study Design:** Case report. Technique description. **Methods:** An 83 year old otherwise healthy man had been troubled by a recurrent plunging ranula for two years, with recurrence after aspiration and temporary decompression. High frequency, real time, office based ultrasonography was used to guide needle aspiration of the ranula contents, followed by instillation of 98% ethanol into the cyst interior. The patient tolerated the procedure well, citing only a transient, mild burning sensation that resolved soon after injection. **Results:** The patient reported complete resolution of his lesion at two month telephone followup with no recurrent signs or symptoms at one year followup visit. Ultrasonography confirmed normal, symmetrical bilateral level I anatomy with no trace of ranula or other abnormalities. **Conclusions:** The most appropriate treatment for plunging ranula remains unclear. Transcervical excision is prone to a high rate of recurrence. Most recent reported cases of successfully treated plunging ranula have involved intracystic injection of OK-432 or transoral excision of both sublingual gland and associated ranula1. OK-432 is inaccessible in the United States, and transoral excision is invasive and morbid, given close operative proximity to the submandibular duct and lingual nerve. The case herein is the first known case of successful ablation of a plunging ranula using 98% ethanol injected via ultrasound guidance.

2:59 **Failure of Multiple Imaging Modalities to Diagnose Venolymphatic Malformation of the Tongue**

Christine M. Kim, MD, Los Angeles, CA; Andrew M. Vahabzadeh-Hagh, MD, Los Angeles, CA; John W. Frederick, MD, Los Angeles, CA; Quang C. Luu, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the common pitfalls associated with the diagnosis of venolymphatic malformations of the tongue.

Objectives: To describe the unreliability of imaging modalities to diagnose venolymphatic malformations of the tongue and to understand the importance of biopsies in order to obtain an accurate tissue diagnosis. **Study Design:** A retrospective chart review performed at a tertiary academic care center. **Methods:** A retrospective chart review was performed on

all patients diagnosed with venolymphatic malformation of the tongue. Diagnostic imaging modalities were reviewed and compared with the patient's ultimate tissue diagnosis. **Results:** We present a 20 year old female with a history of congenital macroglossia who presented to the emergency room multiple times throughout her life with recurrent tongue swelling, pain, and respiratory distress. Despite the use of multiple imaging modalities -- including several MRIs/MRAs, CTs, and ultrasounds -- a definitive diagnosis was never reached. It was only after a punch biopsy of the tongue lesion that a tissue diagnosis of venolymphatic malformation was obtained. **Conclusions:** Imaging modalities often fail to correctly diagnosis venolymphatic malformations of the tongue. Tissue biopsy is paramount to obtaining an accurate diagnosis.

3:06 **Q&A**

3:10 - 3:30 ***Break/View Posters -*** *Napoleon CD*

3:30 - 5:15 - GENERAL SESSION - NAPOLEON AB

Moderator: Andrew H. Murr, MD FACS, San Francisco, CA

3:30 **A Disease of the Healthy: Higher Incidence of Thyroid Cancer in States with Better Predictors of Overall Health**

Brandon L. LaBarge, BA, Hershey, PA; David M. Goldenberg, MD, Hershey, PA; Darrin V. Bann, MD PhD, Hershey, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss how state trends in thyroid cancer incidence correlate with predictors of socioeconomic status and overall health status.

Objectives: Many believe that the rise in incidence of thyroid cancer results from increased diagnostic scrutiny, we hypothesized that states with higher rates of cancer screening and better predictors of overall health status will indeed have a higher incidence of thyroid cancer. **Study Design:** Cross-sectional study. **Methods:** State demographic data from 2008 to 2012 were obtained by the Census Bureau, the American Community Survey, and the Small Area Health Insurance Estimates. Screening and risk factor data were obtained by CDC and Modeled Estimates Combining BRFSS & NHIS. Cancer incidence rates were obtained from CDC SEER data. The number of hospitals per state was obtained from the American Hospital Directory, and the number of physicians per state was obtained from the United Health Foundation. Associations between predictors of health status and thyroid cancer incidence were determined by non-parametric correlation analysis and multivariate regression modeling. **Results:** Poverty, smoking, and obesity were inversely correlated with thyroid cancer incidence. By contrast, thyroid cancer incidence was directly correlated with income, insurance rate, mammogram rate, colonoscopy rate, hospitals per capita, and physicians per capita. **Conclusions:** Higher socioeconomic status and better overall health status correlated with higher incidences of thyroid cancer, despite evidence that indicators of poor health on an individual level, such as obesity, increase thyroid cancer risk. These findings suggest increased diagnostic scrutiny may drive at least in part the increased incidence of thyroid cancer in states with high access to healthcare, while there may be significant undiagnosed disease in states with lower healthcare access.

3:37 **Nonsurgical Management of HIV Associated Parotid Cysts: A Systematic Review and Meta-Analysis**

Akash N. Naik, BA, Charleston, SC; William B. Clinkscales, BAS, Charleston, SC; Shaun A. Nguyen, MD, Charleston, SC; Marion Boyd Gillespie, MD, Memphis, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the effectiveness of high and low dose radiotherapy and discuss different nonsurgical management options for patients with HIV associated parotid cysts.

Objectives: To analyze the effectiveness of nonsurgical management options for HIV associated parotid cysts. **Study Design:** Systematic review and meta-analysis. **Methods:** A literature search was conducted using Scopus, CINAHL, and PubMed-NCBI database by 2 independent authors. Included studies had a minimum of 5 patients and reported objective or subjective outcome measures. Primary outcomes were complete and partial response. **Results:** Systematic review identified 11 relevant studies. 3 radiotherapy studies, totaling 104 patients, were included in meta-analysis. Treatment groups were classified as high dose (>22 Gy) or low dose (<18 Gy) radiotherapy. Complete and partial response was achieved in 65.8% (95%CI, 54.3%-76.2%) and 25.2% (95%CI, 16.1%-36.3%) of patients receiving high dose radiotherapy, and in 23.2% (95%CI, 1.2%-60.9%) and 22.3% (95%CI, 5.2%-87.8%) of patients receiving low dose radiotherapy, respectively. Complete response was significantly greater for high dose radiotherapy compared to low dose (p=0.0001). No difference was found for partial response. Complications with radiotherapy were found to be minimal but included xerostomia and mucositis. Studies utilizing sclerotherapy, antiretroviral therapy (ART), or combined therapies were not included in the statistical analysis due to limited sample size. However, reported rates of complete response range from 25%-90.9% and 16.7%-90% for sclerotherapy and ART, respectively. **Conclusions:** Among nonsurgical treatment modal-

ities for HIV associated parotid cysts, radiotherapy has the highest number of reported outcomes in the literature and our analysis suggests that higher dose radiotherapy has a greater chance of achieving complete response. More studies with greater sample sizes and more consistent measures are needed to compare this outcome with those of alternative treatment methods.

3:44 **Utility of Adjunctive Procedures with Balloon Dilation of the Eustachian Tube**

Yehia M. Ashry, MSC, Boston, MA; Kosuke Kawai, SC D, Boston, MA; Dennis S. Poe, MD PhD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) demonstrate the long term efficacy of balloon eustachian tuboplasty; 2) explain role and effect of concomitant adjunctive procedures when combined with balloon dilation of the eustachian tube; and 3) demonstrate the indications of using illuminated guidewire in bony eustachian tube obstruction.

Objectives: To assess the role and effect of concomitant adjunctive procedures when combined with balloon dilation of the eustachian tube (BDET), including a new technique for treating obstructive disease within the bony eustachian tube (ET). **Study Design:** Retrospective case series. **Methods:** Subjects were adults with persistent (>2 years): 1) OME or non-fixed TM retraction AND 2) type B or C tympanogram OR 3) symptoms of barochallenge with flights or diving, all despite medical treatment for ≥ 6 weeks. Balloon dilation (Acclarent, Irvine, CA) of the cartilaginous ET was performed under general anesthesia using concomitant myringotomy with or without tube placement if indicated. Adjunctive turbinectomy, adenoidectomy, and/or tympanoplasty were used in selected cases. For suspected disease in the bony ET, an illuminated guidewire was used for probing and clearing the lumen. Outcome measures were tympanogram, otomicroscopy, ET mucosal inflammation score, Valsalva maneuver and PTA audiometry. **Results:** 67 ETs (48 patients) underwent balloon dilation: 1) 30/67 balloon w/wo myringotomy, w/wo tube; 2) 20/67 plus adjunctive procedure; or 3) 17/67 plus guidewire. Followup was 0.5-5 years (mean 1.3 year, SD=0.7). Significant improvement occurred in 79%. There was no significant difference in the failure rate comparing balloon dilation with adjunctive procedures 5/20 (25%) or without adjunctive procedures; 4/30 p=0.45 (13%). Failure rate for balloon dilation plus guidewire was 5/17 (29%) and resistance within the bony ET occurred in 8/17 (47%). **Conclusions:** Balloon dilation of the cartilaginous ET demonstrated significant improvement despite expansion of indications that necessitated the addition of adjunctive procedures.

3:51 **Henry Williams, MD Resident Research Award (Middle Section)**
Venous Thromboembolism in Otolaryngology: Do Existing Guidelines Apply?

John D. Cramer, MD, Chicago, IL; Anthony D. Yang, MD MS, Chicago, IL; Amanda E. Dilger, MD, Chicago, IL; Alexander E. Schneider, MD, Chicago, IL; Urjeet A. Patel, MD, Chicago, IL; Stephanie Shintani Smith, MD MS, Chicago, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to appreciate current guidelines for prophylaxis against venous thromboembolism and understand how these guidelines could be adapted to the broad range of surgical procedures performed by otolaryngologists.

Objectives: Venous thromboembolism (VTE) is the number one cause of preventable death in surgical patients. Current guidelines from the American College of Chest Physicians provide VTE prevention recommendations that are specific to individual surgical subspecialties, however no guidelines exist for otolaryngology. **Study Design:** Cohort study of inpatients in the National Surgical Quality Improvement Program from 2005-2013. **Methods:** We compared the rate of VTE in an established average risk group (general surgery) and low risk group (plastic surgery) with that of otolaryngology and used modified Caprini scores to risk stratify patients. **Results:** We identified 31,896 otolaryngology patients and compared them to 27,280 plastic and 1,236,115 general surgery patients. The overall 30 day rate of VTE was 0.5% for otolaryngology compared with 0.7% for plastic surgery and 1.2% for general surgery. We identified a high risk group for VTE in otolaryngology that included free or regional tissue transfer, laryngectomy, composite resection, skull base surgery and incision and drainage. High risk otolaryngology patients with modified Caprini scores ≥ 5 experienced similar rates of VTE as general surgery patients (1.9% 95% confidence interval (CI) 1.4-2.6%, versus 1.8%, CI 1.7-1.8%, respectively). Non-high risk otolaryngology patients experienced significantly lower rates of VTE with even lower rates than plastic surgery patients (modified Caprini scores of ≥ 5 rate of VTE of 0.6%, CI 0.5-0.7% versus 1.0%, CI 0.8-1.2%, respectively). **Conclusions:** Most otolaryngology procedures are at low risk of VTE, indicating that guidelines for a low risk population from plastic surgery could be adapted. High risk otolaryngology procedures should be considered for more aggressive VTE prophylaxis.

3:58 **Pediatric and Adult Patients with No Insurance or Medicaid Are More Likely to Present to the Emergency Department for Acute Rhinosinusitis**

Regan W. Bergmark, MD, Boston, MA; Stacey L. Ishman, MD MPH, Cincinnati, OH; Katie M. Phillips, MD, Boston, MA; Michael J. Cunningham, MD, Boston, MA; Ahmad R. Sedaghat, MD PhD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe patterns of emergency department utilization and associations with insurance status for a common otolaryngic illness, acute rhinosinusitis, for pediatric and adult patients.

Objectives: Patients with Medicaid or self-pay insurance status are more likely to present to the emergency department (ED) for uncomplicated acute rhinosinusitis (ARS). We aimed to determine if this holds true for both pediatric and adult visits. **Study Design:** Cross-sectional survey of the 2005-2012 National Hospital Ambulatory Medical Care Surveys and National Ambulatory Medical Care Surveys. **Methods:** We included all visits with CPT codes for ARS and without codes for ARS complications. We tested for associations between insurance type and presentation to an ED versus a primary care physician (PCP), stratifying children versus adults. We used univariate and multivariable logistic regression modeling, controlling for clinical and demographic characteristics for analysis. **Results:** There were 51,579,977 uncomplicated ARS visits to PCPs (48,213,335 visits) and EDs (3,366,642 visits). Medicaid insurance was significantly associated with ED presentation for ARS for both children (adjusted odds ratio [OR] = 7.0, P<0.001) and adults (adjusted OR = 6.8, P<0.001). Children with ARS and self-pay insurance status were much more likely to present to the ED (adjusted OR=48.8, P<0.001) than adults (adjusted OR = 5.2, P<0.001); this difference between children and adults with self-pay insurance was significant (P=0.001). **Conclusions:** Medicaid is associated with ED presentation for ARS for pediatric and adult visits. Self-pay insurance status is strongly associated with ED presentation for adult and pediatric visits and is significantly more common for children. These results suggest limitations in primary care access for uncomplicated ARS based upon insurance status, particularly for uninsured pediatric patients.

4:05 **Teaching Observation Program in the Operating Room**

Margaret L. Naunheim, MD, San Francisco, CA; Andrew N. Goldberg, MD, San Francisco, CA; Lee-May Chen, MD, San Francisco, CA; Gurpreet Dhaliwal, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the benefits of attending to attending feedback on intraoperative teaching skills and also consider implementation of feedback sessions for faculty at their own institutions.

Objectives: Intraoperative teaching is incredibly important in surgical training, yet attendings rarely get feedback on their performance. Peer to peer feedback has been shown to be extremely beneficial to performance in several arenas of medical education, but this has not yet been applied to surgical attendings. We aimed to assess whether feedback on intraoperative teaching skills allows otolaryngology attendings to gain confidence in their teaching skills. **Study Design:** Pilot cross-sectional survey study. **Methods:** A cohort of otolaryngology attendings participated in the teaching observation program (TOP) in the operating room. TOP consists of observation of an intraoperative teaching encounter between a faculty member and a resident. The encounter is evaluated by an observer--an attending trained through a series of online modules and certified to be an evaluator through the office of medical education. This observation is then followed by a feedback session between the faculty members. Following this, participating attendings responded to a survey to assess the impact of the program. **Results:** All participants strongly agreed (75%) or agreed (25%) that TOP made him or her feel more confident about his or her teaching. All participants also endorsed that they would change some of their teaching behaviors based on their experience. Finally, all participants stated they would recommend participation in TOP to their colleagues. **Conclusions:** Intraoperative observation and feedback through TOP was beneficial for participating surgical attendings and will hopefully have a positive impact on future didactic opportunities. Following a successful pilot of the TOP in the operating room, we aim to expand the program throughout our department.

4:12 **Otolaryngology Externships and the Match: Productive or Futile?**

Carissa M. Thomas, MD PhD, Aurora, CO; Cristina E. Cabrera-Muffly, MD, Aurora, CO

Educational Objective: At the conclusion of this presentation, the participants should be able to describe externship experiences among recent otolaryngology graduates and current otolaryngology residents as well as demonstrate that externships affect the match process for otolaryngology residency applicants.

Objectives: To summarize externship experiences among recent graduates and current residents in otolaryngology residency programs. To determine whether externships affect the match process. **Study Design:** Cross-sectional survey. **Methods:** A survey was distributed to otolaryngology residents in allopathic US residency programs and otolaryngology graduates from the past five years (2011-2015). 2141 surveys were successfully distributed. Statistical analysis was done using Fisher's exact test. **Results:** 677 subjects responded for a 31.6% response rate. A majority of respondents were residents (n=438, 66.8%). 85.6% of the resident respondents had completed at least one externship compared to

75.9% of graduates (p=0.003). The most common reasons for selecting a particular externship were geographic location (74.6%) and program reputation (71.1%), while the most common reason for not completing an externship was being advised not to (60.9%). 91.8% of respondents received at least one interview from their externships, 90% went to those interviews, and 89.3% reported that externship experiences affected their rank list. Respondents had a 32.7% match rate to the externship residency program. Respondents who matched at the externship residency program matched higher on their rank list (p<0.001). 90.6% of respondents found externships to be valuable and 74.4% recommend completing one. **Conclusions:** Externships are beneficial because they influence the rank list of applicants and are viewed as valuable experiences. However, completing an externship only affords an approximate 30% chance of matching to that program. Completing an externship is advisable for the experience, but applicants should consider a program that is not their first choice for residency.

4:19 **Q&A**

4:25 - 5:10 **CONTROVERSIES IN OTOLARYNGOLOGY**
Moderator: Jeffrey M. Bumpous, MD FACS, Louisville, KY
Panelists: **Bilateral Cochlear Implantation**
Oliver F. Adunka, MD, Columbus, OH
Active Surveillance of Papillary Thyroid Carcinoma
Dennis H. Kraus, MD FACS, New York, NY
PE Tube Insertion Guidelines
Richard M. Rosenfeld, MD, Brooklyn, NY
Extracapsular Dissection of Benign Parotid Neoplasms
Robert L. Witt, MD FACS, Newark, DE

5:10 **Q&A**

5:15 **ADJOURN SESSION**

5:30 **MEET THE AUTHORS POSTER RECEPTION - ALL ATTENDEES - NAPOLEON CD**

7:15 **WITCHES, GHOSTS, VAMPIRES & VOODOO WALKING TOUR (arranged for attendees - registration and payment required); meet in lobby at 7:00 pm**

Saturday

Allergy/Rhinology

1. Regional Trends in the Utility of Balloon Sinuplasty

Kevin J. Choi, MD MS, Durham, NC; Matthew G. Crowson, MD, Durham, NC; David W. Jang, MD, Durham, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss regional trends in the use of balloon sinuplasties.

Objectives: The use of balloon sinuplasties in the treatment of chronic rhinosinusitis has been on the rise. However, its efficacy compared to conventional surgical treatment modalities continues to be debated. This study aims to assess regional trends in the use of balloon sinuplasty. **Study Design:** Independent commercial healthcare claims database review. **Methods:** Patients undergoing balloon sinuplasty were identified in the FAIR Health Commercial Healthcare Claims Database from 2013 by CPT codes 31295, 31296 and 31297. Extracted data included associated diagnosis codes (ICD-9), procedure charges, provider location and service settings. Descriptive analysis was performed to describe the findings. **Results:** 159 patients undergoing balloon sinuplasty were identified. Frontal sinus dilation was most frequently performed (57/159), followed by sphenoid (52/159) and maxillary (50/159) sinus dilations. Procedures were most frequently performed in office based settings (152/159) compared to outpatient hospitals (5/159) or ambulatory surgery centers (2/159). The mean charge amount per procedure was $7,325.65. Chronic rhinosinusitis (473.x) was the most frequently associated diagnosis, followed by deviated nasal septum (470.0) and turbinate hypertrophy (478.0). 98.7% (157/159) of balloon sinuplasties were performed in private practice settings in regions independent of academic medical center with otolaryngology training programs. **Conclusions:** A bias exists in the utility of balloon sinuplasties as these procedures are most frequently performed in non-academic, office based settings. Larger studies are necessary to assess whether these trends are applicable at a national level and to explore differences in the patient population between private practice and academic medicine that may potentially explain these findings.

2. Management of Central Skull Base Osteomyelitis

Kurren S. Gill, BA, Philadelphia, PA; Mindy Rabinowitz, MD, Philadelphia, PA; Christopher Farrell, MD, Philadelphia, PA; James J. Evans, MD, Philadelphia, PA; Marc Rosen, MD, Philadelphia, PA; Gurston G. Nyquist, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize, diagnose, and manage central skull base osteomyelitis as a separate entity from non-central skull base osteomyelitis.

Objectives: Skull base osteomyelitis (SBO) is an uncommon infectious condition usually affecting the temporal bone as a complication of malignant otitis externa (MOE) in elderly, immunocompromised, diabetic patients. Central SBO is a rare variant of this disease, localizing to the clivus, sphenoid, and occipital bone, and presents diagnostic and therapeutic challenges to physicians. Objectives are to recognize, diagnose, and manage central skull base osteomyelitis as a separate entity from non-central skull base osteomyelitis. **Study Design:** Retrospective chart review. **Methods:** Patients with central SBO who underwent endoscopic, endonasal surgery for the debridement of SBO at a single academic institution from 2008 to 2015 were included. **Results:** We identified 12 patients with central SBO. Mean age was 63 years and average followup time was 28.8 months. The male to female ratio was 3:1. Seven were diabetics: 4 insulin dependent, 3 non-insulin dependent. Four patients were immunocompromised (myelodysplastic syndrome, history of liver transplant, polymyalgia rheumatica, HIV). Seven patients were culture positive for pseudomonas aeruginosa, 7 for staphylococcus, and 3 for aspergillus (4 cases of pseudomonas + staph, 1 case of aspergillus + staph). Ten patients were treated with IV antibiotics, one patient received oral voriconazole, and one received no antibiotics. Six patients required 10 repeat procedures and all patients were culture positive for either pseudomonas or aspergillus. **Conclusions:** Central SBO is an uncommon yet aggressive variant of SBO that requires prompt diagnosis and treatment to prevent neurologic sequelae and spread of disease. A high percentage may be due to staphylococcus spp. but other recognized pathogens include pseudomonas and aspergillus. IV antibiotics with serial MRIs should be employed after surgery with biopsies, and long term followup is essential. Our findings indicate that staphylococcus related SBO responds more to antibiotic treatment, while SBO due to pseudomonas or aspergillus is more refractory antibiotics, often requiring multiple repeat procedures to achieve eradication of disease.

3. Keros Classification Does not Correlate with Body Mass Index

Christopher J. Ito, MD, Augusta, GA; Camilo Reyes-Gelves, MD, Augusta, GA; Clayton F. Perry, BS, Augusta, GA; Stilianos Kountakis, MD PhD, Augusta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize that the depth of the olfactory fossa and Keros classification are independent from body mass index.

Objectives: Spontaneous cerebrospinal fluid leaks are associated with a high body mass index (BMI) and sometimes a low skull base. The purpose of this study is to determine if a correlation exists between BMI and the depth of the olfactory fossa. **Study Design:** Cross-sectional study. **Methods:** Patients evaluated by the senior author are enrolled in a prospectively collected database. Data was extracted from this database to include demographic data and BMI. Olfactory fossa depth was measured on coronal computed tomography imaging obtained in temporal proximity to the BMI measurement. **Results:** Two hundred and twelve patients were included in the study. There were 104 males and 108 females. The prevalence of each Keros classification on the right side within the cohort was 24%, 65%, and 11% for Keros type 1, 2 and 3, respectively, with similar findings on the contralateral side. Differences in olfactory fossa depth between sides did not meet statistical significance. Males did have a deeper olfactory fossa than women both on the right (5.96mm, 4.99mm, $p<0.00036$) and the left (6mm, 5.03mm, $p<0.0004$). Women had a significantly higher BMI than men (31.8, 28.4, $p<0.036$). The Pearson linear correlation coefficient between BMI and olfactory fossa depth showed no significant correlation between the two ($R=0.18$ on the right, $R=0.24$ on the left). **Conclusions:** The data herein failed to show a correlation between BMI and olfactory fossa depth. In fact, men had a deeper mean olfactory fossa depth compared to women, while women had a higher mean BMI.

4. Pituitary Aspergillosis Presenting as a Sellar Mass with Compressive Symptoms in an Immunocompetent Patient

Caitlin W. Pacheco, BA, New York, NY; Katelyn O. Stepan, MD, New York, NY; Hongyan Zou, MD PhD, New York, NY; Mary E. Fowkes, MD PhD, New York, NY; Alfred M.C. Iloreta, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to identify fungal sellar infection as a rare but potentially lethal process in what may clinically present as a pituitary adenoma in an immunocompetent patient.

Objectives: Although pituitary aspergillosis is a very rare condition with only 22 cases reported, it should be included in the differential diagnosis for asellar/parasellar mass as early recognition is key to successful management. **Study Design:** We present a case report and review of literature. **Methods:** A 67 year old woman presented with months of headache and worsening vision, found to have unilateral temporal hemianopsia and abducens palsy. Initial MRI was unremarkable but later imaging showed a sellar mass encroaching into the right cavernous sinus and abutting the optic chiasm. Preoperative pituitary panel was normal. She was diagnosed with pituitary adenoma. There was no history of paranasal sinus disease. **Results:** The patient underwent resection of the mass via endoscopic transsphenoidal approach. Intraoperatively it was noted to be soft and tan-pink with multiple fibrous septations. Initial pathology showed hypophysitis with mixed inflammation and focal necrosis. She had an uncomplicated immediate postoperative course, but was readmitted twelve days later with weakness, gait instability, and headache, at which point she was treated for adrenal insufficiency. Pathology review including Gomori methenamine silver stain showed hyphae consistent with aspergillus. IV amphotericin B was administered followed by oral voriconazole. Ten weeks postoperatively her headache has resolved, vision remains stable, and she shows no evidence of infection. **Conclusions:** Sellar aspergillosis should be considered in the differential diagnosis of a sellar mass, as it is difficult to diagnose preoperatively and may present similarly to a pituitary neoplasm in an immunocompetent patient. It can be successfully treated with prompt surgical extirpation and systemic antifungals.

5. Successful Endoscopic Transsphenoidal Resection of Suprasellar Mass in Two Pediatric Patients with Non-pneumatization of the Sphenoid Sinus

Tiffany Peng, MD, New York, NY; Theodore H. Schwartz, MD, New York, NY; Jeffrey P. Greenfield, MD, New York, NY; Ashutosh Kacker, MD MBBS, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the feasibility of endoscopic transsphenoidal resection of suprasellar mass in the pediatric population with non-pneumatization of the sphenoid sinus.

Objectives: Non-pneumatization of the sphenoid sinus was once considered a contraindication to endoscopic resection of sellar/suprasellar masses due to obscuration of anatomical landmarks. Studies have since reported safe endoscopic resection of sellar masses in adult patients with this condition; however, there has been limited data on this approach in the corresponding pediatric population. We present two cases of successful endoscopic transsphenoidal resection in pediatric patients with non-pneumatization of the sphenoid sinus. **Study Design:** Case series. **Methods:** Both patients were 4 years old at the time of diagnosis and were noted to have non-pneumatization of the sphenoid sinus due to their young age. Patient #1 presented with short stature and was found to have a 1.5cm sellar/suprasellar mass. Patient #2

presented with vision changes and was found to have a 5cm sellar/suprasellar mass extending to the third ventricle. Intraoperatively, a posterior septectomy was performed and the sellar region was accessed endoscopically by drilling through the sphenoid rostrum with cutting and diamond burrs. A nasoseptal flap was used to close. **Results:** There were no intraoperative or postoperative complications, and postoperative ophthalmologic exam was unchanged. Patient #1 had gross total resection of a Rathke cleft cyst on postoperative imaging and pathology. Final pathology for patient #2 WHO grade I craniopharyngioma and he was referred for radiation therapy. **Conclusions:** Endoscopic transsphenoidal resection is a safe and effective approach for pediatric patients with non-pneumatization of the sphenoid sinus.

6. The Bifurcated Frontal Sinus: Implications for Endoscopic Sinus Surgery

Kiranya E. Tipirneni, MD, Birmingham, AL; Edward D. McCoul, MD MPH, New Orleans, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the potential variations in frontal sinus anatomy and identify intrinsic frontal sinus variants in order to develop a successful surgical plan and maximize patient outcomes.

Objectives: Frontal sinus anatomy is complex, and multiple variations of ethmoid pneumatization have been described that affect the frontal outflow tract. In addition, the lumen proper of the frontal sinus may exist as two separate parallel cavities that share an ipsilateral outflow tract. This variant has not been previously described and may have implications for surgical management. **Study Design:** Case series with planned data collection. **Methods:** Patients were identified who had radiographic and intraoperative findings of separate parallel tracts within a unilateral frontal sinus. All patients were from a tertiary rhinology practice who underwent sinus surgery between May 2015 and July 2016. Data was recorded including sinusitis phenotype, coexisting frontal cells, extent of surgery and complications. **Results:** Ten patients were identified with CT scans demonstrating bifurcation of the frontal sinus into distinct medial and lateral lumens. All cases were treated with Draf 2a or 2b frontal sinusotomy, with partial removal of the common wall to create a unified ipsilateral frontal ostium. Nine cases had a coexisting ipsilateral agger nasi cell, 6 had a supra agger cell, 7 had a suprabullar cell, and 1 had a frontal septal cell. There were no significant complications. **Conclusions:** The bifurcated frontal sinus is an anatomical variant that the surgeon should recognize to optimize surgical outcomes. Failure to do so may result in incomplete clearance of the sinus and residual disease. The bifurcated sinus may occur with other types of frontal sinus cells and may be safely treated with endoscopic techniques.

7. Chondromyxoid Fibroma of the Frontal Sinus: A Case Report and Review of the Literature

Melanie E. Townsend, MD, St. Louis, MO; John S. Schneider, MD, St. Louis, MO; Michael R. Chicoine, MD, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinical, radiologic, histopathologic and epidemiologic features of a rare paranasal sinus and skull base lesion; a chondromyxoid fibroma. They should be able to explain the proper workup and management of this tumor as well as recognize the pitfalls and pearls in making the diagnosis of this lesion correctly. They should be able to discuss the merits and drawbacks of the surgical approach taken for our particular case report.

Objectives: Chondromyxoid fibroma (CMF) is a rare cartilaginous tumor with benign pathologic features and no known metastatic potential. It is an extremely uncommon lesion and seldom is found in the head and neck, in particular in the paranasal sinuses and neighboring skull base. There are only 3 cases of frontal sinus origin reported in the literature, including this case report. Given its clinical and radiologic features, it is often confused with sinonasal and skull base malignancies. Proper diagnosis and management is paramount, as the management of critical neighboring structures such as the eye is quite different from its malignant counterparts. This case series seeks to elucidate the key clinical, radiologic and histopathologic features of CMF of the paranasal sinuses and skull base as well as outline proper workup and management. **Study Design:** We present a case of a chondromyxoid fibroma arising in the frontal sinus of a healthy 45 year old female. The clinical, radiographic, histologic features and surgical management of this case are presented along with a review of the literature of paranasal sinus and skull base (limited to the clivus) CMF. **Methods:** A retrospective review of available literature was conducted using PubMed. Sources were filtered for papers in the English language and search terms included chondromyxoid fibroma, paranasal sinus, skull base, and nasal cavity. Publication dates from 1997 to 2016 were identified and included. **Results:** Twenty-eight additional cases of sinonasal and clival CMF were identified, including 6 in patients less than 18 years old. Three cases of CMF, including this one, were found to originate from the frontal sinus. Presentations commonly included nasal airway obstruction, visual disturbances and headache. The mean age of presentation was 39 years old (range: 20 days - 66 years old). Nineteen of the cases occurred in females and 9 occurred in males. Followup of the cases ranged from 3 months to 5 years. Of the cases with reported outcomes, recurrences were reported in 4 instances, 3 of which were curettage resections at the initial surgery. Two of these cases were treated with re-excision and 2 with external beam radiation. There were an additional 2 cases where incomplete excision was reported, and persistent disease was treated with external beam radiation. Only 1 case of complete excision had a reported recurrence, which was treated with re-excision. Complete surgical excision is the treatment of choice for these tumors with radiation therapy reserved for recurrences and difficult to reach locations as there have been reports of malignant transformation rate of 1-2% following treatment with radiation. En bloc excision is not considered necessary especially at the expense of critical structures such as the eye. **Conclusions:** Chondromyxoid fibromas arising from and

involving the paranasal sinuses are rare, benign neoplasms best treated with surgical excision. These lesions present as a diagnostic challenge most notably radiographically but also histologically. Despite this challenge, it is crucial that these lesions are correctly diagnosed as their treatment course varies significantly from that of a malignant chondroid tumor. This case series strives to summarize what is known about these tumors in order to refine our ability to successfully diagnose and treat them.

8. Is HPV a Factor in Outcomes of Aggressive Open/ Endoscopic Resection of Sinonasal Undifferentiated Carcinoma (SNUC)

Sreeya Yalamanchali, MD, Kansas City, KS; Valerie A. Wood, MD, Kansas City, MO; Ossama Tawfik, MD, Kansas City, MO; Ann Robinson, MD, Kansas City, MO; Terance T. Tsue, MD, Kansas City, MO; Larry Hoover, MD, Kansas City, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the association between SNUC and HPV.

Objectives: SNUC is an uncommon/highly aggressive tumor with poor prognosis. This paper reviews outcomes and assesses HPV tumor presence which is well known to impact on prognosis of oropharyngeal squamous cell carcinoma(SCC). **Study Design:** Retrospective chart review. **Methods:** Since 2003 we have treated nine patients. Seven (7) had aggressive surgical resection combined with chemotherapy/radiation, one surgical resection and postoperative radiation alone, and one had combined chemotherapy and radiation alone. Patients were treated by open techniques utilizing endoscopic instruments to assure complete resection at the skull base tumor bed. HPV tumor status was determined using a real time, multiplex PCR assay that detects and quantifies 15 known high risk HPV types and targets HPV oncogene E6 as well as a beta globulin control and P16 confirmation. **Results:** Seven (of 9) underwent multimodality treatment. One patient's disease was too extensive for surgical resection and was treated with chemotherapy/radiation alone and survived 3 months. Four patients of seven (57%) having aggressive resections combined with chemotherapy/radiation are still alive/NED an average of 8.7 years from the time of treatment. Those with combined treatment who succumbed to disease (3) still had an average survival time of 18 months from diagnosis. All tumors were negative for HPV. **Conclusions:** A combination of aggressive open surgical intervention utilizing endoscopic techniques with closely applied chemotherapy and radiation has resulted in a 57% long term survival and prolonged disease free intervals in these very aggressive tumors. We recently demonstrated a much better survival in our HPV positive nasal SCC s. There is no evidence of HPV virus in these tumors however.

Facial Plastic & Reconstructive

9. WITHDRAWN -- Noninvasive Terahertz Imaging of Tissue Water Content for Flap Viability Assessment

Neha Bajwa, MS, Los Angeles, CA; Joshua K. Au, MD, Los Angeles, CA; Maie A. St. John, MD PHD, Los Angeles, CA; Micahel C. Fishbein, MD, Los Angeles, CA; Warren S. Grundfest, MD, Los Angeles, CA; Zachary D. Taylor, PhD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the application of terahertz (THz) imaging for early and noninvasive tissue flap assessment in reconstructive surgery.

Objectives: Accurate and early prediction of tissue viability is the most significant determinant of tissue flap survival in reconstructive surgery. Perturbation in tissue water content (TWC) is a generic component of the tissue response to such surgeries, and, therefore, may be an important diagnostic target for assessing the extent of flap viability in vivo. We have previously shown that reflective terahertz (THz) imaging, a non-ionizing technique, can generate spatially resolved maps of TWC in superficial soft tissues on the order of minutes. The aim of this study is to investigate the utility of reflective THz TWC imaging for early assessment of skin flap viability. **Study Design:** Longitudinal in vivo studies in animals. **Methods:** We obtained visible and reflective THz imagery and histology comparing 3 bipedicled myocutaneous flaps (i.e. survival model) and 3 fully excised myocutaneous flaps (i.e. failure model) in the dorsal skin of rats over a postoperative period of 7 days. **Results:** While visual differences between both models manifested 48 hours after surgery, statistically significant ($p < 0.05$, independent t-test) local differences in TWC contrast were evident in THz flap image sets as early as 24 hours. Excised flaps, histologically confirmed as necrotic, demonstrated a significant, yet localized, reduction in TWC at the incision sites and flap region compared to non-traumatized skin. In contrast, bipedicled flaps, histologically verified as viable, displayed mostly uniform, unperturbed TWC across the flap tissue. **Conclusions:** These results indicate the practical potential of THz TWC sensing to accurately predict flap failure 24 hours earlier than clinical examination.

10. Maxillofacial Trauma and Sports Related Concussions among National Collegiate Athletic Association Athletes: 2009-2014

Stephen R. Chorney, MD MPH, Syracuse, NY; Lindsay Sobin, MD, Boston, MA; Mitchell Lyons, BA, Syracuse, NY; Brian D. Nicholas, MD, Syracuse, NY; Parul Goyal, MD MBA, Syracuse, NY; Amar C. Suryadevara, MD, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the relationship between maxillofacial injuries and sports related concussions sustained during collegiate athletic events.

Objectives: With increased focus on sports related concussions, the association with maxillofacial injuries remains unknown. We looked to correlate rates of maxillofacial trauma and concussions among collegiate athletes. **Study Design:** Retrospective analysis of the National Collegiate Athletic Association Injury Surveillance System (NCAA-ISS). **Methods:** The NCAA-ISS was queried from 2009 through 2014 for 7 men's and 8 women's sports across Divisions 1, 2, and 3. An injury to the head or face, including concussion, was included. Further details included injury rate, fracture rates, time to return, duration of concussion, and concussion symptoms. **Results:** From 2009-2014, an estimated 23,325 maxillofacial injuries occurred during 106,725,778 athlete events, a rate of 2.87 per 10,000 athlete events (95% CI: 2.05-3.70). Total injuries were significantly higher in male athletes, 3.92 (95% CI: 2.44-5.41), than female athletes, 1.95 (95% CI: 1.15-2.76) (p=0.016). There were an estimated 50,146 concussions, a rate of 5.32 (95% CI: 4.16-6.48), with men sustaining 5.31 (95% CI: 3.98-6.64) and women sustaining 5.33 (95% CI: 3.43-7.23) per 10,000 athlete events (p=0.991). Concussion rate significantly correlated with total maxillofacial injuries (r=0.641, p<0.01) and mandible/oral fractures (r=0.766, p<0.01). Women's field hockey had the highest correlation between mandible/oral fractures and concussions (r=0.996, p<0.01). There was no association between maxillofacial injuries and duration of concussion symptoms, return to competition time, balance symptoms, or post-traumatic amnesia. **Conclusions:** Maxillofacial injuries among collegiate athletes correlated significantly with sports related concussions. Mandible and oral fractures, particularly in women's field hockey, were correlated with increased concussions. Efforts should reduce maxillofacial injuries and adequately screen these athletes for concussions.

11. Does the American College of Surgeons National Surgical Quality Improvement Program Surgical Risk Calculator Accurately Predict Postoperative Outcomes in Head and Neck Free Flap Reconstruction?

Kristen A. Echanique, BS, Newark, NJ; Neil V. Nadpara, BA, Newark, NJ; Sei Y. Chung, BS, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ; Soly Baredes, MD, Newark, NJ; Richard C. Park, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to assess the ACS NSQIP calculator's ability to predict postoperative complications and other outcomes in patients undergoing head and neck free flap reconstructive surgery.

Objectives: To determine the accuracy and clinical applicability of the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) calculator in head and neck free flap reconstructive surgery. **Study Design:** A retrospective chart review utilizing the ACS NSQIP calculator was done to compare predicted perioperative complications to realized complications for patients undergoing head and neck free flap reconstruction. **Methods:** Patient demographics and medical history were collected for 70 cases. Predicted versus actual outcome data were compared. Brier scores (BS) were calculated and a score of <0.01 indicated good performance. Receiver operator curves (ROC) and area under the curves (AUC) assessed sensitivity and specificity. Length of stay (LOS) was evaluated using Pearson r coefficient. **Results:** The calculator under-predicted every complication, with the exception of SSI. Renal failure was the only complication for which the calculator seemed to have good predictive value (P<0.001). However, no cases of postoperative renal failure were observed in our patient sample and thus limit our interpretation of this finding. The calculator demonstrated poor predictive value for all other complications, with a score exceeding 0.01. The calculator had good sensitivity and specificity for predicting cardiac complications (AUC = 0.865; p = 0.007). The calculator had fair sensitivity and specificity for predicting death (AUC =0.739; p = 0.414) and discharge to post-acute care (AUC = 0.606; p = 0.143), but these findings were not significant. The calculator demonstrated poor sensitivity and specificity for all other complications. Pearson's r value for LOS showed significant correlation between predicted and actual LOS (r = 0.234, n = 70, p = 0.05). **Conclusions:** While the ACS NSQIP Risk Calculator displayed some predictive value for patients undergoing head and neck free flap surgery, it overall was a poor predictor of perioperative outcomes. Overall, it was able to significantly predict cardiac complications with good sensitivity and specificity in this cohort of head and neck free flap operations. It was able to predict LOS better than chance alone.

12. The Impact of Frailty on Morbidity and Mortality Following Microvascular Reconstructive Free Flap Surgery of the Head and Neck

Dominick V. Congiusta, BS, Newark, NJ; Monica Azmy, BS, Newark, NJ; Jacob S. Brady, BA, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ; Soly Baredes, MD, Newark, NJ; Richard C. Park, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to use the modified frailty index to predict possible complications after head and neck free flap surgery.

Objectives: To use the modified frailty index (mFI) to predict complications after head and neck free flap microvascular reconstruction. **Study Design:** The aim of our retrospective analysis was to establish the implications of frailty as a predictor of morbidity and mortality in patients undergoing microvascular reconstructive free flap surgery of the head and neck. **Methods:** The American College of Surgeons National Quality Improvement Program database (NSQIP) was queried for all microvascular free flap procedures performed for head and neck reconstruction from 2005 to 2014. Using fifteen variables within a previously validated mFI, we evaluated the correlation between frailty and postoperative complications. Multivariable logistic regression analyses were performed. **Results:** Of the 1938 head and neck free flaps in NSQIP, 613 were included in the final analysis. Patients were excluded if any of the variables needed to calculate the mFI were missing. After multivariate regression accounting for demographics and comorbidities significantly associated with mFI, an mFI score of >3 was a significant predictor of intraoperative or postoperative (within 72 hours) transfusion (OR 4.13; CI 1.77-9.66), dependence on a ventilator >48 hours after surgery (OR 10.49; CI 2.721-40.41), and discharge destination other than home (OR 2.75; CI 1.27-5.96). Frailty was not a predictor of 30 day mortality. mFI scores of 0, 1, and 2 were not predictive of any complication after multivariate logistic regression. **Conclusions:** For patients undergoing head and neck free flap surgery, increases in mFI were associated with increased transfusion rates, ventilator dependence >48 hours and discharge destination other than home.

13. Repair of Cocaine Induced Palatopharyngeal and Sinonasal Stenosis

Austin N. DeHart, MD, Richmond, VA; Jonathan M. Young, MD, Richmond, VA; Thomas S. Lee, MD, Richmond, VA; Rajanya S. Petersson, MD, Richmond, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify intranasal cocaine use as a risk factor for nasopharyngeal stenosis and discuss methods of repair.

Objectives: 1) Report a case of complete palatopharyngeal and sinonasal stenosis from intranasal drug abuse; 2) describe operative approaches to repair multilevel stenosis; and 3) review current literature about sinonasal and palatopharyngeal stenosis. **Study Design:** Case report and literature review. **Methods:** PubMed search ((“nasopharynx”[MeSH Terms] OR “nasopharynx”[All Fields] OR “nasopharyngeal”[All Fields]) AND (“constriction, pathologic”[MeSH Terms] OR (“constriction”[All Fields] AND “pathologic”[All Fields]) OR “pathologic constriction”[All Fields] OR “stenosis”[All Fields])) AND (“humans”[MeSH Terms] AND English[lang]) returned 195 papers. Abstracts and references were reviewed to identify other relevant sources. No previous cases of acquired nasopharyngeal stenosis from drug abuse were found. Surgical techniques are described along with photographic documentation. **Results:** A 35 year old female presented for evaluation of recurrent sinusitis. She was found to have a septal perforation, saddle deformity, extensive vestibular and sinonasal stenosis, and complete concentric scarring of the soft palate to the posterior nasopharynx, causing total obstruction. Her history was significant for prior intranasal cocaine use. She underwent staged operative intervention with vestibular stenosis repair, endoscopic sinus surgery, and nasopharyngeal stenosis repair with a laterally based pharyngeal flap and stenting. A combination of endoscopic, intranasal, and intraoral approaches was utilized. Postoperatively, she had maintained nasopharyngeal patency at followup. **Conclusions:** While acquired stenosis of the nasopharynx has been described after nasopharyngeal radiation and surgical interventions such as uvulopalatopharyngoplasty and adenotonsillectomy, intranasal drug abuse is highlighted as another etiology for vestibular, sinonasal, and nasopharyngeal stenosis. Using various techniques, successful repair of drug induced sinonasal and nasopharyngeal stenosis can be achieved.

14. The Bipedicled Orbicularis Oculi Myocutaneous (BOOM) Flap for Repair of the Paralytic Ectropion

Gita M. Fleischman, MD, Chapel Hill, NC; William W. Shockley, MD, Chapel Hill, NC; Brian D. Thorp, MD, Chapel Hill, NC; Joseph Madison Clark, MD, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) describe surgical options for treatment of paralytic eyelid syndrome; and 2) describe the use of the bipedicle orbicularis oculi myocutaneous (BOOM) flap in restoring both function and aesthetics in patients with the paralytic eyelid syndrome.

Objectives: Paralytic eyelid syndrome from facial paralysis is a complicated condition, both from a functional and aesthetic perspective, with predictable anatomic and physiologic challenges. Loss of orbicularis oculi muscle tone results in ectropion, exposure of conjunctiva and cornea, and an anterior lamella deficiency. Surgical correction via resuspension of the lower eyelid is often indicated to prevent exposure keratopathy and improve cosmesis. Our objective was to describe a novel surgical technique: the bipedicle orbicularis oculi myocutaneous (BOOM) flap for reconstruction of paralytic eyelid syndrome. **Study Design:** Case series. **Methods:** Six patients with paralytic lower lid ectropion underwent the BOOM flap. All patients underwent a single stage anterior lamellar reconstruction. Briefly, incisions were made along the lower eyelid subciliary margin and connected laterally with the supratarsal fold. A separate incision was made 7-15 mm superior to the supratarsal fold to create the BOOM flap, pedicled both medially and laterally. Horizontal lid shortening and upper lid weight procedures were performed, if indicated. The bipedicled flap was elevated in the preseptal plane, then interpolated from the upper to lower eyelid, and inset. **Results:** All patients achieved excellent anterior posterior apposition of lid margin to globar conjunctiva. Vertical lower eyelid position improved in all cases with MRD-2 of 4-6mm. No wound dehiscence or loss of flap viability occurred. All patients reported improvement in paralytic eyelid sequelae. Donor site morbidity was minimal and incision scar was well camouflaged in the supratarsal crease. **Conclusions:** The BOOM flap is a simple and useful procedure that reliably reconstructs and resuspends the lower lid in patients with paralytic eyelid

syndrome.

15. In Vitro Investigation of Tributyrin as a Master Regulator in Keloid Pathogenesis

Laura R. Garcia-Rodriguez, MD, Detroit, MI; Lamont R. Jones, MD, Detroit, MI; Kang Mei Chen, MD, Detroit, MI; Indrani Datta, MS, Detroit, MI; George W. Divine, PhD, Detroit, MI; Maria J. Worsham, PhD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the definition of a master regulator, role of a causal network, and impact of tributyrin on a keloid cell line and changes of gene expression.

Objectives: We previously uncovered four master regulators through Ingenuity Pathway Analysis software's Causal Network Analysis (CAN) (QIAGEN, Redwood City, CA, USA) that were hypothesized to have a driver role in keloid methylation gene targets and influence keloid pathogenesis. The objective is to investigate the role of tributyrin as a master regulator and to assess its influence on modulating the expression patterns of four downstream statistically significant keloid genes in vitro. **Study Design:** Prospective cohort. **Methods:** Tributyrin (Sigma-Aldrich, St. Louis, MO, USA), was used in a methyl tetrazolium (MTT) cell proliferation assay (American Type Culture Collection, Manassas, VA, USA) to determine its IC50 dosage for in vitro studies using keloid cell lines. The expression levels of keloid specific downstream genes VAMP5, TNS1, GALNT3, PPP1R13-± in the tributyrin causal network will be assessed using quantitative reverse transcriptase PCR (qRTPCR) for verification based on the hypothetical experiment produced by CNA. **Results:** The MTT assay, concentrations of 5 mM, 2.5 mM, 1 mM, 0.5 mM, 0.25 mM, 0.1 mM for 24, 48 and 72 hours, demonstrated that the IC50 for tributyrin was at 48 hours with a concentration of 1 mM. We expect that the expression levels of the four gene targets of tributyrin will be consistent with the hypothetical experiment indicated in CNA, where VAMP5, GALNT3, PPP1R13-± are overexpressed and TNS1 is underexpressed. **Conclusions:** Tributyrin's influence in modulating the expression of the downstream keloid specific genes for would be one step in dissecting out mechanistically its role in keloid pathogenesis.

16. Role of Postoperative Radiographs after Orbital Floor Fracture Repair

Adam L. Honeybrook, MBBS, Durham, NC; David J. Carpenter, BA, Durham, NC; Nikita Chapurin, BA, Durham, NC; David Powers, MD DDS, Durham, NC; Charles Woodard, MD, Durham, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the role of postoperative radiographs after orbital floor fracture repair.

Objectives: Postoperative imaging is frequently obtained after surgery for craniomaxillofacial (CMF) trauma. A growing body of literature is questioning the value of this practice due to high costs and risk of radiation exposure. We aim to 1) describe common reasons used for obtaining postoperative imaging in isolated orbital floor fractures; 2) evaluate its impact on management of patients; and 3) assess overall utility of postoperative imaging in this patient population. **Study Design:** A retrospective review was performed of patients that underwent open reduction and internal fixation of isolated orbital floor fractures between July 1st, 2010 and June 30th, 2015. **Methods:** The preliminary cohort included 43 patients. Pre, intra, and postoperative imaging practices were analyzed with the primary outcome being operative and postoperative complications. **Results:** Postoperative imaging was obtained for 8 of 43 subjects (18.6%): 5 for evaluation of plate placement without additional documented concerns (11.6%) and 3 for persistent symptoms including diplopia and blurred vision, diplopia and eye pain, and limited extraocular motility with eye pain (7.0%). Of those patients who had postoperative imaging, one patient (2.3%) had a deviation in standard postoperative management secondary to imaging findings. CT revealed an inferior rectus transection and optic nerve impingement, and revision surgery was performed 26 hours after the original procedure. The single noted operative complication was an anterior skin flap buttonhole. **Conclusions:** These preliminary data may suggest that routine postoperative imaging is not warranted in the absence of persistent clinical symptoms following open reduction and internal fixation of isolated orbital floor fractures.

17. Utilization of Hydroxyapatite for Non-Cosmetic Facial Volume Restoration

Brittany Emma Howard, MD, Chapel Hill, NC; J. Madison Clark, MD, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the non-cosmetic use of hydroxyapatite for restoration of facial volume deficiency resulting from trauma, disease, and/or prior oncologic treatment.

Objectives: Facial volume deficiency resulting from trauma, disease, and/or prior oncologic treatments can result in aesthetic and function sequela. We present and discuss our experience with injectable hydroxyapatite for non-cosmetic volume restoration in these patients. **Study Design:** Retrospective case series. **Methods:** A retrospective chart review of patients at a tertiary care center undergoing non-cosmetic facial volume restoration with injectable hydroxyapatite between August 2015 and August 2016 was performed. Data collected included etiology of volume deficiency, aesthetic and functional sequela, and prior reconstructive treatments. Treatment plan was reviewed for hydroxyapatite injection volume, treatment number, and adjunctive procedures/injections. Results were based upon patient reported satisfaction with aesthetic and functional results following injection. **Results:** Six patients underwent facial volume restoration with

injectable hydroxyapatite for non-cosmetic indications. Etiology of facial volume deficiency included prior treatment for carcinoma (n=2), ossifying fibroma (n=1), scleroderma (n-1), and trauma (n=2). Volume deficiency manifested as aesthetic asymmetry (n=6), ectropion (n=2), epiphora (n=2), and oral incompetence (n=1). Each treatment included injection of 1.5 mL of hydroxyapatite to affected areas; 4 patients required only one treatment, and 2 patients required a series of 2 treatments. Patients reported results of good (n=2) to excellent (n=3) following treatment. **Conclusions:** The treatment of facial volume deficiency following trauma, disease, and/or oncologic treatment is a complex problem for the reconstructive surgeon. Injectable hydroxyapatite can be successfully used for non-cosmetic volume restoration in this patient population. We found this method to be associated with patient reported satisfaction in both aesthetic and functional results.

18. Microtia Repair: A Novel Application of Ultrasonic Bone Aspirator

Timothy E. Ortlip, MD, Baltimore, MD; Julian D. Amin, MD, Baltimore, MD; Chris J. Rizzi, MD, Baltimore, MD; Jewel D. Greywoode, MD, Baltimore, MD; Kalpesh T. Vakharia, MD, Baltimore, MD

Educational Objective: Understand the application, advantages and disadvantages to the Sonopet ultrasonic bone aspirator in microtia repair.

Objectives: Constructing an auricular framework from costal cartilage can be challenging and time consuming. The complex multidimensional structure, detailed contours and delicate cartilage necessitate an experienced and skilled surgeon. Moreover, knowledge and familiarity of a variety of instruments may assist the surgeon and lead to shorter operative times and improved aesthetic outcomes. The purpose of this study is to describe the application of the Sonopet ultrasonic bone aspirator for costal cartilage harvest and preparation in microtia repair. **Study Design:** Cadaveric study using Sonopet to sculpt costal cartilage with the Nagata microtia repair technique. **Methods:** Cadaveric ribs six through nine were harvested and fashioned into an auricular framework. The ultrasonic bone aspirator was used for sculpting costal cartilage. Several different tips were used at different portions of the procedure. Our experience was documented. **Results:** The application of the Sonopet for microtia repair is easy, feasible and can assist in producing an excellent auricular framework with minimal trauma to the cartilage. **Conclusions:** This novel technique for contouring costal cartilage is a valuable resource in a surgeon's armamentarium when performing microtia repair.

19. ThermiTight Treatment for the Aging Face: A Retrospective Review of Short Term Outcomes

Akshay Sanan, MD, Philadelphia, PA; Howard D. Krein, MD PhD, Philadelphia, PA; Ryan N. Heffelfinger, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate the short term outcomes of ThermiTight as a treatment modality for the aging face.

Objectives: Patients are increasingly seeking nonsurgical treatment for the aging face. Radiofrequency has remained a staple procedure for treatment of skin laxity as therapeutic heat thresholds effectively promote collagen remodeling. Nonetheless, comprehensive skin tightening involves both dermal and hypodermal collagen remodeling. Transcutaneous radiofrequency is unable to deliver consistent and measurable temperatures to the hypodermal layers. The purpose of this study was to evaluate the short term outcomes of a new technology which provides precise and controlled subdermal heating and a thermistor controlled subdermal skin tightening (ThermiTight) for treatment of the aging face. **Study Design:** Retrospective chart review. **Methods:** A retrospective analysis of 12 patients was completed on patients having undergone ThermiTight for preauricular and submental skin tightening. Treated sites included under chin, preauricular, and neck jowls. The ThermiTight probe was set at a designated temperature and maintained using a thermistor integrated electrode. The probe was guided at a deliberate pace. The clinical endpoint was a designated epidermal temperature. Patient charts were reviewed to assess for complications up to six months post-treatment. **Results:** The mean age of treated patients was 52.25 years. All 12 (100%) patients treated were female. 4 (33.3%) patients treated with ThermiTight were also treated with injectables (Botox, Juvéderm) simultaneously. 1 (8.33%) patient developed a wound complication within the first six months of treatment. 3 (25%) of patients complained of incisional site pain at their first postoperative visit which subsequently self-resolved by the sixth month interval. **Conclusions:** ThermiTight is a new technology used for nonsurgical treatment of the aging face. Short term outcomes demonstrate the safety of the procedure. Short term complications are rare for ThermiTight for the treatment of aging face.

20. A Novel Computer Algorithm for 3D Printing a Prosthetic Nose: A Pilot Study

Meryam A. Shikara, BA, Baltimore, MD; Christopher J. Rizzi, MD, Baltimore, MD; Brian Zelip, MSLIS MA, Baltimore, MD; Kavita T. Vakharia, MD MS, Baltimore, MD; Jewel D. Greywoode, MD, Baltimore, MD; Kalpesh T. Vakharia, MD MS, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the utility of this computer algorithm as a clinical tool to 3D print a prosthetic nose.

Objectives: To describe a novel computer algorithm that can be used to create a three dimensional (3D) model of a nose. **Study Design:** Prospective pilot study with a cross-sectional survey. **Methods:** A computer algorithm utilizing a

3D animation software, Blender (Blender Foundation, Inc, USA), and Adobe Photoshop CS6 (Adobe Systems, Inc, USA) was developed to create a 3D model of a nose. Photographs of five subjects were processed with the computer algorithm to create a virtual 3D model of each nose. The model was then printed using a Desktop 3D printer. Attending physicians, residents, and medical students completed a survey and were asked to rate the similarity between the subjects' photographs and their 3D printed nose on a Likert type scale [0 - completely different to 10 - identical]. **Results:** Thirty-six survey respondents evaluated four views for each of the five modeled noses. The mean score for the overall similarity between the photographs and the 3D models was 8.41 ± 1.27. The mean scores for each nasal comparison ranged from 7.97 to 8.62. 97.8% of respondents were able to match the correct 3D nose to the corresponding subjects' photographs. All clinicians surveyed indicated that they would consider utilizing this tool to create a temporary prosthesis rather than referring to a prosthodontist. **Conclusions:** This computer algorithm can be utilized to model and 3D print a human nose. The 3D printed models closely depict the actual images of each subject's nose and can potentially be used to create a temporary prosthesis to fill external nasal defects.

21. Impact of Transfusion on Postoperative Complications in Free Flap Surgery of the Head and Neck

Sana H. Siddiqui, BA, Newark, NJ; Aparna Govindan, BA, Newark, NJ; Jacob S. Brady, BA, Newark, NJ; Jean Anderson Eloy, MD FACS, Newark, NJ; Soly Baredes, MD FACS, Newark, NJ; Richard C. Park, MD FACS, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss rates of complications following transfusion administration in patients undergoing free tissue transfer of the head and neck.

Objectives: Free flap reconstruction of the head and neck has been shown to be significantly associated with transfusion needs. In turn, red blood cell transfusions have been linked to complications, including infection, hemolytic reactions, and transfusion related acute lung injury. **Study Design:** The aim of this retrospective analysis was to evaluate the impact of postsurgical red blood cell transfusions on complication rates following head and neck free flap reconstruction. **Methods:** The 2011-2014 National Surgical Quality Improvement Program (NSQIP) database was queried for all cases involving free flap reconstruction of the head and neck. Several variables were compared between transfused and non-transfused cohorts using cross-tabulation, Pearson's chi square, Fisher's exact test, independent 2 tailed t test, and multivariate regression. **Results:** Of 1,909 patients who met our inclusion criteria, 648 (33.9%) received an intraoperative or postoperative (within 72 hours) red blood cell transfusion. Higher rates of comorbidities including anemia (58.5% vs 24.5%; Pd0.001), hypertension (50.8% vs 44.7%; P=0.013), and prior chemotherapy (10.3% vs 3.4%; P=0.001) were seen in the transfusion cohort. Obesity occurred more frequently in non-transfused patients than in transfused patients (22.9% vs 16.2%; P=0.001). Several pulmonary, cardiovascular and systemic complications were significantly related to transfusions. However, on multivariate regression only ventilator dependence (>48 hours) and sepsis were independently associated with blood infusions. Transfusions were also independently correlated with increased overall complication rates (odds ratio [OR]= 2.164 P=0.001). **Conclusions:** Transfusions within 72 hours of microvascular free flap surgery of the head and neck are associated with an increase in overall complication rates including prolonged ventilation and sepsis.

22. Arista Hemostatic Powder to Reduce Donor Site Complications in Anterolateral Thigh Free Flaps

Matthew L. Tamplen, MD, San Francisco, CA; Elizabeth Shuman, BA, San Francisco, CA; Chase M. Heaton, MD, San Francisco, CA; P. Daniel Knott, MD, San Francisco, CA; Rahul Seth, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand a novel therapeutic technique to reduce postoperative donor site drain output, drain duration, and seroma formation in anterolateral thigh free flaps.

Objectives: To evaluate the use of microporous polysaccharide hemospheres (Arista) to reduce postoperative donor site drain output, drain duration, and seroma formation in anterolateral thigh free flaps. **Study Design:** Retrospective chart review. **Methods:** Medical records of all patients undergoing anterolateral thigh free tissue transfer for head and neck reconstruction at a single institution between February 2014 and February 2016 were reviewed (N=51). During this study period a prospective decision was made to start using 3 grams of Arista surgical hemostatic powder in all anterolateral thigh donor sites prior to wound closure. Patients who had Arista used in their donor site (N=22) were compared to those who did not have Arista used (N=29). **Results:** The Arista group had a significant reduction in average total drain output from 450ml to 192ml (p=0.045), drain duration from 9 days to 5 days (p<0.001), and in the rate of seroma formation from 17% to 0% (p=0.040). There was no difference in age, sex, American Society of Anesthesia Classification, or body mass index between groups. On multivariate analysis Arista use was the only significant predictor of reduced drain duration and reduced seroma formation. **Conclusions:** The use of Arista surgical hemostatic powder in anterolateral thigh donor sites prior to wound closure is a novel therapeutic technique that significantly reduces postoperative drain output, drain duration, and seroma formation.

23. Postoperative Intranasal Airway Use Following Septorhinoplasty and Nasal Surgery

Prem B. Tripathi, MD MPH, Irvine, CA; Pejman Majd, BS, Irvine, CA; Tuan Ngo, BS, Irvine, CA; Ata Sharif, MD, Irvine, CA; Naveen D. Bhandarkar, MD, Irvine, CA; Brian J.F. Wong, MD PhD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the use and safety of an intranasal nasal airway device in nasal surgery.

Objectives: Postoperative packing in nasal surgery often results in nasal obstruction and discomfort. The Kotler Nasal Airway is a dual nasal airway silicone tube (5 mm ID, 120 mm length) anchored across the columella that extends posteriorly along the nasal floor. A removable irrigation syringe is used to flush the proximal external lumen periodically to maintain patency. Placed at the end of surgery, it supports airway patency countering edema and packing. It is removed at the first postoperative visit. The objective here is to evaluate the safety of the device in septorhinoplasty and other nasal operations. **Study Design:** Retrospective chart review. **Methods:** All medical records of patients undergoing nasal surgery with insertion of the device were reviewed (2012-2016). Incidents of device removal or dislodgement, transcolumellar incisional dehiscence, cellulitis, bleeding, and septal hematoma were recorded. **Results:** The device was used 256 times (revision septorhinoplasty (n=210), nasal fractures (n=23), intranasal lesion excision (n=7), isolated turbinate reduction (n=5), isolated septoplasty (n=5), cutaneous flap reconstruction (n=2), nasoorbitoethmoid fracture repair (n=2), and implant removal (n=2)). A total of 21 patients (8.2%) self-removed or inadvertently dislodged the device. Local nasal tip cellulitis (2%), septal hematoma (1.6%, 1 cc), postoperative bleeding (1.6%), and wound breakdown (0.3%) were lower than literature averages. Postoperatively 1 patient developed dehiscence along transcolumellar incisions. **Conclusions:** The Kotler nasal airway is safe for maintaining airway patency in nasal surgery patients without increased risk of incisional dehiscence or cellulitis.

General/Clinical Fundamentals

24. Management of Tracheal Stenosis in Patients with Severe Autism Spectrum Disorder

Mark A. Arnold, MD, Syracuse, NY; Jason A. Wallen, MD, Syracuse, NY; Mark F. Marzouk, MD, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the challenges and management of patients with tracheal stenosis and severe autism spectrum disorder.

Objectives: To discuss the challenges of airway management of patients with ASD. **Study Design:** Case report. **Methods:** A literature review was performed on PubMed searching keywords including tracheal stenosis, autism spectrum disorder (ASD), tracheostomy, and tracheal resection. **Results:** Cases of tracheal stenosis after percutaneous dilational tracheostomy have been reported, but the overall incidence is unknown. We report the case of a 26 year old male with history of severe ASD and choreoathetoid movement disorder who underwent percutaneous tracheostomy and later failed decannulation trials due to tracheal fracture and stenosis. Over subsequent months, the patient became increasingly agitated by his tracheostomy and repeatedly self-decannulated, posing a life threatening risk despite maximal medical management and twenty-four hour ICU nursing care. Tracheal resection and anastomosis with decannulation was felt to offer the highest probability of return to baseline functioning. Given the patient's inability to cooperate secondary to ASD, postoperatively he was left intubated with chin sutures to allow for healing of the anastomotic site without tension. The patient was successfully extubated two weeks later without complication. His agitation significantly improved, and he was weaned from psychotropic medications. The patient was later discharged without a tracheostomy tube. **Conclusions:** This case highlights the challenge of airway management and tracheostomy tolerability in patients with ASD or other neurocognitive deficits due to tactile aversion or repetitive behaviors. These patients should be carefully considered prior to tracheostomy, as the outcomes are unknown in this population. Tracheal resection and anastomosis can be a successful option in select patients, with careful attention to perioperative management.

25. Integration of Milestones and the Clinical Competency Committee: Added Time, Added Value, or Both?

Cristina E. Cabrera-Muffly, MD, Aurora, CO; Mona M. Abaza, MD MS, Aurora, CO

Educational Objective: At the conclusion of this presentation, the participants should be able to enumerate clinical competency committee member attitudes towards the next accreditation system's use of milestones and understand the mean amount of time needed to perform these resident evaluations.

Objectives: To determine attitudes of clinical competency committee members regarding the next accreditation system's use of milestones and to quantify time spent on resident milestone evaluations during the first two years. **Study Design:** Prospective cross-sectional. **Methods:** Faculty members were surveyed during the last meeting of the core competency based resident evaluation committee (REC) and the first four meetings (two years) of the milestone based clinical competency committee (CCC). In addition, during each of the first four CCC meetings, actual time spent evaluating milestone competencies for each resident was collected. **Results:** Faculty estimated that it took a mean of 13.5 minutes and 19.6 minutes per resident to evaluate via core competencies and milestones, respectively. Actual mean time per resident for milestone evaluation was 8.8 minutes. 74% of faculty felt that milestone rating time would decrease over time. Mean

rating time decreased from 10.4 minutes to 8.4 minutes per resident over 2 years, which was not statistically significant. Most faculty thought the milestones system was both more difficult (53.8%) and more effective (53.8%) for resident evaluation compared to the previous core competency system. **Conclusions:** Faculty overestimated the time needed to complete milestones evaluation per resident. They accurately predicted that rating time would decrease over time. This was not a statistically significant change, but is likely significant for faculty productivity. While faculty thought the milestone evaluation system took more time and was more difficult, they also thought it was more effective than the core competency system.

26. Postauricular "Finger" Flap for Reconstruction of Conchal Bowl Defects

Charles R. Cannon, MD, Flowood, MS

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the utility of this simple technique, know the indications for this procedure, be able to describe the technical details of this procedure.

Objectives: Describe use of a postauricular flap to reconstruct full thickness defects of the conchal bowl. A random pattern flap which resembles a "finger" is raised, passed through the posterior aspect of the auricle and inset into the conchal bowl defect. After several weeks the pedicle of the flap is divided and final closure of the defect carried out. **Study Design:** Retrospective case series. **Methods:** Seven patients underwent surgery for ear lesions: 4 BCC, 2 SCC, and one with a refractory chondrodermatitis helicis with resultant conchal bowl defects measuring up to 2 cm in diameter. **Results:** None of the patients have had a local recurrence. All of the flaps survived with no necrosis, wound breakdown, or other complication. The aesthetic results were good with barely perceptible scars, the patients uniformly pleased with the results. **Conclusions:** This technique is technically easy to perform, reliable and provides an alternative to skin grafts or the cutaneous island flap. Its disadvantage is that it requires a second stage to divide the flap pedicle but this can be performed in an office setting if needed.

27. Factors Associated with Patient No-Show Rates in an Academic Otolaryngology Practice

Caitlin E. Fiorillo, MD, Lexington, KY; Allyson L. Hughes, MS-3, Lexington, KY; Philip M. Westgate, PhD, Lexington, KY; Thomas J. Gal, MD MPH, Lexington, KY; Matthew L. Bush, MD, Lexington, KY; Brett T. Comer, MD, Lexington, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) identify factors associated with patient clinic attendance; 2) compare no-show rates across otolaryngology subspecialties, clinic types, and patient demographics in an academic otolaryngology practice; 3) use this data to implement changes to improve access to care for patients.

Objectives: Identify factors associated with no-show rates in an academic otolaryngology practice that can be used to target areas of improvement in clinical efficiency and patient access to care. **Study Design:** This is a retrospective review. **Methods:** A retrospective review of scheduled clinical appointments from February 1, 2015, to January 30, 2016, at a single academic otolaryngology department was performed. Multivariate analysis examining no-show rates will be completed for following factors: attending rank, otolaryngology subspecialty, clinic type (e.g. main campus vs. satellite), patient demographic factors, season, day of week, insurance types, distance traveled, and visit type. **Results:** Preliminary data shows an overall no-show rate of 20.00% for 22,759 scheduled clinic visits. Satellite clinics had the highest no-show rates, ranging from 23 to 29%. New patient visits had the highest no-show rate at 24%. Among subspecialties, facial plastic surgery had the lowest no-show rate (12.6%), while pediatrics had the highest (23%). No association between gender and no-show rates was observed ($p=0.4$), although a difference with regards to race was seen ($p<0.001$). Patients with Medicaid (28%), Medicare (15.3%), and commercial insurance (12.8%) had significantly different no-show rates ($p<0.001$). Final multivariate analysis is currently underway. **Conclusions:** New patient visits, pediatric otolaryngology, satellite clinics, Medicaid insurance, and African-American race were preliminarily observed to be associated with reduced attendance at scheduled appointments. Given these factors, additional study is underway at our institution to implement interventions to facilitate better access to care with a goal of better health outcomes.

28. Management of an Unusual Intranasal Foreign Body Abutting the Cribriform Plate: A Case Report and Review of Literature

Mingyang L. Gray, MD MPH, New York, NY; Satish Govindaraj, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to identify key factors in the decision making process of removing an intranasal foreign body.

Objectives: The objective of this case is to appropriately manage the intranasal foreign body as well as potential complications such as CSF leak, major bleeding, and intracranial involvement. **Study Design:** Case report and literature review. **Methods:** A 35 year old man with history of schizophrenia presented three weeks after placing a screw in his right nare. Initial imaging showed a screw in the right ethmoid sinus with the tip penetrating the right cribriform plate. On exam, the patient was hemodynamically stable with purulent drainage in the right nasal cavity but no visible foreign body.

Results: While most nasal foreign bodies occur in children and are generally removed at the bedside, intranasal foreign bodies in adults tend to be more complicated. The location of the foreign object in this case was concerning for skull base involvement. The patient was brought to the OR with neurosurgery for FESS and removal of foreign body. The screw was removed and the patient recovered with no signs of CSF leak postoperatively. **Conclusions:** Many advocate for intranasal foreign bodies to be removed at the bedside. However, when there is concern skull base or intracranial involvement, it is important to fully evaluate the mechanism of injury and intervene in a controlled environment.

29. Partial Denture as an Unusual Airway Foreign Body in Adult

Terence E. Imbery, MD, Syracuse, NY; Joshua E. Romero, MD, Syracuse, NY; Robert M. Kellman, MD, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) highlight the importance of careful history when evaluating patients with mental handicap for stridor; 2) discuss the challenges associated with laryngoscopy in this setting; and 3) discuss safety implications of non-fixed dentures.

Objectives: 1) Highlight the importance of careful history when evaluating patients with mental handicap for stridor; 2) discuss the challenges associated with laryngoscopy in this setting; and 3) discuss safety implications of non-fixed dentures. **Study Design:** Case report and literature review. **Methods:** We report a case of a 52 year old male with a history of traumatic brain injury and seizure disorder who presented with breakthrough seizures. He was unable to communicate or cooperate with exam. He was admitted to the neurology service and was noted to have drooling and inspiratory stridor. This initially prompted a speech therapy swallow evaluation, who recommended ENT consultation. Plain film imaging was obtained and unremarkable. Flexible laryngoscopy was performed but inconclusive given patient's poor compliance with exam. Interview of his family revealed that his lower partial denture was missing. **Results:** The patient was taken to the operating room for direct laryngoscopy and bronchoscopy. GlideScope examination was very helpful in visualizing the upper airway prior to performing instrumentation. This revealed the lower partial denture lodged at the level of the glottis. It was safely removed with cup forceps and a Dedo laryngoscope. Post-removal rigid bronchoscopy was unremarkable. He had immediate relief of his stridor and the remainder of his hospitalization was unremarkable. **Conclusions:** Dentures can be potentially dangerous airway foreign bodies and are potential hazards in adults with compromised mental status. We would encourage consideration of fixed dentures in these patients to prevent catastrophic consequences.

30. From Ancient Wisdom to Modern Medicine: A Concise, Multi-Cultural History of Tracheostomy

Matthew R. Naunheim, MD MBA, Cambridge, MA; Margaret L. Naunheim, MD, San Francisco, CA; George A. Scangas, MD, Boston, MA; Heather A. Osborn, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the historical development of tracheostomy and the importance of this history on 1) current surgical practice; and 2) future innovation in airway management.

Objectives: To familiarize otolaryngologists with the long and multicultural history of tracheostomy. **Study Design:** Historical review. **Methods:** Contemporary and historical sources regarding tracheostomy and airway management were consulted. Relevant data and illustrations were compiled. **Results:** The development of tracheostomy occurred over thousands of years and in many cultures. A Hindu text describes the first use of tracheostomy circa 2000 B.C., whereas Egyptian and Greek physicians first documented tracheostomy in detail centuries later. Renaissance Italy rediscovered the procedure, while diphtheria and polio epidemics in the 19th and 20th centuries helped tracheostomy become safe and routine. The development of percutaneous tracheostomy in the 1960s paralleled the rise of intensive care units. **Conclusions:** Innovations in airway management have often been inspired by historical developments. The history of tracheostomy illustrates how old ideas gain new prominence with the advancement of medical technology, which may ultimately aid otolaryngologists in the development of new techniques.

31. Publication Rates of Abstracts Presented at National Otolaryngology Conferences

Tyler S. Okland, BS, Aurora, CO; Cristina E. Cabrera-Muffly, MD, Aurora, CO (Presenter); Elizabeth F. Boscoe, BA, Aurora, CO; Thad W. Vickery, BA, Aurora, CO; Kenny D. Rodriguez, BS RN, Aurora, CO

Educational Objective: At the conclusion of this presentation, the participants should be able to understand manuscript publication rates and be able to identify predictors of manuscript publication for abstracts presented at national otolaryngology conferences.

Objectives: To determine and compare publication rates and study characteristics of abstracts presented at three national otolaryngology conferences in 2012. **Study Design:** Cross-sectional study. **Methods:** Abstracts presented at three national otolaryngology conferences in 2012 were reviewed. The conferences were the American Academy of Otolaryngology Head and Neck Surgery Meeting (AAO-HNS, n = 695), the Combined Otolaryngology Spring Meeting (COSM, n = 693), and the Triological Society Combined Sections Meeting (TRIO, n = 243). Medline and Google Scholar searches were performed to determine publication rates and characteristics. **Results:** We reviewed 1,644 abstracts, including 584

oral presentations and 1060 poster presentations. Thirteen abstracts were not available for review and were excluded from analysis. Manuscript publication rate was 54.4%. Median time to publication was 12 months (IQR: 8 to 19 months). Factors positively associated with publication included oral presentation, translational and basic science research, treatment studies, and studies with positive findings (all p<0.001). Number of authors and sample size were not found to be associated with publication. Published manuscripts appeared in 118 different peer reviewed journals, with highest rates of publication in The Laryngoscope (26.3%), and Otolaryngology - Head and Neck Surgery (19.1%). Abstracts presented at COSM had a higher publication rate (58.6%) than AAO-HNSF (46.9%, p<0.001). Similarly, abstracts presented at TRIO had higher publication rates (55.6%) than AAO-HNSF (p=0.02). **Conclusions:** In 2012 publication rate of abstracts presented at national otolaryngology conferences was 54.4% with a median time to publication of 12 months. Our investigation is the first to compare publication rates between otolaryngology conferences.

32. Acute Calcific Tendonitis of the Longus Colli: A Case Report and Review of the Literature

Blake S. Raggio, MD, New Orleans, LA; Samuel C. Ficenec, BS, New Orleans, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinical presentation, diagnosis, and successful management of acute calcific tendonitis of the longus colli.

Objectives: Report a rare case of acute calcific tendonitis of the longus colli (ACTLC). **Study Design:** Case report and literature review. **Methods:** Describe the clinical presentation, radiographic findings, and management of a patient with ACTLC and review the pertinent literature. **Results:** A 45 year old otherwise healthy female presented with a 3 day history of progressive neck pain, decreased neck mobility, and odynophagia. The patient was afebrile with normal vital signs. She exhibited tenderness over the right posterolateral neck with limited range of motion. Flexible fiberoptic laryngoscopy revealed moderated posterior pharyngeal wall edema extending from the palatal-pharyngeal sphincter down to the level of the epiglottis. White blood cell count was in the upper limit of normal. Computed tomography (CT) scan of the neck with contrast revealed a calcification in the longus colli muscle and a prevertebral fluid collection without rim enhancement. A diagnosis of ACTLC was presumed. The patient was successfully managed with nonsteroidal anti-inflammatory drugs (NSAIDs), steroids, analgesia, and antibiotics (initiated in emergency room) and displayed marked improvement on hospital day 1. She was discharged with a short course of NSAIDs and antibiotics (precautionary measure) with complete resolution of symptoms on followup. **Conclusions:** ACTLC is an often misdiagnosed disease of the head and neck with limited reports in the literature. CT scan revealing a calcific deposition in the retropharyngeal space confirms the diagnosis. Spontaneous resolution over several weeks warrants conservative treatment with analgesia and anti-inflammatory medications. Awareness of ACTLC is necessary to avoid diagnostic errors and prevent the usage of unnecessary medical intervention.

33. Clinical Manifestations of Ehlers-Danlos Syndrome

Viran J. Ranasinghe, MD, Philadelphia, PA; Jason L. Yu, MD, Philadelphia, PA; Natasha Mirza, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain otolaryngology manifestations of Ehlers-Danlos syndrome.

Objectives: Present a series of two patients with otolaryngology manifestations of Ehlers-Danlos syndrome. **Study Design:** Case series. **Methods:** Two patients with Ehlers-Danlos syndrome seen at our institution. **Results:** We present our experience with these patients and review Ehlers-Danlos syndrome as it pertains to the otolaryngologist. **Conclusions:** Ehlers-Danlos syndrome (EDS) is a group of hereditary connective tissue disorders that can include joint hypermobility and tissue fragility. We present two patients with hypermobile type EDS who presented to an otolaryngology practice with manifestations of EDS. The first patient presented with recurrent temporomandibular joint dislocation and subjective hyoid bone dislocation causing subjective dysphagia and dyspnea. The second patient presented with a nine year history of progressive dysphagia who was found to have a large Zenker's diverticulum. We then review clinical manifestations of EDS as they pertain to the otolaryngologist.

34. Impact of a Resident Initiated Board Review Curriculum on Resident Performance on the Annual Otolaryngology Training Examination

Andrew J. Redmann, MD, Cincinnati, OH; Kareem O. Tawfik, MD, Cincinnati, OH; Charles M. Myer III, MD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the impact of a resident run review curriculum on the annual otolaryngology inservice training examination.

Objectives: 1) Determine the impact of a resident initiated board review curriculum on resident performance on the American Board of Otolaryngology Training Examination (OTE); and 2) examine the relationship between USMLE step 1 scores and OTE scores. **Study Design:** Retrospective review. **Methods:** We retrospectively compiled OTE scores for a single otolaryngology residency program between 2004 and 2016. Residents' USMLE step 1 scores were also obtained.

In 2010 a resident run board review curriculum was instituted to prepare residents for the annual OTE and for future board certification examinations. OTE scores were compared before and after institution of the curriculum. Linear regression was performed to identify predictors of OTE scores. **Results:** 59 residents were evaluated, 36 before and 23 after institution of the curriculum. Mean raw percentage correct on the OTE was 55% before and 64% after institution of the curriculum for PGY-2 residents (P<0.001). No significant change in scores was noted for PGY-1 and PGY 3-5 residents (two tailed P>0.05). USMLE step 1 scores moderately correlated with OTE scores for all years (R=0.44). On multivariate linear regression controlling for USMLE step 1 scores, board review curriculum predicted a 12% improvement in OTE scores for PGY-2 residents (p=0.016). The board review curriculum was not significantly predictive of change in score for all other post-graduate years. **Conclusions:** Institution of a resident led board review curriculum was associated with improved OTE scores for PGY-2 residents but not for PGY-1 and PGY 3-5 residents. The board review curriculum may be of greatest educational value to junior residents with a working knowledge of otolaryngologic disease.

35. Improving No-Show Rate for Otolaryngology Clinic in a Public Safety Net System

Marika D. Russell, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify measures for improving no-show rate in an outpatient otolaryngology clinic.

Objectives: The changing landscape of healthcare delivery demands greater accountability for access to care and patient experience. In the safety net system, delivery of high quality efficient care to a complex vulnerable patient population requires optimizing utilization of limited resources. The goal of this project was to decrease no-show rate for a general otolaryngology clinic in a public safety net system. **Study Design:** Prospective observational study. **Methods:** Prospective data on factors leading to high no-show rate was gathered through patient telephone interviews. Scheduling practices were redesigned to optimize show rate. Interventions included 1) establishing a requirement of telephone contact for scheduling of all new patient appointments; 2) involvement of referring primary care provider in scheduling process; 3) phone call reminders for new patient appointments; 4) implementation of a text reminder system for followup appointments; and 5) limiting advanced scheduling of followup appointments to less than 4 months. Mean no-show rate was calculated before and after the one year study intervention period. **Results:** Mean no-show rate decreased from 36.4% before the intervention period to 22.8% after the intervention period (p=0.015). **Conclusions:** Implementation of operational changes can improve no-show rate in a safety net otolaryngology clinic. Keys to success include optimizing patient contact and minimizing advanced scheduling.

36. Airway Management of Myeloid Sarcoma of the Larynx: A Case Report and Review of the Literature

Justin C. Sowder, MD, Salt Lake City, UT; Aleksandra M. Sowder, MD, Salt Lake City, UT; Marc E. Error, MD, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the presentation of myeloid sarcoma of the larynx and understand that early diagnosis and treatment is key to avoiding acute airway compromise and tracheostomy.

Objectives: 1) To describe a rare case of laryngeal myeloid sarcoma and the initial management; and 2) review the current literature. **Study Design:** Case report and review of the literature. **Methods:** A case of laryngeal myeloid sarcoma will be reported and the current literature will be reviewed. Presenting symptoms, physical exam findings, imaging, bone marrow biopsy, pathologic examination of an excised tumor specimen, and serial endoscopic findings prior to and following induction chemotherapy will be included. **Results:** A 70 year old male with an 8 week history of multiple, slowly enlarging subcutaneous nodules presented with 7 days of intermittent hoarseness. CT revealed diffuse homogeneous masses of the subcutaneous tissues, including a left pyriform sinus mass and a circumferential subglottic mass at the level of the cricoid cartilage. Flexible laryngoscopy confirmed a markedly narrowed airway. Biopsy of a subcutaneous nodule was diagnosed as myeloid sarcoma. Pathologic evaluation of peripheral blood and bone marrow showed acute myeloid leukemia with >75% atypical, CD56 positive blast cells. Administration of induction chemotherapy with cytarabine and idarubicin resulted in rapid regression of the lesions, avoiding the need for tracheostomy. **Conclusions:** Myeloid sarcoma is a rare manifestation of acute myeloid leukemia that can present with progressive laryngeal involvement. Prompt evaluation and confirmation by an otolaryngologist is a necessity. Timely administration of standard induction chemotherapy can result in rapid regression of these lesions. This can allow for cautious but conservative management of the airway, potentially avoiding the need for tracheostomy.

37. Operations Performed Concurrently Did not Affect Outcomes in Microvascular Reconstruction

Larissa Sweeny, MD, Birmingham, AL; Eben L. Rosenthal, MD, Stanford, CA; Tyler Light, BS, Portland, OR; Jessica Grayson, MD, Birmingham, AL; Benjamin Greene, MD, Birmingham, AL; Mark Wax, MD, Portland, OR

Educational Objective: At the conclusion of this presentation, the participants should have an understanding of the outcomes of operations performed concurrently relative to those operations which were not performed concurrently.

Objectives: Determine if microvascular free tissue transfers for reconstruction in the head and neck performed concurrently are associated with worse outcomes. **Study Design:** Retrospective study. **Methods:** Patients undergoing microvascular free tissue transfer operations between January 2010 and February 2015 at two tertiary care institutions were included (n=1,315). Patients were divided into two cohorts: non-concurrent (senior authors had only one reconstruction going during the time the patient was in the operating room or flaps were run consecutively with no overlap; n=773) or concurrent (simultaneous reconstructions were performed on the same day by the senior authors; n=542). Variables reviewed: defect location, indication, T classification, surgical details, duration of the operation and hospitalization, and complications (major, minor, medical). **Results:** Microvascular free tissue transfers performed: radial forearm (49%, n=639), osteocutaneous radial forearm (14%, n=182), anterior lateral thigh (12%, n=153), fibula (10%, n=135), recuts abdominis (7%, n=92), latissimus dorsi (6%, n=78), scapula (<1%, n=4). The mean duration of the concurrent operations was 21 minutes longer than non-concurrent operations (p=0.003). Mean duration of hospitalization was similar for non-concurrent (9.5 days) and concurrent (9.1 days) cohorts (p=0.39). There was no difference in complication rates when stratified by concurrent (18%, n=241) and non-concurrent (26%, n=344) (p=0.65). Subset analysis yielded similar results when minor, major, and medical complications between groups were assessed. The overall survival rate of free tissue transfers was 96%, and this was same for concurrent (96%) and non-concurrent (96%) operations (p=0.71). **Conclusions:** Patients had similar complication rates and durations of hospitalization for operations performed concurrently or non-concurrently.

38. Beyond the USMLE: A New Paradigm for Residency Applicant Selection

Kevin J. Sykes, PhD MPH, Kansas City, KS; Jennifer A. Villwock, MD, Kansas City, KS; Keith A. Sale, MD, Kansas City, KS

Educational Objective: At the conclusion of this presentation, the participants should understand the myriad of components that comprise the residency selection process and that using a screening algorithm that does not use a USMLE cutoff score does not decrease the quality of applicants selected for interviews.

Objectives: Determine the impact of an algorithmic approach - with no USMLE cutoff score - on the quality of applicants selected for residency interviews. **Study Design:** Retrospective cohort study of medical student applicants and current residents. **Methods:** Single institution review of otolaryngology residency program applications (n-=365) from 2008 to 2015. An algorithm was introduced to the selection process in 2013 in which no USMLE cutoff score was needed to receive an interview. In addition to applicants we analyzed characteristics of residents who successfully matched into our program. Pre-algorithm residents (n=16) and post-algorithm residents (n=12) were compared to assess the impact of this approach on characteristics of successfully matched residents at the program. **Results:** Applicant pools pre- and post-algorithm displayed similar characteristics. Interestingly, while there was no USMLE cutoff, scores significantly increased post-algorithm. The proportion of residents with a regional connection increased significantly post-algorithm. The algorithm also aided in the overall applicant screening process, reducing the needed time without impacting the overall composition of the interviewee pool. **Conclusions:** Historic means of screening residency applicants are not uniform and often employ a simple USMLE score cutoff. This is neither the purpose of the exam nor an effective means of selecting the best future otolaryngologists. Applications can be objectified using an algorithmic approach, saving time and without negatively impacting the selection pool. Furthermore, while weighting attributes such as leadership and research equal weight to the USMLE score, we experienced an increase in average USMLE score of interviewed applicants.

39. Safety in Intraoperative MRI Use

Julia C. Toman, MD, New Haven, CT; R. Peter Manes, MD, New Haven, CT

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the complex safety protocols which must be put in place and followed in order to safely use the tool of an intraoperative MRI.

Objectives: Intraoperative MRI has gained increasing use and has expanding indications. While initially used purely in neurosurgical cases, intraoperative MRI is now being used in jointly managed cases between otolaryngologists and neurosurgeons. Its use as an important tool in the surgeon's armamentarium is being evaluated. However, there are a number of safety concerns regarding intraoperative MRI. We seek to review the safety protocols put in place with the expansion of this technology at our center and our safety track record over the past five years. **Study Design:** Retrospective review. **Methods:** All cases planned for intraoperative MRI were reviewed over the past 5 years, including the routine MRI operating room safety protocols. All cases were assessed for safety concerns or activation of the safety protocols. **Results:** There were no complications of having an intraop MRI in the study period. Per policy an MRI cannot proceed if there is a missing instrument or needle. There were a few instances when this policy was enforced and one instance where this led to the planned MRI not occurring. Additionally it was noted that new temperature probes were for a time not MRI safe so the removal of the probes was added to the safety protocol. **Conclusions:** Safety is of paramount concerns when implementing new technology. Clear safety protocols must be in place to prevent harm to patients and staff and maximize the use of evolving technologies. These policies must also evolve to address new concerns as they arise.

40. A Case of Anaplastic Large Cell Lymphoma

Olivia Twu, MD PhD, San Francisco, CA; Christopher G. Tang, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the possible presentations of primary cutaneous anaplastic large cell lymphoma (C-ALCL) and explain the prognosis and treatment.

Objectives: Describe a rare malignancy. Discuss the clinical presentation, prognosis, and treatment of primary cutaneous anaplastic large cell lymphoma (C-ALCL). **Study Design:** Case report including a detailed histopathologic analysis, radiology, and review of the literature. **Methods:** A case report is described from a community hospital. Histopathologic assessment and radiological details are described. A literature review of the background, incidence, disease course, and treatment options are presented. **Results:** This case report presents a 51 year old African American female with a left temporal lesion that began as a 1 x 1.3 cm patch of occasionally pruritic dry skin a year before presentation to ENT clinic. The lesion was treated by dermatology with several different strengths of steroids. When seen by ENT, the lesion was a 2 x 2.5 cm soft pink nodular plaque without ulceration. The patient denied pain, weight loss, or bleeding. A punch biopsy demonstrated cutaneous CD30+ ALK- C-ALCL. A PET scan was negative for systemic involvement and the patient is undergoing radiation therapy for definitive treatment. **Conclusions:** Primary C-ALCL typically presents in people in their sixth decade with a slight male predominance and is more common in those treated with anti-tumor necrosis factor drugs. Here we present a case in an African American female with no known risk factors and a more indolent presentation and progression. Chronic solitary skin lesions, no matter how benign appearing, should be biopsied for definitive diagnosis.

41. Chronic Asymptomatic Parotid Mass as a Unique Focal Manifestation of Immunoglobulin G4 Related Disease

Andrew M. Vahabzadeh-Hagh, MD, Los Angeles, CA; Eddie A. Ramirez, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe IgG4 related disease as an increasingly recognized systemic disease process very prevalent to otolaryngologists. They will be able to better recognize when this entity should be included in their differential diagnosis for chronic glandular diseases (salivary, lacrimal, and thyroid glands) and to understand its diagnostic and treatment pathways.

Objectives: Immunoglobulin G4 related disease (IgG4-RD) is an immune mediated phenomenon with a unique pathologic, serologic, and clinical signature. It commonly presents with tumor-like swelling of involved organs with lymphoplasmacytic infiltrate with an abundance of IgG4 positive plasma cells. It is a systemic disease often presenting with diffuse multi-organ involvement. In the head and neck, IgG4-RD may manifest with salivary gland disease including glandular enlargement or sclerosing sialadenitis, orbital disease including lacrimal gland enlargement, and thyroid disease including thyroiditis. Here we report a uniquely localized manifestation of IgG4-RD in a longstanding minimally symptomatic parotid mass. **Study Design:** A case report and literature review. **Methods:** We investigate a unique presentation and pathology of a chronic parotid mass. **Results:** 44 year old male with 17 year history of intermittent right parotid swelling, variable in size, non-painful. Exam revealed an intact facial nerve with 3 x 3 cm right parotid mass. MRI showed a well circumscribed homogeneously enhancing mass with low T1 and intermediate T2 signal involving the superficial right parotid gland. FNA showed polymorphous population of lymphocytic cells. Given indeterminate cytology and concerning features, patient underwent a right superficial parotidectomy. Pathology demonstrated intraparotid lymph node with reactive follicular hyperplasia with progressive transformation of germinal centers and histologic features of IgG4 related disease. The patient's symptoms resolved. Given the lack of symptoms or diffuse adenopathy treatment with immunosuppression was forgone. **Conclusions:** Classically a systemic, multi-organ disease phenomenon, IgG4-RD can manifest as a focal localized disease process that should be considered alongside other autoimmune processes encountered in the head and neck.

42. The Israel Retractor Modification for Oropharyngeal Surgery on Patients of Larger Body Habitus

Andrew M. Vahabzadeh-Hagh, MD, Los Angeles, CA; Eddie A. Ramirez, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the surgical difficulties with performing oropharyngeal surgery on patients of larger body habitus as well as understand and be able to implement this simple surgical modification to make such surgeries and exposure easier.

Objectives: Elective oropharyngeal surgery including tonsillectomy and uvulopalatopharyngoplasty performed for obstructive sleep apnea increasingly is performed on patients of upper tier body habitus. The use of the Crowe-Davis retractor in such patients may be complicated by a large barrel chest making it difficult to anchor the retractor to the Mayo stand. Here we present a simple modification using the Israel retractor to facilitate such surgeries. **Study Design:** How I do it. **Methods:** Operational instructions for Israel retractor modification in oropharyngeal surgery on patients of larger body habitus. **Results:** The Israel retractor provides an extension to the Crowe-Davis retractor. The Crowe-Davis is able to anchor to the Israel retractor whose fingers articular well for suspension on the Mayo Stand. This extension allows ease of positioning and suspension of patients with larger body habitus in oropharyngeal surgery. **Conclusions:** Classically a systemic, multi-organ disease phenomenon IgG4-RD can manifest as a focal localized disease process that should be considered alongside other autoimmune processes encountered in the head and neck.

43. Medical Student Involvement in National Otolaryngology Organizations

Kevin Wong, BA, Boston, MA; Minyoung Jang, MD, Boston, MA; Amir Gilad, BS, Boston, MA; Jessica R. Levi, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the number and type of opportunities currently available to medical students in the United States in professional otolaryngology organizations.

Objectives: For highly competitive fields such as otolaryngology-head and neck surgery (Oto-HNS), it is important that medical students are confident in their career choice due to the considerable time, effort, and sizable risk of not matching relative to other fields. Previous studies have shown that students are happier with career decisions when given ample and early exposure to a given field. However, few studies have formally evaluated opportunities currently available in otolaryngology. The purpose of this study was to determine the extent to which professional otolaryngology organizations and societies provide opportunities for medical student involvement. **Study Design:** Cross-sectional analysis. **Methods:** We reviewed the websites, newsletters, and brochures of 31 national otolaryngology related professional and subspecialty societies for clinical, research, networking, leadership, and service opportunities. **Results:** In total, 16% of societies offered student membership, 74% allowed students to attend national conferences, and half allowed students to present research at these conferences. The average cost of membership was $50 and the average registration cost to attend conferences was $295. Six organizations provided travel and/or research scholarships for students, however no organizations provided leadership or service opportunities. **Conclusions:** Most professional otolaryngology associations offered some level of student involvement, however opportunities were often limited in scope and depth. Increasing opportunities for medical students should be of interest for professional societies because it will not only increase interest in the field, but also foster the next generation of otolaryngologists who are both well trained and well informed regarding their career choices.

Head & Neck

44. The Effectiveness of Physical Therapy Following Neck Dissection: A Meta-Analysis

Yusuf M. Agamawi, BS, Minneapolis, MN; Masanari G. Kato, BS, Charleston, SC; Shaun A. Nguyen, MD MA, Charleston, SC; Terry A. Day, MD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the effects and benefits of PT, as well as acknowledge the need for additional studies to further expand the benefits of PT on head and neck cancer patients who were treated with neck dissection.

Objectives: To evaluate the effects of post-procedure physical therapy (PT) on measures of shoulder pain and disability, quality of life, and shoulder mobility of patients that underwent neck dissection (ND) as part of treatment for head and neck cancer (HNC). **Study Design:** Systematic review and meta-analysis of continuous measures. **Methods:** Literature search was performed by 2 independent authors using PubMed and Scopus databases. Studies assessing the effects of PT for HNC patients treated with ND were evaluated. **Results:** A total of only 3 studies, representing 57 HNC patients, met inclusion criteria. The effectiveness of PT on shoulder pain and disability, quality of life, and shoulder mobility were evaluated through measurements by Shoulder Pain and Disability Index (SPADI) in 57 patients, Neck Dissection Impairment Index (NDII) in 49 patients, and active shoulder abduction (ASA) measured in degrees in 30 patients, respectively. Pooled analyses of intervention (structured PT program) versus control (standard, self-directed PT exercises) groups for SPADI (mean difference (MD): -8.13, CI [-14.06,-2.12], p = 0.007) and ASA degree (MD: 24.74, CI [6.71,42.76], p = 0.007) favored intervention, while NDII (MD: 6.74, CI [-2.55,16.03], p = 0.16) favored neither. **Conclusions:** Few studies have been performed evaluating the role, extent, timing, and duration of PT following neck dissection. More rigorous PT programs demonstrate greater benefits to HNC patients treated with ND in regards to shoulder pain, disability, and mobility. Additional studies are warranted to further expand on the benefits of PT for HNC patients who underwent ND.

45. Regional Differences in Sinonasal Adenoid Cystic Carcinoma

Sei Y. Chung, BS, Newark, NJ; Albert H. Zhou, BS, Newark, NJ; Aykut A. Unsal, DO, Newark, NJ; Varesh R. Patel, BA, Newark, NJ; Soly Baredes, MD, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to identify geographic differences in demographic and clinicopathologic traits, treatment modality, and survival of sinonasal adenoid cystic carcinoma using a national database.

Objectives: Sinonasal adenoid cystic carcinoma (SNACC) is a rare malignancy of the head and neck. We present the first population based analysis that examines geographic differences in demographic and clinicopathologic characteristics, treatment modality, and disease specific survival (DSS) of SNACC. **Study Design:** Retrospective database analysis. **Methods:** Using the SEER 18 registry from 1973 to 2013, SNACC patients were stratified into east, midwest, south, and west. Differences in demographics, socioeconomic variables, tumor stage, and treatment modality were compared

between these regional groups. Kaplan Meier regression analysis was utilized to generate survival data. **Results:** A total of 694 SNACC patients were identified; 14.8% were from the east, 14.6% were from the midwest, 15.6% were from the south, and 55.0% were from the west. There were no significant regional differences in age, gender, or primary site. More patients from the west presented with metastatic disease (P=0.013). Patients from the south and midwest had the lowest median family incomes (P<0.001), and lived in non-metropolitan areas (P<0.001). A higher proportion of patients from the south and west received neither surgery nor radiotherapy (P=0.023). Despite these differences, 5, 10, and 20 year DSS did not vary significantly among regions. **Conclusions:** Significantly more patients from the south and midwest were poor and lived in rural or urban towns, while significantly more patients in the south and west received no treatment. Regardless of these evident disparities, we did not observe significant any DSS differences in SNACC when stratified by geographic location in the US.

46. Geographical Differences in Disease Specific Survival of Head and Neck Mucosal Melanoma: A Population Based Analysis

Sei Y. Chung, BS, Newark, NJ; Varesh R. Patel, BA, Newark, NJ; Aykut A. Unsal, DO, Newark, NJ; Albert H. Zhou, BS, Newark, NJ; Soly Baredes, MD, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to identify geographical variations in demographics, socioeconomic factors, treatment modality, and survival of head and neck mucosal melanoma patients.

Objectives: It is well established that ultraviolet radiation affects incidence and severity of melanoma. Certain regions of the US, such as the west and south are exposed to more sunlight than others. We aim to determine geographical differences in the patient population, treatment modality, and survival of head and neck mucosal melanoma (HNMM) patients. **Study Design:** Retrospective population based analysis. **Methods:** Using the Surveillance, Epidemiology, and End Results registry from 1973 to 2013, 1,322 HNMM patients were identified as being from the east, midwest, south, or west. Demographics, clinicopathologic traits, socioeconomic factors, treatment methods, and disease specific survival (DSS) were compared among regions. **Results:** We queried 1,322 HNMM patients, of which 12.3%, 15.4%, 12.5%, and 59.8% were from the east, midwest, south, and west, respectively. A higher proportion of patients in the south and midwest had lower median family incomes (P<0.001), lived in non-metropolitan areas (P<0.001), and were treated with neither surgery nor radiotherapy (P=0.044). Furthermore, more patients in the midwest presented with distant metastasis (P<0.001). There were no significant geographical differences in 5, 10, and 20 year DSS of HNMM. **Conclusions:** The west and south are known to have higher ultraviolet indices. The present study demonstrated that significantly more patients from the south and midwest were poor, lived in rural or urban areas, and received no treatment. Significantly more midwest patients also had metastatic disease at presentation. Despite these apparent differences in ultraviolet radiation exposure and socioeconomic factors, there were no DSS differences in HNMM among geographic regions of the US.

47. Diagnostic Challenge of Parathyroid Cysts

Deepa Danan, MD MBA, Charlottesville, VA; Brian Hernandez, Charlottesville, VA; David C. Shonka Jr., MD, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the distinguishing clinical, radiographic, and intraoperative features of parathyroid cysts that can help to differentiate them from other diagnoses, as well as the management of these lesions.

Objectives: 1) Describe four cases of parathyroid cysts including their clinical presentations and management; and 2) discuss distinguishing clinical, radiographic, and intraoperative features of parathyroid cysts that can help to differentiate them from other diagnoses. **Study Design:** Case series. **Methods:** Four patients presented with cervical masses. Two had palpable masses on presentation, one presented with dysphagia, and the other was incidentally noted to have a mass on imaging during syncopal workup. Only one of four patients had primary hyperparathyroidism. On imaging (US and CT), all of the patients had cystic masses in close association with the thyroid gland. FNA was performed on two of the patients. Three patients had a preoperative diagnosis of PC and one patient had a preoperative diagnosis of thyroid mass. **Results:** All four patients underwent successful parathyroidectomy +/- thyroid lobectomy. Photodocumentation was obtained in all four cases demonstrating the intraoperative location and appearance of the cysts. The recurrent laryngeal nerves were identified and preserved in all four cases. All patients had complete resolution of symptoms postoperatively. **Conclusions:** PCs are rare, occurring in only 0.5% of parathyroid disease. The diagnosis of PC is often overlooked due to its rare incidence as well as the challenge of differentiating a PC from thyroid and other cervical pathology. Four cases of PCs are described; and the relevant radiologic findings, pitfalls in determining this diagnosis, and management of these lesions are discussed.

48. A Superoxide Dismutase (SOD) Mimetic, GC4419, Enhances the Efficacy of Standard of Care Therapies for Head and Neck Squamous Cell Carcinoma (HNSCC)

Andrew B. Davis, MD, Iowa City, IA; Collin D. Heer, BS, Iowa City, IA; D. Benjamin Riffe, BS, Iowa City, IA; Dennis P. Riley, PhD, Malvern, PA; Robert A. Beardsley, PhD, Malvern, PA; Douglas R. Spitz, PhD, Iowa City, IA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the purpose and uses of SOD mimetics and their potential use as a chemosensitizer in HNSCC.

Objectives: HNSCC has significant morbidity and mortality. GC4419 is a SOD mimetic that is currently in clinical trials as a radioprotector of normal cells to help prevent mucositis. We hypothesize that GC4419 may also have anti-tumor properties when combined with standard of care (SOC) therapies as a result of its ability to increase steady state levels of H2O2 by exploiting deficiencies in cancer cell oxidative metabolism. **Study Design:** Clonogenic survival assays. **Methods:** SCC25 and SQ20B cells were grown exponentially for 24-48 hours and subsequently treated with 5-20μM GC4419 to establish a clonogenic survival dose response curve. GC4419 was then treated concurrently with cisplatin for 3 or 24 hours, prior to clonogenic survival assays. Normal human fibroblasts (NHF) were grown exponentially for 48 hours and treated with 5uM GC4419 for 24 hours prior to clonogenic survival assay. **Results:** Alone, GC4419 did not exhibit any clonogenic cell killing to either cancer or normal cells. Cancer cells treated concurrently with 5μM GC4419 and 0.5 or 1.0μM cisplatin for 24 hours showed a 13% and 5% increase in clonogenic cell killing, respectively, compared to cisplatin alone (n=3). **Conclusions:** GC4419 increases the toxicity of SOC to cancer cells while not causing normal tissue toxicity. Future experiments will examine the effect of increasing GC4419 dose to further sensitize HNSCC cells to SOC.

49. Melanoma of the External Ear: A Population Based Study

Nicholas L. Deep, MD, Phoenix, AZ; Amy E. Glasgow, MHA, Rochester, MN; Elizabeth B. Habermann, MPH PhD, Rochester, MN; Jan L. Kasperbauer, MD, Rochester, MN; Matthew L. Carlson, MD, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should have a greater understanding of the incidence and survival trends of primary malignant melanoma of the external ear.

Objectives: Primary melanoma of the external ear (PMEE) is rare and therefore well suited for large population based registry analysis. The objective of this study was to utilize the Surveillance, Epidemiology, and End Results (SEER) set of cancer registries to determine the incidence, treatment, and survival characteristics of PMEE. **Study Design:** Retrospective cohort analysis of SEER data 2004-2013. **Methods:** All cases of PMEE stage I-IV by AJCC 7th edition guidelines were extracted; carcinoma in situ (stage 0) was excluded. Population based incidence was calculated and overall and cancer specific survival data, stratified by stage and subtype, were assessed using Kaplan-Meier analysis. **Results:** A total of 5,481 patients were analyzed (mean age 66.7 years, 86.5% male, 93.6% non-Hispanic white). The incidence of PMEE was 1.91 per 100,000 persons per year. At diagnosis, 68.1% were stage I, 15.2% were stage II, 4.7% were stage III, 1.5% were stage IV, and 10.8% were unknown. The five year overall and disease specific survival was 78.8% and 90.0%, and, according to AJCC stage, was 85.7% and 95.3% for stage I (n=2287), 64.6% and 81.1% for stage II (n=453), 50.8% and 57.0% for stage III (n=154), 17.2% and 20.5% for stage IV (n=34), and 71.0% and 87.1% for unknown stage (n=330), respectively. Additional subgroup analyses based on patient demographics and tumor characteristics will also be reported. **Conclusions:** This is the first study to characterize the epidemiology, presentation and outcome of PMEE using the SEER national cancer registry. This population based study elucidates the impact of several well established prognostic factors specific to PMEE.

50. Delayed Infection of Porous Polyethylene Implant after Oncologic Maxillectomy Reconstruction: Two Case Reports and a Review of Literature

Karthik Devarajan, MD MBA, Shreveport, LA; Miriam E. Hankins, BS MSc, Shreveport, LA; Juraj Berkovic, MD, Shreveport, LA; Cherie Ann O. Nathan, MD FACS, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize and address long term infection complications involving porous polyethylene implants used in oncologic maxillary reconstruction.

Objectives: We describe our experience with delayed infections of porous polyethylene (MEDPOR) implants used after oncologic maxillectomy and reconstruction. **Study Design:** Retrospective case report. **Methods:** We reviewed clinical presentations, radiographic findings, microbiology, treatments, and outcomes of patients who developed delayed infections of Medpor implants after maxillary reconstruction. **Results:** Two patients were identified requiring unilateral total maxillectomy and Medpor reconstruction for an ossifying fibroma and squamous cell carcinoma, respectively. The first subject was followed annually with interval CT scans that showed no recurrence of tumor or inflammatory changes. The second subject underwent adjuvant chemoradiation but was lost to followup 1 year after resection. Subjects presented with infection of implant at a mean of 4.5 years following maxillectomy. Both patients presented with swelling, drainage and erythema. Both failed conservative treatment including multiple rounds of antibiotics and incision and drainage. The implants were removed at a mean of 2.5 months after infection and replaced with matrix orbital floor plates. Cultures of removed implants demonstrated alpha-hemolytic streptococcus in the first case and multiple organisms in the second

(Escherichia coli, proteus mirabilis, coagulase negative staphylococcus and candida tropicalis). **Conclusions:** Medpor implants are commonly used for facial skeletal reconstruction due to its reported biocompatibility, fibrovascularization and durability. While uncommon, late implant infections are usually secondary to bacterial seeding from another active source (e.g. dental infection) or exposure to upper aerodigestive tract. An important consideration before using the porous polyethylene implant is their potential to develop infection resistant to systemic antibiotic treatment years after reconstruction.

51. Thyroid Mass from a Malignant Glomus Tumor: Case Report and Literature Review

Amanda E. Dilger, MD, Chicago, IL; John D. Cramer, MD, Chicago, IL; Jose C. Dutra, MD, Chicago, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) describe the typical presentation and histopathology of glomus tumors; and 2) consider metastatic glomus tumor in the workup of an unusual thyroid mass.

Objectives: Glomus tumors arise in the dermal glomus body and are most commonly found in the subungual region of the digits, the dermis or the subcutis of the palm, wrist, forearm or foot. They are typically benign and localized but rare cases of malignant glomus tumor have been reported. Here, we describe the first reported case of glomus tumor metastasizing to the thyroid gland. **Study Design:** Case report and literature review. **Methods:** A 40 year old male with a history of glomus tumor of the dorsal aspect of his left foot status post wide local excision with metastatic disease that was well controlled for four years with chemotherapy and radiation presents with a slowly enlarging left thyroid mass. The mass was first identified on surveillance CT and enlarged from 1.3 centimeters to 2.4 centimeters over the course of six months. Fine needle aspiration of the mass demonstrated atypical epithelioid cells with conspicuous nuclei and scatter mitosis with immunostains positive for SMA, focally positive for calponin and negative for PAX-8 consistent with metastatic malignant glomus tumor. **Results:** The patient underwent total thyroidectomy and final pathology was consistent with metastatic glomus tumor. **Conclusions:** This is the first reported case of a glomus tumor metastasizing to the thyroid gland. This case illustrates several important points for otolaryngologists and highlights the differences between glomus tumors and paragangliomas, which were formerly also called glomus tumors. Although rare, malignant glomus tumors are an additional entity to consider when assessing a patient with an unusual appearing thyroid mass.

52. Parathyroid Adenomatosis: A Case Report of Multifocal Atypical Parathyroid Tissue Leading to Hyperparathyroidism

William M. Dougherty, ND, Charlottesville, VA; David C. Shonka, MD, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss an unusual and complex cause of hyperparathyroidism.

Objectives: Describe a rare pathologic finding. To our knowledge, a similar report in the literature does not exist. **Study Design:** This is a case report of a single patient. **Methods:** This is a case report of a single patient. **Results:** We present a 68 year old man with a history of primary hyperparathyroidism who presented with persistent hypercalcemia (12.8 mg/dL) and hyperparathyroidism (PTH 1087 pg/ml) after four prior parathyroidectomy operations (including right thyroid lobectomy) at an outside hospital. A preoperative MIBI scan demonstrated nodular hypodense tissue with radiotracer uptake in the right thyroid bed. Intraoperative ultrasound demonstrated multiple hypoechoic masses superficial to the right strap muscles and within the right thyroid bed and paratracheal region. He underwent central neck dissection with removal of the multifocal disease with frozen section and permanent pathologic assessment confirming parathyroid tissue in multiple locations including tissue superficial to the strap muscles, within the right central neck contents, and deep to the recurrent laryngeal nerve at the cricothyroid joint. The disease burden extended into the right cricothyroid muscle and was immediately adjacent to the esophagus posterior to the trachea. Rapid intraoperative PTH assessment confirmed a drop in intraoperative PTH from 815 pg/mL to 46 pg/mL 10 minutes after completion of the right central neck dissection. The pathologic assessment revealed atypical multinodular parathyroid proliferation. This institution's pathology department concluded that this represented an atypical, benign, multifocal proliferation of hypercellular parathyroid tissue. Malignancy was considered less likely with a calcium level <15 mg/dL, absence of mitotic figures or clear invasion of surrounding structures. The patient underwent postoperative radiation given the recurrent and multifocal nature of the disease. This report will review the preoperative imaging, intraoperative pictures, and pathologic findings. **Conclusions:** This is a useful report for the head and neck surgeon, demonstrating surgical and medical management of an unusual problem.

53. Recurrent Epidermal Inclusion Cyst of the Parapharyngeal Space: Case Report and Review of Literature

Caleb J. Fan, BS, Baltimore, MD; Susan D. Emmett, MD MPH, Baltimore, MD; Elise S. Gelwan, MD, Baltimore, MD; Charles M. Stewart, MD PhD, Baltimore, MD; David W. Eisele, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the presentation and surgical management of parapharyngeal epidermal inclusion cysts.

Objectives: To share a case report and literature review of a recurrent parapharyngeal epidermal inclusion cyst (EIC). **Study Design:** Case report and literature review. **Methods:** The literature review was conducted in PubMed using ("epi-

dermal inclusion cyst" OR "epidermoid cyst" OR "epidermal cyst" OR "sebaceous cyst") AND "case report". **Results:** A 45 year old woman status post-excision of a left skull base EIC four years prior presented with symptoms of left upper neck pressure and ear fullness. MRI revealed a 3 cm recurrent parapharyngeal T2 hyperintense lesion slightly below the level of the left stylomastoid foramen. Facial nerve function was intact preoperatively and audiogram was unremarkable. A joint transcervical and transmastoid approach to the lateral skull base was required for complete excision due to dense adherence of the tumor to the facial nerve in the stylomastoid foramen. The facial nerve was intact 1 week postoperatively. Histopathologic diagnosis confirmed an EIC. Of the 499 articles on EICs obtained by literature review, 2 described parapharyngeal EICs. One case was iatrogenic and developed 5 years after a modified radical mastoidectomy for cholesteatoma. The second case described an idiopathic EIC of the styloid process that presented with decreased hearing and tinnitus. **Conclusions:** EICs are rarely found in the parapharyngeal space but should be considered in the differential. Imaging and fine needle aspiration can help with diagnosis. In addition to a head and neck surgery evaluation, consultation with neurotology and oral and maxillofacial surgery is recommended given the potential need for multiple points of access to the parapharyngeal space.

54. Laryngeal Chondroma: A Case Report and Systematic Review

Justin B. Fong, St. Louis, MO; Christopher G. Tang, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the clinical presentation and treatment options for laryngeal chondroma.

Objectives: To review the current literature on laryngeal chondromas. **Study Design:** Systematic review. **Methods:** A PubMed search was performed to obtain English language studies on laryngeal chondromas from 1950 to 2016. Bibliographies of the selected articles were also examined. A total of 158 studies and case reports were examined, of which 52 contained relevant information. **Results:** Fifty-two studies yielded 212 patients who have been described to have laryngeal chondromas. Of these 20.2% were female and 79.8% were male. The majority of cases, 50.5%, occurred between the ages of 40 and 60 years. The most common presenting symptoms were dysphonia (68.5%) and dyspnea (58.2%). The cricoid cartilage (49.5%) was the most common site of origin, followed by the thyroid cartilage (17.0%). The most common initial treatment is local excision (70.4%), of which 73.0% were external approach operations and 15.5% were endoscopic. Of the cases collected 5.7% are recorded of dying of the disease. **Conclusions:** Laryngeal chondromas are rare and benign tumors resulting in airway obstruction. This review contains the largest data set of laryngeal chondroma cases to date. Our data suggests that laryngeal chondroma is 4 times more prevalent in males than females, and primarily afflicts individuals over the age of 40. External approach surgery is historically the most common treatment option.

55. A Multi-Institutional Analysis of the Influence of Transfusions on Complication Rates after Major Head and Neck Surgery

Aparna Govindan, BA, Newark, NJ; Sana H. Siddiqui, BA, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ; Soly Baredes, MD, Newark, NJ; Richard C. Park, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to compare postoperative complication rates between patients who received a postsurgical transfusion versus those that did not following major head and neck surgery.

Objectives: To determine the impact of intraoperative and postoperative transfusions on complication rates in patients undergoing major head and neck cancer surgery. **Study Design:** The aim of this retrospective database analysis was to characterize complication rates and mortality in patients who received a transfusion during and within 72 hours of a major head and neck surgery. **Methods:** The National Surgical Quality Improvement Program 2005-2014 participant user files were queried for cases of major head and neck procedures, including glossectomies, mandibulectomies, laryngectomies, pharyngectomies, and esophagectomies. Using univariate and multivariate analysis, perioperative variables were compared between those who received a transfusion and those who did not. **Results:** Of 6,679 patients in our analysis, 1,055 (15.8%) patients received a red blood cell transfusion during or up to 72 hours after surgery. Transfused patients had higher frequencies of comorbidities including anemia (72.7% vs. 44.2%, P <.001), weight loss (21.8% vs 15.6%, P <.001) and chemotherapy (19.5% vs 11.3%, P <.001). Transfused patients had significantly longer lengths of stay than non-transfused patients (15.70 vs 12.49 days; P<0.001) Higher rates of surgical and medical complications and mortality were observed in the transfused cohort. Upon multivariate analysis, only deep incisional surgical site infection (odds ratio [OR] = 2.070, P = .026) and myocardial infarction ([OR] = 3.425, P = .005) remained independently associated with red blood cell transfusions. **Conclusions:** Transfusion within 72 hours of major head and neck surgery correlates with greater odds of developing deep incisional surgical site infection and myocardial infarction, but is not associated with increased overall postoperative complication rates.

56. Transfusion Protocols in Head and Neck Free Flap Surgery

Jessica W. Grayson, MD, Birmingham, AL; David W. Davis, DMD MD, Birmingham, AL; Philip D. Rosen, MD, Birmingham, AL; Lindsay S. Moore, MD, Birmingham, AL; William R. Carroll, MD, Birmingham, AL

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the potential adverse side effects of blood transfusions particularly in the postoperative setting. They should be able to understand and discuss potential poor outcomes related to blood transfusions in free flap surgery along with cost effects of transfusion.

Objectives: To characterize transfusion patterns and effects on outcomes in head and neck cancer patients at one institution utilizing two separate protocols. **Study Design:** Prospective cohort study with historical controls. **Methods:** Two hundred head and neck patients undergoing free flap surgery from 2014 to 2016 were evaluated based upon transfusion for hematocrit < 26% versus hematocrit < 21%. Outcome parameters included length of stay (LOS), number of units transfused, flap survival, perioperative and postoperative complications, and cost savings. **Results:** Of all head and neck patients, 40.5% received transfusions with 57% of them being in the pre-protocol group and 24% of them being within the post-protocol group. Patients in the post-protocol group did not have increased rates of operative take backs, flap failure, fistula formation, infections, or postoperative complications. In one group of postoperative complications, the pre-protocol group had a significantly increased rate of complications. There was a higher transfusion rate at our institution with radial forearm free flaps, but this was likely due to this being the majority of our free flaps. There was significance noted for higher transfusion rates in fibula free flap patients and longer length of stay. **Conclusions:** In our patients, transfusion of less blood did not confer any increased rates of flap loss, infections, or postoperative complications. There was also an additional notation of cost savings by transfusing fewer units of blood with no changes in complications or LOS. Therefore, we recommend a restrictive transfusion protocol similar to the one used in our study.

57. Pharyngeal Flap Reconstruction for Velopharyngeal Insufficiency Following Bilateral Transoral Robotic Radical Tonsillectomy

James M. Hamilton, MD, Philadelphia, PA; David M. Cognetti, MD, Philadelphia, PA; Howard D. Krein, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be aware of the option palatoplasty with a posterior pharyngeal flap as a possibility for successful, functional correction of velopharyngeal insufficiency following bilateral transoral robotic radical tonsillectomy.

Objectives: We report the case of pharyngeal flap reconstruction for debilitating velopharyngeal insufficiency with hypernasal speech following staged TORS resection of simultaneous squamous cell carcinoma of bilateral palatine tonsils. **Study Design:** Case report and literature review. **Methods:** Retrospective review, photographic depiction, and video presentation of a case record at a tertiary care medical center. Literature review using a PubMed search for bilateral tonsillar carcinoma, dysphagia, and velopharyngeal insufficiency. **Results:** We present a 68 year old female with bilateral palatine squamous cell carcinoma. She presented with biopsy proven p16 positive disease in the right tonsil and initially underwent transoral robotic resection with buccal fat graft repair of palatal defect and right neck dissection. Biopsy of the contralateral left tonsil at this time revealed simultaneous squamous cell carcinoma. Three weeks later she underwent transoral robotic radical resection of left tonsil and left neck dissection. She was staged T1N1 on the right and T1N0 on the left. No adjuvant therapy was required. On followup, however, she complained of hypernasality so severe that it limited her social interaction. At three months post-resection, she underwent palatoplasty with posterior pharyngeal flap. At postoperative week one she was tolerating liquids without nasal regurgitation. At three months, she reported near normal voice and had returned to her normal routine. She is currently three years since treatment and remains without evidence of malignancy and without voicing or swallowing complaints. **Conclusions:** In the appropriately selected patient, treatment of simultaneous, bilateral squamous cell carcinoma of the palatine tonsils with staged TORS resections is a viable option despite the risk of velopharyngeal insufficiency, which can be corrected with palatoplasty utilizing a posterior pharyngeal flap.

58. Distinct Epidemiologic Characteristics of Tongue Cancer in the Young Population: A Population Based Epidemiological Study

Albert Y. Han, PhD, Los Angeles, CA; Christine M. Kim, MD, Los Angeles, CA; Camille Pinpin, BA, Los Angeles, CA; Wendy Cozen, DO MPH, Los Angeles, CA; Maie St. John, MD PhD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate understanding of the epidemiologic characteristics of tongue cancer in the young population.

Objectives: To examine the incidence, overall survival (OS), and disease specific survival (DSS) of patients with tongue cancer, stratified by the age and year of diagnosis. **Study Design:** A population based cohort analysis was performed using the Surveillance, Epidemiology and End Results (SEER) database to identify patients with tongue cancer from 1973 to 2012. **Methods:** A population based cohort analysis was performed using patient information in the case listing session of the SEER 18 database (www.seer.cancer.gov). Patients with cancer of the tongue from 1973 to 2012 were

identified using the primary site codes of C01.9 (base of tongue, NOS), C02.0 (dorsal surface of tongue, NOS), C02.1 (border of tongue), C02.2 (ventral surface of tongue, NOS), C02.3 (anterior 2/3 of tongue, NOS), C02.4 (lingual tonsil), C02.8 (overlapping lesion of tongue), and C02.9 (tongue, NOS). For each case, the following information was collected from the database for analysis: histology, sex, race, age at diagnosis, vital status, year of diagnosis, OS, and disease specific survival (DSS) in months. Each patient was grouped into the age category of either minor (0-14), young adult (15-34), middle age (35-54), or older adult (greater than 55) groups. **Results:** A total of 50,416 cases of cancer involving the tongue as the primary site were identified. About 68.2% of these cases affected males and 31.8% affected females. The mean age at the time of diagnosis was 62.14 years (range 0-105). The white race accounted for 85.5% of the cases. The most common site was the base of tongue (48.4%). By far squamous cell neoplasms constituted the greatest number of cases (93.0%). When separated into different age groups, the young adult group (15-34) most frequently had cases at the border of tongue. In other age groups the most common subsite was the base of the tongue. Kaplan-Meier survival analysis showed that tongue cancer in the minor (0-18) and young adult groups had better OS (330.14 ± 33.23 and 282.34 ± 8.15 months, respectively) compared to the middle age and older adult groups (179.42 ± 2.67 and 83.58 ± 0.68 months, respectively). In addition, the DSS of the minor and young adult groups (367.41 ± 29.01 and 313.54 ± 8.20 months, respectively) was greater than that of the middle age and older adult groups (271.80 ± 368 months and 202.34 ± 2.67 months, respectively). **Conclusions:** The results of this study demonstrate that tongue cancers in younger individuals are most commonly at the border of the tongue. This is in contrast with other age groups that have base of tongue as the most prevalent site. A higher prevalence of oral tongue cancer in young adult patients suggests an infectious or environmental etiology. The OS and DSS were both lower in the younger cohorts compared to the older cohort. Future studies should focus on addressing the causes of the rise in incidence of tongue cancer in the young population as well as elucidating other variables that might be affecting the survival.

59. 3 Dimensional Protein Modeling of TP53 Mutations in Head and Neck Squamous Cell Carcinoma

Thomas E. Heineman, MD, Los Angeles, CA; Maie A. St. John, MD PhD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to process and potential of mutation mapping on proteins crystal structures.

Objectives: The most common mutation in head and neck squamous cell carcinoma (HNSCC) occurs in the tumor suppressor gene TP53. The aim of this study was to analyze the recently published Evolutionary Action Score of TP53 (EAp53) variants on a crystal structure of TP53. **Study Design:** All HNSCC TP53 variants published by Neskey et al. were plotted on a crystal structure of TP53. Qualitative conclusions were drawn about the location of the TP53 variants within the tertiary protein structure. **Methods:** All protein modeling was performed using DeepView Swiss-PbdViewer. Emamzadah et al. generated the crystal structure of TP53 used, in complex with DNA (Protein Data Bank Identification Code 4MZR). **Results:** Examples of conclusions drawn by variant mapping include p.Cys176, p.Leu194, and p.Arg248 which are not proximal in the protein by sequence but all co-localize to a particular DNA binding region of TP53 and can behave similar clinically. In contradistinction, p.Val143, p.Leu145, and p.Pro152 represent a region of the protein that results in a more benign clinical phenotype. **Conclusions:** While clinical behavior does model perfectly within the protein structure there are some interesting correlations that can be drawn that may, with validation, provide meaningful clinical information about the treatment and prognosis of HNSCC.

60. Lester A. Brown, MD Resident Research Award
Effects of Curcumin Chewing Gum on Pro-Inflammatory Cytokines When Compared to Capsule Formulation of Curcumin

Sean P. Holmes, MD, Shreveport, LA; Tara M. Moore-Medlin, BS, Shreveport, LA; Xiaohui R. Ma, BS, Shreveport, LA; Brian S. Latimer, BS, Shreveport, LA; Kenneth G. McMartin, PhD, Shreveport, LA; Cherie-Ann O. Nathan, MD FACS, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the effects of curcumin chewing gum on patient's serum cytokine levels, and how this can contribute to future prevention and treatment of head and neck squamous cell carcinoma.

Objectives: Poor bioavailability of curcumin has prevented the routine use of curcumin in chemoprevention of HNSCC. We have shown mucosal absorption of curcumin with a microgranular formulation resulted in improved bioavailability of curcumin when compared to capsular formulation. We now report results of a curcumin chewing gum as an extension of the mucosal absorption concept and its effects on cytokine levels in patient's serum. **Study Design:** 10 patients were administered a onetime dose of curcumin capsule followed by curcumin chewing gum at least 2 weeks apart. **Methods:** Serum was assayed for 15 pro-inflammatory cytokines via multiplex analysis at various time points after dosing. **Results:** We identified significant decreases in CXCL1 as well as TNF± in patient serum after curcumin chewing gum compared to baseline ($p=0.036$, $p<0.001$ respectively). TNF±, VEGF, IFN³, EGF, and IL-13 in the gum group at 4 hours were significantly lower than the capsule group at 4 hours ($P < .05$). **Conclusions:** This is the first study reporting decreased CXCL1 in patient serum after curcumin. CXCL1 and TNF± both represent excellent targets for curcumin therapy of HNSCC. CXCL1 mediates angiogenesis and promotes invasion of HNSCC, while TNF± is a critical player in chronic inflammation via NF-ºB pathway. The significant decrease in cytokines that promote carcinogenesis with mucosal absorption of cur-

cumin compared to the capsular formulation indicates improved biologic response with this formulation. Further studies with long term dosing will need to be performed to determine potential use of curcumin gum in the prevention of oral carcinogenesis.

61. Leiomyosarcoma of the Lateral Skull Base

Emily Hrisomalos, MD, Cleveland, OH; Nauman Manzoor, MD, Cleveland, OH; David Ludlow, MD, Cleveland, OH; Freedom Johnson, MD, Cleveland, OH; James Liu, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to understand and explain the features on clinical and radiographic workup for which to include leiomyosarcoma of the temporal bone in their differential. They should also demonstrate familiarity with recommended surgical approaches in resection and reconstruction as seen in our case and the literature.

Objectives: Leiomyosarcoma involving the temporal bone is an exceedingly rare entity. We describe a case of locally advanced leiomyosarcoma involving the lateral skull base and discuss surgical management including potential reconstructive approaches. **Study Design:** Case report and review of the literature. **Methods:** An 85 year old female with remote history of breast cancer presented with a progressively enlarging right preauricular mass, aural fullness, and otalgia. Imaging showed a soft tissue mass that involved the right temporal bone with destruction of the glenoid fossa and anterior wall of the EAC. MRI showed intracranial extension but no parenchymal involvement. An FNA was performed but was nondiagnostic, thus open biopsy was planned. **Results:** The operative approach involved a lateral temporal bone resection (LTBR) with preservation of the auricle. Circumferential margins of 1.5 cm were obtained. A temporal craniotomy with dural excision of the tumor was performed and despite intracranial extension, there was no involvement of brain parenchyma. Frozen sections from the middle ear and glenoid fossa were negative. Reconstruction involved repair of the dura using a dural regeneration matrix graft and mesh cranioplasty was used to cover the bony defect. A calvarial bone graft and two miniplates were used to reconstruct the glenoid fossa. A pedicled supraclavicular flap was used for soft tissue coverage. Final pathology returned as moderately differentiated leiomyosarcoma with positive desmin and smooth muscle actin (SMA) stains. Postoperative imaging showed complete resection and she remained disease free. The patient did ultimately end up passing away from metastatic disease many months later. **Conclusions:** Leiomyosarcoma involving lateral skull base is rare. Management includes wide surgical resection followed by soft tissue reconstruction.

62. Primary Adenocarcinoma of a Branchial Cleft Cyst - A Rare Diagnosis of a Cystic Neck Mass

Erik T. Interval, MD, Morgantown, WV; Daniel C. O'Brien, MD, Morgantown, WV; Kaylee M. Purpura, BS, Morgantown, WV; Brian M. Kellermeyer, MD, Morgantown, WV

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the incidence of carcinoma in a branchial cleft cyst. Additionally they will learn about a newly described rare entity of adenocarcinoma in a branchial cleft cyst.

Objectives: 1) Discuss the differential of a cystic neck mass; 2) describe a case of focal adenocarcinoma within a branchial cleft cyst; and 3) discuss the incidence of carcinoma in branchial cleft cysts. **Study Design:** Case report and systematic literature review of carcinoma in branchial cleft cysts. **Methods:** A systemic review of the English language literature was undertaken of PubMed and Google Scholar for branchial cleft cysts and carcinomas. An extensive review of the literature revealed less than 20 cases of carcinoma within a branchial cleft cyst. A case was reviewed of a patient with adenocarcinoma in a branchial cleft cystic neck mass at our institution. **Results:** In this case report we describe a 58 year old man with history of metastatic melanoma of the abdomen and right parotid lymphoma. He presented with a right neck mass on a PET scan performed in the management of his malignant melanoma. He then underwent an excisional biopsy which revealed focal adenocarcinoma in association with a branchial cleft cyst. To our knowledge, this is the first time adenocarcinoma arising in a branchial cleft cyst has been described. **Conclusions:** Branchial cleft cysts are rare congenital anomalies and carcinoma presenting within a branchial cleft cyst are even rarer. We present a case of adenocarcinoma arising in a branchial cleft cyst which may be the first reported case of this.

63. The Effect of Marital Status on Head and Neck Cancer Presentation, Course of Therapy, and Survival

Grace C. Iparraguire, BS, Newark, NJ; Kajal P. Shah, BS, Newark, NJ; Jacob S. Brady, BA, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ; Soly Baredes, MD, Newark, NJ; Richard C. Park, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss and compare the survival advantages associated with marriage in patients with head and neck cancer.

Objectives: The objective of this study was to examine the effects of marital status on distant and regional metastasis at presentation, treatment course, and disease specific survival. **Study Design:** The Surveillance, Epidemiology, and End Results database was used to analyze head and neck cancer patients from 1983-2013. The sample size was 78,670, the largest ever used to study the effect of marital status in head and neck cancers. **Methods:** The impact of marital status on distant and regional metastasis at presentation as well as treatment course was analyzed using logistic regression.

A Cox regression analysis on five year disease specific survival was also conducted. Demographics, income level, and high school education were all accounted for and adjusted odds ratios (AOR) were obtained. **Results:** Marital status was associated with lower five year disease specific mortality across every site: hypopharynx (AOR, 0.675; 95% CI, 0.631-0.722), larynx (AOR, 0.631; 95% CI, 0.604-0.659), nasopharynx (AOR, 0.601; 95% CI, 0.537-0.673), oral cavity (AOR, 0.626; 95% CI, 0.606-0.646), and oropharynx (AOR, 0.671; 95% CI, 0.614-0.733). Marital status was also found to be significantly protective against regional metastases at diagnosis (AOR, 0.739; 95% CI, 0.716-0.763) as well as distant metastases at diagnosis for all sites (AOR 0.549; 95% CI, 0.526-0.574). Furthermore married patients are statistically more likely to receive some form of therapy in all head and neck cancer patients (AOR, 1.942; 95% CI, 1.829-2.062). **Conclusions:** Marital status confers a survival advantage in cancer outcomes. Spousal support may also play a role in visual and symptomatic surveillance in head and neck cancer patients.

64. Extracapsular Dissection vs. Superficial Parotidectomy of Benign Parotid Lesions: Surgical Outcomes and Cost Effective Analysis

Masanari G. Kato, BS, Charleston, SC; Bulent E. Erkul, MD, Charleston, SC; Shaun A. Nguyen, MD, Charleston, SC; Marion B. Gillespie, MD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to compare costs and surgical outcomes associated with extracapsular dissection (ECD) and superficial parotidectomy (SP).

Objectives: To compare surgical outcomes and cost effectiveness of ECD with SP. **Study Design:** A retrospective chart review and cost effectiveness analysis. **Methods:** Adult patients who underwent parotidectomies for benign parotid lesions at a tertiary care institution from August 2012 to November 2015 were evaluated. Lesion features consisting of size, location, and pathology, and surgical outcomes including procedure time, hospital stay, and postoperative complications were assessed. Lastly, charges (US$) of surgeon, anesthesia, operating room (OR), and hospital for ECD and SP were compared. **Results:** In total, 46 parotidectomies consisting of 26 ECDs and 20 SPs met criteria. Lesion features were similar between both groups with the majority being pleomorphic adenoma. Procedure time (83.5 ± 36.8 vs. 139.0 ± 48.7; p<0.001) and hospital stay (0.5 ± 0.8 vs. 1.3 ± 1.6; p=0.014) were significantly shorter for ECD compared to SP. Furthermore, anesthesia (mean difference -1469.67; 95% CI, -2064.43 to -874.90; p=<0.001), OR (mean difference -5819.61; 95% CI, -9182.46 to -2456.76; p=0.001), and total hospital charges (mean difference -11717.66; 95% CI, -18226.94 to -5208.37; p=0.001) were significantly less for ECD while remaining charges, including surgeon, showed no difference. Finally, facial nerve weakness, ear numbness, and other relevant postoperative complications were nonsignificant in occurrence between each group. **Conclusions:** When treating benign parotid lesions, ECD is a shorter, less costly, and equally safe alternative to traditional SP.

65. Geographical Region: Does It Matter in Cutaneous Melanoma of the Head and Neck?

Suat Kilic, BA, Newark, NJ; Aykut A. Unsal, DO, Stratford, NJ; Sei Y. Chung, BS, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ; Soly Baredes, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to explore the influence of geographic region on the primary tumor sites, clinicopathologic and demographical traits, histopathologic subtype, treatment modality, and disease specific survival (DSS) on cutaneous melanoma of the head and neck.

Objectives: The head and neck is one of the most common locations for cutaneous melanoma. We present the first population based analysis of geographic differences in primary tumor site, clinicopathologic and demographical traits, histopathologic subtype, treatment modality, and disease specific survival (DSS) of cutaneous melanoma of the head and neck. **Study Design:** Retrospective administrative database analysis. **Methods:** The Surveillance, Epidemiology, and End Results (SEER) database was queried for cases of cutaneous melanoma reported between 1973 and 2013. Patients were grouped into east, midwest, south, and west regions of the United States. Demographical traits, primary tumor site, clinicopathologic and demographical traits, histopathologic subtype, and treatment modality were compared between regions. Survival analysis was done with Kaplan-Meier model. **Results:** A total of 65,023 patients with cutaneous melanoma of the head and neck were identified; 56.9 were from the west, 17.6% from the south, 14.1% from the east, and 11.4 from the midwest. There were no differences in age, gender, race, primary tumor site, clinicopathologic traits, or treatment modality between regions. However, there were differences in the distribution of histopathologic subtypes. DSS at 20 years was highest in the midwest at 61%, and lowest in the south at 46.1%. The east and west had similar DSS at 53.9% and 53.4% respectively. **Conclusions:** Geographical regions in the US have differing ultraviolet indices and therefore may play a big role in melanoma. This study demonstrates that for cutaneous melanoma of the head and neck, histopathologic subtypes and DSS vary between geographical regions.

66. The Epidemiology of HPV Induced Head and Neck Cancer in Haiti

Maxwell P. Kligerman, BA, Palo Alto, CA; Anahuma Alexandre, MD, Port-au-Prince, Haiti; Patrick Jean-Gilles, MD, Port-au-Prince, Haiti; Mack Cheney, MD, Boston, MA; David K. Walmer, MD PhD, Durham, NC; Anna H. Messner, MD, Palo Alto, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the risk factors related to head and neck cancer in our Caribbean nation and explain the utility of Qiagen's Hybrid Capture 2 (HC-2) assay in identifying oral HPV.

Objectives: Identify the prevalence of oral HPV in head and neck cancer (HNC) patients in our Caribbean nation and evaluate the utility of Qiagen's Hybrid Capture 2 (HC-2) assay in identifying oral HPV. **Study Design:** Mixed; prospective case series. **Methods:** We recruited patients from a local hospital who presented between 1/10/2016 and 3/26/2016 with lesions suspicious for HNC. All participants completed a survey regarding lifestyle risk factors and received an oral brush using the HC-2 assay. Mucosal lesions were biopsied and assessed by a pathologist here and a pathologist in the United States. **Results:** A total of 34 participants were identified. The average age was 46.3 (56% women, 44% men). Seven cases of squamous cell carcinoma (SCC) were identified. There was a 35% diagnostic discordance rate between the US pathologist and the Caribbean pathologist. Oral HPV was identified in 3.8% of participants, however, no cases of HPV(+) SCC were identified. Of patients with confirmed SCC, 57.1% had a significant smoking history and 14.3% had a significant drinking history. The median number of lifetime sexual partners amongst all participants was 1. **Conclusions:** HNCs in our Caribbean nation have different risk factors than in the United States. Our results suggest smoking is a more contributory cause and oral HPV is less contributory. The HC-2 assay demonstrated 100% specificity in ruling out the presence of oral HPV. More research is needed to assess its sensitivity. The pathology discordance rate signifies ongoing diagnostic challenges here. HNCs remain an understudied disease burden in low income countries.

67. HPV Subtypes in Oropharyngeal Squamous Cell Cancer

Bailey A LeConte, BS, Galveston, TX; Dianne I. Lou, MD PhD, Nashville, TN; Susan M. Fennewald, PhD, Galveston, TX; Peter Szaniszlo, PhD, Galveston, TX; Suimin Qiu, MD PhD, Galveston, TX; Vicente A. Resto, MD PhD, Galveston, TX

Educational Objective: At the conclusion of this presentation, the participants should appreciate the differences between HPV types and subtypes present in cervical and oropharyngeal cancer.

Objectives: To explore the differences, specifically E6 genomic polymorphisms, in the HPV 16 present in cervical versus oropharyngeal carcinoma in a community. **Study Design:** Archival tissue cohort assessment. **Methods:** 130 patients with HPV positive cervical cancer and 89 patients with HPV positive oropharyngeal cancer were identified retrospectively. For each patient, formalin fixed paraffin embedded biopsy or surgical specimen tissue was obtained. DNA was extracted from each tissue sample and was amplified using PCR. The PCR products were then sequenced and used in analysis. Two different primer sets were utilized. The gp5+/gp6+ primer set was used to identify HPV type present and an E6 specific primer set was used to identify the HPV16 subtype and to determine the E6 DNA sequence. **Results:** The predominate HPV types in the cervical cancer group were identified as 16, 18, and 45. In the oropharyngeal cancer population HPV type 16 was the overwhelming majority (91%). With respect to HPV 16 subtypes, the cervical cancer group had 70% belong to the European subtype and 26% were of the Asian American subtype. This is in contrast to the oropharyngeal cancer group in which 91% were of the European subtype with no instances of the Asian American subtype. **Conclusions:** Significant differences exist in the genetic makeup of HPV positive cervical and oropharyngeal cancers.

68. Atypical Meningothelial Meningioma Presenting as a Painful Hard Palate Mass

Catherine M. Merna, BS, Los Angeles, CA; Jacob L. Wester, MD, Los Angeles, CA; Eddie A. Ramirez, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, participants will have a better understanding of extracranial meningiomas presenting in the head and neck, their associated symptoms, imaging, and treatment strategies.

Objectives: To describe a rare case of an extracranial meningioma presenting as a painful hard palate mass with multiple cranial neuropathies and an unusual destructive pattern on imaging. **Study Design:** Case report and literature review. **Methods:** Retrospective review of a single case presenting to head and neck surgery clinic. **Results:** We present a case of a 79 year old female who presented to our clinic with a painful palate mass, persistent otalgia and hearing loss. She additionally noted right facial hypoesthesia, ageusia, and dysphagia. CT and MRI were obtained showing a 4.6 cm hypervascular mass involving the right masticator and parapharyngeal space with erosion of the pterygoid plates and maxillary sinus. Transoral biopsy of the palate mass revealed atypical meningothelial meningioma (WHO Grade 2) with accelerated growth. The patient was treated via a multidisciplinary surgical approach with head and neck surgery, OMFS and neurosurgery. **Conclusions:** Extracranial meningiomas presenting in the oral cavity are exceedingly rare but should be considered when evaluating a soft tissue mass of the palate. In patients presenting with multiple symptoms and destructive tumors surgical resection should be highly considered.

69. Proximity to Academic Medical Center Relates to Survival for Stage IV Oropharyngeal Cancer

Suresh Mohan, MD, Boston, MA; Sara I. Pai, MD PhD FACS, Boston, MA; Neil Bhattacharyya, MD FACS, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the relevance of proximity to medical center as a factor in survival of oropharyngeal cancer patients and implications for broadening care for those without the proximity benefit.

Objectives: To determine whether proximity to an academic medical center (AMC) relates to survival of patients with oropharyngeal cancer. **Study Design:** Retrospective database review. **Methods:** Cases of oropharyngeal cancer were extracted from the Surveillance, Epidemiology, and End Results (SEER) database (2004-2012) with corresponding 5 digit county codes. Distance to nearest AMC as identified from the Association of American Medical Colleges member directory was computed for each case from the Center for Transportation Analysis County to County distance matrix. Overall survival (OS) and disease specific survival (DSS) were calculated, stratified by stage, with respect to AMC proximity (within versus beyond 55 miles [75th percentile]) using the Kaplan-Meier method. **Results:** A total of 17,021 cases were extracted (mean age, 59.0 years; 81.5% male) (stage 1: 960; stage II: 1,349; stage III: 2,987 and stage IV: 11,725 cases). Median distance to an AMC was 32.6 miles (25th-75th percentiles, 15.5-54.7 miles). There was statistically significant benefit in OS (median survival, 101 versus 86 months, p=0.037) and DSS (p=0.017) among stage IV cases diagnosed within 55 miles of an AMC. Other stages did not demonstrate significant survival benefit from AMC proximity (stage III, p=0.405; stage II, p=0.181 and stage I, p=0.932). **Conclusions:** There is improved survival in stage IV oropharyngeal cancer cases diagnosed with closer proximity to an AMC. Given that the vast majority of oropharyngeal cancers present as advanced stage, the potential for improved survival may warrant further regionalization of oropharyngeal cancer care to AMCs or outreach programs for those lacking such proximity.

70. Colossal Pilomatrixoma of the Face

Kevin A. Moore, MD, Shreveport, LA; Timothy S. Lian, MD MBA, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinical presentation, treatment, and expected outcomes related to pilomatrixoma.

Objectives: To demonstrate a case of gigantic, recurrent pilomatrixoma of the face requiring extensive surgical management and to review postoperative outcomes. **Study Design:** Case report with literature review. **Methods:** Patient case review and search of PubMed database using MeSH keyword pilomatrixoma. **Results:** This is a 25 year old white male who presented to clinic with a recurrence of a left preauricular mass that had previously been excised twice at other institutions. On physical exam, the mass measured 11 x 7 cm and was firm, irregular, nodular, and mobile mass in the left preauricular region that abutted the tragus and root of the helix. CT neck showed a large multiloculated mass with extensive calcifications and absence of significant lymphadenopathy or violation of the SMAS. FNA was read as rare atypical cells in background of enucleated squames and debris. The lesion was excised in its entirety via an elliptical incision surrounding the area of skin involvement. It measured 10 x 7 cm and histopathologic analysis showed pilomatrixoma with focal atypia and increased mitoses. **Conclusions:** Pilomatrixoma is a rare but important tumor that should remain in the differential diagnosis of any superficial head and neck tumor, particularly in the preauricular region.

71. The Management of the Familial Paraganglioma Patient

Lindsay Scott Moore, MD, Birmingham, AL; Andrew C. Prince, BS, Birmingham, AL; Harishanker Jeyarajan, MD, Birmingham, AL; Rupert Obholzer, MD, London, UK; Michael Gleeson, MD, London, UK

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the issues surrounding management of the familial paraganglioma patient, as well as various primary treatment options, outcomes, and deficits.

Objectives: Head and neck paragangliomas are slowly growing neuroendocrine tumors that are benign in over 90% of cases. However, 30-40% of patients have the familial form of paraganglioma. Management of familial patients with more complex, often bilateral and multiple tumors, is significantly more difficult than sporadic cases. Guidelines for management of familial paragangliomas requires is limited and further investigation and is required to direct treatment and optimize outcomes. **Study Design:** An institutional review board approved, retrospective review of a single surgeon's database of paragangliomas was performed. **Methods:** Patients with proven genetic mutations or multicentric tumors were selected to create a cohort of complex, familial paragangliomas. Primary treatment (two different modalities in 23 patients with bilateral tumors), subsequent treatment needed, and resulting deficits were explored. **Results:** Of 266 patients with paragangliomas, 69 patients were included. Sixty-one of these patients had proven genetic mutations, 43 patients had bilateral tumors, and 56 patients had multiple tumors. There were 159 total tumors among the 69 patients, with a mean of 2.33 tumors per patient. Observation was the primary treatment for 35 cases. Fifteen (42.8%) eventually needed surgical intervention and 5 (14.2%) needed radiation therapy. Radiation therapy was the primary treatment in 14 cases and none failed treatment. Surgery was primary treatment in 43 cases and 7 (16.3%) required additional adjuvant therapy. 18 patients had impaired vocal function, 16 had hearing deficits, 3 had swallowing dysfunction, and 5 had first bite syndrome.

Conclusions: Careful selection of a treatment regimen for familial paragangliomas is necessary to optimize outcomes and requires case-specific considerations.

72. Severe Dry Cough as Presenting Symptom of Patient with Five Paragangliomas

John R. Neiner, MD, Shreveport, LA; Maura K. Cosetti, MD, Shreveport, LA; Cherie-Ann O. Nathan, MD, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate and discuss diagnosis and management of a patient with multiple paragangliomas.

Objectives: Present the case of a 60 year old female who presented to pulmonologist with dry cough and in workup was found to have a mediastinal mass. In workup this patient was found to have five paragangliomas -- right glomus jugulare, two left glomus vagale, right glomus vagale, and left superior mediastinum. **Study Design:** Case report. **Methods:** Case report of a patient with five paragangliomas. Clinical history, radiology, and management of this patient are reviewed along with the current literature on multiple paragangliomas. **Results:** The patient was referred to otolaryngology for workup and management. She was asymptomatic other than cough with no other cranial nerve deficits other than longstanding right ear sensorineural hearing loss secondary to acoustic trauma. Masses were found to be non-secretory. Patient's cough resolved with amitriptyline and she elected to pursue observation with serial imaging without surgical or radiation intervention at this time. **Conclusions:** This case highlights the presenting symptoms, multidisciplinary workup, and management of a rare case of five paragangliomas.

73. Outcomes and Prognostic Factors in Malignancies of the Parotid Gland: A 10 Year Experience

Anuraag S. Parikh, MD, Boston, MA; Priya Srikanth, PhD, Boston, MA; Tjoson Tjoa, MD, Irvine, CA; Rosh K.V. Sethi, MD MPH, Boston, MA; Sidharth V. Puram, MD PhD, Boston, MA; James W. Rocco, MD PhD, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of treatment outcomes and prognostic factors in malignancies of the parotid gland.

Objectives: To describe a 10 year single center experience with malignancies of the parotid gland and to determine clinical and pathological factors affecting recurrence and survival. **Study Design:** Retrospective review. **Methods:** The institutional cancer registry was used to identify patients treated surgically for malignancies of the parotid gland between January 2005 and December 2014. Clinical and pathologic data for these patients were collected retrospectively from patient charts and analyzed for their association with overall (OS) and disease free survival (DFS). **Results:** Two hundred patients were identified. Mean age at surgery was 57.8 years and mean followup time was 52 months. 102 patients underwent total parotidectomy, while 77 underwent superficial parotidectomy, and 21 underwent deep lobe resection. 70 patients (35%) required facial nerve sacrifice. Acinic cell carcinoma was the most common histologic type (22%), followed by mucoepidermoid carcinoma (21.5%) and adenoid cystic carcinoma (12.5%). 28 patients (14%) experienced recurrences, with mean time to recurrence of 23.6 months (range 1-82 months). Three and five year OS were 57% and 35%, respectively. In the univariate analysis, histologic type, disease stage, pathologic lymph node status, histologic grade, resection margin, perineural invasion (PNI), and lymphovascular invasion (LVI) were all associated with OS and DFS. **Conclusions:** Our single center experience of 200 patients suggests that disease stage, pathologic lymph node status, histologic grade, resection margin, PNI, and LVI are associated with survival outcomes in malignancies of the parotid gland.

74. Primary Mucosal Melanoma of the Head and Neck: A Comparative Study by Primary Site

Peter A. Pellionisz, BS, Los Angeles, CA; Edward C. Kuan, MD MBA, Los Angeles, CA; Armin Arshi, MD, Los Angeles, CA; Maie A. St. John, MDPhD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to compare factors associated with survival in patients with primary mucosal melanoma of the head and neck and how they differed by primary site, namely the sinonasal tract (SN, nasal cavity and paranasal sinuses) as compared to the oral cavity and pharynx (OCP).

Objectives: Objectives were to determine factors associated with survival in patients with primary MM of the head and neck and how they differed by primary site, namely the sinonasal tract (SN, nasal cavity and paranasal sinuses) compared to the oral cavity and pharynx (OCP). **Study Design:** Retrospective population based cohort study. **Methods:** Patients in the Surveillance, Epidemiology, and End Results (SEER) tumor registry diagnosed with MM of the head and neck from 1973 to 2012 were reviewed. Study variables included age, sex, race, primary site, stage at presentation, and treatment modality. Overall (OS) and disease specific survival (DSS) were determined. **Results:** 630 cases of MM of the head and neck of the SN and 184 of the OCP were identified. Kaplan-Meier analysis demonstrated five year OS and DSS of 21% and 26% for SN primaries, 25% and 32% for OCP primaries. These differences in OS and DSS were significant ($p=0.027$, $p=0.045$). Multivariate analysis of primary site revealed that, for SN primaries, age at diagnosis ($p<0.001$, $p=0.001$), sex

(p=0.016, p=0.005), surgery (p<0.001, p<0.001), and radiation (p=0.040, p=0.025) were predictors of both OS and DSS. For OCP primaries, age at diagnosis was the only predictor of OS (p=0.003) and DSS (p=0.033). **Conclusions:** We report comparative survival outcomes of MM of the SN and OCP. While MM of the SN appears to respond to surgery and radiation, neither modality predicted improved survival for MM of the OCP. OCP primaries are associated with improved prognosis compared to SN primaries. Age at diagnosis remains an important prognosticator in MM of the head and neck.

75. Minimum Lymph Node Yield in the Elective Supraomohyoid Neck Dissection

Jason D. Pou, MD, New Orleans, LA; Blair M. Barton, MD, New Orleans, LA; Claire M. Lawlor, MD, New Orleans, LA; Christopher A. Frederick, BS, New Orleans, LA; Brian A. Moore, MD, New Orleans, LA; Christian P. Hasney, MD, New Orleans, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the minimum number of lymph nodes needed in a supraomohyoid neck dissection to deem a clinically N0 neck pathologically free of disease.

Objectives: Unlike other types of lymphadenectomy, there is no discrete lymph node count defining an adequate neck dissection. The purpose of this study is to determine the minimum lymph node yield (LNY) of an elective supraomohyoid neck dissection (levels I-III) required to reliably capture any positive nodes present in these nodal basins. **Study Design:** Retrospective single institution analysis. **Methods:** All patients with the diagnosis of head and neck squamous cell carcinoma who underwent elective supraomohyoid neck dissection between 2004-2015 at our institution were analyzed. Preoperatively patients had no clinical or radiographic evidence of lymphadenopathy. Patients with unknown number of lymph nodes on pathology report were excluded. Age, sex, race, history of radiation, tumor subsite, stage, surgeon, LNY and number of positive nodes were recorded; bilateral neck dissections were reported separately. **Results:** One hundred eighteen supraomohyoid neck dissections met criteria and were included in the study. Mean lymph node yield was 21.15, and metastatic disease was present in 24.5% of cases with 8.4% of cases being N2. The highest portion of positive lymph nodes was present in the group with 15-21 lymph nodes (36%) which was significantly higher than the group with less than 15 (17%) (p=0.02). Patients with LNY greater than 35 had the highest percentage of N2 disease (21.05%). **Conclusions:** Although there is no accepted minimum for LNY in the supraomohyoid neck dissection at least 15 nodes may be considered an adequate LNY. Such a yield reliably allows for capture of occult disease within these nodal basins.

76. Insurance Status as a Predictor of Mortality in Patients Undergoing Head and Neck Cancer Surgery and Targets for Intervention

Matthew L. Rohlfing, MD, Boston, MA; Ashley C. Mays, MD, Houston, TX; Scott P. Isom, MS, Winston-Salem, NC; Joshua D. Waltonen, MD, Winston-Salem, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the survival disparities between different socioeconomic groups after head and neck cancer surgery.

Objectives: Explore the relationship between insurance status and survival, determine outcomes that vary based on insurance status, and identify potential areas of intervention. **Study Design:** Retrospective cohort analysis of all patients who underwent resection of an upper aerodigestive tract malignancy at a single tertiary care hospital during a 5 year period. **Methods:** Patients were categorized into four groups by insurance status: Medicaid or uninsured, Medicare and under 65 years of age, Medicare and 65 years of age or older, and private insurance. Data were collected from the medical record and analyzed with respect to survival and other outcomes. **Results:** The final cohort consisted of 860 patients. Survival analysis demonstrated a hazard ratio of 2.1 (95% CI, 1.5-3.0) for the Medicaid/uninsured group when compared to the private insurance group. When adjusted for other variables, mortality was still different across insurance groups (p=0.002). The following were also different across insurance groups: tumor stage (p<0.001), American Society of Anesthesiologists (ASA) score (p<0.001), length of stay (p<0.001), and complications (p=0.021). The Medicaid/uninsured group was most likely to have a complication (OR=2.10, 95% CI 1.24-3.56, p=0.006). **Conclusions:** Medicaid/uninsured patients present with more advanced tumors and have poorer survival than privately insured patients. Insurance status is predictive of tumor stage, comorbidity burden, length of stay, and complications. Specifically, the Medicaid/uninsured group had high rates of tobacco use and alcohol abuse, advanced stage tumors, and postoperative complications. Since alcohol abuse and advanced stage were also predictors of poor survival, they may be useful targets for intervention to improve survival for socially disadvantaged patients.

77. Polygenic Risk Score Prediction of Head and Neck Squamous Cell Carcinoma

Brian D. Schwab, MD, New York, NY; Mridu Middha, MS, New York, NY; Robert J. Klein, PhD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the role of polygenic risk scores in predicting complex diseases.

Objectives: New research on the search for susceptibility alleles in complex disease processes provides support for the possibility of a polygenic approach in the prevention and treatment of common diseases. Over 50,000 new cases of head

and neck squamous cell carcinoma are diagnosed in the United States annually. Despite the current multi-modality therapies available, approximately 50 percent of all patients will die of the disease. We sought to create a novel polygenic risk score to determine a patient's genetic risk of developing HPV negative head and neck squamous cell carcinoma. **Study Design:** Case control study design using publicly available genotypes and controls. **Methods:** Our study sample included 376 patients from the Cancer Genome Atlas and 10,842 controls. We created a polygenic risk score based on 15 known head and neck cancer associated single nucleotide polymorphisms for risk stratification. These analyses were based on multiple genome wide association studies. We then used multivariate logistic regression to determine the statistical significance of our model in cases versus controls. We then used a combination of Mann-Whitney U test and Kruskal-Wallis test to perform within group analyses of the model. **Results:** In a case control study of 376 cancer patients vs. 10,842 control genotypes, our score was statistically significant ($p = 0.0234$). Our polygenic risk score was shown to be an independent risk factor for developing head and neck squamous cell carcinoma. This effect was independent of smoking or drinking history. **Conclusions:** We have successfully created a novel polygenic risk score for predicting head and neck squamous cell carcinoma using 15 single nucleotide polymorphisms. This was shown to be an independent risk factor and not implicitly due to smoking or alcohol status. Further work is needed to determine the clinical utility of this approach.

78. Origin of Otolaryngology Referrals for Evaluation of Head and Neck Cancer in a Safety Net Hospital: Impact on Presentation, Diagnosis and Treatment

Lucy L. Shi, BA, Atlanta, GA; Oswaldo A. Henriquez, MD, Atlanta, GA (Presenter); Nehal Navali, Atlanta, GA; Charles E. Moore, MD, Atlanta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) demonstrate and reinforce the importance of early detection and awareness in the treatment and prognosis of HNSCC; 2) discuss and emphasize the role of PCP and outpatient services in identifying and referring patients with early stage HNSCC.

Objectives: To assess the origin of initial referrals for otolaryngology evaluation and the referral site's impact on initial staging and time intervals between initial evaluation, diagnosis, and treatment in head and neck squamous cell carcinoma (HNSCC) patients. **Study Design:** Retrospective chart review of patients with HNSCC diagnosed at a hospital between 2011-2016. **Methods:** Data was analyzed by demographic information, primary site/stage, and referral service. Time intervals between referral placement, otolaryngology evaluation, biopsy, treatment initiation, and treatment completion were also quantified. **Results:** A total of 100 patients met inclusion criteria. 83% of patients were male with an average age of 59.6 years. The most common referral origin was the emergency department (ED) (43%), followed by primary care physicians (PCP) (20%, $p=0.0002$), and the inpatient internal medicine (IM) service (12%). 83% of patients from the ED or IM services had stage IV cancer, compared to 59% of patients from a PCP or outpatient offices ($p=0.003$). 18 days elapsed between referral and initial otolaryngology evaluation for patients from ED/IM services compared to 65 days for outpatient clinics ($p<0.01$). Finally, 48% of patients experienced a delayed start of treatment (defined as >45 days from biopsy), 38% started on time, and 14% did not begin treatment at all. **Conclusions:** The origin of the referral for otolaryngology evaluation has significant relevance and potential impact in the initial stage as well as time intervals between evaluation, diagnosis, and treatment for HNSCC patients.

79. Dynamic Optical Contrast Imaging (DOCI): An Imaging Technique to Differentiate Parathyroid Tissue from Surrounding Tissues

Maie St. John, MD PhD, Los Angeles, CA; Peter A. Pellionisz, BS, Los Angeles, CA (Presenter); Zachary D. Taylor, PhD, Los Angeles, CA; Harrison C. Cheng, BS, Los Angeles, CA; Warren L. Grundfest, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand a novel technology that allows for identification and delineation of parathyroid tissue intraoperatively.

Objectives: The variable location and indistinct external features of parathyroid glands can make their intraoperative identification challenging. Currently, there exists no routine use of noninvasive localization methods during surgery. Dynamic optical contrast imaging (DOCI) leverages a novel realization of temporally dependent measurements of tissue autofluorescence that allow the acquisition of specific tissue properties over a large field of view. The objective of this study is to demonstrate the utility of DOCI in reliably and accurately identifying parathyroid glands and differentiating them from surrounding neck tissues. **Study Design:** Patients with primary hyperparathyroidism requiring surgery were identified and consented for involvement in this IRB approved study. **Methods:** Parathyroid adenomas and their surrounding tissues in the surgical bed were collected; fluorescence decay images were acquired using a wide field DOCI system. Samples (81 patients) were subsequently processed for standard histological assessment. Mean relative fluorescence decay signatures were calculated for parathyroid, fat, thyroid, and thymus tissues. **Results:** Our DOCI system extracts relative fluorescence decay information in a surgically relevant field of view with a clinically accessible acquisition time < 2 minutes. We demonstrate the feasibility of utilizing DOCI to rapidly distinguish parathyroid tissue from surrounding tissue. Analysis of DOCI images revealed microscopic characterization sufficient for tissue type identification consistent with histology. **Conclusions:** This study demonstrates a new imaging modality capable of efficiently distinguishing parathyroid tissue from adjacent tissues. Such an intraoperative tool would be transformative in gland localization, enabling

the surgeon to effectively identify lesions, preserve healthy tissue, and improve patient outcomes.

80. DOCI: A Novel Modality to Identify Real Time Intraoperative HNSCC Margins

Maie St. John, MD PhD, Los Angeles, CA; Peter A. Pellionisz, BS, Los Angeles, CA; Zachary D. Taylor, PhD, Los Angeles, CA; Harrison C. Cheng, BS, Los Angeles, CA; Warren L. Grundfest, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe and understand a new intraoperative tool: dynamic optical contrast imaging (DOCI) characterized by speed, low cost, and improved sensitivity and specificity, for enhancing intraoperative imaging and margin detection in cancer patients.

Objectives: Head and neck cancers are debilitating diseases where patient prognosis depends heavily on complete tumor resection. Currently, it is the surgeon's fingers and eyes that determine the location of tissue margins. An intraoperative instrument that can significantly improve the accuracy of margin detection over current methods will improve outcomes for cancer patients by minimizing removal of normal functional tissue while also ensuring complete tumor removal. The objective herein is to demonstrate the utility of DOCI in reliably and accurately delineating tumor tissue from surrounding normal tissues. **Study Design:** Patients with HNSCC requiring surgery were identified and consented for involvement in this IRB approved study. **Methods:** HNSCC specimens and surrounding tissues from the surgical bed were collected; fluorescence decay images were acquired using a wide field DOCI system. Samples (110 patients) were subsequently processed for standard histological assessment by head and neck pathologists. Mean relative fluorescence decay signatures were calculated for tumor, fat, muscle and collagen tissues. Statistical analyses were performed using the Wilcoxon signed rank test. **Results:** Qualitative analysis of DOCI images revealed microscopic characterization sufficient for tissue type identification comparable to histology. Quantitative analysis revealed a statistically significant difference ($p < 0.05$) between tumor and collagen among ten of ten wavelength bands analyzed, between tumor and muscle in ten bands, and between fat and tumor in two bands. **Conclusions:** This study demonstrates a novel imaging modality capable of rapidly and significantly distinguishing HNSCC from surrounding normal tissue. Such an intraoperative tool would be transformative: allowing for an intraoperative capacity to delineate tumor tissue from non-tumor tissue, thus maximizing the efficacy of tumor resection and minimizing damage to adjacent structures, thus improving patient outcomes.

81. Sinonasal Adenoid Cystic Carcinoma: A Distinct Clinical Entity with Poor Prognosis and Resistance to Radiotherapy

William A. Stokes, MD, Morgantown, WV; Erik T. Interval, MD, Morgantown, WV; Rusha J. Patel, MD, Morgantown, WV

Educational Objective: At the conclusion of this presentation, the participants should be able to have 1) a better understanding of the prognostic difference between major salivary and sinonasal adenoid cystic carcinoma; and 2) an understanding of the role of radiation therapy in treating these cancers.

Objectives: Analyze sinonasal adenoid cystic carcinoma (ACC) versus major salivary ACC in regards to presentation, survival, and treatment. **Study Design:** Retrospective case review. **Methods:** In this retrospective case review of the Surveillance, Epidemiology, and End Results (SEER) database from 1988-2011, 1,295 major salivary and 368 sinonasal ACC patients were identified. Data on race, age, sex, radiation treatment, surgical treatment, and tumor stage were extracted. Kaplan-Meier survival functions were used to calculate disease specific survival curves. Significant contributors to survival were incorporated into a Cox proportional hazards model to identify independent predictors of survival. **Results:** Sinonasal tumors tended to have a more advance T stage ($P<0.001$) but lower rate of regional metastasis ($P<.001$) compared to major salivary ACC. They also tended to be treated less aggressively with higher rates of radiation and lower rates of surgery/combined treatment modalities ($P<.001$). A Cox proportional hazards model demonstrated that the sinonasal site was a predictor of poor prognosis (HR=1.62 [CI=1.34-2.01, $P<0.001$]) independent of treatment modality, stage, race, age, and sex. Specific analysis of the sinonasal site found that surgery offered a significant survival advantage (HR=0.454 [CI=0.29-0.70, $P<.001$]) independent of radiation therapy (HR=0.77 [CI=0.50-1.17, $P=0.22$]). **Conclusions:** Sinonasal ACC's poor prognosis compared to major salivary ACC has been attributed to higher tumor stage at diagnosis. However, this study finds that its relative poor prognosis is independent of tumor stage and treatment modality and that surgery appears to offer significant benefit to survival, while radiation therapy does not. However, this is limited by the retrospective nature of the data and therefore more research is needed.

82. Diagnostic Value of Sentinel Lymph Node Biopsy for Oral Cavity Squamous Cell Carcinoma: A 10 Year Retrospective Study

Ryan L. Sturgill, BS, Louisville, KY; Jeffrey M. Bumpous, MD, Louisville, KY; Elizabeth D. Cash, PhD, Louisville, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the diagnostic accuracy of sentinel lymph node biopsy for oral cavity squamous cell carcinoma.

Objectives: This study aimed to evaluate the diagnostic accuracy of sentinel lymph node biopsy (SLNB) in clinically

node negative patients with oral cavity squamous cell carcinoma by reporting a single institution's experience. **Study Design:** Retrospective medical records review. **Methods:** The clinical and surgical parameters, including 2 year followup of patients treated for clinically T1/ T2, N0 SCC of the oral cavity with concurrent SLNB from September 2003 to 2013 were analyzed retrospectively. The primary measure was to determine the diagnostic accuracy of a negative SLNB representing true node negative status. A false negative result was defined as a negative SLNB with subsequent isolated neck (+/- distant) recurrence. **Results:** SLNB was performed on 15 patients with clinically T1/T2, N0 SCC of the oral cavity. Sentinel lymph nodes were found in all 15 patients with a total of 30 sentinel lymph nodes harvested (average of 2 SLN per patient). 13 patients had a negative SLNB. Of those 13 patients 1 had local recurrence and 3 had local and neck recurrence during 2 year followup. No patients had a negative SLNB with subsequent isolated neck recurrence (no false negative biopsies). **Conclusions:** Congruent with prior reports, the data from our institution supports SLNB as an accurate diagnostic technique for correctly predicting a pathologically negative neck in patients with clinically T1/T2, N0 SCC of the oral cavity.

83. A Review of Virtual Surgical Planning and the Utilization of Patient Specific Implants in Craniofacial Reconstruction

Zahrah M. Taufique, MD MBA, New York, NY; Kimberly J. Atiyeh, MD, New York, NY; David H. Harter, MD, New York, NY; David A. Staffenberg, MD, New York, NY; Jamie P. Levine, MD, New York, NY; Adam S. Jacobson, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to have a detailed understanding of virtual surgical planning, medical modeling and utilization of patient specific implants in craniofacial reconstruction.

Objectives: Over the past decade, there have been major advances in biomaterials as well as the computer and printing technology that enables delivery of custom fabricated skeletal implants. The fields of neurosurgery, oral and maxillofacial surgery, and plastic surgery have taken advantage of these advances in providing patient specific implants that promise single stage reconstruction of anatomically complex defects, however, there has been a paucity of otolaryngology literature in this field. Recognition of the versatility of these techniques may help expand its use. We aim to illustrate the process of case selection, implant design methodology, and interdisciplinary surgical technique. **Study Design:** Review of the virtual surgical planning and fabrication of patient specific implants and utilization of these concepts in a case series performed at our medical center. **Methods:** A retrospective chart review was performed on all patients who underwent craniofacial reconstructions with patient specific implants. Analysis of perioperative and postoperative outcomes were assessed. **Results:** Indications for use of patient specific implants included intraosseous hemangioma, acinic cell carcinoma, fibrous dysplasia, recurrent cutaneous SCCa and post-traumatic deformities. Preoperative imaging was obtained and used for implant planning and/or marking/cutting guides. Patients underwent reconstruction with polyetheretherketone or titanium. Representative photographs are included. **Conclusions:** Patient specific implants provide a new option for reconstruction of complex craniofacial defects. They are advantageous in that reconstruction can occur in a single stage, without donor site morbidity, and with ideal cosmesis. This technique has potential applications for use in reconstruction of defects of malignant tumors, benign tumors, trauma, and infection.

84. Practice Patterns of Primary Care Physicians Regarding HPV Vaccination Counseling and Head and Neck Cancer: A Survey Based Study

James M. Taylor, MPH, Winston-Salem, NC; Dipan D. Desai, BS, Chapel Hill, NC; Angela L. Mazul, PhD MPH, Chapel Hill, NC; Eunice E. Yim, BS, Chapel Hill, NC; Douglas R. Farquhar, MD MPH, Chapel Hill, NC; Jose P. Zevallos, MD MPH, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate and discuss the current practice patterns of academic primary care physicians with regards to recommending the HPV vaccination for protection from head and neck cancer.

Objectives: To develop an understanding of the current practice patterns of primary care physicians (PCPs) towards head and neck cancers (HNCs) with an emphasis on human papillomavirus (HPV) vaccination and risk factor counseling. **Study Design:** Online survey. **Methods:** A 29 question electronic survey was developed and distributed by email to PCPs (pediatricians, internal medicine physicians, and family medicine physicians) at two tertiary academic medical centers. PCPs were invited to participate between May 1, 2016 and July 30, 2016. We report on part of this survey. **Results:** Of the 275 PCPs invited to participate, 99 PCPs completed the survey (response rate of 36.4%). The majority of respondents were attending physicians (60.1%), female (66.3%) and practiced in an academic setting (85.9%). 86.6% of PCPs reported that they either always or often recommend the HPV vaccination for all eligible female patients, versus only 70.9% for eligible male patients. Additionally, 71.1% and 62.9% of PCPs selected they never or seldom discuss protection from HNC as a potential benefit of the HPV vaccination when discussing benefits for female and male patients, respectively. In regards to risk factor counseling, PCPs were more likely to discuss smokeless tobacco as a risk factor for HNC compared to smoking tobacco or alcohol consumption. **Conclusions:** PCPs more frequently recommend the HPV vaccination for women compared to men. Additionally, the majority of PCPs reported they never or seldom discuss a

protective benefit of the HPV vaccine for HNC. New efforts to increase vaccination among males are needed.

85. An Analysis of the National Surgical Quality Improvement Program and Surgery for Osteoradionecrosis of the Head and Neck: Overview, Complications, and Readmissions

William Walsh Thomas, MD, Philadelphia, PA; Jason A. Brant, MD, Philadelphia, PA; Jason G. Newman, MD, Philadelphia, PA; Ara A. Chalian, MD, Philadelphia, PA; Steven B. Cannady, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the nationwide trends in the surgical management of osteoradionecrosis of the head and neck with a specific focus on free tissue transfer.

Objectives: Osteoradionecrosis (ORN) is a debilitating post-treatment sequela with a range of treatment options. There is little data concerning complications and readmissions from a national database. **Study Design:** Retrospective review of a national database. **Methods:** The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) 2005-2014 was queried for patients being admitted from home for surgery with the ICD-9 corresponding to ORN. **Results:** The NSQIP database identified 222 patients who underwent surgery for ORN with 75 patients undergoing free tissue transfer. Sixty of these free flaps included bony reconstruction while 15 were soft tissue alone. 83/218 patients had a complication and 53/220 had a serious complication. The presence of a wound infection, decade of life and length of index operation were significantly associated with having a postoperative complication: odds-ratios 3.6, 1.5 and 1.2 respectively. Readmission within 30 days was predicted by underweight BMI, recent weight loss or overweight BMI (ORs: 17.6, 11.6, and 4.5). In an analysis of 3335 patients who underwent free tissue transfer, an ORN diagnosis did not increase the risk of complications on multivariate regression analysis. **Conclusions:** In this database analysis of ORN patients, there is significant risk for postoperative complications, reoperations and readmissions. However, in regards to free tissue transfer specifically, contrary to anecdotal evidence and case series data, this risk is not shown to be significantly elevated.

86. Unplanned Readmission Following Transoral Robotic Surgery

Michael C. Topf, MD, Philadelphia, PA; Amanda A. Vo, BA, Philadelphia, PA; Patrick T. Tassone, MD, Philadelphia, PA; Adam J. Luginbuhl, MD, Philadelphia, PA; David M. Cognetti, MD, Philadelphia, PA; Joseph M. Curry, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to report the most common causes and risk factors for unplanned readmission following transoral robotic surgery.

Objectives: Transoral robotic surgery (TORS) is used with increasing frequency for surgical resection of a wide range of benign and malignant disorders. In this review, we sought to determine the rate of unplanned readmission after TORS, and to determine which patient or surgical factors increase the likelihood of readmission. **Study Design:** Retrospective chart review. **Methods:** Following IRB approval, clinical data were reviewed for all patients undergoing TORS at our institution for both benign and malignant lesions since the inception of our TORS program in 2010 until December 2014. Primary outcome was unplanned readmission to the hospital within thirty days of procedure. Patients who underwent TORS for obstructive sleep apnea were excluded. Age, sex, insurance type, TNM stage when applicable, p16 status when applicable, specimen size, operative site, contralateral tonsillectomy, timing of neck dissection, length of hospitalization, anticoagulant use, need for feeding tube postoperatively, and discharge diet were analyzed as potential predictors of unplanned readmission following TORS. **Results:** 118 patients met eligibility criteria. Twelve patients (10.2%) had unplanned readmissions within 30 days. Most common reasons for readmission were oropharyngeal bleed (n=4) and pain/dehydration (n=4). **Conclusions:** Unplanned readmission following TORS occurs in a small but significant proportion of patients. Oropharyngeal bleeding, pain control and dehydration were the most common reason for unplanned readmission following TORS in our series.

87. The Use of Intraoperative Nerve Stimulation for Identification and Preservation of the Facial Nerve in the Case of an Intraparotid Facial Nerve Schwannoma

Andrew G. Tritter, MD, Shreveport, LA; Cherie-Ann O. Nathan, MD, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to appreciate the value of intraoperative nerve stimulation when resecting intraparotid tumors concerning for facial nerve schwannomas.

Objectives: Facial nerve schwannomas (FNS) are exceedingly rare tumors that have historically posed numerous diagnostic and therapeutic challenges for physicians. Surgical excision is considered the standard for definitive diagnosis and treatment, however, given the intricate association between tumor and nerve, complications from damage to the facial nerve are not uncommon. **Study Design:** Case report. **Methods:** We present the case of a large intraparotid FNS with the nerve embedded in the tumor capsule, where intraoperative nerve stimulation and neuromuscular monitoring of facial function were used to safely identify and separate the facial nerve from the enucleated specimen. **Results:** A 32 year old male presented with a right facial mass involving both superficial and deep lobes of the parotid gland with extension into the stylomastoid foramen. Facial nerve function was completely intact. Fine needle aspiration was nondiagnostic, and a

subsequent MRI was suggestive of a possible schwannoma. The patient underwent parotidectomy with mastoidectomy for facial nerve decompression. Intraoperatively, the mass was found to be intricately associated with the facial nerve, and application of the nerve stimulator along the tumor capsule was used to identify and trace the course of the facial nerve. An incision was made in the capsule of the tumor, parallel to the nerve, and the tumor was subsequently enucleated with complete sparing and separation of the nerve. The patient had an uneventful postoperative course with only mild facial paresis. **Conclusions:** Intraoperative nerve stimulation is an important tool for identification and separation of the facial nerve in intraparotid FNS without clinical or gross evidence of neural invasion.

88. The Utility of Intraoperative Frozen Sections in Thyroid Surgery

Samuel J. Trosman, MD, Cleveland, OH; Rohith Bhargavan, BS, Cleveland, OH; Brandon L. Prendes, MD, Cleveland, OH; Brian B. Burkey, MD, Cleveland, OH; Joseph Scharpf, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the benefits and limitations of performing intraoperative frozen section analysis on thyroidectomy specimens in the era of the Bethesda classification scheme.

Objectives: To determine the accuracy of intraoperative frozen section analysis on thyroidectomy specimens stratified by the Bethesda classification scheme and its utility for intraoperative decision making. **Study Design:** Retrospective chart review. **Methods:** A retrospective review was performed on all patients who underwent thyroidectomy or thyroid lobectomy with intraoperative frozen sections at a tertiary care academic center from 2009 to 2014. **Results:** One hundred total patients underwent partial or total thyroidectomy with intraoperative frozen section analysis; 74 of these patients had undergone a preoperative thyroid fine needle aspiration. The sensitivity, specificity, positive predictive value, and negative predictive value for a thyroid frozen section was 81%, 95%, 98%, and 66%, respectively, with a diagnostic accuracy of 85%. For patients with an indeterminate cytologic diagnosis on fine needle aspiration (i.e. the sum of Bethesda classifications of atypia of undetermined significance, follicular neoplasm, or suspicious for malignant cells), the sensitivity, specificity, positive predictive value, and negative predictive value for a thyroid frozen section was 81%, 91%, 95%, and 67%, respectively, with a diagnostic accuracy of 84%. False positives and false negatives resulted in 1 completion thyroidectomy for benign pathology and 3 reoperations for malignancy not discovered on frozen section. **Conclusions:** While intraoperative frozen sections on thyroid specimens with a classification of atypia, follicular neoplasm, or suspicious for malignancy on prior fine needle aspiration may be helpful if positive, the false negative rate remains high. There appears to be limited value in routine frozen sections to guide clinical management and decision making in the era of the Bethesda system.

89. Disease Specific Survival in Head and Neck Sweat Gland Adenocarcinoma: A Population Based Analysis of 296 Cases

Aykut A. Unsal, DO, Newark, NJ; Varesh R. Patel, BA, Newark, NJ; Sei Y. Chung, BS, Newark, NJ; Albert H. Zhou, BS, Newark, NJ; Soly Baredes, MD, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to identify trends in patient demographics and clinicopathologic characteristics for head and neck sweat gland adenocarcinoma and their impact on survival rates.

Objectives: Head and neck sweat gland adenocarcinoma (HNSGA) is an extremely rare malignancy. We present the first population based analysis regarding this entity. **Study Design:** Retrospective database analysis. **Methods:** Using the Surveillance, Epidemiology, and End Results registry from 2000 to 2013, we extracted 296 cases of HNSGA. Data were analyzed for incidence trends, demographic and clinicopathologic traits, and predictors of disease specific survival (DSS). **Results:** The majority of 296 cases of HNSGA were Caucasian males between 60-79 years old. The incidence was 0.9% and was significantly decreasing throughout our study period (P=0.03). Tumors most commonly presented as localized disease and histological grade II/III. The scalp and neck was a common primary site (30.1%), while remaining cases arose from lips, eyelids, external ear, and other facial locations. 5, 10, and 20 year DSS were 94.6%, 90.8%, 82.3%, respectively. Gender and ethnicity did not affect survival, while younger age at diagnosis conferred an advantage at 10 years (P=0.0386). Distant metastatic disease predicted worse 5, 10, and 20 year DSS than disease (P<0.001). Compared to grade I/II disease, grade III worsened 10 and 20 year DSS, and grade IV dramatically worsened 5, 10, and 20 year DSS (P=0.0027, P=0.0025, P=0.0178, respectively). Scalp and neck HNSGA exhibited poorer 20 year DSS than other primary sites (P=041). **Conclusions:** We present the largest cohort of HNSGA, a rare malignancy that most often presents as localized, grade II/III disease. Significant poor prognostic indicators include older age, higher tumor grade, greater extent of invasion, and a primary site of the scalp and neck.

90. Impact of Socioeconomic Status on Initial Clinicopathologic Presentation among an Urban Population Receiving Thyroid Surgery

Tara J. Wu, BA, San Francisco, CA; Marika D. Russell, MD, San Francisco, CA (Presenter); Patrick K. Ha, MD, San Francisco, CA; Ivan H. El-Sayed, MD, San Francisco, CA; Jonathan R. George, MD MPH, San Francisco, CA; Chase M. Heaton, MD, San Francisco, CA; William R. Ryan, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinicopathologic outcomes (larger thyroid volumes, advanced nodal involvement, and positive margins) at time of thyroidectomy that are associated with patients of low versus high socioeconomic status (SES). Furthermore, they should compare the differences in thyroid volumes that exist between patients of low and high SES, and how these differences become most significant for patients presenting with very large thyroid volumes (>150ml). They should be able to explain the potential factors associated with low SES that may contribute to increased disease burden at time of thyroidectomy and discuss the poorer postoperative outcomes associated with advanced presentation.

Objectives: To examine the impact of socioeconomic status on the presentation of thyroid disease among patients undergoing total thyroidectomy. **Study Design:** Retrospective review. **Methods:** We retrospectively examined the records of 252 patients undergoing total thyroidectomy at an urban safety net hospital and two tertiary care academic hospitals, from January 2012 to May 2016. Demographic variables included age, sex, race, health insurance type (as a measure of socioeconomic status [SES]), and BMI. Clinical variables included history of prior head and neck radiation, symptoms, medical comorbidities, thyroid volume, pathologic diagnosis, surgical pathology features, and TNM staging. Univariate analyses were performed to determine the clinicopathologic outcomes associated with low versus high SES. Multivariate regression models were built to investigate the association between SES and thyroid volume. **Results:** On univariate analyses, low SES was significantly associated with race ($p<0.001$), facility ($p<0.001$), and pathologic thyroid volume ($p=0.016$). Among patients with malignant disease, low SES was associated with positive margins ($p=0.008$), a greater number of positive nodes ($p=0.002$), and larger metastatic deposit size ($p=0.023$), despite no significant differences in tumor type or TNM staging. After multivariate regression analyses, among patients with benign disease (n=60), low SES was the most significant independent predictor of larger volume ($p=0.002$), after adjustment for age, sex, BMI, and presence of compressive symptoms. Among our entire cohort, the association of low SES with increased volume was most pronounced for patients presenting with very large thyroid volumes (>150mL). **Conclusions:** Low SES patients suffered increased disease burden at time of thyroidectomy, including larger volumes, advanced nodal disease, and positive margins.

91. Oncologic Outcomes of Extended Neck Dissections in HPV Related Oropharyngeal Squamous Cell Carcinoma

Joseph Zenga, MD, St. Louis, MO; Patrik Pipkorn, MD, St. Louis, MO; Eliot J. Martin, PA-C, Rochester, MN; Eric J. Moore, MD, Rochester, MN; Bruce H. Haughey, MBChB, Celebration, FL; Ryan S. Jackson, MD, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss and compare the oncologic outcomes of patients undergoing resection of extralymphatic structures during a neck dissection due to nodal invasion with those undergoing uncomplicated selective neck dissection for patients with HPV related oropharyngeal squamous cell carcinoma.

Objectives: To evaluate the oncologic outcomes of patients with HPV related oropharyngeal squamous cell carcinoma (OPSCC) in cases where resection of extralymphatic structures (RELS) is necessary due to nodal invasion. **Study Design:** Retrospective cohort. **Methods:** Patients with HPV related OPSCC undergoing neck dissections requiring RELS were compared to those receiving standard uncomplicated SND. Patients who had RELS were identified from a database including two academic institutions from 1998 to 2014. This group was matched by pathological T-stage, pathological node number, and comorbidity to a group of patients undergoing uncomplicated SND. **Results:** Seventy-two patients were included in each group. There were no significant baseline differences between treatment groups. RELS included the spinal accessory nerve (51%), internal jugular vein (82%), and sternocleidomastoid muscle (57%). In a Kaplan-Meier survival analysis, patients undergoing RELS had decreased disease specific survival compared with those receiving an uncomplicated SND (log-rank 0.03). Regional recurrence, however, was similar between groups (4%). Distant recurrence occurred in 17% of patients undergoing RELS and 7% of those who received an uncomplicated SND, although the difference did not reach statistical significance ($p>0.05$). Initial gastrostomy tube placement was significantly higher in the RELS group (58% vs 22%, difference 36%, 95% CI 18% to 54%), however, this difference was no longer significant at 2 years (10% vs 4%, $p>0.05$). **Conclusions:** Patients with invasive nodal disease from HPV related OPSCC can be managed with RELS as indicated without increased regional recurrence. The need for RELS appears to be an independent predictor of decreased survival.

Laryngology/Bronchoesophagology

92. Pleomorphic Adenoma of the Trachea: A Case Report

Stephen R. Bakos, MD PhD, Charlottesville, VA; Abel P, David, BS, Charlottesville, VA; James J. Daniero, MD, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the diagnosis of tracheal pleomorphic adenoma.

Objectives: Pleomorphic adenomas are the most common benign tumors of salivary glands, comprising approximately 65% of all salivary gland tumors. Though commonly located in the parotid glands, pleomorphic adenomas have been reported in other head and neck sites including the soft palate, hard palate, nasopharynx, buccal mucosa, nasal septum, upper and lower lips, and external auditory canal. Theoretically, these tumors can arise in any area with salivary glands, however there are few reports of pleomorphic adenomas in locations outside the head and neck. **Study Design:** In this case report, we describe a pleomorphic adenoma arising in the trachea of an 80 year old non-smoker woman with hypertension and rheumatoid arthritis. **Methods:** Chart review. **Results:** On initial evaluation in clinic, she denied shortness of breath despite the mass obstructing approximately 80% of her airway seen on flexible bronchoscopy. A computed tomography scan performed at an outside hospital revealed a smooth tracheal mass measuring approximately 1.6 cm x 1.3 cm. She was taken urgent to the operating room and the mass excised endoscopically with a bronchoscope. Histological evaluation of the mass revealed the diagnosis of pleomorphic adenoma. Her postoperative course was unremarkable and the tumor has not recurred during clinical followup. **Conclusions:** This case represents a rare presentation for pleomorphic adenoma.

93. Price Variation in Proton Pump Inhibitors

Daniel A. Benito, BS, Philadelphia, PA; Jeffrey Liaw, BS, Philadelphia, PA; Amanda Hu, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the variability in prescription prices for proton pump inhibitors.

Objectives: To assess price variation between four proton pump inhibitors (PPI) used to treat laryngopharyngeal reflux. **Study Design:** Cross-sectional survey. **Methods:** Active pharmacies across our city and county were identified via the department license verification system. A random sample of 75 pharmacies was contacted to obtain medication price between April - May 2016. PPIs chosen were: omeprazole (generic) - 40mg; Prilosec (AstraZeneca Pharmaceuticals) - 40mg; esomeprazole (generic) - 40mg; Nexium (AstraZeneca Pharmaceuticals) - 40mg; Dexilant (Takeda Pharmaceuticals) - 30mg. The cost for 30 tablets was selected. Minimum, maximum, mean, and standard deviation were obtained. Bonferroni correction factor was applied, and $p < 0.004$ were taken as significant. Our secondary objective was to examine factors that may contribute to PPI price variation: 1) generic vs trade; 2) urban vs rural location; 3) retail chain vs non-chain pharmacy. **Results:** 121 pharmacies were identified as being operational, community pharmacies. Mean prices differed significantly between trade vs generic of omeprazole ($92.48 vs $401.52, p=7.87E-86), esomeprazole ($199.70 vs $291.46, p=8.9E-24). Prices varied significantly between urban and rural pharmacies for omeprazole ($70.23 vs $117.46, p=0.0005) and Prilosec ($420.71 vs $389.87, p=0.001). A significant difference in prices was also noted between chain vs non-chain pharmacies. **Conclusions:** Significant price variation was noted between trade vs generic for omeprazole and esomeprazole. Factors that significantly affected price variation included urban vs rural and retail chain vs non-retail pharmacy. Prices for all the medications were less expensive at non-chain pharmacies.

94. A Novel Approach to the Treatment of Laryngeal Amyloidosis

Karuna Dewan, MD, Los Angeles, CA; Avraham Mendelsohn, MD, Los Angeles, CA; Gerald Berke, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the presentation of laryngeal amyloidosis as well as a new method of treatment.

Objectives: The objective of this investigation is to describe our experience with the nonsurgical management of laryngeal amyloidosis. Aerodigestive tract amyloidosis is a rare entity that involves primarily the larynx and the tongue. Management of laryngeal amyloidosis for years has consisted of excision of lesions using the CO2 laser or cold steel. However, surgical management of an amyloidosis site is often plagued with complications including hemorrhage, stenosis or persistent obstruction. **Study Design:** This is a retrospective case series of patients with laryngeal amyloidsis treated in a tertiary care laryngology practice. **Methods:** In a retrospective manner charts from all patients with laryngeal amyloidosis between 2010 and 2016 were reviewed. Course of treatment, laryngeal imaging before and after treatment, subjective voice outcomes and symptoms were analyzed. **Results:** The use of intralesional dexamethasone has effectively treated patients with hoarseness and infraglottic obstruction due to laryngeal amyloidosis. Intralesional steroid injection is a safe and effective treatment, providing long lasting results including improved hoarseness and resolution of shortness of breath due to obstruction. **Conclusions:** These cases demonstrate the efficacy of intralesional steroid injection of the

nonsurgical management of laryngeal amyloidosis. It is an effective method to avoid the risks of surgery which include hemorrhage, postoperative stenosis and persistent obstruction. This must be added to our armamentarium of treatments for laryngeal amyloidosis.

95. Herpes Simplex Virus Laryngitis Presenting as Airway Obstruction: A Case Report and Review of the Literature

Lucas D. Harless, MD, Oakland, CA; Megan L. Durr, MD, Oakland, CA; Nancy Jiang, MD, Oakland, CA; Frank Schneider, MD, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinical presentation, course, and treatment of herpes simplex virus laryngitis in adults.

Objectives: Herpes simplex virus (HSV) laryngitis is rare in adults. We add a case report to the literature and perform a review to further delineate the clinical presentation, course, and treatment of HSV laryngitis in adults. **Study Design:** Case report and literature review. **Methods:** A case report is discussed. A literature review on HSV laryngitis in adults was performed using the PubMed database. **Results:** Ten cases of diagnosed HSV laryngitis in adults were reported in the literature. It is more common in immunocompromised patients. The mean patient age was 51 years with a male to female ratio of 1:1. The clinical presentation and course of HSV laryngitis is highly variable. Patients may have mild chronic symptoms, such as dysphonia, for weeks to months or a fulminant course with airway compromise within 24 hours. On laryngoscopic exam, the most common findings are a white exudate or ulceration, but there are also reports of HSV presenting as a laryngeal mass lesion. The most common treatment is with antiviral medication, such as acyclovir, which tends to be highly effective. **Conclusions:** We present the fifth reported case of HSV laryngitis in an immunocompetent adult. A literature review is also presented which differs from previous literature reviews in that we focused solely on confirmed HSV laryngitis cases and excluded cases related to varicella zoster virus. Clinical presentation of HSV laryngitis varies and the disease course can be indolent or fulminant resulting in airway compromise. Treatment with antiviral medication is highly effective and may avoid more invasive measures in the future.

96. Tracheostomy Post Liver Transplant: Indications, Complications and Outcomes

Jeffrey Stephen Mella, BS, Indianapolis, IN; Weston J. Bush, BS, Indianapolis, IN; Jonathan A. Fridell, MD, Indianapolis, IN; Chandrashekhar A. Kubal, MD, Indianapolis, IN; Burcin Ekser, MD, Indianapolis, IN; Richard S. Mangus, MD, Indianapolis, IN

Educational Objective: At the conclusion of this presentation, the participants should be able to explain indications for tracheostomy within 6 months of liver transplant (LT), and compare post-tracheostomy complications and outcomes.

Objectives: This study reviews a large number of liver transplant (LT) recipients at a single center and describes indications for tracheostomy within 6 months of transplant and analyzes post-tracheostomy complications and outcomes. **Study Design:** Retrospective review and case control. **Methods:** The records for all LT patients over a 15 year period were reviewed. A case control subgroup analysis was conducted in which 80 tracheostomy patients were matched with 80 non-tracheostomy liver transplant patients based on age, gender, and body mass index. **Results:** Among 1786 LTs, 80 required tracheostomy (4%). Tracheostomy patients had a higher MELD score, were older and had a lower BMI. Tracheostomy patients had longer stay (39 versus 10 days, $p<0.001$) and worse 1 year survival (63% versus 90%, $p<0.001$). Median days between transplant and tracheostomy were 20 days, with a median of 48 days from tracheostomy to decannulation. Pretransplant pulmonary function among tracheostomy patients included FVC of 79%, FEV1 of 75%, FEV1/FVC of 80%. In the case control analysis tracheostomy patients had a muscle mass deficit of -45% when compared to matched LT controls ($p<0.05$). The most common complications post-tracheostomy included bleeding (5%), tracheocutaneous fistula (4%), operative revision (3%), and leak with subcutaneous or mediastinal air (3%) (overall 15% complication rate). **Conclusions:** Tracheostomy was required in 4% of liver transplant patients with a 15% complication rate. Respiratory failure was associated with worse liver disease, older age, deconditioning and lower pulmonary function testing but was not associated with body mass index or history of tobacco use.

97. Evaluation of Handedness in Endoscopic Laryngeal Surgery Using a High Fidelity Phonosurgery Model

Matthew R. Naunheim, MD MBA, Boston, MA; Amanda Le, Boston, MA; Matthew M. Dedmon, MD PhD, Boston, MA; Ramon A. Franco, MD, Boston, MA; Jennifer Anderson, MD, Toronto, ON Canada; Phillip C. Song, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the impact of handedness on surgical approach and outcomes in laryngologic surgery.

Objectives: There are no controlled prospective studies demonstrating the outcomes of left and right sided surgery in otolaryngology. Endoscopic microlaryngeal phonosurgery is an ideal procedure to assess technical aspects of handedness, due to anatomic symmetry. In this study, we analyzed 1) choice of surgical approach; and 2) outcomes based on handedness. **Study Design:** Prospective cohort study. **Methods:** Using a validated high fidelity phonosurgery model,

19 laryngologists undertook endoscopic resection of a simulated vocal fold lesion. These resections were video recorded and scored by 2 blinded laryngologists using a validated global rating scale, procedure specific rating scale, and a hand preference analysis. **Results:** There were 18 right handed participants and 1 left-handed. 12 left and 7 right excisions were evaluated. Cronbach's alpha for inter-rater reliability was good (0.89, global scale; and 0.70, procedure specific scale). Surgeons used their dominant hand 78.9% of the time for incision and 76.3% for dissection. In cases where the nondominant hand would have been preferred, surgeons used the nondominant hand only 36.4% of the time for incision and dissection. Use of the nondominant hand did not influence global or procedural rating (p=0.222 and p=0.568, respectively). **Conclusions:** There are measurable differences in surgical approaches based on hand dominance, with surgeons preferring to cut and perform resection with the dominant hand despite limitations in the instrument and exposure. Despite these choices, overall outcomes based on global rating and technique specific rating scales were not significantly different.

98. Inflammatory Myofibroblastic Tumor of the Epiglottis Excised with Carbon Dioxide Laser: A Case Report

Blake S. Raggio, MD, New Orleans, LA; Neil N. Chheda, MD, Gainesville, FL

Educational Objective: At the conclusion of this presentation, the participants should be familiar with laryngeal inflammatory myofibroblastic tumors including their clinical presentation and how they are successfully managed.

Objectives: Report the first case of an inflammatory myofibroblastic tumor (IMT) of the epiglottis. **Study Design:** Case report and literature review. **Methods:** Present the patient's case history, management, and histopathological findings. Review literature of inflammatory myofibroblastic tumors localized to the larynx. **Results:** A 66 year old female with progressive dysphonia presented with a mass on her suprahyoid epiglottis. The tumor was completely excised via CO2 laser; no adjuvant therapy was administered. Histopathology revealed an IMT of the epiglottis. No evidence of disease recurrence was noted after 2 years of followup. Review of the English literature revealed approximately 40 reported cases of laryngeal IMT, none of which originated from the epiglottis. **Conclusions:** IMT, a benign neoplastic tumor of intermediate biological potential, rarely occurs in the larynx. This is the first reported case of an IMT localized to the epiglottis. Complete endoscopic excision (with or without laser) is the treatment of choice for tumors with laryngeal localization. No adjuvant therapy is necessary.

99. Presentations of Bleeding Diatheses in the Larynx

Saranya Reghunathan, MD, Tucson, AZ; Stephen A. Goldstein, MD, Tucson, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the larynx as a possible site of bleeding diathesis and explain the need for early diagnosis and management.

Objectives: Highlight the larynx as potential location of bleeding diathesis and its subsequent clinical relevance. **Study Design:** Report of two cases and review of literature. **Methods:** Patient chart analysis and literature review. **Results:** Two patients presented to our institution with hoarseness, dysphagia, mild airway obstructive symptoms and known coagulopathies. Flexible fiberoptic laryngoscopy revealed vocal cord hemorrhage. Patient history suggested that neither patient had sustained recent trauma. Ultimately both patients were primarily treated with conservative measures, including rapid reversal of coagulopathy, voice rest, and proton pump inhibitors without any need for procedural intervention. Both patients resolved their vocal cord hemorrhage and returned to their normal voices on subsequent visits. **Conclusions:** Head and neck manifestations of coagulopathies are a known entity that frequently requires procedural management by otolaryngologists. However, the larynx as the solo manifestation of bleeding diathesis in a coagulopathic patient without direct trauma has not been clearly reported. This process requires early diagnosis and management by an otolaryngologist. We report two unusual cases of laryngeal bleeding diatheses without prior traumatic injury and subsequent medical management that prevented airway collapse.

100. Case Report and Clinical Review of Laryngeal Pemphigoid: Presentation, Diagnosis, and Therapeutic Options

Zain H. Rizvi, MD, Los Angeles, CA; Sophie Shay, MD, Los Angeles, CA; Eddie Ramirez, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinical manifestations, diagnosis, and treatment options unique to laryngeal pemphigoid.

Objectives: Describe a rare laryngeal autoimmune condition. Emphasize the need to recognize a rare clinical entity during diagnostic workup in order to avoid a missed diagnosis. Understand laryngeal involvement of membranous pemphigoid of the larynx and airway management. **Study Design:** Case report including clinical and histopathologic analysis as well as review of the literature. **Methods:** A case report is described from a university hospital. Presentation, workup and diagnostic details are discussed. A literature review of the epidemiology, natural history of the disease, and treatment options are reviewed. **Results:** A 48 year old female presented to the emergency room with recent diagnosis of asthma with dyspnea refractory to medical management. She initially improved with intravenous steroids but was noted to have stridor on exam. The patient denied dysphagia, pain, weight loss, or hemoptysis. Bedside indirect laryngoscopy revealed supraglottic stenosis and a 3mm airway. The patient underwent awake tracheostomy, direct laryngoscopy, bronchoscopy,

and biopsies. She was noted to have laryngeal mucosa that very easily separated from the underlying structures, as well as oropharyngeal bullae-like lesions. Histopathology and immunofluorescent staining of the specimen acquired from the supraglottic larynx revealed subepidermal bullae and linear basement membrane deposits respectively. **Conclusions:** Laryngeal pemphigoid is a rare but important entity that should be recognized by the practicing otolaryngologist. Recognition of this diagnostic possibility is key to ensure proper specimen handling and perform appropriate, non-routine staining which is key to the diagnosis. Ongoing care for these patients includes multidisciplinary care from various subspecialists including otolaryngology.

101. Grade IV Subglottic Stenosis after Percutaneous Tracheostomy

Marisa A. Ryan, MD, Durham, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the signs, evaluation and treatment of grade IV subglottic stenosis after percutaneous tracheostomy.

Objectives: Percutaneous tracheostomy is a common alternative to open surgical tracheostomy. We report two cases of grade IV subglottic stenosis after percutaneous tracheostomy that required tracheal resection. **Study Design:** Retrospective case series. **Methods:** Review of two adult cases at a tertiary medical center during 2015. **Results:** One patient was unable to tolerate a speaking valve after percutaneous tracheostomy at another institution for management of a gunshot wound to her thorax. Tracheoscopy identified firm stenosis of the proximal trachea that was 1cm long and just above the tracheostoma on imaging. She underwent tracheal resection with decannulation and two subsequent endoscopic debridements of granulation at the anastomosis. She achieved an adequate voice and ability to perform all activities of daily living. The second patient had quadriplegia after a gunshot wound to his cervical spine. He underwent percutaneous tracheostomy and was not able to tolerate a speaking valve. Tracheoscopy identified firm stenosis from the first tracheal ring to 1cm above the tracheostoma. Since his quadriplegia prevented using his hands for communication, he elected for tracheal resection for phonation, although he required continued tracheostomy for ventilator support. He had two debridements of anastomosis granulation postoperatively and now uses a speaking valve. **Conclusions:** Complete subglottic stenosis can occur after percutaneous tracheostomy even in the absence of a prolonged intubation. Those who care for patients who have undergone percutaneous tracheostomy must remain aware of this potential complication. Tracheal resection can be effective for phonation and decannulation. Close monitoring postoperatively with debridement of granulation is important to prevent restenosis.

Otology/Neurotology

102. WITHDRAWN - Outcomes of Round Window Vibroplasty

Jacqueline A. Anderson, MD, Tacoma, WA; Scott K Walton, MD, Tacoma, WA; James V. Crawford, MD, Tacoma, WA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the current and potential future indications for implantation of a Vibrant Soundbridge (VSB) in patients with hearing loss. Specifically, participants should develop an understanding of the surgical technique and potential audiologic outcomes for round window (RW) insertion of a VSB in patients with mixed hearing loss.

Objectives: The Vibrant Soundbridge (VSB) is an active middle ear implant developed for the treatment of hearing loss. Initially introduced and approved for use in patients with sensorineural hearing loss, indications for the VSB were expanded in Europe to include conductive and mixed hearing loss in 2007. In the United States this remains a non-FDA approved use of the device. The aim of this study is to assess audiological performance and surgical complications of 9 patients who underwent attempted implantation of the Vibrant Soundbridge (VSB) via the round window vibroplasty (RWV) technique. **Study Design:** Retrospective chart review at a tertiary referral center in the United States. **Methods:** We reviewed and compared preoperative and postoperative audiological results for 9 patients in whom RWV was attempted. In addition, we assessed safety by reviewing each patient's records to identify intraoperative and/or postoperative complications. **Results:** 8 of 9 patients underwent successful placement of the VSB within the round window (RW). In 1 patient, surgery was aborted due to intraoperative complications. Two patients developed postoperative complications worth highlighting: 1 patient developed an infection necessitating explantation 2 months after initial placement, and a second patient developed a profound sensorineural hearing loss postoperatively. For the 6 patients with usable postoperative audiologic assessments, the mean functional gain was 34.3 dB HL. **Conclusions:** We report the first case series of RWV performed in the United States. Our findings support its use for mixed and conductive hearing loss, however highlights that in most patients the functional gain was primarily secondary to closure of the air bone gap.

103. Bilateral Internal Auditory Canal and Labyrinthine Enhancement in an Infant with Severe Labyrinthine Dysplasia: A Previously Unreported Phenomenon

Charles L. Anzalone, MD, Rochester, MN; Neil S. Patel, MD, Rochester, MN; Lisa A. Schimmenti, MD, Rochester, MN; Melissa D. Dejong, AuD, Rochester, MN; Mai L. Ho, MD, Rochester, MN; Matthew L. Carlson, MD, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to identify a unique constellation of signs and symptoms involving congenital profound bilateral sensorineural hearing loss in patients with bilateral nodular internal auditory canal and labyrinthine enhancement and inner ear dysplasias as well as have an increased understanding of the role of cochlear implantation in similar patient populations.

Objectives: To describe a novel case of congenital profound bilateral sensorineural hearing loss in a patient with bilateral nodular internal auditory canal and labyrinthine enhancement and inner ear dysplasias. **Study Design:** Case report with review of the literature. **Methods:** We retrospectively reviewed the medical literature using PubMed, searching the terms cochlear dysplasia, cochlear implant, congenital hearing loss, labyrinthitis ossificans, neurotology, skull base. The patient's medical record was reviewed. Previous reviews of the subject were critically assessed and the salient features are presented. **Results:** A 76 day old female was referred to our clinic for congenital deafness and bilateral internal auditory canal masses. Behavioral and objective audiometric evaluation demonstrated bilateral profound sensorineural hearing loss. Computed tomography and contrast enhanced magnetic resonance imaging studies demonstrated bilateral cochleovestibular malformations with nodular contrast enhancement in the bilateral internal auditory canals and cochleae. A comprehensive multidisciplinary evaluation failed to define a syndromic or infectious etiology. Given the potential risk for progressive bilateral labyrinthitis ossificans, bilateral simultaneous cochlear implantation was performed at 4 months of age. The patient received initial stimulation 17 days after surgery with encouraging behavioral responses to sound and at her last followup visit one month after implantation, she was progressing appropriately. **Conclusions:** We report a novel presentation of congenital bilateral profound sensorineural hearing loss in a patient with nodular internal auditory canal and labyrinthine enhancement and coexisting inner ear dysplasia. The patient has demonstrated good benefit from cochlear implantation. Future study of rare variants of congenital deafness such as this is critical toward defining new disease processes and determining optimal treatment.

104. High Resolution Computed Tomography Analysis of the Human External Auditory Canal

Jason H. Barnes, BA, Richmond, VA; Roy T. Sabo, PhD, Richmond, VA; Daniel H. Coelho, MD, Richmond, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to appreciate a new method used to accurately measure external auditory canals (EAC) using high resolution computed tomography and understand differences in EAC dimensions among different demographics.

Objectives: To accurately measure external auditory canal (EAC) dimensions by high resolution computed tomography (CT), determine demographic differences in EAC dimensions, and to compare with a traditional method of EAC measurement. **Study Design:** Analysis of temporal bone CT scans with comparison to tympanometry. **Methods:** Using an advanced multidimensional open source digital imaging and communications in medicine (DICOM) analysis program (OsiriX, Pixmeo, Geneva, Switzerland) 91 adult EACs were analyzed. Tympanometric data were also recorded for each ear. Demographic data were recorded. The methods were compared using a linear mixed effect model. **Results:** EAC volume was compared between tympanometrically calculated volumes and CT measured volumes. It was found that CT measured volumes are, on average, smaller (1.12 cm3, SE=0.04) than tympanometry volumes (1.27 cm3, SE=0.04 cm3). There was a significant difference in CT measured volume between genders ($p = 0.0125$), with males having larger measured volume (1.23 cm3, SD = 0.28 cm3) than females (1.06 cm3, SD = 0.20 cm3). There was a significant difference in minimum circumference between age groups ($p= 0.0448$), with patients younger than 60 years having larger minimum circumferences (1.89 cm, SD =0.21 cm) than older patients (1.78 cm, SD = 0.25 cm). **Conclusions:** This study demonstrates that CT analysis can provide more information about EAC dimensions than traditional techniques. Moreover, slight but statistically significant differences are associated with age and gender. Accurate estimation of EAC dimensions is important for the development of hearing aids and personal protective equipment and can also be helpful for surgical planning. Future research will focus on simplifying computation, as well as developing cross-cultural cohort comparisons.

105. The Malleus to Oval Window Revision Stapedotomy: Efficacy and Longitudinal Study Outcome

Peter A. Benedict, BA, New York, NY; Ling Zhou, MD, Seattle, WA; Robert Peng, MD, New York, NY; Darius Kohan, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) discuss the technique and efficacy of the malleus to oval window revision stapedotomy technique when the incus is unavailable; and 2) comprehend that the immediate and delayed auditory benefits are adversely affected by the number of previous revision surgeries that patients have undergone.

Objectives: To determine the longitudinal effectiveness of the malleus to oval window stapedotomy technique among

patients undergoing revision surgery when the incus is unavailable. **Study Design:** Retrospective chart review. **Methods:** Charts of 19 patients who underwent 21 malleus attachment stapedotomies from 2000-2015 were reviewed. Surgery was ambulatory, performed by a single surgeon, transcanal, with laser technique, under general anesthesia. **Results:** Of 21 stapedotomies performed, there were 12 first revisions, 6 second revisions, 2 third revisions, and 1 fourth revision. There were no surgical complications. Average preoperative air bone gap (ABG) was 32.3 dB. Average postoperative ABG at 6 weeks was 9.5 dB and at last followup was 14.3 dB. Average length of followup was 29.8 months (range 1.0 - 156.1 months). Speech discrimination was universally maintained. At last followup, 100% of first revisions achieved ABG ≤ 20 dB (75% ≤ 10 dB), compared to 50% of second revisions with ABG ≤ 20 dB (none ≤ 10 dB), and 33% of combined third and fourth revisions with ABG ≤ 20 dB (33% ≤ 10 dB). The first revision trend line showed a slope of -0.03 dB lost per month, compared to -0.06, -0.63, and -1.09 dB lost per month for second, third, and fourth revisions respectively, demonstrating superior outcome of first and second revisions compared to subsequent surgeries. **Conclusions:** The malleus to oval window stapedotomy technique is effective and longer lasting in first and second revision surgery compared to subsequent procedures. Standard or implantable amplification devices may be preferable for patients with multiple prior procedures.

106. Hemangioma of the Middle Ear Mimicking Glomus Jugulotympanicum: A Case Study and Review of the Literature

Delaney J. Carpenter, BS, Charlottesville, VA; Nadia J. Mostovych, MD, Philadelphia, PA; Thomas O. Willcox, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the clinical presentation, imaging characteristics, histological features, and management of middle ear hemangioma.

Objectives: Hemangiomas are benign vascular tumors that present frequently in the skin and soft tissues of the head and neck but only rarely in the middle ear cavity. In this case report we present the imaging, surgical, and pathological findings of a middle ear hemangioma mimicking a glomus jugulotympanicum, followed by a review of the literature. **Study Design:** Case report. **Methods:** We report the case of a 49 year old male who presented with a two year history of left sided hearing loss with intermittent tinnitus. Physical exam was remarkable for an erythematous mass behind the left tympanic membrane. Contrast enhanced CT and MRI revealed an enhancing mass involving the left middle ear cavity and cochlear promontory with likely contiguous erosive change of the left jugular foramen, suggesting a diagnosis of glomus tympanicum or jugulare. **Results:** Left tympanoplasty with canaloplasty and transmeatal subtotal resection of the tumor was performed with intraoperative findings suggestive of a glomus jugulare with a broad base in the hypotympanum. However, the specimen stained negative for s100 and chromogranin, ruling out paraganglioma and demonstrated morphologic and immunohistochemical features consistent with a diagnosis of hemangioma. The postoperative period was uneventful and the patient will undergo surveillance at this time. **Conclusions:** Hemangiomas arising primarily in the middle ear are rare and not easily distinguishable from glomus jugulotympanicum. Therefore hemangioma should be considered in the differential diagnosis of a vascular middle ear mass.

107. Outcomes Following Transcanal Endoscopic Lateral Graft Tympanoplasty

Francis X. Creighton, MD, Boston, MA; Elliot D. Kozin, MD, Boston, MA; Anni M. Rong, MD, Boston, MA; Michael S. Cohen, MD, Boston, MA; Daniel J. Lee, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand techniques for endoscopic transcanal lateral grafts and compare the audiometric and closure success rates to traditional postauricular microscopic techniques.

Objectives: 1) Demonstrate feasibility of performing endoscopic transcanal lateral graft tympanoplasty; and 2) compare audiometric and clinical outcomes of transcanal endoscopic lateral graft to previously reported outcomes of microscopic postauricular lateral graft tympanoplasty. **Study Design:** A retrospective review of sequential pediatric and adult endoscopic transcanal lateral graft tympanoplasties (class III) performed between May 2014 and August 2015 at a single institution by two experienced otologists. Rate of perforation closure and audiometric outcomes (pure tone average (PTA) and word discrimination scores (WDS)) were obtained and compared to prior published outcomes of postauricular microscopic lateral grafts. **Methods:** Retrospective review. **Results:** Twenty patients, 5 right and 15 left ears, met criteria. Ninety percent of patients had successful closure of their perforation. One patient had a residual central perforation; active AOM was noted intraoperatively in this case. One patient had graft lateralization. Mean followup was 9 months (SD = 141 days). Mean operative time was 160 (SD = 26.1) minutes. Mean improvement in PTA was 18db (SD = 10.3). Two patients had worsening of audiometric outcomes with <15dB decreases in PTA and unchanged WDS; all other patients showed improvement or no change in audiometric outcomes. These results are similar to previously published outcomes for postauricular microscopic approaches. **Conclusions:** Transcanal endoscopic lateral graft tympanoplasty is a novel technique for closure of anterior and subtotal perforations that avoids a postauricular incision. Outcomes in this cohort were similar to historical results for postauricular microscopic approaches. Prospective studies with larger cohorts will be crucial to understanding the advantages of this new surgical approach.

108. Facial Palsy and the Vanishing Facial Nerve Lesion

Nicholas L. Deep, MD, Phoenix, AZ; J. Peyton Hines, MD, Phoenix, AZ; Peter A. Weisskopf, MD, Phoenix, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss causes of progressive facial nerve paralysis and be aware of this perplexing idiopathic presentation which was successfully treated with facial nerve decompression and release of the epineurium.

Objectives: To present a case over 8 years of followup concerning facial palsy in the setting of a vanishing facial nerve lesion. **Study Design:** Case report. **Methods:** A 40 year old woman with persistent right sided Bell's palsy (House-Brackmann II) for 6 months underwent MRI and CT imaging which demonstrated an enhancing mass in the area of her geniculate ganglion and surrounding bony scalloping, consistent with a facial nerve hemangioma. She had no hearing loss or tinnitus. The patient favored observation and was followed with serial examinations over 8 years without any clinical decline or radiographic change. She then presented with worsening facial palsy (House-Brackmann IV) but perplexingly, MRI showed that the enhancing mass in her geniculate ganglion had disappeared. Facial nerve decompression via middle fossa approach was performed. No mass was found. The nerve initially did not stimulate but after the epineurium was cut and released, the nerve immediately stimulated. Her facial function recovered to a House-Brackmann II postoperatively which has been stable at her 5 month followup. **Results:** The present case of idiopathic facial nerve paralysis has not been previously reported based on a detailed review of the literature. One hypothesis is an ossifying hemangioma of the facial nerve which eventually ossified itself out of existence and in the process constricted the facial nerve. Alternatively, an idiopathic inflammatory process causing scarring and contracture of the epineurium is plausible. **Conclusions:** Despite the disappearing enhancing lesion in the area of the geniculate ganglion on MRI, facial nerve decompression with release of the epineurium was associated with improvement in our patient's facial function.

109. Petrous Apex Cholesteatomas: Endonasal versus Infracochlear Endoscopic Approaches

Nicholas L. Deep, MD, Phoenix, AZ; J. Peyton Hines, MD, Phoenix, AZ; Rachel B. Cain, MD, Phoenix, AZ; Joseph M. Hoxworth, MD, Phoenix, AZ; Devyani Lal, MD, Phoenix, AZ; David M. Barrs, MD, Phoenix, AS

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the indications, advantages, and disadvantages of the various endoscopic approaches in the resection of petrous apex cholesteatomas.

Objectives: To compare infracochlear versus endonasal approaches for resection of petrous apex cholesteatomas (PAC). **Study Design:** Retrospective case series and detailed review of the literature. **Methods:** Clinical, radiological, and surgical details on two patients with PAC are presented to highlight the indications and outcomes of endoscopic approaches in the management of PAC. Long term outcomes including recidivism requiring additional surgery are compared. **Results:** A 24 year old female presented with left sided facial weakness (House-Brackmann IV), sensorineural hearing loss, and decreased vestibular function due to involvement of the geniculate ganglion and labyrinth by a PAC, which was accessed via the transcanal infracochlear approach. A 52 year old male presented with double vision and found to have right sided lateral rectus palsy due to a PAC, which was accessed via an endoscopic endonasal transsphenoidal approach. Both approaches provided access for near total resection of the PAC with preservation of hearing, vestibular and facial nerve function. The transcanal infracochlear approach is appropriate for accessing the posterior and inferior aspects of the petrous apex, whereas the endonasal transsphenoidal approach is more suitable for superior or anterior-inferior petrous apex disease. Over a 12 year followup on each patient, both required 2 additional operations for recurrent disease. **Conclusions:** Recidivism is common in PAC and repeat debridement procedures are often required in patients in whom hearing and balance are attempting to be preserved. Endoscopes provide a less invasive way to access this problematic region where enhanced visualization may lead to improved gross total resection and a greater period of time between debridement procedures.

110. Hydroxyapatite Cement Resurfacing of the Dehiscent Jugular Bulb: A Novel Treatment for Pulsatile Tinnitus

Austin N. DeHart, MD, Richmond, VA; Wayne T. Shaia, MD, Richmond, VA; Daniel H. Coelho, MD, Richmond, VA

Educational Objective: Participants should be able to describe the presentation of jugular bulb dehiscence and discuss the benefits and limitations of different methods of treatment.

Objectives: 1) Discuss the presentation and symptomatology of patients with jugular bulb abnormalities; 2) review literature describing jugular bulb abnormalities; 3) compare methods of treating symptomatic dehiscent jugular bulb; 4) describe a novel surgical technique and pitfalls to repair dehiscent bulbs with hydroxyapatite cement; and 5) present a case series to demonstrate outcomes with this technique. **Study Design:** Case series presentation, PubMed literature review, and description of operative technique. **Methods:** A series of patients presenting with pulsatile tinnitus due to dehiscent jugular bulbs who underwent operative repair with hydroxyapatite cement resurfacing is described. Literature review was conducted via PubMed database search. Abstracts and references were reviewed to identify relevant

sources. Surgical technique of repair and outcomes are reported. **Results:** Three patients who presented with unilateral, bothersome, pulsatile tinnitus with history and imaging consistent with a diagnosis of high riding, dehiscent jugular bulbs underwent jugular bulb resurfacing with hydroxyapatite cement. Two patients associated the onset of their symptoms with trauma. All patients reported complete resolution of their tinnitus at an average followup of fifteen months. No hearing, vestibular, or intracranial complications were encountered. **Conclusions:** Compressive, obliterative, and endovascular interventions have been attempted to treat pulsatile tinnitus due to high riding dehiscent jugular bulbs. Reconstruction of the middle ear floor with autologous tissue grafts has also been described. These techniques have been associated with variable results and with the risk of increased intracranial pressure. Hydroxyapatite cement resurfacing may be considered as a safe and efficacious alternative for the treatment of this pathology.

111. Development of Non-Ototoxic Anti-Fog Agents for Endoscopic Ear Surgery: A Novel Validation Paradigm

Benjamin P. Fiorillo, BA, Boston, MA; Vivek V. Kanumuri, MD, Boston, MA; Elliot D. Kozin, MD, Boston, MA; Daniel J. Lee, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to have a better understanding of how to assess anti-fog agents for use in endoscopic ear surgery (EES).

Objectives: Commercially available anti-fog agents for endoscopes were developed for use in sinus and abdominal surgery. Recent studies have demonstrated potential ototoxicity of anti-fog agents. Herein we design a model to evaluate quality of anti-fog agents for endoscopic ear surgery with the ultimate aim of identifying high quality and non-ototoxic agents. **Study Design:** In vitro study. **Methods:** Commercial anti-fog solutions (n=3), shampoo (n=1), and a water control were analyzed for their efficiency in preventing endoscopes from fogging in humid conditions. Anti-fog solutions were applied to an endoscope, which was then rapidly exposed to extremes in humidity and temperature. Images of a Snell Eye Chart were recorded over time using a HD monitor and 3 chip CCD camera. A visual analogue score (VAS) was used to rate the quality of the images up to five minutes post-exposure from 0 (highest resolution) to 10 (poorest resolution). **Results:** Images obtained from the rigid endoscope alone had poor VAS scores (9.00 ± 1.32). Commercially available agents were shown to be efficacious in maintaining image resolution. Medline and DeRoyal were the most effective commercial solutions (VAS scores 2.78 ± 1.20 and 1.67 ± 1.3, respectively; $p < 0.05$), with clear images even when exposed to 5 minutes of high heat and humidity. Over the counter shampoo was also an effective potential non-alcohol based solution (VAS score 3.11 ± 1.36; $p < 0.05$). **Conclusions:** The study demonstrates a model to rapidly and semiquantitatively evaluate anti-fog agents for EES. The model may be used for the analysis of existing or novel non-ototoxic anti-fog agents.

112. Ultrasonic Bone Aspirator in Endoscopic Ear Surgery: Feasibility and Safety in a Cadaveric Temporal Bone

Elizabeth G. Gardner, MD, New Orleans, LA; Sohit P. Kanotra, MD, New Orleans, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to to describe the feasibility of using an ultrasonic bone aspirator in endoscopic ear surgery.

Objectives: 1) To describe the feasibility of using an ultrasonic bone aspirator in endoscopic ear surgery; and 2) to assess the safety of the ultrasonic bone aspirator in endoscopic ear surgery. **Study Design:** Cadaveric temporal bone. **Methods:** Five temporal bones were dissected using exclusive endoscopic ear surgery and an ultrasonic bone aspirator, Sonopet® (Stryker®, Kalamazoo, MI). Atticotomy and retrograde canal wall down mastoidectomies were undertaken. Another 4 bones were dissected using routine endoscopic equipment and standard bone curettes in the same manner. The feasibility and safety were assessed in terms of the following parameters: 1) time for dissection; 2) adequacy of the atticoantrotomy; 3) damage to the tympanomeatal flap; 4) injury to the chorda tympani nerve; 5) injury to the ossicles; 6) ossicular chain disruption; 7) exposure of the facial nerve; and 8) dural injury. **Results:** The time taken to perform atticotomy and retrograde canal wall down mastoidectomy was significantly less with the use of the ultrasonic bone aspirator as compared to conventional bone curettes. **Conclusions:** The ultrasonic bone aspirator is a feasible option in endoscopic ear surgery and provides easy bone removal with no additional complications and greater efficacy than traditional bone curettes and should be a part of the armamentarium for transcanal endoscopic ear surgery.

113. Prevalence of Adult Unilateral Hearing Loss and Hearing Aid Use in the United States

Justin S. Golub, MD, New York, NY; Lawrence R. Lustig, MD, New York, NY; Anil K. Lalwani, MD, New York, NY

Educational Objective: To demonstrate the prevalence of unilateral hearing loss as well as hearing aid use in unilateral hearing loss in the adult United States population.

Objectives: The prevalence of unilateral hearing loss and corresponding hearing aid usage in adults has not been definitely assessed. 1) To establish the prevalence of unilateral hearing loss; and 2) to establish the prevalence of hearing aid use with unilateral hearing loss in US adults using a nationally representative study. **Study Design:** Cross-sectional national epidemiologic study (n=6,242). **Methods:** Subjects aged 18 years and over with audiometric testing in the

2005-2006, 2009-2010, and 2011-2012 cycles of the National Health and Nutrition Examination Study (NHANES) were included. Unilateral hearing loss was defined as normal hearing (<=25 dB HL pure tone average; PTA) in one ear and at least mild hearing loss (>25 dB HL PTA) in the other ear. Hearing aid usage was defined by at least 5 hours per week (2005-2006) or at least seldom (2009-2012) use. Sampling weights were utilized to ensure generalizability to the US population. **Results:** The overall prevalence of unilateral hearing loss in adult Americans was 7.2% (95% CI 6.1-8.6%). The prevalence of mild and moderate or worse unilateral hearing loss was 5.7% (4.8-6.7%) and 1.5% (0.1-2.1%), respectively. Of those with unilateral hearing loss, the overall prevalence of hearing aid usage was 2.0% (0.6-6.7%). Hearing aid usage for mild and moderate or worse unilateral hearing loss was 1.4% (0.2-8.0%) and 4.2% (0.1-22%), respectively. **Conclusions:** The prevalence of unilateral hearing loss is common among US adults. The prevalence of at least occasional hearing aid usage for this condition is surprisingly low at 2% overall and 4% for moderate or worse unilateral hearing loss.

114. Cochlear Endoscopy in Cochlear Implantation of an X-Linked Stapes Gusher Syndrome

Jennifer F. Ha, MBBS FRACS, Ann Arbor, MI; Timothy Baerg, BS, Ann Arbor, MI; Marc C. Thorne, MD, Ann Arbor, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of potential disparity of the preoperative CT findings with intraoperative cochlear otoendoscopy. They will be able to discuss with the patients regarding its potential to impact on CI electrodes selection and the potential hearing outcomes in selected patients.

Objectives: X-linked stapes Gusher syndrome is a rare form of congenital sensorineural hearing loss (SNHL) syndrome. Affected patients have abnormal configuration of the lamina cribrosa and internal auditory canal (IAC) leading to an increased risk of perilymph gusher with surgical manipulation. We report a case whereby intraoperative otoendoscopic visualization allowed real time visualization of the IE anatomy, which has the potential to impact on electrode choices in cochlear implants (CI). **Study Design:** Case report. **Methods:** A 12 year old boy has been followed up in our pediatric otolaryngology department with bilateral SNHL and X-linked stapes Gusher syndrome for five years. He initially performed well with bilateral traditional hearing aids, but developed progressive mixed loss and became a CI candidate for his left ear. The preoperative computed tomography of the temporal bone showed a bulbous IAC with a dysplastic cochlear and no apparent modiolus characteristic of this condition. The intraoperative cochlear otoendoscopy however, showed osseous spiral lamina without direct communication to the IAC contrary to the imaging. **Results:** Perilymph gusher during CI in patients with X-linked Gusher syndrome is inevitable, but a thorough examination of the inner ear is still critical. We advocate for the use of cochlear otoendoscopy to allow better delineation of the anatomy, which will impact on the CI electrodes selection and potentially hearing outcomes in selected patients. **Conclusions:** We advocate the use of intracochlear otoendoscopy in selected cases as it offers a better resolution than the high resolution CTTB and has the potential to change electrode choices in CI.

115. Unilateral Glomus Jugulare Presenting with Intracranial Hypertension

John P. Hines, MD, Phoenix, AZ; Nicholas L. Deep, MD, Phoenix, AZ; Peter A. Weisskopf, MD, Phoenix, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize a nonsecreting unilateral paraganglioma with contralateral sigmoid sinus stenosis as a rare cause of intracranial hypertension.

Objectives: To present a case and subsequent management of unilateral paraganglioma with simultaneous contralateral sigmoid sinus stenosis causing bilateral venous outflow obstruction and resulting in intracranial hypertension. **Study Design:** Case report and literature review. **Methods:** The clinical course, radiological imaging, and therapeutic interventions of a single patient are reviewed. **Results:** A 58 year old female presented with right sided mild conductive hearing loss, pulsatile tinnitus, aural fullness, progressive headache, and blurred vision. Otoscopy was notable for a red, pulsatile mass in the inferior quadrant of the tympanic membrane. Imaging revealed a right sided glomus jugulare tumor causing right jugular bulb stenosis. Pertinent laboratory studies were consistent with a nonsecreting paraganglioma; however this did not explain the progressive headaches and blurred vision. Further workup confirmed intracranial hypertension and led to the discovery of concomitant idiopathic left sided proximal sigmoid sinus stenosis, which, along with her right sided paraganglioma, resulted in bilateral venous outflow obstruction. Endovascular stenting of the left sided sigmoid sinus stenosis led to improvement in venous pressure gradients as well as complete resolution of headaches and normalization of vision. She subsequently underwent stereotactic radiosurgery treatment of the right sided paraganglioma with satisfactory results. **Conclusions:** In a patient with a nonsecreting unilateral paraganglioma and intracranial hypertension, clinicians should remain vigilant of concomitant pathology.

116. Stapes Prosthesis Length and Hearing Outcomes

Qasim Husain, MD, New York, NY; Kenny F. Lin, MD, New York, NY; Samuel H. Selesnick, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the relevance of prosthesis length with regards to hearing outcomes and determine if there are patient factors that may influence the size selected.

Objectives: To determine first if prosthesis length plays a role in optimizing successful hearing outcomes in stapedotomy surgery, and second if patient factors such as height had any predictive influence on the selection of the length of prosthesis. **Study Design:** Retrospective chart review. **Methods:** Retrospective chart review of patients undergoing stapedotomy surgeries with adequate followup. Indication for surgery was for those with diagnosis of otosclerosis with air bone gap (ABG) of greater than 20 dB. Length of prosthesis, pre/postoperative audiograms, and followup data was obtained. **Results:** The primary group consisted of 176 cases. The prosthesis length ranged from 3.75 mm to 4.75 mm (median 4.25 mm). The greatest residual ABG occurred with the 3.75 mm prosthesis at 12.73 dB, and the smallest residual ABG occurred in the 4.75 mm prosthesis group at 3.44 dB. Patient height showed a positive, although weak correlation with length of prosthesis. **Conclusions:** Accurate prosthesis length is important for successful postoperative hearing outcomes. There is a positive, but not significant, correlation between patient height and prosthesis length.

117. Operative Outcomes Following Round Window Occlusion for Superior Canal Dehiscence Syndrome

Ruwan Kiringoda, MD, Boston, MA; Yew S. Cheng, Bm BCh, Boston, MA; Deepa Galaiya, MD, Boston, MA; Daniel J. Lee, MD, Boston, MA

Educational Objective: This presentation aims to demonstrate outcomes associated with round window occlusion (RWO) and compare the role of RWO with more traditional middle cranial fossa and transmastoid approaches.

Objectives: Transcanal round window occlusion (RWO) is a minimally invasive treatment for semicircular canal dehiscence syndrome (SCDS). Unlike middle fossa craniotomy (MFC) or transmastoid (TM) approaches, RWO is performed to ameliorate symptoms without directly repairing the dehiscence. We aim to describe subjective and objective operative outcomes in patients who undergo RWO for SCDS. **Study Design:** Case series. **Methods:** We reviewed our experience with RWO for SCDS from 2002 to 2016. Clinical visits, operative outcomes, VEMP and audiometric testing, and pre and postoperative symptom surveys were reviewed. **Results:** Eight patients underwent RWO in nine ears. Five underwent RWO as primary therapy, two following prior MFC or TM repair, and two patients with bilateral SCD underwent RWO as a second stage after contralateral MFC or TM repair. Five of eight patients responded to postoperative questionnaires; all five reported at least some improvement in their primary symptoms. Three patients ultimately elected for MFC or TM repair with the goal of more complete symptom control. Air conduction pure tone average (PTA; ± SD) after RWO was 15.0 ± 9.7 dB preop and 23.3 ± 17.0 postop. Bone conduction PTA was 5.6 ± 12.4 dB preop and 11.9 ± 14.2 dB postop. No major complications were observed. **Conclusions:** RWO may lead to subjective improvement in primary complaints, despite a minimally invasive approach. A significant number of patients may elect to proceed to a more definitive TM or MCF repair. Patients with contralateral vestibular hypofunction may be particularly good candidates for RWO. Careful patient selection, combined with a realistic appraisal of outcomes, is crucial to achieve positive outcomes in SCD surgery.

118. Audiometric Assessment of Pediatric Patients with Cystic Fibrosis

Kathryn L. Kreicher, BA, Charleston, SC; Michael J. Bauschard, MD, Charleston, SC; Clarice S. Clemmens, MD, Charleston, SC; Concetta M. Riva, MD, Charleston, SC; Ted A. Meyer, MD PhD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the prevalence, type of hearing loss, and otologic findings in children with cystic fibrosis.

Objectives: The purpose of this study was to evaluate hearing impairment in pediatric patients with cystic fibrosis (CF). **Study Design:** This is a retrospective analysis of the AudGen database generated by Children's Hospital of Philadelphia. **Methods:** Audiograms were analyzed for type of hearing loss (HL), pure tone average (PTA), laterality, and change in hearing over time. Medical charts were reviewed to identify factors that influence development and progression of hearing loss. **Results:** 217 patients with CF were included in this study. 69 (31.8%) had hearing loss on initial audiogram. Positive predictors of hearing loss included otitis media (OR: 2.16, 95% CI: 1.21-3.88, p=0.009), eustachian tube dysfunction (OR: 2.71, 95% CI:1.42-5.18, p=0.002), and otorrhea (OR: 4.79, 95% CI:1.39-16.49, p=0.007). Nasal polyps were a negative predictor of HL (OR:0.15, 95% CI: 0.05-0.43, p<0.001). Children with a diagnosis of diabetes had more decline in hearing loss over time than those without diabetes (+12.4 ± 17.2 dB worsening vs. -5.7± 9.8 dB improvement in PTA, p=0.014). **Conclusions:** This is the largest comprehensive analysis of all types of hearing loss in pediatric patients with CF. Our data suggest that children with more severe sinus disease, particularly nasal polyps, may be at lower risk for inflammatory middle ear disease and subsequent hearing loss. Patients who develop complications of CF such as diabetes should be monitored frequently, and the use of ototoxic drugs should be limited if possible.

119. Esthesioneuroblastoma of the Temporal Bone

Phillip H. Lee, MD, Salt Lake City, UT; Jason P. Hunt, MD, Salt Lake City, UT; Richard K. Gurgel, MD, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the temporal bone as a potential site of esthesioneuroblastoma metastasis and understand management options.

Objectives: Metastasis to the temporal bone from an olfactory esthesioneuroblastoma is extremely rare. We report a case of a metastatic esthesioneuroblastoma lesion to the temporal bone. **Study Design:** Case report and review of the literature. **Methods:** We reviewed the patient's clinical information including presenting symptoms, physical exam findings, imaging, intraoperative findings, and pathologic examination of resected tumor specimen of a patient with esthesioneuroblastoma of the temporal bone are described in detail. **Results:** A 48 year old male had a history of esthesioneuroblastoma status post-endoscopic resection and adjuvant radiation in 2012 presented with right otalgia of 4 months duration that had been treated unsuccessfully with multiple rounds of antibiotics. He also reported right sided aural fullness, hearing loss and intermittent vertigo. Shortly thereafter he developed right sided neck masses and House-Brackmann II/VI facial weakness. A large EAC mass was noted on physical examination. CT revealed a large mass in the right temporal bone encasing the facial nerve with associated bony destruction. There was diffuse enhancement of the mass on MRI with adjacent dural enhancement. PET/CT was also performed and was notable for pathologic parotid and bilateral neck nodes. An excisional biopsy of the EAC mass returned positive for esthesioneuroblastoma. A transotic approach to the posterior fossa with extradural resection of tumor was performed in conjunction with a superficial parotidectomy and bilateral neck dissections. Permanent pathology returned esthesioneuroblastoma. The patient underwent postoperative adjuvant radiation. **Conclusions:** Esthesioneuroblastoma has the potential for locoregional metastasis and can affect the temporal bone. Treatment consists of surgical resection, adjuvant radiation and in some cases chemotherapy.

120. How Was Your Otology Training? A Survey of Recent Otolaryngology Residents

Phillip A. Montague, MD, Morgantown, WV; Donald A. Bennett, BA, Morgantown, WV; Brian M. Kellermeyer, MD, Morgantown, WV

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss quality of otology training in residency training programs and the need for early exposure to surgical cases during training.

Objectives: To survey graduating or recent graduates of otolaryngology residency programs to evaluate their otology experience in residency and discern if they had received adequate otology training to decide on pursuing a fellowship in otology or neurotology. **Study Design:** Electronic survey. **Methods:** A survey was distributed to program directors of all US otolaryngology residency programs to distribute to fifth year residents and recent graduates in last 4 years. The survey assessed overall satisfaction in otology experience, presence of otology/neurotology fellows, adequacy of otology experience to decide on otology/neurotology fellowship, PGY year at which residents observed, performed, and proficiently performed 5 otologic procedures (tympanoplasty, mastoidectomy, ossiculoplasty, stapedectomy, and cochlear implant), and plan for performing these surgeries in practice. **Results:** 106 responses were obtained. 89/106 (84%) of respondents felt they had adequate training in otology to pursue a fellowship and were found to observe and perform surgeries significantly earlier in training by post-graduate year (PGY) including: mastoidectomy (observed PGY 1.9 vs. PGY 2.3, performed PGY 2.9 vs. PGY 3.5), ossiculoplasty (observed 2.1 vs 3.0, performed 3.6 vs. 4.3), stapedectomy (observed 2.3 vs 3.0, performed 3.9 vs. 4.5), and cochlear implant (observed 2.1 vs 2.8, performed 3.4 vs. 4.1) all $p<0.05$. 19/106 (17.9%) of respondents had fellows in residency in which 15/19 (78.9%) believed fellows were beneficial to their otology experience. **Conclusions:** Early exposure to otology surgeries benefits residents' decision on pursuing a fellowship in otology or neurotology. The presence of fellows appears to enhance resident training.

121. External Canal Cholesteatoma Causing Facial Paralysis

Omid Moshtaghi, BS, Irvine, CA; Yarah M. Haidar, MD, Irvine, CA; Ronald Sahyouni, BA, Irvine, CA; Harrison W. Lin, MD, Irvine, CA; Hamid R. Djalilian, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain a unique presentation of canal cholesteatoma and discuss the benefits of urgent decompression.

Objectives: External auditory canal (EAC) cholesteatoma is a rare condition and is estimated to occur in 1.2 in 1000 new patients at an otology clinic. Patients with EAC cholesteatoma (EACC) typically present with chronic otorrhea and obstruction. We present a unique case of a canal cholesteatoma presenting as facial paralysis. **Study Design:** Case report. **Methods:** A cholesteatoma patient presenting to an otology/neurotology clinic in a tertiary care academic center. **Results:** A 38 year old male presented with a 5 week history of otalgia and 10 day history of grade VI facial paralysis after cleaning his ear with a cotton swab. Occasional dizziness and progressive ipsilateral hearing loss was reported. In-office examination revealed extensive keratin debris within the EAC. Computed tomography demonstrated destruction originating in the medial canal and extending to the vertical facial nerve segment. A canal wall down tympanomastoidectomy, facial nerve decompression, and cholesteatoma resection were performed with obliteration of the mastoid using bone pate and cartilage. The 1.5 cm of decompressed facial nerve was noted to be inflamed and edematous. Histopathology confirmed a cholesteatoma. At one week postoperatively, the facial paralysis improved to grade III. At six months postoperatively, facial nerve function was grade I, and hearing had returned to normal. **Conclusions:** This is the first report of facial paralysis from EAC cholesteatoma. Urgent decompression in this case led to normalization of facial function. The facial nerve result in this case of EAC cholesteatoma was better than that of middle ear cholesteatomas causing facial paralysis.

122. Cochlear Implantation with Hearing Preservation in Neurofibromatosis Type II

Neil S. Patel, MD, Rochester, MN; Michael J. Link, MD, Rochester, MN; Amy P. Olund, AuD, Rochester, MN; Matthew L. Carlson, MD, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to understand that hearing preservation in retrocochlear sensorineural hearing loss is possible and demonstrate the role of early implantation in patients with neurofibromatosis type II.

Objectives: Hearing rehabilitation in patients with neurofibromatosis type II (NF2) is challenging. In most patients with useful hearing, a conservative approach to tumor control is utilized in an effort to preserve serviceable hearing for as long as possible. Cochlear implantation (CI) offers hearing outcomes that exceed those of auditory brainstem implantation in patients with an anatomically intact cochlear nerve. The optimal timing of CI in NF2 patients with residual hearing is complex and remains undefined. Herein we report a patient with NF2 who underwent CI with hearing preservation in his only hearing ear. **Study Design:** Retrospective review. **Methods:** Case report and review of the literature. **Results:** A 52 year old male was evaluated for hearing impairment in the setting of NF2. Prior treatment of a large right sided VS resulted in profound deafness. His left sided tumor, in his only hearing ear, was treated with radiosurgery (12 Gy marginal dose) 16 years prior resulting in gradual hearing loss but durable tumor control. In 2015, left sided audiometric testing revealed a low frequency pure tone average (LFPTA) of 40dB HL; however, CNC and AzBio scores were only 8% and 7% in the best aided condition, respectively. He subsequently underwent CI with a conventional length lateral wall electrode. Postoperative audiometry demonstrated preservation of native hearing (LFPTA 38.3 dB HL) and CNC and AzBio scores at 1 year are 52% and 44%, respectively. **Conclusions:** Cochlear implantation with hearing preservation in NF2 is possible. This index case supports the expanding role of CI in select cases of NF2, even in patients with substantial residual low frequency hearing.

123. Otopathologic Evaluation of Temporalis Fascia Grafts Following Successful Tympanoplasty

Aaron K. Remenschneider, MD MPH, Boston, MA; Elliott D. Kozin, MD, Boston, MA; Reuven Ishai, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe normal histologic findings of commonly used grafting materials in tympanoplasty. They will also be able to better explain how graft materials change and remodel over time following surgery. This information will be helpful to consider new approaches to tympanoplasty and the role that graft structure plays in healed tympanic membrane form and function.

Objectives: Temporalis fascia is a commonly used grafting material in tympanoplasty; however, little is known about how the histological structure of fascia remodels over time. Herein, we aim to quantify the pre and postoperative microstructure of temporalis fascia and compare histological findings to the normal tympanic membrane (TM). **Study Design:** Otopathologic review of specimens from a human temporal bone repository. **Methods:** Temporal bone specimens having undergone successful total drum replacement using temporalis fascia were identified (n=3). Histopathologically prepared pre-implantation temporalis fascia (PreTF, n=4) and normal TMs (n=5) were used as controls. Multiple measurements of thickness of PreTF and TMs at the mesotympanum and hypotympanum were obtained. Collagen and elastin fiber thickness and orientation of normal and reconstructed TMs were analyzed. **Results:** In cases of fascia tympanoplasty, the average duration from time of surgery to death was 16 years (range 8-28). All cases contained an aerated middle ear without residual perforation. There was no significant difference between the thickness of PreTF and the tympanoplasty specimens (289 ± 230 vs 226 ± 105, p=0.4). Temporalis fascia in tympanoplasty cases did not change its perpendicular, longitudinal fibrous structure over time, with preserved inner and outer collagen layers. The normal TMs were thinner than the PreTF or tympanoplasty cases (p=0.002, p=0.01, respectively). **Conclusions:** Based on temporal bone studies, temporalis fascia does not significantly change thickness or fibrous structure following successful tympanoplasty with an aerated middle ear. Given the role radial and circumferential fibers play in normal TM sound conduction, temporalis fascia may have inherent limitations for restoration of sound transmission.

124. Aberrant Internal Carotid Artery in the Middle Ear--A Benign Presentation with Significant Clinical Importance

Ryan A. Rimmer, MD, Philadelphia, PA; Patrick T. Tassone, MD, Philadelphia, PA; Robert C. O'Reilly, MD, Wilmington, DE

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the relevant embryologic and anatomic relationships of the internal carotid artery to the middle ear, and appreciate the significance of aberrant internal carotid artery course within the middle ear space.

Objectives: To present a case of aberrant internal carotid artery course within the middle ear, review relevant literature concerning this clinical entity, and demonstrate the importance of its recognition. **Study Design:** Case report and literature review. **Methods:** Retrospective chart review including relevant history, imaging, and otoscopic photodocumentation. Literature review examining relevant studies of the embryology, anatomy, prevalence, and complications associated with

aberrant internal carotid artery in the middle ear space. **Results:** A 15 year old female was referred to our institution after a vascular lesion was visualized in the left middle ear during routine physical exam by her pediatrician. She had mild left sided conductive hearing loss at 250 Hz on audiologic testing and was otherwise asymptomatic. CT angiography demonstrated an aberrant left internal carotid entering the skull base through an enlarged tympanic foramen and coursing within the inferior aspect of the middle ear cavity. There was an associated absence of the foramen spinosum on the left. In the neck, there was an anomalous origin of the occipital artery from the left internal carotid artery. Presence of a persistent stapedial artery could not be determined due to lack of detail on the study. The patient has been observed and is doing well at her six month followup appointment. **Conclusions:** Aberrant internal carotid artery within the middle ear space is a rare condition. Despite having a benign presentation, there are catastrophic consequences if not appropriately recognized. If there is clinical suspicion, angiographic imaging should be obtained prior to any otologic surgery.

125. Congenital Cholesteatomas Originating within the Facial Nerve Canal

Ronald Sahyouni, BA, Irvine, CA; Yarah M. Haidar, MD, Irvine, CA; Omid Moshtaghi, BS, Irvine, CA; Harrison W. Lin, MD, Irvine, CA; Hamid R. Djalilian, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain how congenital cholesteatoma can present in otherwise healthy young patients and discuss relevant treatment options.

Objectives: Congenital cholesteatoma (CC) is a squamous epithelial lesion within the temporal bone that can erode nearby structures and afflicts 1.2 per 1,000,000 individuals annually. Although the pathogenesis is unknown, the persistence of a squamous cell nest may underlie the condition. We present two cases of CC originating within the facial canal. **Study Design:** Case series. **Methods:** Retrospective review of two CC patients presenting to our otology/neurotology clinic in a tertiary care academic center. **Results:** Two patients, 16 months (patient 1) and 5 years (patient 2) of age presented with grade VI facial paralysis. Hearing in both cases was normal. Computed tomography (CT) demonstrated lesions in the tympanic segment (patient 1) and the labyrinthine segment (patient 2) of the facial nerve. A tympanomastoidectomy with an extended facial recess was performed for the first patient, and a middle fossa approach was performed in patient 2. The epidermoid was medial to the nerve in patient 1, and accordingly a segmental nerve resection was required. Keratin debris was observed on both nerves and the middle ear was otherwise normal. Nerve histopathology demonstrated cholesteatoma sacs. At 6 and 12 months postoperatively, patient 1 had grade III facial function while patient 2 had grade IV facial function. **Conclusions:** CC within the facial nerve canal may present with complete facial paralysis in otherwise healthy young patients. Complete CC resection is warranted and may improve facial function. Segmental resection and grafting may result in better nerve outcomes.

126. Preoperative Endovascular Carotid Occlusion Facilitates Internal Carotid Artery Resection for Lateral Skull Base Lesions

Joshua M. Sappington, MD, New Orleans, LA; Stephen A. Hernandez, MD, Baton Rouge, LA; Daniel W. Nuss, MD, New Orleans, LA; Dwayne A. Anderson, MD, Baton Rouge, LA; Moises A. Arriaga, MD, Baton Rouge, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss how preoperative endovascular carotid occlusion can facilitate resection of the internal carotid artery allowing for ablation of select advanced lateral skull base lesions.

Objectives: While lateral skull base tumor involvement of the ICA has traditionally been thought to be a relative contraindication to surgical management, in exceptional cases, carotid resection may offer survival or outcome advantages. **Study Design:** Retrospective review of patients undergoing preoperative carotid occlusion in a referral skull base center. **Methods:** Two patients underwent balloon occlusion to demonstrate cooperative vascular anatomy, followed by endovascular occlusion, post-embolization supportive care and surgical resection with sacrifice of the ICA. One patient is an 11 year old female with a recurrent endolymphatic sac tumor with invasion of the ICA at the vertical portion of the petrous segment. The second patient is a 48 year old female who had undergone multiple surgeries for a left sided paraganglioma. The lesion had grown to 6.5 cm at the jugular foramen with an addition 3.5cm cerebellopontine angle component which surrounded and narrowed the cervical and petrous portion of the ICA. **Results:** Both patients did well during embolization, surgery and in the postoperative period. Resection of the internal carotid artery allowed for complete resection of the endolymphatic sac tumor and near complete resection of the paraganglioma. **Conclusions:** Preoperative permanent endovascular carotid ablation, followed by resection of the ICA is a viable strategy for management of select advanced tumors where the vessel would be at significant risk during surgical resection. Such a strategy permits hemodynamic intensive care focused solely on the carotid sacrifice prior to the multiple fluid, hemorrhage, and anesthetic issues when carotid sacrifice is part of tumor resection.

127. Pharmacokinetics of Sodium Thiosulfate in Guinea Pig Perilymph Following Middle Ear Application

Ronald J. Schroeder, MD, Syracuse, NY; Brian J. Nicholas, MD, Syracuse, NY

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

kinetics of sodium thiosulfate in perilymph and its potential application as a localized therapy to prevent cisplatin induced ototoxicity.

Objectives: To study the pharmacokinetics of sodium thiosulfate in the inner ear perilymph of guinea pigs using high pressure liquid chromatography. **Study Design:** Basic science laboratory research. **Methods:** Twenty guinea pig ears were split into two groups and administered sodium thiosulfate to the middle ear at either a concentration of 250 mg/mL or 50 mg/mL for 30 minutes. Perilymph samples were then obtained serially through the round window over 6 hours. Sodium thiosulfate concentrations were obtained using high pressure liquid chromatography. **Results:** The 250 mg/mL group had an initial perilymph concentration of 7.27 mg/mL (±0.83) and decreased to 0.94 mg/mL (±0.03) over 6 hours. The 50 mg/mL group had an initial concentration of 1.63 mg/mL (±0.17) and was undetectable after 1 hour. **Conclusions:** Sodium thiosulfate was shown to enter the inner ear perilymph via round window perfusion. This has a potential application as a localized therapy in the prevention of cisplatin induced ototoxicity.

128. Metastatic Renal Cell Carcinoma Masquerading as Glomus Jugulare: A Role for Novel Magnetic Resonance Imaging

Andrew J. Thomas, MD, Salt Lake City, UT; Richard H. Wiggins III, MD, Salt Lake City, UT; Richard K. Gurgel, MD, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) understand the challenge of distinguishing metastatic skull base renal cell carcinoma from paraganglioma with traditional computed tomography (CT) and magnetic resonance imaging (MRI); and 2) understand the potential utility of diffusion weighted MRI sequences and computed apparent diffusion coefficient (ADC) values in distinguishing these skull base lesions.

Objectives: To describe an unusual case of metastatic renal cell carcinoma (RCC) masquerading as a jugular foramen paraganglioma. To compare imaging findings between this case and histologically proven paraganglioma. **Study Design:** Case report and review of literature. **Methods:** A case of unexpected metastatic skull base RCC is reviewed. Imaging by computed tomography (CT) and magnetic resonance imaging (MRI) was compared between a confirmed case of paraganglioma and our case of skull base RCC. Diffusion weighted MRI (DW-MRI) sequences and computed apparent diffusion coefficient (ADC) values were compared between these entities. A review of related literature was performed using PubMed. **Results:** A 55 year old man presents with what appears clinically and radiographically to be a paraganglioma centered at the jugular foramen. After resection pathology surprisingly diagnoses metastatic RCC. Literature review reveals the rarity of skull base RCC and lack of a clear radiographic means of distinguishing this entity from paraganglioma. RCC has been described as having higher ADC values than expected for a malignant lesion. Based on DW-MRI sequences an ADC value of $1.36x10^{-3}$ mm^2/s was calculated for this lesion, whereas a similar location pathologically proven jugular foramen paraganglioma had an ADC value of $0.69x10^{-3}$ mm^2/s. **Conclusions:** Metastatic RCC at the skull base may mimic the clinical presentation and traditional radiographic appearance of a paraganglioma. The pathognomonic finding of flow voids in paraganglioma is also seen in metastatic RCC. DW-MRI is able to distinguish these entities, highlighting its potential utility in diagnosis of skull base lesions.

129. Semicircular Canal Dehiscence from High Riding Jugular Bulb Diverticulum Causing Vestibular Drop Attacks: A Case Report and Review of Literature

Jacob L. Wester, MD, Los Angeles, CA; Catherine M. Merna, BS, Los Angeles, CA; Ali R. Sepahdari, MD, Los Angeles, CA; Akihira K. Ishiyama, MD, Los, CA; Gail A. Ishiyama, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation the participants should be able to demonstrate an understanding of the pathophysiology of vestibular drop attacks (Tumarkin otolithic crisis), their impact on patients' quality of life, and discuss the potential non-Meniere's otologic etiologies and treatment strategies of this disease process.

Objectives: To describe the clinical features and audiovestibular testing of drop attacks secondary to Semicircular canal dehiscence from high riding jugular bulb diverticulum. **Study Design:** Case report and literature review. **Methods:** Retrospective review of a single presenting to a neurotology clinic. Quantitative audiologic and vestibular function testing, relevant imaging, neurologic history, and examination were performed. **Results:** We present a 78 year old female with a 10 year history of vestibular drop attacks without loss of consciousness and a sensation of being pushed to the right. Vestibular evoked myogenic potential showed mild weakness on the right, while audiogram demonstrated an asymmetric right sided mixed hearing loss. Delayed intravenous contrast enhanced 3D FLAIR MRI showed no endolymphatic hydrops; however, CT scan revealed a high riding jugular bulb diverticulum (JBD) on the right side with osseous dehiscence of the posterior semicircular canal. To our knowledge this is the first reported case of non-Meniere's vestibular drop attacks secondary to high riding JBD. **Conclusions:** High riding JBD should be considered in patients with vestibular drop attacks that do not meet diagnostic criteria for Meniere's disease.

Pediatric Otolaryngology

130. Pediatric Unilateral Hearing Loss: An Analysis of Progression and Associated Risk Factors

Jason H. Barnes, BA, Richmond, VA; Kelley Marie Dodson, MD, Richmond, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the most common risk factors and radiographic images associated with pediatric unilateral sensorineural hearing loss and understand the prevalence of disease progression.

Objectives: To elucidate common risk factors of unilateral pediatric hearing loss and explore the prevalence of disease progression. **Study Design:** This was a retrospective study of pediatric patients seen in a tertiary otolaryngology clinic. **Methods:** This study was performed to investigate pediatric patients seen for unilateral sensorineural hearing loss (USNHL) over a ten year period. Through clinical chart and audiogram review, patients with SNHL were grouped by severity. Radiographic imaging results were also reviewed. **Results:** 79 patients were identified with USNHL. 51 (65%) were determined to have severe to profound hearing loss (SPHL), and 28 (35%) had mild to moderate hearing loss (MMHL). Identifiable risk factors were determined in thirteen and ten patients, respectively. Prematurity was the most common risk factor identified, followed by a NICU stay. CT temporal bone or MRI radiographic results were available for 37 patients with SPHL and 32 patients with MMHL. An identifiable cause was seen in 22% of cases. Enlarged vestibular aqueduct was the most commonly identified radiographic abnormality followed by cochlear dysplasia. Patients were also evaluated for progression of severity, or progression from unilateral to bilateral hearing loss. 5.9% of patients with SPHL progressed to bilateral hearing loss. Progression of severity and progression to becoming bilateral was seen in 23.5% of patients originally diagnosed with MMHL. **Conclusions:** The etiologies underlying pediatric USNHL remains ill defined. Risk factors can be identified in about 30% of cases, and imaging can identify abnormalities in 20% of cases. Followup is essential as progression was observed in both severity and change to bilaterality.

131. G. Slaughter Fitz-Hugh, MD Resident Research Award
Cost Minimization Analysis of Nonsedated versus Sedated MRI Strategies for Congenital Hearing Loss

Matthew G. Crowson, MD, Durham, NC; Debara L. Tucci, MD MS MBA, Durham, NC; Jeffrey Cheng, MD, Durham, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to describe a nonsedated MRI strategy for congenital hearing loss and be able to explain the potential economic benefits when comparing this new strategy to a traditional sedated MRI.

Objectives: To determine if a nonsedated magnetic resonance imaging (MRI) strategy for infants with congenital hearing loss is less costly than a sedated MRI. **Study Design:** Cost minimization analysis. **Methods:** A decision tree was created to analyze two different MRI strategies. The reference strategy utilized a sedated MRI. The alternative strategy included a nonsedated MRI with an assumed failure rate requiring a subsequent sedated MRI. Diagnostic efficacy for both MRI approaches was assumed equal. Monte Carlo and sensitivity analysis was completed to determine the optimal strategy and cost threshold for a minimum nonsedated MRI failure rate. Charge data was obtained for anesthesia charges and for MRI brain imaging. **Results:** The average charge of moderate sedation for an MRI was $1,366 and an MRI brain with and without contrast was $981. Mean charges for a sedated MRI strategy were higher than that of a nonsedated MRI strategy ($2,344.1 versus $1,213.8; $p < 0.05$). When varying the probability of a successful nonsedated MRI, a nonsedated MRI strategy is less costly than a sedated MRI strategy if the success rate is greater than 42%. **Conclusions:** From a charge perspective, a nonsedated MRI strategy is less costly than a sedated MRI strategy if the success rate of the nonsedated MRI exceeds 42%. These results suggest there may be an economic advantage to providing a nonsedated MRI for infants with congenital hearing loss. Further work to compare the efficacy of nonsedated MRI versus sedated MRI is needed to rigorously evaluate the cost effectiveness of a nonsedated MRI strategy.

132. Post-Tympanostomy Tube Otorrhea Rates: Data from a Claims Analysis and a Phase 3b Clinical Trial

Debra M. Don, MD, Los Angeles, CA; Iris M. Tam, PharmD, San Diego, CA; Carl Lebel, PhD, San Diego, CA; Jonathon R. Moss, MD MPH, Charlotte, NC; Joseph E. Dohar, MD MS FAAP FACS, Pittsburgh, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to have an increased understanding of 1) clinical outcomes for Medicaid population after tympanostomy tube (TT) surgery; 2) disparities in healthcare resource utilization post-TT placement; and 3) clinical trial data and large database analysis which provides insight into follow-on research needs.

Objectives: Otorrhea is the most common sequela following tympanostomy tube placement (TTP). However, the impact of otorrhea on clinical outcomes and healthcare utilization (HU) are not well understood. Objectives of two studies were to evaluate rates of otorrhea related post-TTP emergency department (ED) visits (HU study) and post-TTP otorrhea between Medicaid enrolled versus commercially insured populations in patients who received OTO-201 (OTIPRIO, ciprofloxacin otic suspension, phase 3b study). **Study Design:** HU: Retrospective analysis of insurance claims databases. Phase 3b:

8 week, prospective, multicenter, open label study of OTO-201 in pediatric patients with a history of otitis media requiring TTP. **Methods:** HU: Patients < 17 years old undergoing TTP between 1/1/10 and 12/31/13 were identified. ED encounters within 30 days post-TTP, all cause, ear related, and otorrhea related were compared. Phase 3b: during TTP, a single 6 mg OTO-201 was administered to each ear in patients at 40 US sites. Safety, efficacy and quality of life (QOL) assessments were evaluated at weeks 4 and 8. **Results:** HU: 128,472 Medicaid enrolled; 240,375 commercially insured. Within 30 days following TTP, rate of all cause ED visits was twice as high in Medicaid enrolled compared with commercially insured (8.0% versus 3.9%, p<0.0001). Ear related and otorrhea related ED visits were three- to four-fold higher (p<0.0001) in Medicaid enrollees. Phase 3b: enrollment completed in 501 patients. Full data analysis underway. **Conclusions:** Based on the HU study, ED visits within 30 days following TTP was significantly greater among Medicaid enrolled pediatric patients than commercially insured, regardless of cause. Initial phase 3b data suggests Medicaid and commercial otorrhea rates are similar. Additional clinical and QOL data from phase 3b will be presented.

133. Utility of a Clinical Pathway Designed to Triage and Reduce Perioperative Risks for Children with Sleep Disordered Breathing Undergoing Adenotonsillectomy

Lisa M. Elden, MD, Philadelphia, PA; Terri A. Giordano, DNP, Philadelphia, PA; Arul M. Lingappan, MD, Philadelphia, PA; Jorge A. Galvez, MD, Philadelphia, PA; Luis M. Ahumada, MSCS, Philadelphia, PA; Mohammed A. Rehman, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss that clinical pathways are tools that may not directly impact change in practice.

Objectives: To determine if a clinical pathway for children with sleep disordered breathing (SDB) undergoing adenotonsillectomy (T&A) impacted care providers' decisions to triage patients. **Study Design:** Survey of clinicians to determine if measured reductions in variation and improvement in practice were associated with the availability of a published clinical pathway. **Methods:** Survey of healthcare providers at a tertiary care center responsible for triaging children undergoing T&A for SDB to most appropriate postoperative care sites. To determine if improvement in triage protocols resulted from publication of a clinical pathway designed by a team of healthcare providers (otolaryngology, anesthesiology/critical care, sleep medicine, informatics, quality improvement, web development) based on national guidelines, expert opinions and EHR data (EPIC systems and PSG databases). **Results:** Baseline data were collected: 2,320 adenotonsillectomies were performed between 7/1/13-8/1/14. Over one year admissions to PICU dropped by 44% (154 patients in 2014 (99 scheduled/55 unscheduled) to 86 patients in 2015 (56 scheduled/30 unscheduled). The frequency of unexpected transfers of patients from ambulatory care centers to hospital or from regular ward to critical care ward did not change. 9/12 (75%) surgeons and 18/27 (67%) advanced care nurses responsible for determining site of surgery and which level of care would be required postoperatively were surveyed. Only 20/36 (56%) clinicians were aware of the pathway and 2/20 (10%) routinely used it to triage patients. **Conclusions:** Although a clinical pathway designed to educate and reduce practice variation has been useful in monitoring outcomes and costs, changes in practice more likely resulted from local culture changes.

134. An Unusual Presentation of Papillary Thyroid Carcinoma

Erynne A. Faucett, MD, Tucson, AZ; Saranya Reghunathan, MD, Tucson, AZ; Tyson J. Nielsen, MD, Tucson, AZ; Audrey B. Erman, MD, Tucson, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize that metastatic papillary thyroid carcinoma can present as a large solitary cystic mass in the pediatric population. Regardless of age, metastatic papillary thyroid carcinoma should be considered in any cystic mass workup.

Objectives: 1) Discuss an unusual presentation of metastatic papillary thyroid carcinoma; and 2) discuss differential diagnosis of cystic masses in the neck in the pediatric population. **Study Design:** Case report and review of the literature. **Methods:** A rare case of papillary thyroid carcinoma presenting as a lymphangioma of the left neck is described and the recent English literature is reviewed. **Results:** Four years ago a 15 year old female with history of Beckwith-Wiedemann syndrome presented with acute left neck swelling following knee surgery. A CT scan was performed revealing a large solid and cystic mass deep to the left sternocleidomastoid muscle abutting the left thyroid gland causing narrowing of the great vessels, which was thought to be a lymphangioma radiographically. FNA was not recommended due to the benign characteristics of the mass and patient chose to observe. The patient was seen three more times in the clinic setting for the next three years for intermittent neck swelling, resolving on its own each time. In June 2016 the patient decided to proceed with surgery prior to starting college. The patient was taken to the operating room for excision of the left neck mass. Intraoperative frozen section revealed metastatic papillary thyroid carcinoma. The patient recovered from surgery well. Ultrasound mapping suggested left thyroid mass and bilateral abnormal cervical lymph nodes. Two weeks later the patient underwent total thyroidectomy and bilateral neck dissections. She is scheduled to begin radioactive iodine therapy. **Conclusions:** Cystic neck masses in the pediatric population are rarely concerning for malignant processes. As such they are frequently conservatively managed. Here we present an unusual case of a waxing and waning cystic neck mass that pathologically was shown to be metastatic papillary thyroid carcinoma. This extremely odd presentation ultimately led to a delay in diagnosis and oncologist care. As such we suggest that metastatic papillary thyroid carcinoma be considered in any cystic neck mass workup regardless of age.

135. Sleep Disordered Breathing in Prader-Willi Syndrome: A Review
Jennifer F. Ha, MBBS FRACS, Murdoch, WA Australia

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate understanding of sleep disordered breathing (SDB) in children with Prader-Willi syndrome (PWS) compared to the normal population. They will be able to explain the treatment options to patients, in particular discuss the risks and benefits of growth hormone treatment, evidence for other conservative options, as well as surgical option.

Objectives: PWS is a rare genetic disorder characterized by cognitive impairment, hypogonadism, morbid obesity due to hyperphagia and lack of satiety, and hypothalamic dysfunction. PWS is closely associated with SDB in many forms. **Study Design:** Narrative review. **Methods:** Narrative review of the current literature. **Results:** GH therapy was approved in 2000 for treatment of PWS and has been successful in promoting linear growth and improving muscular trophism and tone, with a consequent improvement in strength, physical activity and cardiorespiratory function as well as SDB. However it is not without its complications, in particular sudden deaths. Patients should be managed in the multidisciplinary team with regular polysomnogram especially in the first few weeks following initiation of the treatment. There are other conservative options that can be considered for persistence of SDB despite GH as well as surgical options. **Conclusions:** PWS is a rare disorder associated with a variety of SDB. GH has the potential to positively impact on the frequency and severity of SDB in these children. Therefore, they will benefit from careful monitoring in a multidisciplinary setting.

136. Mandibular Condylar Hypoplasia in Children with Isolated Unilateral Congenital Aural Atresia
Tyler R Halle, BS BA, Atlanta, GA; N. Wendell Todd, MD MPH, Atlanta, GA; Bruno P. Soares, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss unilateral isolated mandibular condyle hypoplasia in nonsyndromic congenital aural atresia patients as a manifestation of craniofacial microsomia.

Objectives: We hypothesized that children with isolated nonsyndromic unilateral congenital aural atresia have subclinical mandibular condylar hypoplasia ipsilateral to the atretic ear, and that the Jahrsdoerfer score is associated with the degree of condylar hypoplasia. **Study Design:** Retrospective case series. **Methods:** We reviewed computed tomography scans of the temporal bones of 68 children with isolated nonsyndromic unilateral congenital aural atresia. We used the transverse (axial) plane slice perpendicular to the axis of the mandibular ramus, selecting the slice where the condyle had the largest cross-sectional area. This was a consistent and readily reproducible method that eliminated the individual variability of external ear anatomy between patients. Cross-sectional area was checked for correlation with atresia status, age and sex. The Jahrsdoerfer score of the atretic ear was calculated and correlated with condyle cross-sectional area, age and sex. **Results:** Cross-sectional area of the condyle ipsilateral to the atretic ear was smaller than the contralateral condyle ($P < .0001$). The Jahrsdoerfer score was not associated with the condylar cross-sectional area, age or sex. **Conclusions:** Isolated nonsyndromic unilateral congenital aural atresia is associated with mild hypoplasia of the mandibular condyle ipsilateral to the atretic ear. This is consistent with the hypothesis that congenital aural atresia is a variant of craniofacial microsomia.

137. Outcomes of Aspiration of Pediatric Head and Neck Abscesses
Mickie J. Hamiter, MD, Shreveport, LA; Anil A. Gungor, MD, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate our outcomes of using primary aspiration as a therapeutic modality in pediatric head and neck abscesses.

Objectives: To examine the outcomes of primary aspiration of pediatric head and neck abscesses in our institution to determine if this is an adequate therapeutic modality. **Study Design:** Retrospective chart review. **Methods:** We reviewed 12 charts of patients that underwent primary aspiration of a head and neck abscess in our institution's pediatric sedation suite from August 2008 to November 2015. Examining outcomes of ultimate incision and drainage, number of aspirations required, hospital stay, purulence obtained, culture, imaging modality used. Comparing these results to previous studies specifically hospital stay. **Results:** None of our 12 patients required incision and drainage. 2 of 12 (16.7%) did require repeat aspiration with no patient requiring more than 2 aspirations. Median hospital stay of 4 days, range 3 to 8 days. **Conclusions:** In our patient group aspiration was found to be an effective treatment modality with hospital stay comparable to other studies that included treatment with incision and drainage.

138. Gross Pathology of Routine Tonsillectomy: Cost Analysis
Elizabeth A. Hobbs, MD, Albuquerque, NM; Karen A. Hawley, MD, Albuquerque, NM

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinical relevance (or lack thereof) of gross pathological analysis of routine tonsillectomy specimens and the potential cost savings should this practice be determined clinically irrelevant.

Objectives: Over the past twenty years, significant evidence has shown that microscopic analysis of routine tonsillectomy specimens is unnecessary from a safety standpoint and significantly costly. Gross pathological analysis has since become the standard of care. Although this is more cost effective than microscopic analysis, it still has a cost, without evidence that it changes our management of these patients. Cost analysis has become essential in light of healthcare reform favoring the model of bundled reimbursement payments over the current paradigm of fee for service. This investigation seeks to evaluate the effect of gross pathological analysis on our management of patients undergoing routine tonsillectomy and to determine its cost. **Study Design:** Retrospective chart review. **Methods:** We reviewed the charts of 997 patients under the age of 12 from 1/2/2013 to 3/29/2016 who underwent routine tonsillectomy with gross pathological analysis only. Demographic, surgical indication, and pathology data were recorded. Any abnormal report prompted an in depth review of the medical record. Cost analysis entailed tallying both charges and reimbursement of supplies, facility fees and professional fees of gross pathological analysis per case and per year. **Results:** A total of 997 cases were reviewed. A mean of 332 cases were performed yearly. The mean age was 6.9 years. There were no abnormal gross pathology reports. The mean total charge and reimbursement for gross pathological analysis was $59.18 and $24.28, respectively. **Conclusions:** Gross pathological analysis did not change our management of routine tonsillectomy patients. Based on our results, foregoing the practice would save approximately $19,647.60 per year.

139. Presence of Middle Ear Effusion at the Time of Tympanostomy Tube Placement: Quality Assessment of the Clinical Practice Guidelines

Phillip A. Huyett, MD, Pittsburgh, PA; Joshua J. Sturm, BS PhD, Pittsburgh, PA; Amber D. Shaffer, PhD, Pittsburgh, PA; Dennis J. Kitsko, DO, Pittsburgh, PA; David H. Chi, MD, Pittsburgh, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the impact of the clinical practice guideline for tympanostomy tubes in children at a single institution.

Objectives: To assess the impact of statements 6 and 7 in the 2013 clinical practice guidelines for tympanostomy tubes in children (CPG) on the identification of preoperative and intraoperative middle ear fluid (AOM/OME) in children undergoing tympanostomy tube placement (BMT). **Study Design:** Retrospective case series with comparison group. **Methods:** The records of patients who underwent BMT for recurrent acute otitis media (RAOM) at a tertiary care children's medical center were retrospectively reviewed. We enrolled 240 patients before (BG) and 240 patients after (AG) the introduction of the CPG. **Results:** The baseline characteristics of the two groups were comparable. There was a nonsignificant increase in the rate of preoperative AOM/OME identification following CPG introduction (BG 77.9% vs AG 82.9%, p=0.168). The rate of identification of AOM/OME in both clinic and in the OR increased from 54.4% (BG) to 71.3% (AG, p<0.001). The average time between clinic and the OR decreased from 26.5 days (BG) to 20.6 days (AG, p=0.003). Cases performed within 28 days showed a 71.9% AOM/OME concordance rate between clinic and OR, whereas this rate for cases performed beyond 28 days was 59.8% (p=0.023). **Conclusions:** Following the introduction of the CPG, there was a nonsignificant increase in the appropriate recommendation of BMT in children with RAOM and AOM/OME present at the preoperative appointment. Children became more likely to clear AOM/OME spontaneously when the OR date was greater than 4 weeks after the clinic date, which, in addition to the slight increase in patient selectivity, may partially explain the increased rate of AOM/OME concordance observed after the CPG.

140. Ectopic Thymic Cyst of the Subglottis: Considerations for Diagnosis and Management

Bryan J. Liming, MD, Iowa City, IA; Iram N. Ahmad, MD MME, Iowa City, IA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the presentation, management and theoretical embryologic origin of subglottic ectopic thymic cysts.

Objectives: To share the diagnostic and management challenges created by an extremely rare airway lesion--the subglottic ectopic thymic cyst. **Study Design:** Case report and literature review. **Methods:** We review the presentation, management and clinical course of an infant who presented with a subglottic mass that was histologically confirmed as a thymic cyst. A brief literature review supplements the case presentation. **Results:** We present the third described case of an ectopic thymic cyst presenting as a subglottic mass. The differential diagnosis of subglottic masses in neonates consists primarily of subglottic hemangioma and mucous retention cysts. Otolaryngologists must be prepared for unexpected findings when dealing with critical airways. We compare the presentation and management of our patient with the two previously described cases. We propose an embryologic theory for the origin of these rare lesions. **Conclusions:** An ectopic thymic cyst is a rare and unexpected cause of neonatal stridor. Management of pediatric airway lesions must allow for unexpected findings at the time of diagnostic and therapeutic endoscopy. The appropriate management of subglottic thymic cysts is poorly defined but principles of airway management underlie the treatment. As with any subglottic lesion, close surveillance for recurrence is mandatory.

141. Exophytic Schneiderian Papilloma in a Pediatric Patient: A Rare Case Report

Tayaba Miah, BS, Detroit, Mi; Laura R. Garcia-Rodriguez, MD, Detroit, MI; Ramya Gadde, MD, Detroit, MI; Ilaaf Darrat, MD, Detroit, MI

Educational Objective: The authors wish to discuss that there is a vast number of diagnosis for nasal obstruction in children. We would also like to discuss the clinical presentation, evaluation, and treatment options for patients presenting with Schneiderian exophytic papilloma.

Objectives: 1) To present a rare case of exophytic Schneiderian papilloma in a juvenile patient; and 2) to review the literature of juvenile exophytic Schneiderian papilloma. **Study Design:** Retrospective case report. **Methods:** In this report, we discuss the occurrence, the histopathologic and radiological findings, and the treatment of exophytic Schneiderian papilloma in a pediatric patient. A review of the literature of exophytic Schneiderian papilloma in pediatric population was performed. **Results:** This case report shows a rare cause of nasal polyposis in a pediatric patient. The report discusses an exophytic Schneiderian papilloma in an eleven year old male which was emanating from the posterior aspect of the inferior turbinate. **Conclusions:** Nasal polyposis is a common finding in pediatric population, however, a diagnosis of exophytic Schneiderian papilloma is a rare diagnosis.

142. Glial Heterotopia of the Auricle in a Newborn

Mark L. Nagy, MD, Buffalo, NY; Casey Y. Hay, MD, Buffalo, NY; Ryan E. Nagy, BS, Buffalo, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the physical and radiologic findings of a glial heterotopia and recognize planes of surgical dissection.

Objectives: Glial heterotopia is a rare congenital anomaly consisting of ectopic neural tissue. Most commonly in the literature this is reported in the nasal or orbital region. This paper will review the presentation of a newborn with a large congenital auricular abnormality initially thought to be a lymphatic malformation. Due to redundant tissue and distortion, the 29 day old child underwent surgical resection and auricular reconstruction. The pathology was consistent with a glial heterotopia. This paper will review the radiologic findings, clinical appearance, and surgical removal of a glial heterotopia. **Study Design:** Case report. **Methods:** Review of a patient case. **Results:** The patient initially underwent serial aspiration and sclerotherapy for a suspected lymphatic malformation. Although there was a reduction in the size of the mass, there was significant redundant skin and auricular distortion that lead to the decision of surgical excision. The surgery was planned to remove excess skin, remove the mass, and reconstruct the auricle. Dissection of the glial heterotopia revealed a definitive plane between the mass and the periosteum of the auricle and the fascia of the sternocleidomastoid muscle. Auricular reconstruction was done by resurfacing the posterior aspect of the ear, repositioning, and creating an antihelix. **Conclusions:** Glial heterotopia is a rare clinical entity that in this case report mimicked a lymphatic malformation. With surgical excision, the abnormality was noted to be in a fluid sac that maintained tissue planes and was able to be separated from surround tissue. The child has been followed regularly with no evidence of recurrence.

143. Excision of Sublingual Gland as a Definitive Treatment for Ranulas in Pediatric Patients

Brittany N. Nguyen, BS, Minneapolis, MN; Barbara N. Malone, MD, Minneapolis, MN; Brianne B. Roby, MD, Minneapolis, MN; James D. Sidman, MD, Minneapolis, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the advantages and drawbacks of sublingual excision as a treatment for ranulas in pediatric patients.

Objectives: The aim of this case study is to demonstrate that sublingual gland excision has lower postoperative complication and recurrence rates than alternative methods for treating ranulas. **Study Design:** This was a retrospective review of pediatric patients from 2004 to 2014 at our hospital treated for ranulas by the department of ENT and facial plastic surgery. **Methods:** Data examined included age, gender, scans of the lesion, location and size of lesion, surgical procedures, complications, and recurrence. **Results:** There were 22 patients who met criteria. Sixteen ranulas and six plunging ranulas were treated via sublingual gland excision during the timeframe. One patient had recurrence of the lesion (4.5%). The recurrent lesion was treated via surgical removal of the ranula. One patient reported lateral tongue numbness postoperatively, and one patient had a hypoglossal nerve injury with tongue deviation upon exam. Both of these complications were not permanent and resolved within months of the procedure. **Conclusions:** Although sublingual gland excision is a definitive treatment for ranulas, many surgeons still utilize other methods such as marsupialization or drainage of the ranula as the primary method of treatment due to concerns about complications. This retrospective study demonstrates that excision of the sublingual gland is both a safe and effective method of treatment for ranulas.

144. Pediatric Outcomes of Vocal Cord Paralysis

Aniruddha Patki, MD, Durham, NC; Anatoli F. Karas, MD, Durham, NC (Presenter); Marisa A. Ryan, MD, Durham, NC; Patrick A. Upchurch, MD, Durham, NC; Rose J. Eapen, MD, Durham, NC; Eileen M. Raynor, MD, Durham, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the incidence of and time to regaining vocal fold mobility in pediatric patients who have vocal fold immobility following cardiovascular surgery. The participants should also understand the frequency of additional procedures for phonation, feeding and airway protection in this patient population.

Objectives: Cardiovascular surgery is increasingly performed in infants to correct congenital malformations of the heart and great vessels. Observed postoperatively as vocal fold (VF) immobility, recurrent laryngeal nerve injury is a well described complication. As overall outcomes improve and these patients live longer, the sequelae of VF immobility amplify in significance. We report on the return of VF motion and requirement for aerodigestive interventions in a cohort of these children. **Study Design:** Retrospective chart review. **Methods:** We reviewed all 65 patients <2 years old who underwent cardiovascular surgery at a tertiary center from 2008-2013 and were diagnosed postoperatively with VF immobility by laryngoscopy. **Results:** The most common diagnoses included 18 patent ductus arteriosus, 17 hypoplastic left heart syndrome (HLHS), 13 aortic coarctation, 12 interrupted aortic arch, and 2 tetralogy of Fallot. The majority (92%) had left, but 4 had right and 1 had bilateral VF immobility. 19 (29%) had recovery of motion. 14 (74%) of these occurred by 375 days. Time to recovery ranged from 30 to 1089 days (median 190 days). Patients with HLHS had a significant negative correlation with recovery. 31 (48%) required subsequent aerodigestive surgery. Direct laryngoscopy/bronchoscopy was performed in 14 (22%), tracheostomy in 6 (9%), injection VF medialization in 3 (4.6%), and surgical feeding tube placement in 29 (45%). The likelihood of regaining mobility was not significantly different in those who required additional aerodigestive interventions. **Conclusions:** Longitudinal evaluation by otolaryngology and speech pathology is imperative in these patients since the majority does not experience recovery of VF motion and many require interventions for airway protection, feeding and phonation.

145. Osteochondroma of the Hyoid: A Rare Case of Neck Pain in an Adolescent Male

Blake S. Raggio, MD, New Orleans, LA; Samuel C. Ficenec, BS, New Orleans, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinical presentation, diagnosis, and management of a patient with osteochondroma of the hyoid bone.

Objectives: Osteochondroma, the most common benign bone tumor, rarely occurs in the head and neck. Here we report a rare case of osteochondroma of the hyoid presenting as a symptomatic neck mass in an adolescent male. **Study Design:** Case report and literature review. **Methods:** Describe the clinical presentation, diagnosis, and management of a patient with osteochondroma of the hyoid. **Results:** A 17 year old male with a history of multiple hereditary exostoses (MHE) presented with a 1 month history of a non-enlarging neck mass with associated neck pain and dysphagia. The patient reported a history of multiple surgeries to remove osteochondromas from various locations of the axial skeleton, but he denied prior involvement of the head and neck. Physical exam revealed a 1.5 cm firm, non-tender, midline neck mass fixed to the hyoid. Lateral plain film showed a smoothly corticated lesion on the hyoid's anterior surface. A diagnosis of osteochondroma was presumed and removal was planned. Intraoperatively a 1 cm calcified lesion pedicled to the hyoid body was excised en bloc with a 1.5 cm segment of adjacent bone. Histopathology confirmed the diagnosis of osteochondroma. The patient exhibited complete resolution of symptoms on followup. Review of the English literature revealed one reported case of osteochondroma of the hyoid. **Conclusions:** Osteochondroma is a benign bony tumor that rarely occurs in the head and neck. We present the second reported case of osteochondroma arising from the hyoid and discuss the characteristic clinical and radiologic findings which should alert the physician to its successful diagnosis and management.

146. Barriers and Limitations of Non-Otolaryngology Providers Performing Frenulectomies

Kimberly A. Russell, MD, Boston, MA; Michael B. Cohen, MD, Boston, MA; Jessica R. Levi, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss non-otolaryngology providers' experiences regarding performing frenulectomies.

Objectives: To determine barriers and limitations of non-otolaryngology providers at our institution encounters with regards to obtaining credentialing and performing frenulectomies. **Study Design:** Survey study administered to family medicine and pediatric attendings at our institution regarding their experiences performing the procedure. **Methods:** A survey consisting of 12 questions was administered anonymously via Survey Monkey to the pediatric and family medicine attendings at our intuition. 26 pediatric attendings and 70 family medicine attendings were surveyed as to their training, perceived usefulness of the skill, interest in learning how to perform the procedure or retraining, and likelihood of performing the procedure at our institution. **Results:** 7 out of 26 pediatric attendings responded and 24 out of 70 family medicine responded for a total of 31 out of 96, or 32% response rate. 29% had previously been trained in the procedure with 55% of the training in residency. 70% of those surveyed never perform frenulectomies due to various reasons such as

credentialing issues and perceived need for procedure not seen frequently enough. 75% (6/8) of respondents previously trained were interested in retraining. 48% (11/23) of respondents never trained were interested in training. **Conclusions:** Frenulectomy is a common procedure performed in neonates for ankyloglossia, i.e. tongue tie, due to difficulty breastfeeding. There are a significant number of non-otolaryngology providers who would like to be trained and credentialed to perform this procedure. We should investigate instituting a more formal training and credentialing program at our institution.

147. Pediatric Nasopharyngeal Fibrolipoma: A Case Report and Review of the Literature

Rishabh Sethia, BS, Columbus, OH; Abdullah Aljasser, MD, Columbus, OH; Stephen J. Nogan, MD, Columbus, OH; Jeffrey R. Leonard, MD, Columbus, OH; Charles A. Elmaraghy, MD, Columbus, OH; Gregory J. Wiet, MD, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss nasopharyngeal fibrolipoma in the pediatric population by reviewing a unique case as well as previous reports in the literature.

Objectives: To discuss the presentation and management of nasopharyngeal fibrolipoma by illustrating a rare pediatric case. **Study Design:** Case report and literature review. **Methods:** We report a unique case of a pediatric patient with nasopharyngeal fibrolipoma treated with transoral surgical excision. **Results:** A 3 year old female presented for evaluation of progressive snoring since birth. She exhibited multiple symptoms of sleep disordered breathing and had a history of nonrecurrent otitis media. On exam, she was found to have a firm, immobile, submucosal mass of the right nasopharynx. MRI revealed a fatty appearing mass measuring 2.4 cm x 1.5 cm x 3.0 cm arising from the predental space of C1 and extending anteriorly through the prevertebral space into the retropharyngeal space. CT confirmed involvement of the anterior spine without bony violation into the spinal canal. The patient subsequently underwent endoscopic transoral excision. Intraoperatively, the mass was mobilized using electrocautery and blunt dissection until the interdental space was reached. At this point, the remnant deep interdental attachments were removed allowing complete release of a well encapsulated, pink-tan, rubbery mass. Pathological analysis yielded a diagnosis of fibrolipoma. One month following surgery, snoring and apnea resolved with no hypernasality or velopharyngeal insufficiency. Twelve months post-surgery, the patient continues to function well with no evidence of recurrence on CT. **Conclusions:** Nasopharyngeal fibrolipoma is an extremely rare finding, especially in the pediatric population. Very few case reports exist in the literature, and this is the first report of one year, CT confirmed disease resolution in a pediatric patient.

148. Novel Endoscopic Suturing Technique to Mitigate Risk of Graft Extrusion in Endoscopic Posterior Cricoid Split and Costal Cartilage Grafting: A Case Report

Janki Shah, MD, Cleveland, OH; Peter Ciolek, MD, Cleveland, OH; Adeeb Derakhshan, BS, Cleveland, Oh; Brandon Hopkins, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to describe a novel suturing technique to secure a graft in endoscopic posterior cricoid split with costal cartilage grafting (EPCSCG).

Objectives: Endoscopic posterior cricoid split with costal cartilage grafting (EPCSCG) is becoming common in the management of laryngotracheal reconstruction in children. However, this minimally invasive technique poses a risk of graft extrusion and possible subsequent airway obstruction. To mitigate this potential risk, we describe a novel endoscopic suturing technique for graft securement with EPCSCG in a 3 year old male with stridor secondary to subglottic stenosis. **Study Design:** Case report. **Methods:** A 3 year old male with history of DiGeorge syndrome presented with stridor. Airway evaluation revealed hypomobile true vocal cords bilaterally, left subglottic cyst, and posterior glottic stenosis. He underwent endoscopic laryngotracheal reconstruction with rib grafting. The graft was secured in place using a novel endoscopic suturing technique. **Results:** The patient was extubated 3 days following surgery with no complications. One year post-surgery the patient has no stridor even with exertion, and direct laryngoscopy reveals no subglottic stenosis and an intact graft. **Conclusions:** We propose a novel suturing technique for graft securement with endoscopic posterior cricoid split with costal cartilage grafting to diminish the risk of graft extrusion and avoid stenting and need for tracheostomy.

149. Cost and Operative Time in Pediatric Adenoidectomy: Which Technique Is Best?

Phayvanh P. Sjogren, MD, Salt Lake City, UT; Andrew J. Thomas, MD, Salt Lake City, UT; James M. Butterfield, MS, Salt Lake City, UT; Benjamin N. Hunter, MD, Salt Lake City, UT; Craig N. Gale, MS, Salt Lake City, UT; Jeremy D. Meier, MD, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the impact of surgical instrument choice on operative times, costs, and complications for pediatric adenoidectomy.

Objectives: To evaluate the effects of surgical instrument choice on operative time, costs, and complications in outpatient pediatric adenoidectomy. **Study Design:** Observational cohort study. **Methods:** Patients 18 years and younger undergoing outpatient adenoidectomy in a multi-hospital network from January 2008 to September 2015 with either monopolar electrocautery, microdebrider, or coblation techniques were included. Children with additional procedures or those admitted to the hospital were excluded. Analysis of variance (ANOVA) and appropriate post-tests for multiple com-

parisons were used to determine significance of mean differences between continuous variables (cost and time), while Fisher's exact test was used for categorical variables (repeat procedures and complications). **Results:** A total of 982 children underwent adenoidectomy with electrocautery (N=289), microdebrider (N=278) and coblation (N=415). Surgeries were performed at 23 surgical sites by 67 surgeons. Costs were significantly reduced with electrocautery ($556 ±245) compared to both microdebrider ($833 ±362) and coblation ($796 ±262) (P <0.001). Total operating room time was less for electrocautery compared to microdebrider and coblation (P <0.001). The incidence of repeat adenoidectomy was less frequent with electrocautery compared with the microdebrider (P <0.005) and coblation (P <0.05). Other complications resulting in emergency room visit or readmission were extremely rare and the incidence was not significantly different between methods. **Conclusions:** Monopolar electrocautery was shown to be significantly less costly, take less operative time, and associated with fewer repeat procedures when compared to microdebrider and coblation techniques for pediatric outpatient adenoidectomy.

150. Otolaryngology Service Usage in Children with Cleft Palate

Kenneth R. Whittemore, MD MS, Boston, MA; Jenna M. Dargie, BS, Waltham, MA (Presenter); Brian Boudreau, PA-C MPAS, Boston, MA; Briana K. Dornan, AuD CCC-A, Weymouth, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate understanding of the otolaryngology service usage in children with cleft palate.

Objectives: To determine the usage of otolaryngology services by children with cleft palate at a pediatric tertiary care facility. **Study Design:** Retrospective chart review. **Methods:** A centralized data repository was queried for all children born between 1/1/1999 and 12/31/2002 with the diagnosis of cleft palate or cleft lip and palate. **Results:** 110 patients were identified. Three patients were excluded for having a diagnosis of cleft lip only and 18 were excluded for not receiving otolaryngologic care at the hospital; therefore, 89 patients (41 female and 48 male) were included. 58 (65.2%) of these children had both cleft lip and palate. 12 (13.5%) had a cleft associated with a syndrome. In the first five years of life, the children had an average of 8.2 otolaryngology clinic visits (SD 5.0; range: 1-22) and underwent 3.3 tympanostomy tube surgeries (SD 2.0; range: 1-10). 77 (86.5%) had their first tube placed at the time of repair; 73 at the time of palate repair, and 4 at the time of lip repair. 51 (57.3%) required other otologic or upper airway procedures, including tonsillectomy or adenoidectomy (27 children), removal of tympanostomy tubes (24 children), tympanomastoidectomy (3 children), and tympanoplasty (14 children). Of the children who underwent other procedures, they underwent a mean of 1.67 (SD=.84, range 1-4) surgeries. **Conclusions:** Children with cleft palate are at increased risk for eustachian tube dysfunction, frequently utilize otolaryngology care, and generally receive multiple sets of tympanostomy tubes. This study found that children with cleft palate receive on average of approximately 3 sets of tympanostomy tubes, and the majority required another otologic or upper airway surgery.

151. Management of Pediatric Orbital Cellulitis: A Review

Stephanie J. Wong, MD, Rochester, NY; Jessica Levi, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to better understand the appropriateness of medical vs surgical management of pediatric orbital cellulitis.

Objectives: There are no established guidelines specific to the management of orbital cellulitis in the pediatric population. The objective of this review is to summarize and review current literature and offer a new comprehensive literature based algorithm for the management of pediatric orbital cellulitis. **Study Design:** Literature review. **Methods:** Studies relevant to the management of each subcategory of the Chandler criteria (pre-septal cellulitis, post-septal cellulitis, subperiosteal abscess, intraconal or orbital abscess, and cavernous sinus thrombosis) in the pediatric population were compiled, reviewed, and interpreted. **Results:** Pre-septal and post-septal cellulitis can generally be managed nonsurgically. In contrast, orbital abscess and cavernous sinus thrombosis seem to always be managed surgically. In cases of pediatric subperiosteal abscess, nonsurgical medical management has been successful in certain patients. Results of the literature review were summarized and subsequently developed into a comprehensive algorithm for management. This can help guide management of orbital cellulitis in the pediatric population, taking into account important characteristics such as Chandler criteria, clinical findings (i.e. loss of visual acuity, optic nerve involvement), patient age, and imaging criteria. **Conclusions:** Orbital cellulitis, particularly subperiosteal abscesses, in children is not an absolute indication for immediate surgical intervention as classically thought. Conservative measures can be safe and effective if appropriately used, depending on patient characteristics, exam findings, clinical course, and imaging.

152. Unilateral Sinonasal Polyposis in a Child with IRAK4 Deficiency

Nina W. Zhao, MD, San Francisco, CA; Kristina W. Rosbe, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the underlying immune dysfunction in IRAK4 deficiency and discuss a case of sinonasal polyposis in a patient with this disorder.

Objectives: To present a unique case of unilateral sinonasal polyposis in a patient with IRAK4 deficiency, a rare primary immunodeficiency that impairs signaling of innate immune responses from toll-like receptors. **Study Design:** Case report

and literature review. **Methods:** Medical records of a patient with IRAK4 deficiency and sinonasal polyposis treated at a tertiary academic medical center were reviewed. PubMed was searched for IRAK4 deficiency OR immune deficiency AND nasal polyps OR sinusitis. **Results:** A 7 year old female with a history of interleukin-1 receptor associated kinase-4 (IRAK4) deficiency presented to the pediatric head and neck clinic for evaluation of progressive right nasal congestion and recurrent sinusitis. Her physical exam was significant for right nasal polyposis, and her computed tomography scan demonstrated complete opacification of all the paranasal sinuses. She was taken to the operating room for right endoscopic sinus surgery. Intraoperative findings were notable for diffuse polyposis throughout the right sinonasal cavities and pus in right frontal sinus. Final pathological analysis was consistent with nasal polyposis with chronic inflammation and microbial culture revealed haemophilus influenzae. A comprehensive search of the literature did not reveal any previous reports of sinonasal polyposis in patients with IRAK4 deficiency. **Conclusions:** This is the first report to our knowledge of a patient with IRAK4 deficiency presenting with sinonasal polyposis. Sinonasal polyps are uncommon in the pediatric population. Underlying immunodeficiency has been reported as possible etiology of chronic rhinosinusitis, and toll-like receptor dysfunction has been implicated in the development of nasal polyps. Associated diseases should be considered in children presenting with sinonasal polyposis.

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