

## Message from the President, Mark S. Persky, MD FACS



I welcome you all to the 121st Annual Meeting of the Triological Society. To the members of this august Society, I thank you for your participation and continuing support of our activities. To those who are not members, we invite you to join us and enjoy our collegiality, our focus on sharing knowledge and experience, and our emphasis on mentoring our younger colleagues. This past year for me has been an incredible time to make friends and to assist with the many activities of the Triological—research grants, publications (The Laryngoscope, ENTToday and LIO), the academic programming and the interactions with some of our other otolaryngology societies. I thank you for the privilege and honor to help lead this Society as its President. Special thanks to Richard Smith, Program Chair of this meeting, and the program committee who have invested time and effort to organize this stimulating meeting. Thanks to Gail Binderup, Marsha Holbert, and Beth Slovinski for attention to the numerous details of the Triological Society. And of course, many thanks to Myles Pensak, our Executive Vice President, for his wisdom and perspective which has sustained the success of the Triological Society.

## FRIDAY AT A GLANCE

### General Session - Maryland A

- 7:00 - 7:50 Business Meeting (Triological Fellows only) followed by New Fellow Ceremony and Member Reception**
- 7:55 Welcome and Introduction of Special Guests
- 8:05 Presidential Address
- 8:25 - 9:05 Ogura Lecture
- 9:07 - 9:28 Harris P. Mosher, Edmund Prince Fowler, Maureen Hannley Thesis Presentations
- 9:33 Break in Exhibit Hall/View Posters

### Concurrent Session 1 - Maryland A

- 9:55 - 12:00 Head and Neck and Laryngology: Panels and Papers  
PANEL: Survivorship: A Critical Program for Cancer Patients  
PANEL: Laryngology: State of the Art

### Concurrent Session 2 - Maryland C

- 9:55 - 12:10 Otolology/Neurotology and Pediatric Otolaryngology: Panels and Papers  
PANEL: Is the Eustachian Tube the Key?
- 12:10 Adjourn
- 12:15 Celebration of Llife for Michael Glasscock, MD
- 5:30 - 7:00 TRIO, ANS, AOS, AAFPRS Meet the Authors Poster Reception

# SATURDAY AT A GLANCE

## Morning Scientific Session - Maryland B

**7:00 - 7:50**     **Annual Business Meeting (Triological Fellows only)**

8:00             Announcements

## Morning Scientific Session - Maryland B

8:05 - 12:00     Facial Plastic Reconstructive Surgery, Laryngology/Bronchoesophagology, Allergy/  
Rhinology: Panels and Papers  
PANEL: Facial Anomalies: The “Wonder” Effect  
PANEL: Atypical Chronic Rhinosinusitis

10:05            Break with Exhibitors

12:00 - 1:00     Lunch Break

## Afternoon Scientific Session - Maryland B

1:00 - 4:55       Sleep Medicine, Clinical Fundamentals, and General: Panels and Papers  
PANEL: What to Expect When Baby Boomers Go Bust  
PANEL: Potpourri

2:35 - 3:05       Break with Exhibitors

4:55              Introduction of President-Elect

5:00              Adjourn

# 121ST ANNUAL MEETING AT COSM

April 20-21, 2018 • Gaylord National Resort • National Harbor, Maryland

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## Triological Society's Mission Statement and Goals

The American Laryngological, Rhinological and Otological Society, Inc., aka The Triological Society, was founded in 1895 in New York, New York. In the more than 120 years 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

The mission of the Triological Society is to encourage and assist otolaryngologist-head and neck surgeons and other health care professionals to develop, maintain, and enhance their knowledge and skills in their pursuit of improved patient care through education, research, and fellowship.

## Goals

- To continue the noble legacy of the Triological Society, which is to attract, develop and mentor the best otolaryngologists to become scholars and leaders.
- To encourage, support, and disseminate through meetings, print and electronic mediums the latest basic and clinical research findings and reports on evidence-based medicine pertaining to the diagnosis, treatment and prevention of the full spectrum of disorders of the head and neck and related structures.
- To seek out and encourage scientific and technical advances in otolaryngology-head and neck surgery.
- To provide a forum through meetings, print and electronic mediums for the international exchange of ideas and knowledge in otolaryngology-head and neck surgery and related fields of medicine and science.
- To provide for physician professional development through support of teaching and peer reviewed research.
- To encourage the highest ethical and professional standards in the delivery of patient care by otolaryngologist-head and neck surgeons.
- To promote academic excellence by requiring peer recommendations and an acceptable mentored thesis for admission to membership.
- To ensure that all educational activities comply with ACCME directives, and develop vehicles for otolaryngologist-head and neck surgeons to meet their Maintenance of Certification requirements.
- To enhance fellowship amongst members by creating social forums for interface and conversation.
- To maintain *The Laryngoscope* and *Laryngoscope Investigative Otolaryngology* as primary journals at the forefront of excellence as a resource and venue for scientific advancement of the profession.
- To advance the Society's standing outside the field of otolaryngology-head and neck surgery and promote across all types of practice environments.

To facilitate the above goals, the Society sponsors educational meetings. The Society's journals, *The Laryngoscope* and *Laryngoscope Investigative Otolaryngology* serve as a means of disseminating the latest basic and clinical research results. The Society encourages research in otolaryngology-head and neck surgery by providing research grants and awards on a competitive basis.

**In 2017, the Triological Society awarded:**

- \$480,000 in grant funds to otolaryngologist-head and neck surgeons to 1) help facilitate research career development in young otolaryngologists; and 2) further support otolaryngology clinical scientists with new or existing K08/K23 awards;
- \$193,000 in travel awards to residents, medical students and Fellows who presented podium and poster presentations at the Society's meetings;
- \$20,000 to residents, medical students, and Fellows who presented research award winning papers and posters at the Society's meetings.

**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:

- Describe a comprehensive survivorship plan for head and neck cancer patients.
- Interpret a variety of laryngology assessments, including stroboscopy and objective reflux testing.
- Assess the importance of the Eustachian tube in their patients with chronic ear disease.
- Examine the impact of facial anomalies on their patient and families.
- Evaluate the patient with atypical chronic rhinosinusitis and apply effective therapy.
- Recognize issues which are distinct to the aging population and incorporate those issues into clinical care.
- Develop a strategy to include lifelong learning and quality improvement in clinical practice.

**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.

**Exhibits**

We encourage attendees to visit more than 100 exhibitors in the exhibit hall Thursday through Saturday. 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.*

## ***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 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 **10.50** *AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Of the *AMA PRA Category 1 Credits™* listed above, a maximum of **0.00** credits meet the requirements for Self-Assessment.



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**GUEST OF HONOR AND  
JOSEPH H. OGURA, MD, LECTURER  
Dana M. Thompson, MD MS FACS**



Dr. Thompson is the Lauren D. Holinger Professor and Chair of Pediatric Otolaryngology at the Ann & Robert H. Lurie Children's Hospital of Chicago and Northwestern University Feinberg School of Medicine. She received undergraduate and medical degrees at the 6 Year BA/MD program at the University of Missouri-Kansas City. She is uniquely fellowship trained in both laryngology and pediatric otolaryngology.

Including a faculty position, residency and a laryngology/dysphagia clinical outcomes research fellowship she spent 18 years of her career at the Mayo Clinic and was the founding chair of the Division of Pediatric Otolaryngology. A portion of her career was spent at the University of Cincinnati College of Medicine and Cincinnati Children's Hospital as a fellow under the direction of Dr. Robin Cotton, and later served on the faculty as the Director of the Adult Airway Reconstruction Program and member of the Pediatric Aerodigestive & Sleep Center.

She has a unique hybrid of expertise in the surgical treatment and management of airway, voice, and swallowing disorders for infants, children, and adults. She was the President of the ABEA during the centennial year celebration. She is a member of the Triological Society Council and was the Society's 2006 recipient of the Harris Mosher Award for excellence in clinical research for her work on laryngomalacia, and is considered one of the world's authorities on the topic. She was the 2013 AAO-HNS Helen F. Krause, MD Trailblazer awardee, and the recipient of the 2015 Gabriel Tucker award from the ALA for outstanding career contributions to pediatric laryngology. She is a member of the American Academy of Otolaryngology - Head and Neck Surgery (AAO-HNS), the Triological Society, American Society of Pediatric Otolaryngology (ASPO), National Medical Association, American College of Surgeons (ACS), and others. She has published over 70 scientific articles and 15 book chapters.

**PRESIDENTIAL CITATION AWARDEE  
Stanley M. Shapshay, MD FACS**



Dr. Shapshay has been a Professor of Otolaryngology at Albany Medical College for the past 12 years with his practice limited to Laryngology. Formerly he was Professor and Chairman of the Otolaryngology Department at Tufts Medical Center and Professor of Otolaryngology at Boston University and Mount Sinai School of Medicine.

He is past President of the Triological Society, the ALA and the ABEA. He was the Chairman of the COSM Secretaries Liaison Committee for 8 years.

Dr. Shapshay is the author of 190 scientific publications, 3 books and over 40 book chapters. Honors and awards include the Fowler Award from the Triological Society, the ALA award, the Chevalier Jackson Award (ABEA) and the Daniel Baker Lecturer at the ALA. He has received the teacher of the year award from the following Otolaryngology residency programs: Boston University, Tufts University, Mount Sinai School of Medicine and Albany Medical College.

**PRESIDENTIAL CITATION AWARDEES  
My Residents - Past and Present**

My residents, past and present, represent a major reason for my appreciation of a career that I find both demanding and fulfilling. A personal "thank you" is certainly due for their impact on my development as a physician, teacher and mentor.



**PRESIDENTIAL CITATION AWARDEE**  
**Sujana S. Chandrasekhar, MD FACS**



Dr. Chandrasekhar is an otologist/neurotologist with a passion for ear and balance patient care and teaching, humanitarian work, and leadership/empowerment of others. She practices in New York City and speaks around the world.

She served as President of AAO-HNS in 2015-2016. She is the third woman and the first person of Indian descent to hold that office. She is Secretary-Treasurer of the American Otological Society.

Dr. Chandrasekhar completed her fellowship in Otology and Neurotology at the House Ear Clinic and Institute in Los Angeles, California. She served on the full-time academic faculty of both UMDNJ-New Jersey Medical School and Mount Sinai School of Medicine before entering private practice in New York City. She is currently Director of New York Otology, Director of Neurotology at the James J. Peters Veterans Administration Medical Center, Otologist/Neurotologist at the New York Head and Neck Institute, Clinical Professor at Zucker SOM at Hofstra-Northwell and Clinical Associate Professor at Icahn SOM at Mount Sinai. As such, she is at the clinical forefront in management of disorders of hearing, balance, tinnitus, facial nerve, and lateral skull base, as well as cochlear and Baha implants. She is the medical director of the Vestibular Disorders Evaluation Clinic at the Bronx VA Hospital, a multidisciplinary team to rapidly and thoroughly assess and treat patients, especially those returning from active duty, with complex dizziness disorders, and is developing the Comprehensive Balance Center at Northwell/LHH.

Dr. Chandrasekhar's scientific interests include hearing loss, tinnitus, vertigo, skull base tumors and temporal bone histopathology. She has published several papers, monographs, and book chapters in otology/ neurotology and otolaryngology, including a landmark paper on sudden hearing loss. Her book, authored with her father, Temporal Bone Histology and Radiology Atlas, was published in January 2018. Her research on intranasal surfactant for otitis media and Eustachian tube dysfunction is ground-breaking. She has developed a company to commercialize the use of intranasal surfactant for OM and ETD.

She has also written on, and is funded for, gender research in otolaryngology. Dr. Chandrasekhar was honored with the AAO-HNS's Distinguished Service Award in September 2006 and 2012 and she has spoken extensively on Leadership.

Her other main interest is in humanitarian and international outreach. She has led five groups of practitioners on medical/ surgical missions to Nicaragua, and has delivered lectures in India, Brazil, Mexico, Colombia, Venezuela, Costa Rica, Italy, Turkey, United Kingdom, Japan, Dubai, and Canada.

Dr. Chandrasekhar is married and has four children.

**Harris P. Mosher Award****Aaron C. Moberly, MD, Ohio State University***How Does Aging Affect Recognition of Spectrally Degraded Speech?***Edmund Prince Fowler Award****Murugappan Ramanathan, MD FACS, Johns Hopkins School of Medicine***Disruption of Sinonasal Epithelial Nrf2 Enhances Susceptibility to Rhinosinusitis in a Mouse Model***Maureen Hannley Award****James C. Denny, MD FACS, American Academy of Otolaryngology-HNS***A Comprehensive Look at Chronic Rhinosinusitis Using a Claims Database***Honorable Mention for Basic Science Award****Alexander T. Hillel, MD, Johns Hopkins University School of Medicine***T-Helper 2 Lymphocyte Immunophenotype is Associated with Idiopathic Laryngotracheal Stenosis***Honorable Mention for Clinical Research Award****Paul C. Bryson, MD FACS, Cleveland Clinic***Oropharyngeal Symptoms Following Suspension Laryngoscopy: Procedural Factors and the Impact of Submucosal Perfusion Using Capillaroscopy***With Distinction Awards****David J. Eisenman, MD, University of Maryland School of Medicine***Evaluation and Treatment of Pulsatile Tinnitus Associated with Sigmoid Sinus Wall Anomalies***Jose P. Zevallos, MD MPH FACS, Washington University School of Medicine***Gene Expression Subtype Analysis of Laryngeal and Oral Cavity Squamous Cell Carcinoma Reveals Novel Molecular Markers of Nodal Metastasis and Survival*

New Fellow Ceremonies followed by the reception with Triological Fellows is scheduled on Friday, April 20th from 7:00 am to 7:50 am in Maryland A.

<b>Marc L. Bennett, MD FACS</b>	Nashville, TN
<b>Paul C. Bryson, MD FACS</b>	Highland Heights, OH
<b>Brian B. Burkey, MD FACS</b>	Cleveland, OH
<b>Steven S. Chang, MD FACS</b>	Birmingham, MI
<b>J. Madison Clark II, MD FACS</b>	Chapel Hill, NC
<b>Alessandro De Alarcon, MD MPH</b>	Cincinnati, OH
<b>Robert H. Deeb, MD</b>	Grosse Pointe Shores, MI
<b>James C. Denny, MD FACS</b>	Alexandria, VA
<b>David J. Eisenman, MD</b>	Baltimore, MD
<b>Dale C. Ekbom, MD</b>	Rochester, MN
<b>James K. Fortson, MD MPH MBA FACS</b>	East Point, GA
<b>Mark E. Gerber, MD FACS</b>	Northbrook, IL
<b>Bradley J. Goldstein, MD PhD FACS</b>	Miami, FL
<b>Nathan W. Hales, MD FACS</b>	San Antonio, TX
<b>Alexander T. Hillel, MD</b>	Baltimore, MD
<b>Brandon Isaacson, MD</b>	Dallas, TX
<b>Adam S. Jacobson, MD FACS</b>	New York, NY
<b>Nausheen Jamal, MD</b>	Philadelphia, PA
<b>Alan J. Johnson, MD</b>	Evans, GA
<b>Joe W. Kutz, MD FACS</b>	Coppell, TX
<b>Aaron C. Moberly, MD</b>	Columbus, OH
<b>Larry L. Myers, MD FACS</b>	Dallas, TX
<b>Urjeet A. Patel, MD FACS</b>	Chicago, IL
<b>Steven D. Pletcher, MD</b>	San Francisco, CA
<b>Liana Puscas, MD MHS MA FACS</b>	Durham, NC
<b>Murugappan Ramanathan, MD FACS</b>	Bethesda, MD
<b>Christopher H. Rassekh, MD FACS</b>	Philadelphia, PA
<b>Elie E. Rebeiz, MD FACS</b>	Boston, MA
<b>William R. Ryan, MD FACS</b>	Mill Valley, CA
<b>Ahmad R. Sedaghat, MD PhD</b>	Boston, MA
<b>Michael C. Singer, MD FACS</b>	Detroit, MI
<b>Libby J. Smith, DO</b>	Pittsburgh, PA
<b>Phillip C. Song, MD</b>	Wellesley, MA
<b>Baran D. Sumer, MD</b>	Dallas, TX
<b>Chad A. Zender, MD FACS</b>	Rocky River, OH
<b>Jose P. Zevallos, MD MPH FACS</b>	St. Louis, MO

NEW FELLOWS TO BE INDUCTED

## Harris P. Mosher Award

Given in recognition of the excellence of the Candidate's Thesis in Clinical Research. This honor was created to perpetuate the ideals of the great teacher for whom it was named and to bestow upon a worthy recipient the responsibility of furthering the highest standards of perfection in the study, teaching and practice of Otolaryngology.

## Harris P. Mosher • 1867-1954

Highly respected, feared, and revered by his students, Dr. Mosher attended Harvard College and the Harvard Medical School, receiving his MD degree in 1896. There were no formal residency training programs then, so he sought training at the best ear, nose and throat centers in Germany, namely, with Jansen in Berlin and Grunert in Halle. After returning home, Mosher became an instructor in the department of anatomy at the Massachusetts Eye and Ear Infirmary and the Harvard Medical School.

He started the first course in sinus anatomy in the United States. This course was to become famous for its content and its progenitor and was appropriately named "Mosher's course". It endured for 35 years.

In 1919 he was appointed Professor of Laryngology at the Harvard Medical School and Chief of Laryngology at the Massachusetts General Hospital. In 1932 he was appointed to the Walter Augustus LaCompte Chair of Otology at Harvard and at age 66 became the second individual to hold two chairs at Harvard. Dr. Mosher was a member and became the president of all of our prominent national otolaryngology societies. When the American Board of Otolaryngology was formed in 1924 (the second certification board after ophthalmology in 1917\*) he was chosen as its president and served in that capacity for 25 years. He was the recipient of the Semon Medal from the Royal Society of Medicine of London, the Gold Medal from the American Laryngological Association, and a service medal from the American Academy of Ophthalmology and Otolaryngology. He is known for his intranasal ethmoidectomy technique and his method for the removal of safety pins swallowed by babies, for which he was given a citation by the American College of Surgeons in 1934.

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\*Deliberations and progress in our specialty were interrupted by World War I. Also, there was growing resistance to authority to regulate specialty education and training--in essence, the transition from apprenticeships to formal training programs as we know them today. The need was urgent because some form of evaluation of physicians was needed to supplement the general licensing regulations of the various states' Boards of Public Health.

## Mosher Award Recipients

1957	Harold G. Tabb, MD	1988	Thomas V. McCaffrey, MD
1958	Jack V.D. Hough, MD John A. Kirchner, MD	1989	Arnold Komisar, MD Bernard R. Marsh, MD
1959	Maurice Schiff, MD	1990	Patrick J. Gullane, MD
1960	Walter A. Petryshyn, MD Alex Weisskopf, MD	1991	Robin T. Cotton, MD
1961	Godfrey E. Arnold, MD	1992	Myles L. Pensak, MD
1962	Wesley E. Compere, MD	1993	Ronald A. Hoffman, MD
1963	Edward G. McCoy, MD William W. Montgomery, MD Henry J. Rubin, MD	1994	Robert Sofferman, MD
1964	Hugh O. Barber, MD	1995	Fred Herzon, MD
1965	Brian F. McCabe, MD	1996	Stimson P. Schantz, MD
1966	No award	1997	Scott C. Manning, MD
1967	Frank N. Ritter, MD George T. Singleton, MD	1998	No award
1968	Leslie Bernstein, MD	1999	Dennis S. Poe, MD
1969	David A. Hilding, MD Lindsay L. Pratt, MD	2000	Lyon L. Gleich, MD David J. Terris, MD
1970	Herbert H. Dedo, MD	2001	Joseph G. Feghali, MD
1971	Byron J. Bailey, MD	2002	Wendell G. Yarbrough, MD
1972	Hugh F. Biller, MD	2003	Edwin M. Monsell, MD PhD
1973	Mark May, MD Andrew W. Miglets, MD	2004	Craig A. Buchman, MD
1974	Robert W. Cantrell, MD	2005	Francisco J. Civantos, MD
1975	Donald G. Sessions, MD	2006	Henry T. Hoffman, MD Dana M. Thompson, MD
1976	No award	2007	Erin D. Wright, MD
1977	Donald B. Hawkins, MD	2008	Robert C. O'Reilly, MD
1978	Robert A. Jahrsdoerfer, MD	2009	Steven J. Wang, MD
1979	Arnold M. Noyek, MD	2010	Adrian L. James, MD
1980	H. Bryan Neel III, MD PhD	2011	Robert L. Ferris, MD PhD
1981	Bruce A. Feldman, MD	2012	Nira A. Goldstein, MD MPH Judith E.C. Lieu, MD MSPH
1982	Roger L. Crumley, MD	2013	Joseph M. Chen, MD Adam M. Zanation, MD
1983	S. George Lesinski, MD	2014	George B. Wanna, MD FACS
1984	Irwin F. Stewart, MD	2015	Lisa E. Ishii, MD MHS
1985	Frank E. Lucente, MD	2016	Giovana R. Thomas, MD FACS
1986	Harold C. Pillsbury, MD	2017	Jonathan M. Bock, MD
1987	James N. Thompson, MD	2018	Aaron C. Moberly, MD

## Edmund Price Fowler Award

Given in recognition of the excellence of the Candidate's Thesis in Basic Research. This honor was created to perpetuate the ideals of the great teacher for whom it was named and to bestow upon a worthy recipient the responsibility of furthering the highest standards of perfection in the study, teaching and practice of Otolaryngology.

## Edmund Prince Fowler • 1872-1966

It says something about the intellectual wealth of the Triological Society that Edmund Prince Fowler Sr., MD, succeeded Max Goldstein, MD, as president in 1932. Both were giants in otology, prolific authors and advocates for the hard of hearing. In honor of Dr. Fowler's contributions to otolaryngology, the Society established The Edmund Prince Fowler Award in 1971, given each year for the best thesis in basic research.

After earning his MD from Columbia University, Dr. Fowler joined the Manhattan Eye and Ear Hospital and became a clinical professor at Columbia University in 1933. He was a decorated colonel of World War I. He was president of the American Otological Society in 1937, recipient of the first Award of Merit from that society in 1952 and founder of the first hearing center in the United States (in New York City). To the legacy of the prodigious researcher and "Dean of Audiology", as he was called, we attribute the invention of the modern clinical audiometer. He tested many patients and soon became aware of the fact that some patients with severe or unilateral losses had suprathreshold hearing values, a condition he coined as "recruitment". This clinical finding resulted in the Alternate Binaural Loudness Balance test, the first to separate cochlear from retrocochlear losses.

In his address to the sections in January 1932, Dr. Fowler described specific recommendations for hearing tests on schoolchildren. He also asked his colleagues to be thoughtful: "Let us not forget to treat the patient as a sensitive human being," he said, "and aid him in surmounting the drawbacks and psychological reactions to his disability."

At the 38th Annual Meeting in Atlantic City, NJ, in 1932, Dr. Fowler shared the spotlight with Edward B. Dench, MD, first president of the Triological, then 72 years old. (Dr. Dench had been named Honorary President of the Society in 1931 until his death in 1936.) At the meeting, George Richards, MD, editor of the Transactions, outlined a list of guidelines for submissions. During the same meeting the council approved a resolution supporting the ABO and its work in raising educational standards in the specialty as part of an effort to stem the tide of proposals for examinations for specialists by each of the 48 states.

Dr. Fowler died in 1966, six months after the last of his 113 papers was presented (at 94 years of age!) at a meeting of the American Otological Society.



## Fowler Award Recipients

1971	Richard R. Gacek, MD	1995	Michael Pratt, MD
1972	Duane W. Nagle, MD Raimund G. Rueger, MD	1996	P. Ashley Wackym, MD
1973	Robert J. Ruben, MD	1997	Allen Hillel, MD D. Bradley Welling, MD
1974	Robert I. Kohut, MD Willard B. Moran, Jr., MD Gershon J. Spector, MD	1998	No award
1975	Gregory J. Matz, MD Richard L. Vorhees, MD	1999	Debra L. Tucci, MD
1976	Shokri Radpour, MD	2000	Rick A. Friedman, MD Michael D. Seidman, MD
1977	LaVonne Bergstrom, MD	2001	J. Christopher Post, MD
1978	Diran O. Mikaelian, MD	2002	Richard D. Kopke, MD
1979	William L. Meyerhoff, MD Clarence T. Sasaki, MD	2003	Chung-Ku Rhee, MD PhD
1980	Robert A. Schindler, MD	2004	Shawn D. Newlands, MD
1981	Don E. Gebhart, MD	2005	Steven W. Cheung, MD
1982	Michael E. Johns, MD	2006	Alan G. Micco, MD
1983	Bruce W. Jafek, MD	2007	Bradley W. Kesser, MD
1984	David E. Schuller, MD	2008	Eric M. Genden, MD Marlan R. Hansen, MD
1985	Marvin P. Fried, MD	2009	Ravindhra G. Elluru, MD PhD Andrew P. Lane, MD
1986	Michael Friedman, MD	2010	Philip D. Littlefield, MD
1987	Stanley M. Shapshay, MD	2011	Stacey L. Halum, MD
1988	Timothy T.K. Jung, MD	2012	Quy T. Nguyen, MD PhD
1989	Robert T. Sataloff, MD	2013	Subinoy Das, MD FACS
1990	Soly Baredes, MD	2014	Hinrich Staecker, MD PhD
1991	Douglas E. Mattox, MD	2015	Bradford A. Woodworth, MD
1992	Vanessa G. Schweitzer, MD	2016	Gregory A. Grillone, MD FACS
1993	Ralph F. Wetmore, MD	2017	Syed F. Ahsan, MD FACS
1994	Paul Lambert, MD	2018	Murugappan Ramanathan, MD FACS

## Maureen Hannley Award

Given in recognition of the excellence of the Candidate's Thesis in an Alternative Science category. This honor was created in 2016 to honor Dr. Hannley's contributions and legacy to the Triological Society. She was the Society's Thesis and Research Grants consultant from 2006 to 2015. Dr. Hannley assisted young researchers and mentored candidates for Triological Fellowship, assisting them with preparation of their theses.

## Maureen Hannley • 1942-2015

Maureen Hannley, PhD, was a dedicated advisor and respected for her commitment to advance the mission of the Society to attract the best minds in otolaryngology. Her tireless work assured that the quality of the contributions of the candidates reflected the honor and prestige of membership. As the diversity of the academic and scientific work of the otolaryngology community evolved, Dr. Hannley acknowledged the importance of alternative scholastic contributions to our Society that fall outside the traditional basic and clinical research paradigms. This award is annually bestowed upon the candidate whose thesis represents an outstanding contribution in the alternative science category of Technology/ Procedure Development, Otolaryngology Status and Trends, Health Services Research, or Historical Perspectives.

Maureen Hannley, PhD received her M.A. from the University of Arizona and a Ph.D. in Hearing Science and Biocommunication from Baylor College of Medicine. Throughout her academic and research career, she held appointments at Louisiana State University, Kresge Hearing Research Laboratory, Stanford University School of Medicine, Duke University, Medical College of Wisconsin and, most recently, was a Professor in the Department of Otolaryngology at University of Arizona. Dr. Hannley held many administrative appointments, including that of Chief Research Officer at the AAO-HNSF and Health Services Administrator and Director of the Hearing Research Program at NIDCD. She lent her expertise to numerous advisory boards including NIH, ARO, SUO, and Boys Town National Research Hospital, to name a few. She was elected as an Honorary Triological Society Fellow in 2009.

## Hannley Award Recipients

2016 Paul Hong, MD FRCSC  
2017 Kofi D. Boahene, MD FACS  
2018 James C. Denny, MD FACS

## Honorable Mention for Basic Science Award

Given in recognition of the excellence of the Candidate's Thesis in Basic Science.

1998	Perry M. Santos, MD, MS	2008	No Award
1999	Saamil N. Merchant, MD	2009	No Award
2000	Jennifer R. Grandis, MD	2010	Seth H. Dailey, MD
2001	William H. Lindsey, MD	2011	Norman D. Hogikyan, MD FACS Maie A. St. John, MD
2002	No Award	2012	Adrien Eshraghi, MD, MSC
2003	Sujana S. Chandrasekhar, MD	2013	John D. Macias, MD FACS
2004	Joseph Sniezek, MD	2014	Kenneth H. Lee, MD PhD
2005	Cliff A. Megerian, MD Brian Nussenbaum, MD	2015	Eunice Y. Chen, MD PhD Ian N. Jacobs, MD FACS
2006	Eben Rosenthal, MD Richard L. Scher, MD	2016	Lamont R.D. Jones, MD
2007	Joseph E. Kerschner, MD J. Paul Moxham, MD	2017	Devraj Basu, MD PhD FACS
		2018	Alexander T. Hillel, MD

## Honorable Mention for Clinical Research Award

Given in recognition of the excellence of the Candidate's Thesis in Clinical Research.

1998	Kenneth M. Grundfast, MD	2010	Peter C. Belafsky, MD PhD Seth M. Cohen, MD MPH Jeffrey H. Spiegel, MD
1999	Randal Paniello, MD	2011	Carol R. Bradford, MD FACS Gregory J. Wiet, MD FACS
2000	Seth I. Rosenberg, MD	2012	Bruce H. Haughey, MBChB FACS
2001	Mark S. Courey, MD	2013	Amy Y. Chen, MD FACS Sam J. Daniel, MD MSC Tanya K. Meyer, MD BS
2002	Christopher J. Linstrom, MD	2014	Andrew R. Scott, MD FACS
2003	Phillip K. Pellitteri, DO James C. Alex, MD	2015	Oliver F. Adunka, MD Hamid R. Djalilian, MD Brett A. Miles, MD DDS FACS
2004	Donald T. Weed, MD	2016	No Award
2005	George T. Hashisaki, MD Judith C. McCaffrey, MD	2017	Daniel H. Coelho, MD FACS
2006	Neil Bhattacharyya, MD	2018	Paul C. Bryson, MD FACS
2007	Joel A. Ernster, MD Natasha Mirza, MD		
2008	Marshall E. Smith, MD		
2009	Stephen F. Conley, MD FACS David R. Friedland, MD PhD		

## Honorable Mention Award

Given in recognition of the excellence of the Candidate's Thesis.

1982	Joseph B. Nadol Jr., MD	1992	Lawrence P.A. Burgess, MD
1983	No award		William W. Shockley, MD
1984	No award	1993	C. Ron Canon, MD
1985	George P. Burns, MD		Gerald E. Merwin, MD (posthumous)
	Wayne F. Larrabee Jr., MD		James L. Nettekville, MD
	Richard T. Miyamoto, MD		K. Thomas Robbins, MD
	Leonard P. Rybak, MD	1994	Arthur S. Hengerer, MD
1986	Paul J. Donald, MD		Larry A. Hoover, MD
	Jack L. Gluckman, MD		Richard W. Waguespack, MD
	Jeffery P. Harris, MD		Steven M. Zeitels, MD
1987	Frederick M.S. McConnell, MD	1995	Kevin A. Shumrick, MD
1988	C. Gary Jackson, MD		Robert C. Wang, MD
1989	Samuel R. Fisher, MD	1996	Author Unknown
	Joan T. Zajtchuk, MD	1997	George S. Goding Jr., MD
1990	David M. Barrs, MD		Joseph Haddad Jr., MD
	James A. Koufman, MD		Sigsbee W. Duck, MD
1991	Gary L. Schechter, MD		

## With Distinction Award

Given in recognition of the excellence of the Candidate's Thesis.

2011	Julie L. Wei, MD	2016	No Award
2012	Daniel D. Lydiatt, DDS MD FACS	2017	Matthew L. Bush, MD FACS
2013	Joseph A. Brennan, MD FACS		David Goldenberg, MD FACS
2014	Howard W. Francis, MD	2018	David J. Eisenman, MD
2015	Wade W. Chien, MD		Jose P. Zevallos, MD MPH FACS
	Noam A. Cohen, MD PhD		







TRIOLOGICAL SOCIETY  
121ST ANNUAL MEETING AT COSM  
GAYLORD RESORT, NATIONAL HARBOR, MD

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FRIDAY, APRIL 20, 2018  
MARYLAND A

- 7:00 - 7:50**      **Business Meeting (Triological Fellows only)**  
**New Fellow Ceremony and Reception**
- 7:55**            **Welcome and Introductions by President**  
Mark S. Persky, MD FACS, New York, NY
- Presidential Citations**  
Sujana S. Chandrasekhar, MD FACS, New York, NY  
Stanley M. Shapshay, MD FACS, Albany, NY  
My Residents - Past and Present
- 8:05**            **Presidential Address**  
**Patient Trust - Entitled or Earned?**  
Mark S. Persky, MD FACS, New York, NY
- 8:25 - 9:05**    **Introduction of Guest of Honor and Joseph H. Ogura, MD Annual Lecturer**  
**Inspiring Change from Within**  
Dana M. Thompson, MD FACS, Chicago, IL
- 9:05**            **Introduction of 2018 Thesis Award Presenters**  
Dana M. Thompson, MD FACS, Chicago, IL
- 9:07**            **2018 Harris P. Mosher Award for Clinical Research - Thesis Presentation**  
**How Does Aging Affect Recognition of Spectrally Degraded Speech?**  
Aaron C. Moberly, MD, Columbus, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe several auditory and cognitive factors that contribute to aging related declines in the ability for adults to understand degraded speech, particularly relevant for adult patients with cochlear implants.

**Objectives:** Cochlear implants (CIs) restore hearing sensation to patients with moderate-to-profound sensorineural hearing loss. However, the benefits to speech recognition experienced by CI users vary considerably among patients. Advancing age contributes to this speech recognition variability in post-lingual adult CI users. Similarly, older individuals with normal hearing (NH) perform more poorly on tasks of recognition of spectrally degraded speech used in studies of CI simulation. The mechanisms by which advancing age affects speech recognition in adult CI users and NH peers listening to spectrally degraded speech have not been explored in detail. The overarching hypothesis of this study was that the detrimental effects of advancing age on speech recognition can be attributed both to declines in auditory spectral resolution as well as declines in cognitive functions. **Study Design:** Clinical research. Cross-sectional study. **Methods:** Speech recognition was assessed for sentences and words in CI users (in the clear) and NH controls (spectrally degraded using noise-vocoding), along with auditory spectral resolution using a modified spectral ripple task. Cognitive skills were assessed using nonauditory visual measures of working memory, inhibitory control, speed of lexical/phonological access, nonverbal reasoning, and perceptual closure. Linear regression models were tested for mediation to explain aging effects on speech recognition performance. **Results:** For both CI users and NH controls, older age predicted poorer sentence and word recognition. The detrimental effects of advancing age on speech recognition were mediated by poorer spectral resolution along with poorer functions in some cog-

nitive measures; for CI users, these were speed of lexical access and nonverbal reasoning. For NH controls, significant cognitive mediators included working memory, inhibitory control, speed of phonological access, and nonverbal reasoning. **Conclusions:** Advancing age contributes to poorer recognition of degraded speech for CI users and NH controls, through aging related declines in both auditory spectral resolution and cognitive functions. Findings suggest that improvements in spectral resolution through improved device processing or auditory training, as well as cognitive improvements through postoperative aural rehabilitation, may serve as therapeutic targets to optimize CI speech recognition outcomes for post-lingually deaf adults. Moreover, findings contribute to our understanding of speech recognition for older NH individuals listening to degraded signals.

**9:14**                    **2018 Edmund Prince Fowler Award for Basic Research - Thesis Presentation**  
**Disruption of Sinonasal Epithelial Nrf2 Enhances Susceptibility to Rhinosinusitis in a Mouse Model**  
Murugappan Ramanathan, MD FACS, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the role of the antioxidant transcription factor Nrf2 in regulating sinonasal inflammation

**Objectives:** Oxidative stress has been postulated to play an important role in chronic rhinosinusitis. Nrf2 is a transcription factor that is involved in the regulation of multiple antioxidant genes and its function has been previously shown to be important in maintaining sinonasal epithelial barrier function in response to environmental stimulants. The function of sinonasal epithelial expression of Nrf2 has not been previously studied. The primary aim of this study is to generate a mouse model that is genetically deficient in epithelial specific Nrf2 and to understand its role in regulating sinonasal inflammation. **Study Design:** Basic science. **Methods:** An epithelial specific Nrf2 knock out mouse was generated by crossing Krt5-cre (K5) with Nrf2 flox/flox. A papain induced model of rhinosinusitis was generated in the resulting K5 Nrf2-/- mouse. Mouse heads were sectioned to perform immunohistochemistry to quantify goblet cell hyperplasia. Mucosal cellular infiltrates were quantified using flow cytometry. Mucosal tissue cytokines were measured using ELISA. Lastly, the cellular source of type 2 cytokine production was determined using intracellular cytokine staining. **Results:** Papain sensitized mice lacking epithelial specific Nrf2 demonstrate goblet cell hyperplasia, significant tissue eosinophilia, and statistically significant increase in mucosal IL-13 when compared to Nrf2 intact mice. Lastly, mucosal T cells were identified as the cellular source of IL-13. **Conclusions:** In this study, we demonstrate enhanced severity of eosinophilic sinonasal inflammation from disruption of the epithelial specific Nrf2 pathway. The responsiveness of Nrf2-directed antioxidant pathways may act as a major determinant of susceptibility to eosinophilic sinonasal inflammation and may have potential as a therapeutic target for chronic rhinosinusitis.

**9:21**                    **2018 Maureen Hannley Award for Alternative Science - Thesis Presentation**  
**A Comprehensive Look at Chronic Rhinosinusitis Using a Claims Database**  
James C. Denny, MD FACS, Alexandria, VA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the current treatment paradigms for CRS and the value brought to the health care system.

**Objectives:** To construct a comprehensive picture of the typical chronic rhinosinusitis (CRS) patient in the United States including the demographics, comorbidities and geographic prevalence. The study will also identify the diagnostic and treatment regimens, their cost and pattern of use for both medically and surgically managed patients. **Study Design:** Historical cohort study utilizing private and public payer databases. **Methods:** Medical claims data from the Truven Health MarketScan Research Databases from the years 2010 to 2012 for patients with acute rhinosinusitis (ARS) and CRS age eighteen and older were analyzed. CRS patients were defined as those patients having sinus diagnoses for three months or greater after an original trigger diagnosis of ARS. Patient demographics, comorbidities, prescribed medications, diagnostic testing and surgical treatment were all included in the analysis. **Results:** There were 54 million unique patients in the databases from 2010 to 2012. Approximately 10.3 million had at least one diagnosis of ARS and 555,000 had a diagnosis of CRS. There was a female predominance of 60.7% in ARS and 59.1% in CRS. The geographic area in the United States with the highest prevalence was the South with 43.6% of ARS and 36.5% of CRS diagnoses. Medicare patients represented 5.3% of the ARS population and 9.6% of the CRS population. The mean yearly cost of CRS in the commercially insured population was \$958 and the Medicare population was \$741. The mean age of CRS patients was 42 in the commercial population and 73 in the Medicare population. Otolaryngologists treated 15.8% of those with ARS and 43.8% of those with CRS. Comorbidities existed in 56.9% of patients with CRS including allergic rhinitis (43.2%),

headache (14.5%), asthma (8.2%), GERD (4.5%) and COPD (2.9%). CRS patients underwent diagnostic procedures 57.6% of the time including diagnostic endoscopy (53.9%), cultures (24.2%), sinus CT scan (81.9%) and MRI (0.2%). Endoscopic sinus surgery (ESS) was performed on 21.1% of those patients with CRS. Frequency and cost of medications in the six months prior to ESS was greater for antihistamines, antibiotics, anti-inflammatories and leukotriene modifiers than in the six month postoperative period. The most commonly operated sinuses (w/w/o septoplasty) were the maxillary (88.7/79.0%); followed by ethmoid (77.5%/68.1%); frontal (36.9%/35.0%); and sphenoid (26.9%/28.2%). Only 15.4% had just one of the above sinuses operated on; 36.9% had two; 23.2% had three; and 17.9% had all four sinuses operated on. Acute exacerbations of CRS were similar in the medically managed and surgically managed patients, although the cost to manage these significantly declined in the surgically managed patients. **Conclusions:** This data paints a very clear picture of the CRS patient in the unselected population using a very tight definition of CRS. A much clearer understanding of the current medical and surgical management paradigms emerges from this data set that will inform future areas of inquiry. This study confirms the previously described "value proposition" for the surgical management of those CRS patients refractory to medical management. It also identifies opportunities for the future association of administrative, clinical and outcome data through registry based systems.

**9:28**                    **Q&A**

**9:33**                    **Break in Exhibit Hall/View Posters**

9:55 - 12:00            CONCURRENT SCIENTIFIC SESSIONS

CONCURRENT SESSION 1 -- MARYLAND A  
HEAD & NECK AND LARYNGOLOGY

**9:55 - 10:35**            **HEAD AND NECK PANEL: SURVIVORSHIP: A CRITICAL PROGRAM FOR CANCER PATIENTS**

**Moderator:** Jonas T. Johnson, MD FACS, Pittsburgh, PA

**Panelists:** Leila Mady, MD PhD MPH, Pittsburgh, PA  
Marci L. Nilsen, PhD RN, Pittsburgh, PA  
Tamara Wasserman, MS CCC-SLP, Pittsburgh, PA

**Moderators:** Giovana R. Thomas, MD FACS, Miami, FL  
Miriam Lango, MD FACS, Philadelphia, PA

**10:35**                    **Postoperative Analgesic Requirement and Pain Perceptions after Minor Head and Neck Surgery**

Elizabeth D. Stephenson, BA, Chapel Hill, NC; Zainab Farzal, MD, Chapel Hill, NC;  
Katherine N. Adams, BA, Chapel Hill, NC; April M. Tanner, MD, Chapel Hill, NC;  
Adam M. Zanation, MD, Chapel Hill, NC; Eugenie Du, MD, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the preoperative pain perceptions and pain medication requirements of patients undergoing minor head and neck surgeries.

**Objectives:** Opioid usage and abuse potential in post-surgical patients is of increasing concern. Presently, little data exist regarding drivers of postoperative analgesic requirement after head and neck (H&N) surgery. We analyzed factors associated with higher narcotic use and subjective pain perception following minor H&N surgery. **Study Design:** Prospective cohort study. **Methods:** From May to September 2017, data was collected for patients undergoing minor H&N procedures. Patients completed a preoperative survey querying history of chronic pain, prior narcotic usage, and postoperative pain expectation. Demographics, surgical data, postoperative narcotic use defined by oral morphine equivalents (OMEQ), and pain scores were also recorded and analyzed using multivariate regression. **Results:** Sixty-four patients, 36 (56.3%) females and 28 (42.4%) males with mean age of 53 years, met inclusion criteria. Surgeries included 19 (29.7%) parotidectomies, 20 (31.2%) thyroidectomies/parathyroidectomies, 17 (26.6%) neck mass excisions, 4 (0.6%) removals of skin lesion, and 4 (0.6%) other procedures. Average 24 hour postoperative OMEQ dose and OMEQ dose/length of stay

(including <1 day) were 40.3±29.6 mg and 64.7±63.2 mg, respectively. Average 24 hour postoperative pain scores were 3.5±2.0. Multivariate regression analysis showed that average 24 hour postoperative narcotic use was higher in females (p=0.019). Average 24 hour postoperative pain score was significantly greater only in the thyroid/parathyroid group compared to neck mass (p=0.011). No other variables significantly correlated with postoperative OMEQ or pain scores. **Conclusions:** This study presents baseline assessment of narcotic usage and pain control in minor H&N surgery patients. Such information is necessary for the development and optimization of future postoperative narcotic sparing pain control pathways in minor H&N surgery.

## 10:40 Outcomes and Prognostic Factors for p16 Positive Oropharyngeal Carcinoma: A Long Term Analysis

Parul Sinha, MBBS, St. Louis, MO; Bruce H. Haughey, MBChB, Celebration, FL; Dorina Kallogjeri, 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 understand the long term oncologic and functional outcomes, and prognosticators for p16 positive oropharyngeal carcinoma treated primarily with transoral laser microsurgery, for application in adjuvant treatment considerations, clinical trial planning and patient counseling.

**Objectives:** We observed high survival with low recurrences in a previous report on a p16 positive, oropharyngeal carcinoma (OPC) cohort treated primarily with transoral laser microsurgery (TLM) and followed for ≥ 12 months. To address the lack of published data on long term outcomes and prognosticators for this unique disease, we present an updated analysis of this cohort with extended followup. **Study Design:** Cohort followup study. **Methods:** Prospectively assembled, TLM treated 171 OPC patients (1996-2010) with a minimum followup of 60 months or to death were analyzed for overall, disease specific and disease free survivals (OS, DSS, DFS) and gastrostomy rate. **Results:** Median followup was 103 (60-201) months. Seven year DSS, OS and DFS estimates were 91% (95% CI:86%, 95%), 85% (95% CI:79%, 90%) and 83% (95% CI:77%, 88%). A second primary developed in 6 (3.5%); recurrence in 19 (11%; 7 locoregional, 12 distant). Median time to recurrence was 18.8 months; 90% recurred within 48 months. Of the 12 distant metastases, adjuvant therapy groups were none in 3(25%), radiation in 5(42%) and chemoradiation in 4(33%). pT3-T4 classification, AJCC 8th edition pTNM and pN category, and angioinvasion were significant DSS prognosticators in multivariable Cox regression analyses. Thirty (17%) had a gastrostomy tube at last followup; indications were recurrence/second primary (n=11), post treatment dysphagia (n=8), post adjuvant esophageal stenosis (n=6), comorbidities (n=3), radio chondronecrosis (n=2). **Conclusions:** In this cohort, high long term survival and locoregional control persisted. Distant metastasis, independent of adjuvant type, was the commonest site of recurrence. The observed time to recurrence indicates post treatment oncologic surveillance for at least 48 months. Identified prognosticators will inform adjuvant treatment considerations, trial planning, and patient counselling for long term outcomes.

## 10:45 Racial Differences in Oral Human Papillomavirus Infection and Sexual Behaviors in the United States

Janet S. Choi, MD MPH, Los Angeles, CA; Liyang Tang, MD, Los Angeles, CA; Niels C. Kokot, MD, Los Angeles, CA; Uttam K. Sinha, MD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the epidemiologic differences in oral HPV infection, specifically HPV type 16 highly associated with oropharyngeal cancer, across racial groups in the United States and the role of sexual behavior in the racial differences.

**Objectives:** To determine the racial differences in oral human papillomavirus (HPV) infection and sexual behaviors in the US. **Study Design:** National cross-sectional survey. **Methods:** We analyzed data from the 2011-2014 National Health and Nutritional Examination Survey during which participants aged 20-69 years completed oral rinse exam for HPV detection (n=9,134). Logistic regression was used to examine the associations of race with various types of oral HPV infection and sexual behaviors. Analyses incorporated sampling weights to yield results that are generalizable to the US population. **Results:** The prevalence of overall oral HPV infection and HPV type 16 infection were 7.3% [95% CI: 6.3-7.2%] and 1.0% [95% CI: 0.8-1.3], respectively. In multivariate model adjusting for age, gender, and income, blacks were more likely to have oral HPV infection [OR: 1.38, 95%CI 1.16-1.63] and Asian Americans were less likely to have oral HPV infection [OR: 0.40, 95% CI 0.30-0.53] than whites. Asian Americans were less likely to have type 16 infection [OR: 0.28, 95% CI 0.08-0.95] than whites. There were no differences in prevalence of type 16 infection among whites, blacks, and Hispanics. After adjusting for sexual behaviors including number of lifetime vaginal/oral sex partners and barrier use, Asian Ameri-



cans were no longer less likely to have type 6 infection than whites [OR: 1.03, 95% CI 0.67-1.58]. The number of lifetime vaginal/oral sex partners was a significant predictor of oral HPV infection. **Conclusions:** There are racial differences in oral HPV infection in the US. Differential sexual behaviors across these groups may explain observed racial differences in oral HPV infection.

### 10:50 Long Term Quality of Life in Patients Receiving Definitive Multimodality Treatment for Sinonasal Skull Base Malignancies

Matthew A. Tyler, MD, Houston, TX; Shirley Y. Su, MBBS FRACS, Houston, TX (Presenter); Abdallah S.R. Mohamed, MD MSc, Houston, TX; Clifton D. Fuller, MD PhD, Houston, TX; Ehab Y. Hanna, MD, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss long term quality of life in patients receiving definitive multimodality treatment for sinonasal skull base malignancies.

**Objectives:** This study evaluated several facets of global and site specific quality of life (QOL) outcomes in patients receiving definitive multimodality treatment for sinonasal skull base malignancies. **Study Design:** Retrospective case control. **Methods:** Subjects included one hundred thirty-one patients with sinonasal skull base malignancies receiving surgery, radiation, systemic chemotherapy, or a combination thereof, with curative intent. Validated global (EQ-5D) and disease specific (MDASI-HN, ASBQ) patient reported instruments were administered to patients after completing definitive therapy, and associations between instrument, instrument domains and specific clinical parameters were analyzed. **Results:** Instruments were administered a median of 66 months after treatment (range 12-154 months). The mean global QOL, as measured by EQ-5D, was 80 (range 60-90). A statistically significant inverse correlation existed between ASBQ sum score and site specific instrument sum scores (MDASI-HN) (spearman  $\hat{A}=0.73$ ,  $p<0.0001$ ) while ASBQ sum score was directly proportional to EQ-5D health status score (spearman  $\hat{A}=0.73$ ,  $p<0.0001$ ). We did not find a relationship between ASBQ scores and several clinical or demographic variables, including disease stage and treatment regimen. There existed a positive correlation between EQ-5D and the site specific domain of smell on ASBQ. **Conclusions:** This is the largest study evaluating long term QOL outcomes in patients receiving multimodality treatment for sinonasal skull base malignancies. The QOL for patients treated for sinonasal cancer in our cohort was generally good. ASBQ correlates strongly with global QOL. Smell is the only site specific domain in the ASBQ that correlated with global QOL. Further studies are required to determine the impact of stage, treatment modality and additional site specific domains on overall QOL.

### 10:55 Spinal Accessory Nerve Neural Mapping Reduces Shoulder Syndrome in Neck Dissection

Robert L. Witt, MD, Newark, DE; Marisa Srivareerat, PhD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to incorporate spinal accessory neural mapping and monitoring to potentially reduce shoulder syndrome.

**Objectives:** Neural mapping of the spinal accessory nerve, that includes mapping the course of the spinal accessory nerve, with precise initial neural stimulation to locate the nerve prior to its actual intraoperative visual identification, when added to continuous intraoperative monitoring throughout the neck dissection, can reduce the incidence of shoulder syndrome compared to continuous neural monitoring without initial neural mapping. **Study Design:** Retrospective cohort comparison of neck dissection with or without neural mapping. **Methods:** Retrospective study over 54 months of 80 consecutive patients undergoing 90 neck dissections that underwent initial neural mapping of the spinal accessory nerve and continuous neural monitoring of the nerve, in a single surgeon, single institution study. Patients were examined for scapular position, shoulder shrug, and shoulder range of motion. This was compared to a series by the same author where continuous neural monitoring was used without initial neural mapping. **Results:** Initial spinal accessory nerve neural mapping resulted in an overall significant reduction of shoulder syndrome from 18% (4/22) without neural mapping to 4% (4/90) with neural mapping ( $p = .04066$ ,  $p < .05$ ). Shoulder syndrome with neural mapping occurred in 4/36 (11.1%) patients with modified radical neck dissection (levels 1-5); 0/33 (0%) patients with selective neck dissection (levels 1-3 or 2-4) and 0/21 (0%) patients with compartmental neck dissection (levels 2-6). **Conclusions:** Initial neural mapping of the course of the spinal accessory nerve that includes precise initial neural stimulation to locate the nerve prior to its actual initial intraoperative visual identification; when added to continuous intraoperative monitoring during neck dissection can reduce the incidence of shoulder syndrome compared to continuous monitoring without initial neural mapping.

# Friday

11:00

## HPV+ Oropharyngeal Cancer: Do You Really Know Your Patients?

Annika M. Meyer, MD, New York, NY; Daniel A. Alicea, MD, New York, NY;  
Brett A. Miles, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to evaluate the epidemiologic makeup of a population of human papilloma virus positive oropharyngeal squamous cell carcinoma (HPV+ OPSCC) patients at one institution over a decade.

**Objectives:** In the past 20 years there has been a significant increase in HPV+ OPSCC. In the US, the increase is highest among middle aged white males. Typically, patients tend to be nonsmokers from a higher socioeconomic status with a history of multiple sexual partners. **Study Design:** Prospective survey study examining patients aged 18+ who underwent treatment for HPV+ OPSCC at our institution between 2007 and 2016. **Methods:** 223 patients were asked to complete a survey on past medical and social history including substance use and sexual practices. **Results:** Eighty-two patients responded, 70 male (85.4%) and 12 female (14.6%). Average age at diagnosis was 60 years old. The majority (95.1%) were white and born in the United States (91.5%). While half of patients were nonsmokers, 18% had a history of <15 pack years, and 32% had a 15+ pack year smoking history. Nearly 25% reported significant drinking history (3+ drinks/day). Eight patients reported 100+ lifetime sexual partners. The remainder of males had an average of 18 and females an average of 7 lifetime partners. **Conclusions:** Our cohort demonstrated HPV+ OPSCC was more prevalent in white, nonsmoking males with a high number of sexual partners. However, many had significant smoking, drinking, and/or drug pasts, highlighting the importance of taking a careful history when deciding treatment plans.

11:05

## Utilization of Post-Acute Care Following Major Head and Neck Oncologic Surgery with Free Flap Microvascular Reconstruction

Harman S. Parhar, MD, Vancouver, BC Canada; Brent A. Chang, MD, Phoenix, AZ;  
Donald W. Anderson, MD, Vancouver, BC Canada; J. S. Durham, MD,  
Vancouver, BC Canada; Eitan Prisman, MD, Vancouver, BC Canada

**Educational Objective:** At the conclusion of this presentation, the participants should 1) understand the array of services encompassed in post-acute care; 2) understand the dramatic recent increase in the use of post-acute care; 3) learn about the utilization of post-acute care among patients undergoing head and neck cancer surgery with microvascular reconstruction; 4) learn about the preoperative risk factors and postoperative complications associated with post-acute care utilization in this population; and 5) appreciate how an understanding of post-acute care utilization may be helpful for patient decision making, discharge planning and health system resource allocation.

**Objectives:** Post-acute care (PAC) encompasses services to optimize recovery after hospitalization. We aimed to identify factors associated with PAC utilization among patients undergoing head and neck cancer surgery with microvascular reconstruction. **Study Design:** Retrospective linked analysis using the 2011-2015 National Surgical Quality Improvement Program (NSQIP). **Methods:** Eligible patients were identified and stratified by discharge disposition. A univariate screen of demographic and clinical variables was performed comparing those discharged to PAC and those discharged home. Subsequently, a multivariable logistic regression analysis was performed modelling discharge to PAC. **Results:** Among 1,652 identified patients, 261 (15.8%) were discharged to PAC. Those admitted to PAC were older (mean 69.9 years vs. 60.7 years,  $p < 0.01$ ), had a higher burden of comorbidity and were more likely to be functionally dependent (3.8% vs. 1.2%,  $p < 0.01$ ). They also had longer surgeries (mean 9.9 hours vs. 9.3 hours,  $p < 0.01$ ), longer hospitalizations (median 12.0 days vs. 8.0 days,  $p < 0.01$ ), higher rates of reoperation (29.9% vs. 17.4%,  $p < 0.01$ ) and higher rates of postoperative complications. After multivariate analysis, factors independently associated with discharge to PAC included increasing age (OR 2.12, 95% CI 1.81-2.48), active smoking status (OR 1.64, 95% CI 1.15-2.34), prolonged hospitalization (OR 1.05, 95% CI 1.03-1.07) and postoperative pulmonary complications (OR 2.07, 95% CI 1.40-3.06). **Conclusions:** 15.8% of patients undergoing surgery for head and neck cancers with microvascular reconstruction are discharged to PAC. Advancing age, active smoking status, prolonged hospitalization and postoperative complications (pulmonary and neurologic), rather than comorbidity and functional status, are independently associated with discharge to PAC.

11:10

Q&A



**11:15 - 12:00 LARYNGOLOGY PANEL: STATE OF THE ART**  
**Moderator:** Julina Ongkasuwan, MD, Houston, TX  
**Panelists:** **Injection Augmentation**  
Tanya K. Meyer, MD, Seattle, WA  
**Objective Reflux Testing**  
Jonathan M. Bock, MD, Milwaukee, WI  
**Reinnervation Revisited**  
Marshall E. Smith, MD FACS, Salt Lake City, UT  
**Pediatric Voice**  
Karen B. Zur, MD BS, Philadelphia, PA

**12:00 Adjourn**

**Afternoon ALA/ABEA, AOS, ARS, AND ASPO MEET**

**5:30 - 7:00 TRIO, ANS, AOS, AAFPRS MEET THE AUTHORS POSTER RECEPTION**

CONCURRENT SESSION 2 -- MARYLAND C  
OTOLOGY/NEUROTOLOGY AND PEDIATRIC OTOLARYNGOLOGY

**Moderators: Joni K. Doherty, MD PhD FACS, Seal Beach, CA**  
**Michael Hoa, MD, Washington, DC**

**9:55 Policy vs. Patient Safety and the Annulment of Medical Clearance Exams for Hearing Aids: Are We Closing the Book too Soon?**  
Tedeon K. Green, MD, Detroit, MI; Robert S. Hong, MD PhD, Detroit, MI;  
Jonathan W. Koons, BS, Detroit, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss whether or not the change in federal law regarding recommendation for medical clearance exams prior to obtaining hearing aids is premature.

**Objectives:** In the year of 1977 federal law was passed by the U.S. Food and Drug Administration (FDA) restricting the sale of hearing aids to those patients who had received a medical clearance exam from a licensed physician, preferably an otolaryngologist (FDA CFR, 2016). The federal law permitted adults greater than 18 years of age to sign a waiver form that would forego this restriction due to personal or religious beliefs, although this was highly discouraged. The regulation was instituted to enable those with a medically treatable form of hearing loss to receive proper management that the use of hearing aids alone could not address (FDA CFR, 2016). However, on June 2, 2016, the National Academies of Sciences through the Institute of Medicine's Committee on Accessible and Affordable Hearing Health Care published a report refuting the utility of these medical clearance exams (Blazer, 2016). This report was cited by the FDA as being among the evidence for its new stance to no longer enforce medical clearance exams among this age group (FDA DOED, 2016). The report's recommendations were made in light of the rarity of the eight red flag otologic conditions detailed by the federal law as warranting further investigation, as well as the fact that the majority of adults over 18 years of age waived the exam. But several issues remained unanswered, including an assessment of the incidence and scope of critical pathology obtained by medical clearance exams. Therefore, the objective of this study is to assess these findings and determine if further research is needed prior to a definitive change in federal recommendations. **Study Design:** Retrospective cohort study. **Methods:** The patients included in the study were those who presented to a Lions hearing center (LHC) and obtained medical clearance exams from an ear institute for hearing aids. Patients excluded from the study were those who presented to clinic for any other reason than to obtain medical clearance prior to obtaining their first or subsequent set of hearing aids. The information was collected by retrospective chart review of the ear institute's electronic medical record. The information collected included age, characteristics of hearing loss (including type, severity, symmetry, air-bone gap, progression), characteristics of the pathology (including objective/subjective findings, management, and followup), con-

ditions requiring alternative management to hearing aids, and prior relevant physician appointment information (such as, patient reported results of prior clearance and/or otologic examinations if applicable). This study was analyzed taking into account anonymized demographic information including age, gender, and racial or ethnic identification. Audiometric data, which was obtained in the medical record, was analyzed and categorized by severity, tonality, and symmetry. The incidence of medical pathology encountered on medical clearance exam prior to hearing aid evaluation was calculated.

**Results:** The total number of patient charts examined in our study was 313. Out of this number, approximately 135 patients (43.1%) were found to fall into categories included under the 8 red flag otologic conditions, with some falling into multiple categories: 1) visible congenital or traumatic deformities (20.0%); 2) history of active drainage from the ear within the previous 90 days (8.1%); 3) history of sudden or rapidly progressive hearing loss within the previous 90 days (0%); 4) acute or chronic dizziness (23.0%); 5) unilateral hearing loss of sudden or recent onset within the previous 90 days (0%); 6) audiometric air bone gap equal to or greater than 10\*-15 decibels at 500 Hz, 1000 Hz, and 2000 Hz (30.4%); 7) visible evidence of cerumen accumulation or foreign body in the ear canal (59.3%); and 8) pain or discomfort in the ear (14.1%). Out of the 313 patients, 28% would have benefited from alternative intervention over basic hearing aids (such as surgical management), 29.7% were found to have asymmetric hearing loss (and were offered further evaluation), and 5.4% would have been harmed without the medical clearance exam. In contrast, approximately 35.8% of patients did not obtain benefit. **Conclusions:** The vast majority of patients who presented for medical clearance exams prior to obtaining hearing aids benefited from examination by an otologic specialist. Notably, a subset of these patients could have been harmed if they had obtained hearing aids without appropriate examination. We expect that our study will help to increase awareness of the importance of maintaining the recommendations for medical clearance exams prior to obtaining hearing aids. The results of this study shed new light on the need for further studies to assess its relevance prior to changing federal law.

## 10:00 Twelve Month Outcomes of Eustachian Tube Procedures for Management of Patulous Eustachian Tube Dysfunction

Bryan K. Ward, MD, Baltimore, MD; Godwin Abiola, BA, Baltimore, MD;  
Kosuke Kawai, PhD, Boston, MA; Yehia Ashry, MD, Boston, MA; Dennis S. Poe, MD PhD,  
Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify symptoms and signs of patulous eustachian tube dysfunction and outcomes of procedures performed to correct the patulous eustachian tube defect.

**Objectives:** To determine the 12 month effectiveness of nasopharyngeal surgical procedures for eliminating symptoms of patulous eustachian tube dysfunction (pETD). **Study Design:** Retrospective chart review. **Methods:** Patients with medically refractory pETD underwent one of the following procedures: 1) shim (catheter) insertion, 2) calcium hydroxyapatite injection, 3) patulous eustachian tube (ET) reconstruction, or 4) obliteration of the eustachian tube lumen. Time to recurrence of any pETD symptoms was recorded and success was determined as complete symptom resolution at 12 months. Survival analyses were performed using multivariate Cox proportional hazards models. **Results:** A total of 241 procedures were performed in 78 patients. Median duration of symptom relief after surgery was 5.0 months (interquartile range [IQR]: 1.1 15.5 months), and varied by procedure type, ranging from 3.0 months (IQR: 0.7 7.0 months) for calcium hydroxyapatite injection to 20.6 months (3.4 35.9 months) for obliteration. Compared to shim insertion, the risk of 12 month failure was significantly higher for calcium hydroxyapatite injection (HR=2.18; 95% CI 1.29, 3.67; p=0.004) and patulous ET reconstruction (HR=1.62; 95% CI 1.04, 2.52; p=0.035). Patients undergoing shim insertion (52.2%) and obliteration (81.8%) were likely to require pressure equalization tubes or to have had otitis media with effusion. **Conclusions:** While all procedures potentially resulted in symptom resolution, placement of a shim or obliteration of the ET lumen were more likely to achieve 12 month resolution of pETD symptoms, and more likely to result in otitis media with effusion than hydroxyapatite injection or patulous ET reconstruction.

## 10:05 Development of a Novel Augmented Reality (AR) Platform for Lateral Skull Base Anatomy

Pawina Jiramongkolchai, MD, St. Louis, MO; Michael Southworth, BS, St. Louis, MO;  
Nedim Durakovic, MD, St. Louis, MO; Craig A. Buchman, MD, St. Louis, MO;  
Jonathan R. Silva, PhD, St. Louis, MO; Jonathan L. McJunkin, MD, St. Louis, MO

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the concept of augmented reality (AR) and discuss how the application of an AR platform to lateral skull base anatomy can enhance intraoperative dissection and understanding of key anatomical structures and relationships.

**Objectives:** The aim of this study is to develop a novel augmented reality (AR) platform for lateral skull base anatomy. **Study Design:** Augmented reality (AR) is the integration of virtual images into a real time environment. In otology, the use of AR has the potential to greatly improve intraoperative visualization and access to the lateral skull base. Through the integration of three dimensional (3D) holographic images to real time surface anatomy, the surgeon will be able to see underlying structures, allowing for more rapid exposure and access, while avoiding adverse events, such as facial nerve injury. To date, AR navigation systems have not been applied to otologic surgery. We hypothesize that the use of a novel AR platform will accurately overlay 3D projections of key lateral skull base anatomical structures over human cadaveric specimens. **Methods:** CT scans of a cadaveric head and 2 cadaveric temporal bones were obtained. The digital imaging and communications in medicine (DICOM) data were imported into an open source software ITK-SNAP ([www.itksnap.org](http://www.itksnap.org)), from which 3D models of the skull, temporal bone anatomy, and surrounding soft tissue were created. 3D images were then integrated and projected in the Microsoft HoloLens headset using a prototype software developed at our institution. **Results:** A 3D soft tissue hologram was successfully projected onto a cadaveric head. Similarly, 3D holograms of key structures, such as the facial nerve, bony labyrinth, sigmoid/jugular bulb, and carotid artery were projected into the HoloLens headset. **Conclusions:** We present a novel prototype AR platform to visualize and project the 3D anatomy of the lateral skull base.

### 10:10 Temporal Bone CT Scan for Middle Ear Ligaments Assessment

Yona Vaisbuch, MD, Stanford, CA; Davood K. Hosseini, MD, Stanford, CA (Presenter);  
Bryan Lanzman, MD, Palo Alto, CA; Stephen C. Marcott, BS, Palo Alto, CA;  
Yohan Song, MD, Palo Alto, CA; Jennifer C. Alyono, MD, Palo Alto, CA;  
Nikolas H. Blevins, MD, Palo Alto, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the assessment of middle ear ligaments by a temporal bone CT scan and the difference in the ability to identify the ligaments or a potential calcification on different slice thickness and modalities.

**Objectives:** To characterize middle ear ligaments on temporal bone CT scans. **Study Design:** Retrospective review. **Methods:** Different modalities and slice thickness of 302 CT scans of the temporal bone were blindly and retrospectively reviewed by two physicians (radiologist and a non-radiologist trainee). Each scan was graded as to the appearance of the malleoli ligaments and the suggestion of calcification. Then the findings were correlated to surgical and audiological reports. **Results:** When comparing 2mm, 1mm and submillimeter scans, the chance of identifying the malleoli ligaments was 42.5%, 53.8%, 82.8% respectively. Calcification was seen in 4.2% of the scans and clinical correlation to a conductive component on an audiogram was found to be 56.5% (2.4% of total ears). 88.5% of all ligaments were identified on cone beam CT scan vs 79.5% of all ligaments in a traditional submillimeter scan. **Conclusions:** Middle ear ligaments can be seen on CT scan in the majority of aerated ears and the ability to identify them improves with thinner cuts. For a given slice thickness, the use of cone beam tomography is superior to conventional CTs in demonstrating malleoli ligaments.

### 10:15 Human Caudate Nucleus Subdivisions in Tinnitus Modulation

Philip L. Perez, MD, San Francisco, CA; Leighton B. Hinkley, PhD, San Francisco, CA;  
Sarah Wang, PhD, San Francisco, CA; Srikantan S. Nagarajan, PhD, San Francisco, CA;  
Paul S. Larson, MD, San Francisco, CA; Steven W. Cheung, MD, San Francisco, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss functional subdivisions of the human caudate nucleus as they relate to acute modulation of tinnitus loudness using deep brain stimulation.

**Objectives:** To define caudate nucleus locations responsive to intraoperative direct electrical stimulation for tinnitus loudness modulation and relate those locales to functional connectivity maps between caudate nucleus subdivisions and auditory cortex. **Study Design:** Prospective cohort case series. **Methods:** Six awake subjects who underwent bilateral deep brain stimulation (DBS) electrode placement in the caudate nucleus with intraoperative stimulation as part of a phase I clinical trial were analyzed for tinnitus modulation to acute stimulation at 20 locations. Resting state 3T fMRI was used to compare connectivity strength between centroid locations of tinnitus loudness reducing and non-reducing caudate locales with auditory cortex in the 6 DBS phase I trial subjects and 14 other tinnitus subjects with greater than moderate tinnitus severity. **Results:** Acute tinnitus loudness reduction was observed at 5 caudate locations; 4 were positioned at the body and 1 at the head of the caudate nucleus in normalized Montreal Neurological Institute space. The remaining 15 stimulation runs at the caudate head failed to reduce tinnitus loudness. Compared to the caudate head, the body subdi-

vision had stronger functional connectivity to the auditory cortex on fMRI ( $p < 0.05$ ). **Conclusions:** Acute tinnitus loudness modulation is more readily achieved by electrical stimulation of the caudate nucleus body. Compared to the caudate head, the caudate body has stronger functional connectivity to auditory cortex. These findings in human subjects provide insight into the functional anatomy of caudate nucleus subdivisions and guidance for target selection in our basal ganglia neuromodulation approach to treat medically refractory tinnitus.

10:20

## Otosyphilis: Resurgence of an Old Disease with a New Presentation

Hailey A. Theeuwes, BS, Seattle, WA; Jamie R. Litvack, MD MS, Seattle, WA;  
Mark E. Whipple, MD SM, Seattle, WA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) discuss the presentation, clinical characteristics, and evolving risk factors for otosyphilis; 2) review current treatment strategies and outcomes of care; and 3) recognize the increased incidence of syphilis across the country and appreciate the importance of screening for otosyphilis as a cause of hearing loss.

**Objectives:** To examine trends in the presentation, clinical characteristics, risk factors, treatment, and outcomes of patients presenting with otosyphilis over the past 10 years. **Study Design:** Retrospective case series. **Methods:** A chart review of all patients who presented to an adult otolaryngology clinic at an urban safety net hospital with a diagnosis of syphilis and hearing loss over a 10 year period from August 2007 to August 2017. **Results:** Nine patients met the criteria for otosyphilis. The average age at time of presentation was 42 years (range 19-63). All (100%) were men. Three (33%) presented with tinnitus and/or hearing loss within two months of their initial rash. Eight patients (88%) were diagnosed within the past two of the ten years reviewed. **Conclusions:** We have seen an increase in the number of otosyphilis cases in our clinic that parallels the increasing incidence of syphilis across the country. We suspect otosyphilis may be underdiagnosed and emphasize the importance of screening for a disease that may be on the rise in parallel with other manifestations of syphilis. The demographics of the patients at risk and presentation at the time of diagnosis are evolving. Changes in STD prevention practices and social media may be contributing to this new resurgence.

10:25

## Over the Counter Tinnitus Cures: Hucksters' Promises Do Not Ring True

Varun Vendra, MD, Stanford, CA; Yona Vaisbuch, MD, Stanford, CA; Albert Mudry, MD, Stanford, CA; Robert Jackler, MD, Stanford, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the over the counter tinnitus remedy marketplace.

**Objectives:** To investigate the current landscape of over the counter tinnitus remedies. To categorize treatments based on common ingredients, price, and therapeutic claims. To review marketing strategies both towards consumers and physicians. **Study Design:** Cross-sectional survey. **Methods:** Iterative broad internet based review of the online marketplace for over the counter tinnitus treatments, review of products found in brick and mortar pharmacies, and a review of tinnitus treatment marketing materials found online and in trade publications. **Results:** An abundance of over the counter tinnitus treatments were found which can be broadly organized by "active" ingredient subtype with vitamins, minerals/chemical elements, homeopathy, herbal supplements, hormonal, and mixed treatment categories. A handful of ingredients are seen repeatedly in many products including ginkgo biloba, zinc, magnesium, melatonin, B and C vitamins. A broad range of prices was found from treatments under \$10 to several hundreds of dollars. A large number of manufacturers and brand names are present, suggesting low barrier of entry into this loosely regulated, lucrative marketplace. Therapeutic claims, including drug claims, contradicting evidence based recommendations were found on the labeling of several products. Advertisements are used to target both consumers and physicians. **Conclusions:** Despite strong evidence based guidelines recommending against the use of pharmacotherapy for the treatment of tinnitus, the over the counter market for tinnitus remedies is thriving. Otolaryngologists should educate themselves about the tinnitus marketplace as patients are using these products. Clinicians should counsel patients appropriately, and recommend evidence based treatment such as hearing amplification and cognitive behavioral therapy.



**10:30 Radiographic Findings in Young Adults with Asymmetric Sensorineural Hearing Loss**

Gregory G. Capra, MD, Chapel Hill, NC; Catherine Y. Park, MS, North Chicago, IL (Presenter); Hiba Z. Khan, MS, North Chicago, IL; Michelle A. Lim, MS, North Chicago, IL; Amado J. Beltran, MS, North Chicago, IL; Myron W. Yencha, MD, North Chicago, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the relative risk of intracranial lesions of young adults that will contribute to asymmetric hearing loss in this population as compared to the older adult population.

**Objectives:** To evaluate radiographic findings in US Navy recruits found to have asymmetric sensorineural hearing loss (ASNHL) during routine medical screening. **Study Design:** Retrospective analysis of US Navy recruits receiving screening audiometry and medical suitability evaluation from January 2011 to October 2016. **Methods:** Single institution, institutional review board approved study of US Navy recruits screened for hearing loss over a six year period. All recruits with ASNHL were evaluated by an otolaryngologist and received diagnostic radiographic evaluation. Audiometric and imaging results were retrospectively reviewed for this population and compared to common screening criteria. **Results:** ASNHL was identified in 701 of 228,504 total recruits screened. This population was 91% male and between 17 and 35 years old (mean age 21.1). Six hundred eighty (97%) met criteria for further ASNHL evaluation. Subjective hearing loss was reported in only 5% of patients. Six hundred eighty-three (97%) received magnetic resonance imaging of the internal auditory canals. Intracranial pathology was identified in 44 (6.2%) patients and 3 (0.42%) had a causative intracranial lesion corresponding to the ASNHL. One patient was found to have a vestibular schwannoma. **Conclusions:** In a population of healthy young adults with audiometric proven ASNHL, 0.42% had radiographic proven intracranial pathology explaining the hearing loss. Intracranial masses may be less likely to cause ASNHL in this population; further research is needed to determine whether MRI screening is necessary for young adults with ASNHL.

**10:35 Shifting Trends in Management of Vestibular Schwannoma - A National Cancer Database Analysis**

Bassel A. Bashjawish, BA, Newark, NJ; Suat Kilic, BA, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ; Yu-Lan Mary Ying, MD, Newark, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss changes in management of vestibular schwannoma over the last decade.

**Objectives:** To describe changes in management trends of vestibular schwannoma (VS) with respect to tumor size and its effect on patient survival. **Study Design:** Cross-sectional analysis using the National Cancer Database. **Methods:** All patients with a diagnosis of VS were identified between 2004 and 2014. Trends in treatment modality over time were analyzed. Correlation between demographics, institution type, median income and education level by zip code and insurance status were assessed using univariate and multivariate logistic regressions. **Results:** Of the 22,290 VS patients identified, 16,011 (71.8%) received treatment while 6,279 (28.2%) received observation. Management trend analysis over the 11 year period revealed patients with tumor size <1cm are more frequently observed (34.6% in 2004 v. 60.8% in 2014) and less frequently received surgery (34.6% v. 16.8%). Incremental increase in tumor size correlates with an increase in cases managed with observation from 2004 to 2014. Univariate analysis revealed age <65 years, tumor size >2cm, and Medicaid insurance were associated with receiving surgery ( $p<0.0001$ ). Age >65 years ( $p<0.0001$ ), treatment at a non-academic institution ( $p=0.026$ ), and Medicare ( $p<0.0001$ ) were associated with receiving radiation. Age  $\geq 65$ , treatment at nonacademic institution, and Medicare  $\geq 65$  were associated with receiving linear acceleration (LINAC) compared to gamma knife ( $p<0.0001$ ). Multivariate analysis showed uninsured patients, Medicaid, and Medicare patients were more likely to receive observation compared to privately insured patients ( $p<0.0001$ ). **Conclusions:** Management of VS is shifting towards increased observation, most significantly in tumors size <1cm. Insurance provider plays a significant role on receipt of treatment and modality, while median income and education level do not.

**10:40 Q&A**

# Friday

## 10:45 - 11:30 OTOLOGY/NEUROTOLOGY PANEL: IS THE EUSTACHIAN TUBE THE KEY?

**Moderator:** Joseph G. Feghali, MD FACS, Bronx, NY

**Panelists:** Sujana S. Chandrasekhar, MD FACS, New York, NY  
Dennis S. Poe, MD PhD FACS, Boston, MA  
William H. Slattery III, MD, Los Angeles, CA  
Eric E. Smouha, MD FACS, New York, NY

## PEDIATRIC OTOLARYNGOLOGY

**Moderators:** Jeffrey P. Simons, MD FACS, Pittsburgh, PA  
Diego A. Preciado, MD PhD, Washington, DC

## 11:30 Pediatric HIV and Otolaryngologic Manifestations: An Analysis of Hospital Admissions from 1997-2012

Aparna Govindan, BA, Newark, NJ; Evelyne Kalyoussef, MD FACS, Newark, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss changing trends in hospital admissions for pediatric patients with HIV, and describe the common ENT illnesses affecting inpatient pediatric HIV patients.

**Objectives:** Many HIV infected pediatric patients develop otolaryngologic disease. We aim to characterize their ENT manifestations by type, prevalence, and demographic variation, and model temporal trends. **Study Design:** A retrospective chart review utilizing the Kids Inpatient Database (KID). **Methods:** ICD-9 codes for HIV and ENT diagnoses were used to query data from the triennially published KID files from 1997 to 2012. A subset analysis of infectious versus noninfectious admitting ENT diagnoses was conducted. **Results:** A total of 17,988 cases met the inclusion criteria. 19.5% were admitted for ENT manifestations, with 14.7% presenting with infectious symptomatology, 3.7% with noninfectious disease, and 1.1% with both. On average, patients presenting with infectious disease were younger (9.82 years vs 11.84 years;  $P < 0.001$ ). Patients in the South were significantly more likely to be admitted for infection (53.1% vs 47.9%;  $P = 0.016$ ), with no significant differences in the Northeast, West, and Midwest. HIV infected children in 1997 were more likely to present with infectious ENT disease (46.5% vs 32.8%;  $P < 0.001$ ), however there has been a decrease in the prevalence of infectious head and neck presentations (46.5%, 19.1%, 13.2%, 9.6%, 7.0%, 4.6% from 1997 to 2012), and a gradual shift towards noninfectious manifestation with notable differences in 2009 and 2012 (7.0% vs 15.7% and 4.6 vs 8.7 respectively; both  $P < 0.001$ ). **Conclusions:** ENT disease accounts for nearly one fifth of hospitalized HIV infected children; however, rates of hospitalization as well as ENT manifestations have progressively decreased over time. Patients nowadays are more likely to present with noninfectious rather than infectious disease.

## 11:35 Age Stratified Differences in Management and Outcomes of Pediatric Cervical Abscesses

Jonathan A. Harounian, MD, Philadelphia, PA; Andrew Azab, BS; Hershey, PA;  
Christopher A. Roberts, MD; Morgantown, WV; Michele M. Carr, MD PhD,  
Morgantown, WV

**Educational Objective:** At the conclusion of this presentation, the participants should be able to contribute to the discussion regarding optimal management for pediatric neck abscesses as otolaryngologists today are likely to see infants in this clinical context, in which infants are more likely to require surgical drainage than older children despite their more subtle presentation.

**Objectives:** To identify differences in cervical infection management and outcomes in infants versus older children. **Study Design:** Retrospective chart review. **Methods:** Charts of patients 0-18 years diagnosed with a cervical infection at our institution between 2004 and 2015 were reviewed. Age, gender, presenting symptoms, comorbidities, CT scan findings and management including admission, procedures, antibiotics, cultures, length of stay, readmission rates, and complications were analyzed. **Results:** 239 patients (133 male, 106 female) were included: 54 (22.6%) were < 1 year old, 95 (39.7%) were 1-3, 48 (20.1%) were 4-7, and 42 (17.6%) were 8-18 years old. Infants had fewer symptoms documented than older children. Sore throat, neck stiffness and vomiting were all more common in children >3 years ( $P < 0.05$ ). 70.0% went to the operating room for incision and drainage. Younger children were significantly more likely to undergo sur-



gery, with an odds ratio of 2.383 for children under 1 year ( $P=0.029$ ). 90.9% of patients aged 1 or less required operative intervention with radiolucencies of 1cm diameter or more in contrast to 50% of children >8 years old. **Conclusions:** This study emphasizes the importance of considering early operative treatment of cervical abscesses in infants despite fewer symptoms and smaller radiolucencies on CT studies.

**11:40**                    **Validating Peritonsillar Abscess Surgical Drainage Rates among Pediatric Patients Using the Pediatric Hospital Information System (PHIS) Data**  
Romaine F. Johnson, MD, Dallas, TX; Allison G. Ordemann, MD, Dallas, TX (Presenter); Benjamin Little, BA, Villa Rica, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the accuracy PHIS data as compared to a chart review of patients with a peritonsillar abscess.

**Objectives:** To study a cohort of children diagnosed with the peritonsillar abscess. We examined administrative data from The Children's Hospital Association's Pediatric Health Information System (PHIS) registry to a chart review of the same patients for the accuracy of surgical drainage rates. **Study Design:** Retrospective analysis. **Methods:** We performed analysis of children, ages 2 to 17, treated for a peritonsillar abscess from 2011 to 2016. The primary outcome was to determine the sensitivity, specificity, predictive values, receiver operating characteristics (ROC), and likelihood ratios of surgical drainage rates comparing the PHIS database to manual chart review of the same patients. **Results:** The analysis included 200 children. The average age was 12.6 years, 61.5% were female, and the majority were Hispanic (46.5%). 115 (57.5%) children underwent drainage by chart review while 87 (43.5%) had a drainage procedure by PHIS data. Age was a significant predictor of abscess drainage by chart review (age coefficient = 0.10; SE = 0.04;  $Z = 5.8$ ;  $p = 0.02$ ; odds ratio = 1.1; 95% CI = 1.01 - 1.19). When using the chart review as the reference value for surgical drainage, the PHIS data had a sensitivity of 75.7% and 100% specificity. The positive and negative predictive values were 100% and 75.2% respectively. The ROC area was 0.88 (95% CI, 84 to 92). The cases that lacked a clear procedure note composed the false negative cases in the PHIS. **Conclusions:** Administrative data from the PHIS showed good to excellent predictive values for surgical drainage of the peritonsillar abscess when compared to chart review. Researchers can use this information when studying similar conditions and procedures with related administrative databases.

**11:45**                    **Increased Rate of Bleeding with Ibuprofen Use after Tonsillectomy: A Meta-Analysis**  
William A. Stokes, MD, Morgantown, WV; Robert T. Swanson, BS, Hershey, PA;  
Jane R. Schubart, PhD MS MBA, Hershey, PA; Michele M. Carr, MD PhD FRCSC,  
Morgantown, WV

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the various studies on the use of ibuprofen after tonsillectomy and demonstrate that ibuprofen appears to be associated with an increased rate of post-tonsillectomy hemorrhage.

**Objectives:** To better quantify the risk of ibuprofen (IBU) associated post-tonsillectomy hemorrhage (PTH). **Study Design:** Meta-analysis. **Methods:** The study methodology was based upon the Cochrane Handbook for Systematic Reviews of Interventions. We searched Medline, Web of Science, and Cochrane Clinical Trials Database from inception to May 2017 for RCTs, prospective cohort studies, and retrospective cohort studies related to tonsillectomy, IBU use, and PTH among pediatric patients. Electronic searches revealed 151 studies of which 12 were deemed eligible for analysis. Studies were weighted according to level of evidence and risk of bias. **Results:** Pooling of results across all studies showed a statistically significant increase in PTH among the patients taking IBU (OR= 1.38, CI=[1.11-1.78]). Overall, the I<sup>2</sup> statistic= 20.8% demonstrates an overall low study heterogeneity and good comparability of the results. **Conclusions:** Our meta-analysis is the first to show a statistically significant increase in PTH with the use of IBU. This has not been demonstrated in other studies and systematic reviews because their analyses were limited by use of multiple NSAIDs and inclusion of studies limited to the perioperative period. Also, IBU's impact on PTH is difficult to demonstrate in a single RCT due to the low rate of PTH (0.1-3%). Our inclusion of studies restricted to IBU and with reporting of delayed bleeding throughout the postoperative period improves on previous meta-analyses heterogeneity. This led to the identification of a significant association between IBU and increased PTH.

## 11:50 **Are Zika Exposed Infants at Risk? Early Swallow and Hearing Outcomes One Year after the Outbreak**

Si Chen, MD, Los Angeles, CA; Joaquin E. Jimenez, BS, Miami, FL;  
Megan E. Ballard, MD, Miami, FL; Ramzi T. Younis, MD, Miami, FL

**Educational Objective:** One year after the peak of the Zika outbreak in the United States, subtle neurodevelopmental issues continue to be of concern in infants exposed to ZIKV in utero, due to its strong neurotropism. At the conclusion of the presentation, the participants should understand that in utero exposure to Zika virus (ZIKV) affects postnatal neurodevelopment in infants without overt microcephaly or imaging evidence of neurologic malformation. It manifests in varying degrees of swallowing and hearing difficulties. The participants should be aware of the clinical characteristics of dysphagia and hearing loss in infants exposed to ZIKV.

**Objectives:** Are Zika exposed infants at risk? Early swallow and hearing outcomes one year after the outbreak. **Study Design:** Determine the prevalence of dysphagia and hearing loss in newborns with intrauterine exposure to Zika virus (ZIKV) infection. **Methods:** Retrospective chart review. **Results:** There were 89 ZIKV exposed (ZIKE) infants and 15 controls. The weight, length, and head circumference by World Health Organization (WHO) percentiles were comparable between ZIKVE infants and controls at birth. There was no increase in the prevalence of abnormal brain imaging among the two groups. Ten (11%) ZIKVE infants demonstrated dysphagia compared to 1 (7%) in the control group ( $p > 0.05$ ). Four (4%) ZIKVE infants failed newborn hearing screening, compared to none in the controls ( $p > 0.05$ ). At followup, 7 (8%) of the ZIKVE infants demonstrated decrease in head circumference by WHO percentile ( $p > 0.05$ ). **Conclusions:** This is the first study to examine swallow and hearing outcomes in all infants exposed to ZIKV in utero without of the presence of microcephaly at birth. Dysphagia, hearing loss, and decreasing head circumference were seen in these infants; however, the clinical course of these postnatal effects remains an important area of research.

## 11:55 **Evaluation of a Magnetic Resonance Imaging Only Protocol in the Assessment of Children Prior to Cochlear Implantation**

Jennifer M. Siu, MD, Toronto, ON Canada; Sharon L. Cushing, MD, Toronto, ON Canada;  
Susan Blaser, MD, Toronto, ON Canada; Blake C. Papsin, MD, Toronto, ON Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the benefits of an MRI only protocol for assessment of children prior to cochlear implantation. Discuss the pros and cons of MRI vs. HRCT imaging in children prior to cochlear implantation. Explain predictable features on history and physical examination that require concurrent HRCT and MRI imaging prior to cochlear implantation.

**Objectives:** There is no consensus on the necessary preoperative imaging in children being evaluated for cochlear implantation (CI). The objectives of the current study were to examine the efficacy of a predominantly magnetic resonance imaging (MRI) only paradigm in reducing radiation and anaesthetic exposure. We hypothesize that 1) in the majority of cases, MRI would be sufficient both for etiologic assessment and surgical planning; 2) a small number of cases would predictably require concurrent MRI and HRCT based on history and physical examination; and 3) relatively few cases would require additional HRCT after initial MRI showed unexpected findings. **Study Design:** Retrospective analysis. **Methods:** During the protocol implementation period (2012-2017), we measured the number of times and the indication for which HRCT was required in addition to MRI. Duration of anaesthesia and general costing information was also measured. **Results:** During the study protocol, 246 children were assessed prior to CI. In the majority of cases (226, 93.7%) MRI only provided adequate assessment. In 9 (3.7%) cases, concurrent CT/MRI was required based on initial findings during history and physical. In 11 cases (4.5%) CT was required after initial MRI showed unexpected findings. Implementation of the protocol also resulted in reduced anaesthesia time, as well as decreased resource utilization and therefore cost. **Conclusions:** The MRI only protocol for children being evaluated prior to cochlear implantation is efficient and effective in reducing exposure and saving cost. The necessity for CT is predictable in many cases and only a limited number of children will require further CT imaging following MRI.

## 12:00 **Cervical Abscess Outcomes in Children under 2 Years**

Jonathan A. Harounian, MD, Philadelphia, PA; Laila Siddique, MD, Hershey, PA;  
Michele M. Carr, MD, Morgantown, WV

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the outcomes of surgical management of cervical abscess in children younger than two years of age with respect to a variety of param-

eters such as length of stay, operative duration, risk of postoperative complications, and sepsis. At present time, no study discusses outcomes in children younger than two years of age.

**Objectives:** Compare outcomes after surgery for cervical abscesses in children older or younger than 2 years. **Study Design:** Retrospective database study. **Methods:** The pediatric NSQIP database from 2012-2015 was used to examine outcomes after surgery for cervical abscesses for children aged 1-18 years. **Results:** 2181 children were identified, 858 were <2 years (51.5% male) and 1323 were > 2 years (57.1% male) ( $p=0.011$ ). The younger group had more lateral approach for cervical abscesses and the older group having more intraoral approaches ( $p<0.001$ ). The younger group had a higher preop WBC (20.7 versus 17.5,  $p<0.001$ ) but there was no difference in preop sepsis. Younger children had a longer wait until surgery (1.47 versus 1.23,  $p=0.003$ ) and a longer length of stay (LOS) (4.58 versus 3.76 days,  $p<0.001$ ). Operative time was lower in the younger group (18.4 versus 21.5 minutes,  $p=0.003$ ). Operative time was significantly longer for external approach to para/retropharyngeal abscesses ( $p<0.001$ ). The younger group had more days of postop ventilation--0.36 (median 0, SD=1.772) versus 0.10 days (median 0, SD=0.407) with  $p<0.001$ . There were no differences in postop complications, which were rare (including wound infection, dehiscence, pneumonia reintubation, reoperation, and readmission). Linear regression for LOS showed that major contributors were operative time, days of postop ventilation, and days to surgery with  $R=0.700$ . **Conclusions:** Children under 2 have longer LOS in part because of delay to surgery and greater likelihood of postop ventilation, despite having surgical approaches associated with shorter LOS. They are no more prone to complications than are older children.

**12:05**            **Q&A**

**12:10**            **Adjourn**

**Afternoon**        **ALA/ABEA, AOS, ARS, AND ASPO MEET**

**5:30 - 7:00**      **TRIO, ANS, AOS, AAFPRS MEET THE AUTHORS POSTER RECEPTION**

Friday

SATURDAY, APRIL 21, 2018  
MARYLAND B

7:00 - 7:50 Annual Business Meeting (Triological Fellows only)

8:00 - 12:00 SCIENTIFIC SESSION

8:00 Announcements

FACIAL PLASTIC/RECONSTRUCTIVE SURGERY

8:05 - 8:50 FACIAL PLASTIC/RECONSTRUCTIVE SURGERY PANEL: FACIAL ANOMALIES: THE "WONDER" EFFECT

**Moderator:** Deborah Watson, MD FACS, San Diego, CA

**Panelists:** Shelagh A. Cofer, MD, Rochester, MN  
Steven L. Goudy, MD FACS, Atlanta, GA  
Andrew R. Scott, MD FACS, Boston, MA  
Travis T. Tollefson, MD MPH FACS, Sacramento, CA

**Moderators:** Robin W. Lindsay, MD, Boston, MA  
Jeffrey H. Spiegel, MD FACS, Newton, MA

8:50 In-Office Treatment of Nasal Valve Obstruction Using a Novel, Bipolar Radiofrequency Device

Ofer Jacobowitz, MD PhD, New York, NY; Mark S. Driver, MD, Middletown, NY;  
Moshe Ephrat, MD FACS, Lake Success, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the safety and effectiveness of an in-office radiofrequency procedure for internal nasal valve obstruction.

**Objectives:** To assess the safety and effectiveness of in-office bipolar radiofrequency treatment of the nasal valve obstruction. **Study Design:** Prospective, nonrandomized, multicenter case series. **Methods:** Adult patients with a NOSE score  $\geq 60$  were selected. Patients were clinically diagnosed with dynamic or static internal nasal valve obstruction as a primary or significant contributor to obstruction and were required to have a positive response to nasal mechanical dilators or lateralization maneuvers. Bilateral radiofrequency treatment was applied intranasally using a novel device, under local anesthesia in a single session. Safety and tolerance were assessed by event reporting, inspection, and VAS for pain. Efficacy was determined using the NOSE score and patient reported satisfaction survey at 26 weeks. **Results:** Fifty patients were treated. No device or procedure related serious adverse events occurred. Minor adverse events of soreness, edema and crusting resolved by 1 month. At 4 weeks, pain by VAS was 9/100. The mean NOSE score at baseline was 79.9 (SD 10.8, range 60-100), and 100% had severe or extreme obstruction. At 26 weeks, mean NOSE score was 24.7 (SD 20.4,  $p < 0.0001$ ) with 95% two sided confidence intervals 48.5-61.1 for change from baseline. Only 10% had severe or extreme obstruction. The response rate, as defined by a decrease of  $\geq 15$  in NOSE score, was 94%. Patient satisfaction mean was 8.2/10. **Conclusions:** In-office treatment of internal nasal valve obstruction using a bipolar radiofrequency device is safe and well tolerated. Nasal obstruction, as assessed using the NOSE questionnaire at 26 weeks, is markedly improved with high patient satisfaction.

8:55 Major Auricular Avulsion Injuries and Reattachment Techniques: A Systematic Review

Andrew D. Gailey, MS, Chapel Hill, NC; Douglas Farquhar, MD, Chapel Hill, NC; Joseph M. Clark, MD, Chapel Hill, NC; William W. Shockley, MD, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the success rates of reattachment techniques in cases of major auricular avulsion injuries.

# Saturday

**Objectives:** Multiple surgical techniques exist in the acute management of auricular avulsion injuries, including reattachment as a composite graft, use of local skin flaps, the pocket method, the Baudette method, and microvascular repair. This review aimed to compare the success rates of reattachment methods in major auricular avulsion injuries. **Study Design:** N/A. **Methods:** A PubMed search systematically identified cases in which 1) a major auricular avulsion injury occurred; and 2) reattachment was attempted. Search results were combined with an extensive review of references from published studies. In total, 149 cases were identified. Three reviewers independently graded the final aesthetic result of each case using a 5 point scale. The average grade of each repair was compared to reattachment method in order to identify successful techniques. **Results:** Microvascular repair and composite graft reattachment demonstrated higher success rates compared to other reattachment methods. No difference was found between success rates of microvascular repair versus composite graft reattachment, which held true when accounting for the size of the involved segment and type of injury. **Conclusions:** Microvascular repair and composite graft reattachment were found to have similar success rates and as superior alternatives to other techniques. Overall, microvascular repair and composite graft reattachment should be considered the best options in cases of auricular avulsion repair. The authors share a major concern that other methods that rely on the use of periauricular skin will compromise any future attempts for secondary reconstruction, such as staged procedures using costal cartilage grafts. Manipulation of these tissues and in particular any burying of ear cartilage is discouraged.

**9:00**                    **Return to Alcohol Use in Free Flap Patients for Head and Neck Cancer**  
Naillid Felipe, BA, Boston, MA; Pamela Huang, BA, Boston, MA; Richard D. Hubbell, MD, Boston, MA; Waleed Ezzat, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the return to alcohol use in head and neck cancer patients undergoing free flap surgery.

**Objectives:** Surgical patients with head and neck cancer requiring free tissue transfer for reconstruction have higher frequency of alcohol use and need ICU care postoperatively. Thus, alcohol withdrawal is a commonly encountered issue for these patients. However, little to no information about patients' return to alcohol postoperatively has been reported. We examine the rate of return to alcohol after treatment for alcohol induced withdrawal in head and neck cancer patients undergoing free flap surgery. **Study Design:** Retrospective chart review. **Methods:** We conducted chart reviews on 110 patients requiring free tissue transfer between 2013 and 2015. Data was collected and analyzed on alcohol use before and after surgery, intake status, length of stay, and complications. **Results:** 25 patients (22.7%) were found to have significant alcohol use prior to surgery (>2 drinks per day) and were put on CIWA protocol during hospitalization. 82% returned to alcohol when on full oral diet (n=11) and 44% returned to equal or more alcoholic drinks. In contrast, 45% returned to alcohol when on tube and oral diet (n=11) and 67% when reliant on tube feeds (n=3). None returned to equal or more alcoholic drinks in the latter two groups. **Conclusions:** Patients who were not able to retain a full oral diet and those restricted to a feeding tube returned to alcohol at a lower rate. While some studies suggest that treatment of alcohol withdrawal using ethanol may reduce length of hospital stay, use of CIWA protocol and benzodiazepines may have the benefit of decreased ethanol intake postoperatively in our unique patient population.

**9:05**                    **A High Throughput Platform for Nerve Conduit Assessment**  
Suresh Mohan, MD, Boston, MA; Wenjin Wang, MD PhD, Boston, MA;  
Ivan Coto Hernandez, PhD, Boston, MA; Nate T. Jowett, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, participants will better understand the current pitfalls of histologic assessment of neural regeneration and the benefits inherent to the use of modern microscopy techniques combined with transgenic fluorescent reporter murine models.

**Objectives:** To present a novel platform for high throughput histologic assessment of neural regeneration across conduits in a transgenic rodent model that expresses yellow fluorescent protein in peripheral axons. **Study Design:** Experimental animal study. **Methods:** A rapid, non-toxic, and stain free frozen section protocol suitable for assessment of neural regeneration by brightfield and confocal laser scanning fluorescent microscopy was developed. Interposition repair of a sciatic nerve defect in Thy1.2 YFP-16 mice was performed using various types of bioengineered neural conduits and regeneration assessed at six weeks. **Results:** Processing time for axon counting was shortened from two weeks to three days, and stain costs eliminated. Confocal fluorescent microscopy images revealed excellent morphology of regenerating axons, with clear elucidation of permissive vs. repulsive conduit environments. **Conclusions:** A rapid and cost efficient platform for assessment of neural regeneration suitable for testing of novel neural conduit designs has been described.



9:10 Q&amp;A

## LARYNGOLOGY/BRONCHOSOPHAGOLOGY

**Moderators:** Jennifer L. Long, MD PhD, Los Angeles, CA  
Lee M. Akst, MD, Baltimore, MD

9:15 **Outcomes of Intubation Induced Vocal Fold Paralysis and Paresis**  
Debbie R. Pan, BA, Miami, FL; Nancy Jiang, MD, Oakland, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify vocal fold paralysis/paresis (VFP) as a rare but serious complication of intubation; demonstrate an understanding of the outcomes of prolonged intubation induced VFP; discuss the caution that should be taken when approaching post-intubation bilateral VFP cases.

**Objectives:** Vocal fold paralysis/paresis (VFP) is a potential consequence of intubation. Studies describing the natural course of this complication are largely case reports. This study aims to evaluate outcomes for a cohort of patients who endured varying degrees of true vocal fold immobility post-intubation. **Study Design:** Retrospective chart review. **Methods:** Upon excluding known causes of VFP, such as surgeries and tumors involving the head and neck, VFP cases (ICD-9 diagnosis code 478.3) were identified from 2008 to 2014 at a regional healthcare institution. A total of 865 patients were identified and of those, 25 were intubation induced VFP cases. This cohort was then examined for notable features. **Results:** With a mean prolonged intubation duration of 6.55 days, 68% of cases resulted in unilateral left, 8% unilateral right, and 24% bilateral VFP. 80% of patients experienced a recovery outcome (voice improvement or restoration of vocal fold mobility) and of this outcome class, 50% demonstrated full resolution. Mean recovery time was 6.98 months (range, 11-881 days). Additionally, bilateral VFP cases showed a statistically significant association with an approximately 36-fold lower odds of recovery than unilateral cases (OR, 0.0278; 95% CI, 0.0020-0.3868; p-value, 0.0077). **Conclusions:** Intubation induced VFP is rare. In this cohort, most cases resulted from prolonged, not procedural, intubation. While spontaneous recovery was the most common outcome, full remission was not guaranteed in every case. A sizable proportion of cases revealed bilateral VFP which was less likely to resolve. Our results are informative for tracheostomy decision making and differential diagnoses for post-intubation laryngeal symptomatology.

9:20 **Cranial Nerve X Compression at the Brainstem Associated with Chronic Cough, Unilateral Vocal Fold Paresis, Vocal Fold Spasm, Dysphoric Breathing, and Dysphagia: Diagnosis and Treatment Outcomes**  
Robert J. Taylor, MD, Charleston, SC; Stephen R. Lowe, MD, Charleston, SC;  
Nick Ellis, BS, Charleston, SC; Evan Abdullah, BS, Charleston, SC; Sunil J. Patel, MD, Charleston, SC; Lucinda A. Halstead, MD, Charleston, SC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand an algorithm for workup of chronic cough; 2) understand the pathophysiology and clinical presentation of laryngeal manifestations of cranial nerve X compression at the brainstem; 3) compare outcomes of neurosurgical decompression versus non-neurosurgical treatments of cranial nerve X compression at the brainstem; and 4) discuss complications of neurosurgical decompression of cranial nerve X.

**Objectives:** We have observed an association between cranial nerve X (CN-X) compression at the brainstem with laryngeal symptoms utilizing a stepwise algorithm that systematically evaluates and eliminates all common etiologies. Our experience with neurosurgical decompression versus non-neurosurgical treatments is detailed. **Study Design:** Retrospective chart review at a tertiary care academic medical center. Long term quality of life outcomes were obtained by telephone survey. **Methods:** Baseline demographics, clinical characteristics, larynx specific quality of life surveys, and treatment outcomes were recorded for patients with laryngeal symptoms associated with CN-X at the brainstem. **Results:** Forty-nine patients demonstrated CN-X compression at the brainstem on imaging and presented with chief complaints of dysphonia (25/49, 51%), chronic cough (19/49, 39%), dysphoric breathing (3/49, 6%), and dysphagia (2/49, 4%). Poor initial scores were noted for Voice-Related Quality of Life (V-RQOL), Reflux Symptom Index (RSI), and Glottal Closure Index (GCI). Patients undergoing neurosurgical decompression reported partial or complete improvement in 21/24 (88%) cases. Major perioperative complications occurred in 4/24 patients (17%). Neurosurgical decompression was more likely



to obtain complete/near complete symptom resolution (10/24 patients, 42%) than non-neurosurgical treatments (2/24 patients, 8%) ( $p = 0.02$ ). V-RQOL scores improved more in neurosurgical patients [mean change score, 33.0 (SD, 31.2)] than non-neurosurgical patients [mean change score, 9.6 (SD, 20.9)] ( $p = 0.03$ ) (mean followup 3.0 years, SD 2.0). **Conclusions:** CN-X compression at the brainstem should be investigated when all other etiologies are excluded. Neurosurgical CN-X decompression demonstrates acceptable results but requires careful patient selection and preoperative counseling about potential complications.

## 9:25 **Brain Networks for Speech Motor Control and Auditory Processing in Unilateral Vocal Fold Paralysis**

Molly L. Naunheim, MD, San Francisco, CA; Katherine C. Yung, MD, San Francisco, CA; Sarah L. Schneider, CCC-SLP, San Francisco, CA; Jennifer Henderson-Sabes, AuD, San Francisco, CA; Srikanth S. Nagarajan, PhD, San Francisco, CA; Steven W. Cheung, MD, San Francisco, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand the basics of the human sensorimotor loop; 2) explain the reciprocal interdependency of sensory and motor systems in the head and neck; and 3) discuss how functional neuroimaging can elucidate brain networks in speech motor control and auditory processing.

**Objectives:** To evaluate the integrity of brain networks for speech motor control and auditory processing in patients with unilateral vocal fold paralysis (UVFP). **Study Design:** Cross-sectional comparison. **Methods:** Cohorts composed of 10 UVFP study patients treated by type I thyroplasty and 12 control subjects were compared using magnetoencephalographic imaging (MEGI) to examine neuronal activity in brain networks for vocal motor control during a pitch feedback perturbation task. Functional neuroimaging provides important information about central nervous system motor and sensory consequences arising from peripheral impairment in UVFP. **Results:** In response to altered acoustic pitch feedback during vocal production, UVFP patients showed abnormally reduced pitch compensatory responses especially within the first 200ms of feedback perturbation onset ( $p < 0.05$ ), during the auditory feedback error processing phase. This reduction in behavioral compensation was accompanied by enhanced beta-band activity within auditory cortical and premotor regions ( $p < 0.05$ ), indicating over-recruitment of these structures. **Conclusions:** This novel study suggests that a peripheral motor injury is associated with alterations in central sensorimotor activity. An ostensibly isolated laryngeal injury may have broader consequences than previously thought: UVFP, despite mitigation by surgical intervention, impacts not only vocal motor output, but also the central auditory component of sensorimotor communication loop interactions.

## 9:30 **The Effects of Endoscopic Sinus Surgery on Voice Characteristics and Quality of Life in Chronic Rhinosinusitis Patients**

Danny B. Jandali, MD, Chicago, IL; Ashwin Ganti, BA, Chicago, IL; Inna A. Husain, MD, Chicago, IL; Pete S. Batra, MD FACS, Chicago, IL; Bobby A. Tajudeen, MD, Chicago, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the effects functional endoscopic sinus surgery has on postoperative voice characteristics and quality of life.

**Objectives:** Functional endoscopic sinus surgery (FESS) is a standard treatment modality for patients with chronic rhinosinusitis (CRS) who have failed appropriate medical therapy. However, FESS entails modification of the upper airway tract that may alter phonatory resonance and produce voice changes. The effects of FESS on postoperative voice characteristics in patients with CRS have yet to be quantitatively assessed. **Study Design:** Prospective cohort study. **Methods:** Patients with severe CRS who underwent FESS at a tertiary care referral center between May and October 2017 were enrolled. The Consensus Auditory-Perceptual Evaluation of Voice (CAPE-V) and the Voice Handicap Index (VHI) were utilized to quantitatively evaluate voice characteristics and quality of life, respectively. Pre and postoperative CAPE-V and VHI scores were compared to postoperative scores for each patient. Sino-Nasal Outcome Test (SNOT-22) scores were also obtained to assess self reported changes in disease severity. **Results:** 16 CRS patients undergoing FESS were evaluated. The average preoperative Lund-Mackay score was 13.9, indicating baseline severe CRS. Postoperative assessments demonstrated a significant decrease in CAPE-V scores (47.0 vs. 28.1,  $P = 0.013$ ) and VHI scores (9.7 vs. 4.7,  $P = 0.0014$ ). These correlated with a significant decrease in SNOT-22 scores (41.7 vs. 12.5,  $P = 0.00023$ ). **Conclusions:** Patients with CRS experience a significant improvement in voice characteristics and vocal quality of life following FESS. Further, this appears to correlate with a significant decrease in self reported disease severity. These findings may augment the discussion of potential benefits of FESS to a new potential domain for voice quality.

9:35 Q&A

9:40 **Automated Quantification of Vocal Fold Motion after Iatrogenic Recurrent Laryngeal Nerve Injury in a Mouse Surgical Model**

Megan M. Haney, DVM, Columbia, MO; Ali S. Hamad, BS, Columbia, MO;  
Filiz E. Bunyak, PhD, Columbia, MO; Teresa E. Lever, PhD, Columbia, MO

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss automated vocal fold tracking and its advantage over manual analysis.

**Objectives:** The goal of this study was to objectively examine vocal fold (VF) motion dynamics after iatrogenic recurrent laryngeal nerve (RLN) injury in a mouse surgical model. Furthermore, we sought to identify a method of inducing injury with a consistent recovery pattern from which we can begin to evaluate spontaneous recovery and test therapeutic interventions. **Study Design:** Animal experiment. **Methods:** The right RLN in C57BL/6J mice was crushed using an aneurysm clip with 1.3 Newtons closing force. Transoral laryngoscopy enabled visualization of VF movement prior to surgery, immediately post-crush, and at two endpoints: 3 days (n=5) and 2 weeks (n=5). VF motion was quantified with our custom motion analysis software (VFTrack). At each endpoint, RLN samples were collected for transmission electron microscopy (TEM) for correlation with VF motion dynamics. **Results:** Our VFTrack software permitted automated quantification of several measures of VF dynamics, such as range and frequency of motion. By two weeks post-injury, the frequency of right VF movements equaled the left, yet range of motion was only partially recovered. These objective outcome measures enabled us to detect VF dysfunction at 2 weeks post-crush, which was not possible with manual subjective analysis methods. TEM images revealed RLN degeneration 3 days post-crush, and partial regeneration at two weeks, consistent with functional results obtained with automated VF tracking. **Conclusions:** Our motion analysis software provides novel metrics to detect and quantify subtle VF dysfunction in mice that corresponds with underlying RLN degeneration. Adaptation for use with human patients is underway.

9:45 **Factors Associated with Epiglottic Petiole Prolapse Repositioning Success**

Mathieu Bergeron, MD BPharm, Cincinnati, OH; Alessandro De Alarcon, MD MPH, Cincinnati, OH; Catherine K. Hart, MD, Cincinnati, OH; Michael J. Rutter, MD, Cincinnati, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the classical symptoms of petiole prolapse, factors associated with petiole repositioning success and understand the procedure.

**Objectives:** Epiglottic petiole prolapse is an overlooked entity that could lead to supraglottic airway obstruction for patients with complex airway histories. Classical symptoms include exercise intolerance, obstructive sleep apnea, and difficulty with decannulation. Petiole repositioning is a technique to improve the prolapse and its associated symptoms. The goal of this study is to understand factors affecting repositioning results. **Study Design:** Retrospective case series. **Methods:** Patients with complex history of airway reconstruction evaluated by the aerodigestive team at a tertiary pediatric hospital from May 2003-August 2017. All patients underwent repositioning of petiole prolapse. **Results:** We had a total of 59 patients (14 female, 23.7%) with complex airway anomalies with petiole prolapse noted during a microlaryngoscopy and bronchoscopy. Patients had a history of 2.2 (0-5) open airway surgeries and 51/58 (87.9%) of them had prior complete laryngofissure. Laryngotracheoplasty and petiole repositioning were performed as a double staged surgery for 54/58 (91.5%) patients. Mean age was 12.9±6.1 year old (1.3-35.9). Thirteen patients (22.0%) developed classic symptoms of petiole prolapse after a median of 170 (45-1969) days after decannulation. The main risk factor associated with petiole prolapse recurrence was the lack of pre-epiglottic fat debulking at the time of the repositioning (OR 9.6; 95% IC 1.5-60.4, P=0.016). A longer duration of stent placement (49 vs 42 days, P=0.07) was not a statistically significant factor affecting the success rate, mainly due to lack of power. **Conclusions:** Patients with petiole prolapse have a history of complete laryngofissure and multiple open airway surgeries. Pre-epiglottic fat debulking at the time of the repositioning surgery appears to significantly increase the long term success rate.

# Saturday

## 9:50 **How Design Characteristics of Tracheostomy Tubes Affect the Cannula and Tracheal Flows**

Liran Oren, PhD, Cincinnati, OH; Dhananjay Radhakrishnan Subramaniam, MS, Cincinnati, OH; Ephraim Gutmark, PhD, Cincinnati, OH; Paul Jay Willging, MD, Cincinnati, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain how design characteristics of comparable tracheostomy tubes affect flow parameters (such as turbulence, flow resistance) in the cannula and the trachea.

**Objectives:** The present study describes computational modeling of airflow in comparable tracheostomy tube designs for adult subjects with an outer cannula diameter of 12-13mm under different breathing conditions. **Study Design:** Basic science. **Methods:** Flow simulations were performed for three comparable cuffed tracheostomy tubes, namely Tracoe twist plus, Portex DIC, and Shiley XLT Proximal. Anatomically accurate 3D geometry of the trachea was reconstructed for an adult subject. In each model, the tracheostomy tube was aligned with the trachea and its cuff was virtually inflated to seal the airway. Transient simulations of airflow through the models (from the cannula to the bronchi level) were performed for natural and ventilator assisted breathing conditions. **Results:** Flow velocity in the cannula and subsequently the trachea was greater for the Shiley tubes when compared to the Portex and Tracoe. The largest magnitude of inspiratory turbulence was observed near the midpoint of the cannula for all cases. Peak inspiratory and expiratory airflow resistance was least for the Tracoe cannula. Inspiratory wall shear stress from the flow was significantly less for the Tracoe and Portex compared with the Shiley. **Conclusions:** The geometry of tracheostomy tubes has a significant effect on the airflow through the system. Small internal diameter and sharp changes in angulation of the tracheostomy tube was associated with higher turbulence and flow resistance through the cannula. Wall shear stress in the trachea is directly correlated with airflow velocity through the cannulas. Possible clinical implications of the differences in flow dynamics will be further discussed.

## 9:55 **Adenoid Size by Drug Induced Sleep Endoscopy Compared to Nasopharyngeal Mirror Exam**

Habib G. Zalzal, MD, Morgantown, WV; Michele M. Carr, MD, Morgantown, WV; William J. Kohler, Morgantown, WV; Steven W. Coutras, MD, Morgantown, WV

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the correlation of adenoid size as determined by using drug induced sleep endoscopy (DISE) versus nasopharyngeal mirror examination for surgical planning purposes.

**Objectives:** To establish the correlation of adenoid size as determined by using drug induced sleep endoscopy (DISE) versus nasopharyngeal mirror examination. **Study Design:** Retrospective chart review with blinded analysis. **Methods:** Over a 6 year period, 154 pediatric patients underwent DISE for obstructive sleep apnea and had nasopharyngeal mirror exam. DISE videos were assessed by one reviewer, blinded to results of mirror exams. Mirror exam findings were taken from operative notes recorded by one attending physician. Demographic data, comorbidities, and sleep study results were also recorded. **Results:** Ninety-three (58.5%) males and 66 (41.5%) females were included. Mean age + standard deviation at the time of DISE was  $7.34 \pm 3.99$  years, with an average of 29 days after DISE until nasopharyngeal mirror examination. The mean initial adenoid size based on DISE assessment was  $2.62 + 0.99$ , and upon nasopharyngeal mirror assessment was  $2.56 + 0.97$ . DISE and mirror examination determination of adenoid size correlated well (Spearman's  $Rho = 0.82$ ,  $P < 0.00001$ ; Kendal tau = 0.764,  $P < 0.00001$ ). **Conclusions:** Nasal endoscopy during DISE is an excellent tool to confirm adenoid size prior to surgical adenoidectomy in children with obstructive sleep apnea.

## 10:00 **Q&A**

## 10:05 - 10:35 **Break with Exhibitors**

## ALLERGY/RHINOLOGY

**10:35 - 11:20 ALLERGY/RHINOLOGY PANEL: ATYPICAL CHRONIC RHINOSINUSITIS****Moderator:** Andrew N. Goldberg, MD MSCE FACS, San Francisco, CA**Panelists:** **Identification of Immune Deficiency**

Sandra Y. Lin, MD, Baltimore, MD

**Cystic Fibrosis**

Steven D. Pletcher, MD, San Francisco, CA

**Rheumatologic/Systemic Disorders**

Eric H. Holbrook, MD, Boston, MA

**Moderators: Melissa A. Pynnonen, MD Msc, Ann Arbor, MI****Leigh J. Sowerby, MD FRCSC, London, ON****11:20 Eustachian Tube Balloon Dilation: Emerging Practice Patterns for a Novel Procedure**

Steven B. Micucci, MD, Oakland, CA; Jonathan Liang, MD, Oakland, CA;

David B. Keschner, MD, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the applications and indications for use of eustachian tube balloon dilation (ETBD) and compare how ETBD is currently being used in the community today.

**Objectives:** To review the role of eustachian tube balloon dilation (ETBD) in the setting of chronic eustachian tube dysfunction (ETD), and to ascertain how ETBD is currently being used in practice today. **Study Design:** Survey study. **Methods:** An online survey included 20 questions designed by three investigators to examine how otolaryngologists utilize ETBD in the management of ETD. The survey was distributed to the members of the American Rhinologic Society (ARS), the American Otological Society (AOS), and the American Neurotology Society (ANS) in their respective annual electronic mailings in April and May of 2017. **Results:** A total of 157 surveys were returned (126 from ARS and 31 from AOS/ANS). Of those returning the survey, 72 (50%) had not performed ETBD and were excluded from subsequent analysis. 44 (66%) respondents consider ETBD after failure of medical management, conversely 18 (27%) and 26 (39%) consider ETBD after failure of one or more trials of myringotomy tube placement. Routine testing for ETBD includes audiogram with tympanometry 64 (96%) and preoperative CT 38 (57%). 53 (80%) of practitioners only perform ETBD in adults 18 years and older. 34 (53%) respondents describe ETBD as great or good, while 27 (42%) were unsure, and only 3 (5%) did not like ETBD. **Conclusions:** ETBD is a novel technique for the treatment of chronic ETD, and its role continues to evolve and develop. Current practice patterns demonstrate wide variability in the assessment of ETD, heterogeneity in the timing of ETBD, and controversy in preoperative CT screening.

**11:25 Modified EEA with a Minimally Invasive Transoral Approach--An Adjunct to Infrapetrous Approaches**

Guillermo Maza, MD, Columbus, OH; Ali M. Moustafa Omar, MD, Columbus, OH;

Somasundaram Subramaniam, MD, Columbus, OH; Bradley A. Otto, MD, Columbus, OH;

Daniel M. Prevedello, MD, Columbus, OH; Ricardo L. Carrau, MD, Columbus, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate the advantages and limitations of a minimally invasive transpalatal approach to the petrous apex, as compared to an endoscopic endonasal approach.

**Objectives:** To evaluate the potential of a minimally invasive transoral approach (MITA) to the retrocarotid space of the petrous apex, as an adjunct to endoscopic endonasal approaches (EEAs). **Study Design:** Preclinical anatomic study using five cadaveric specimens. **Methods:** All specimens were dissected to include a cross-court (contralateral line of sight) transpterygoid EEA, followed by an extradural clivectomy exposing both petroclival junctions. Surgical targets were marked on the posteromedial wall of the petrous internal carotid artery (ICA) at its anterior genu, mid-horizontal portion, and posterior genu. A palatal mucoperiosteal flap was raised, and a rectangular window was drilled, between



greater palatine foramina, with its posterior margin set anteriorly to the palatine aponeurosis. For each target, the surgical freedom and angles of attack (in the horizontal and vertical planes) were calculated and statistically compared between approaches. **Results:** Compared to EEAs, the MITA resulted in greater surgical freedom for all targets, with highest values at the anterior genu (1661.37[mm<sup>2</sup>] Vs. 312.76[mm<sup>2</sup>],  $p < 0.001$ ), maintaining superiority all the way to the posterior genu (847.84[mm<sup>2</sup>] Vs. 138.91[mm<sup>2</sup>],  $p < 0.005$ .) Significantly greater angles of attack were also obtained in all targets. **Conclusions:** This study shows that a MITA could supplement the exposure provided by a transpterygoid EEA. This technique, with a low potential morbidity, offers an alternative to carotid lateralization while resecting extradural tumors, closely adjacent to the petrous ICA.

## 11:30 Does Appropriate Medical Therapy Improve SNOT-22 Domain Scores? An Investigation of the Minimum Clinically Important Difference

Naweed I. Chowdhury, MD, Nashville, TN; Jess C. Mace, MPH, Portland, OR; Todd E. Bodner, PhD, Portland, OR; Jeremiah A. Alt, MD PhD, Salt Lake City, UT; Adam S. DeConde, MD, San Diego, CA; Timothy L. Smith, MD MPH, Portland, OR

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify and discuss the minimum clinically important differences in SNOT-22 scores associated with outcomes of medical therapy for chronic rhinosinusitis and compare those to historical values associated with outcomes of endoscopic sinus surgery.

**Objectives:** Minimum clinically important differences (MCIDs) for the 22 item SinoNasal Outcomes Test (SNOT-22) in patients with chronic rhinosinusitis (CRS) electing endoscopic sinus surgery (ESS) are well described. However, similar estimations for the MCID have not been investigated for patients electing continued appropriate medical therapy (CAMT). We sought to determine MCID values for a medically treated CRS cohort and compare them to historical MCIDs associated with ESS. **Study Design:** Multi-institutional, observational cohort. **Methods:** 120 patients with refractory CRS electing CAMT were prospectively enrolled from academic referral clinics. Baseline and post-treatment SNOT-22 survey responses were collected. Four distribution based methods for calculating MCIDs (e.g. half standard deviation, Cohen's d, standard error of measurement, and minimum detectable change) were used to identify a range of MCID values for SNOT-22 total and domain scores. **Results:** The average MCID value for SNOT-22 total scores was 8.0 while mean MCID values for rhinologic, extranasal rhinologic, ear/facial, psychological dysfunction, and sleep dysfunction symptom domain scores were 3.9, 2.5, 3.3, 3.4, and 2.9 respectively, comparable to previously reported values for patients electing ESS. While average followup SNOT-22 total scores exceeded the MCID, none of the average SNOT-22 domain score improvements surpassed their respective MCID thresholds. **Conclusions:** MCID values for SNOT-22 total and domain scores in patients electing CAMT are similar to previously published MCID values associated with ESS, indicating that MCID values are independent of treatment modality selection. Therefore, despite evidence of statistical significance, CAMT for CRS may not be associated with clinically discernible improvement in average SNOT-22 domain scores.

## 11:35 Balloon Catheter Dilation of the Sinuses: A 2011-2014 MarketScan® Analysis

David W. Jang, MD, Durham, NC; Cecily F. Abraham, BS, Durham, NC; Derek D. Cyr, PhD, Durham, NC; Kristine A. Schulz, MPH DrPH, Durham, NC; Ralph Abi Hachem, MD MS, Durham, NC; David L. Witsell, MD MHS, Durham, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the recent practice patterns for balloon catheter dilation of the sinuses.

**Objectives:** This study uses a large national claims based database to analyze recent practice patterns related to balloon catheter dilation (BCD) of the sinuses. **Study Design:** Retrospective analysis of claims based database. **Methods:** Patients with chronic rhinosinusitis (CRS) undergoing BCD and functional endoscopic sinus surgery (FESS) from 2011 to 2014 were identified in Truven Health MarketScan® Databases using ICD-9 and current procedural terminology (CPT) codes. Prevalence of CRS and frequency of sinus procedures were trended over the study period. Information related to site of service, demographics, and comorbidities was analyzed. **Results:** Although the prevalence of CRS and sinus procedures remained stable over the study period, there was a consistent increase in the annual number of BCD procedures, especially those performed in the office setting. Among BCD procedures, multi-sinus dilation had the largest increase. A higher proportion of the patients undergoing BCD were women, over the age of 65, and from the South. There was a higher prevalence of headache disorder and allergic rhinitis in the BCD group as compared to the FESS and hybrid groups. **Conclusions:** BCD, especially in the office, has risen in popularity since the introduction of CPT codes in 2011. This study reveals significant differences in demographics and comorbidities between patients undergoing BCD and those

undergoing FESS. Such disparities may highlight the need for better defined indications for use of this technology.

- 11:40**                    **Mucosal Bleeding and Intraoperative Visibility during Endoscopic Sinus Surgery: A Blinded Randomized Controlled Trial with Labetalol and Esmolol**  
Philip F. Lavere, BS, Galveston, TX; Nikunj A. Rana, MD, Galveston, TX;  
Michael P. Kinsky, MD, Galveston, TX; Mohamad R. Chaaban, MD, Galveston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the intraoperative measures used to reduce mucosal bleeding during endoscopic sinus surgery; specifically, the role of controlled hypotension in endoscopic sinus surgery, comparison between adrenergic antagonists efficacy in maintaining intraoperative hemodynamic control, and their interaction with topical decongestants (epinephrine).

**Objectives:** Improved intraoperative visibility during functional endoscopic sinus surgery (FESS) decreases the risk of serious orbital or skull base injuries. Controlled hypotension is among several factors proposed to reduce mucosal bleeding. Adrenergic antagonists that are used to maintain mean arterial pressure (MAP) may interact with topical epinephrine. Labetalol (mixed alpha-beta blocker) reduces heart rate (HR) and MAP; however, its alpha-blockade may mitigate topical epinephrine decongestant effects. Esmolol (selective beta-blocker) may result in unopposed alpha-stimulation. This study compares the hemodynamic parameters, intraoperative visibility, and estimated blood loss (EBL) during FESS between esmolol and labetalol. **Study Design:** Randomized double blind controlled trial. **Methods:** Adults undergoing FESS at a tertiary center received dose infused esmolol or intravenous push labetalol. Intraoperatively, patients received topical epinephrine (1:1000) every 15 minutes. Charts were reviewed for hemodynamic data and operative video recording was reviewed for bleeding scores. Primary outcomes included: intraoperative visibility using validated Boezart and Wormald scores, and hemodynamics including EBL/minute, average MAP, and average HR. **Results:** 26 patients received either study drug. There was no statistically significant difference between esmolol and labetalol in EBL/minute (0.65 vs. 0.71 mL/min), average MAP (79.1 vs. 77.8 mmHg), and median bleeding scores for Boezart (3.3 vs. 3.5) or Wormald (6.6 vs. 6.4). Labetalol had a lower HR trend (73.1 vs. 65.3, p-value = 0.054). **Conclusions:** There were no significant differences between esmolol and labetalol in surgical visibility, EBL and MAP. The labetalol lower HR trend didn't reach statistical significance. No interactions with topical epinephrine were observed and either drug may be used.

- 11:45**                    **Does Inferior Turbinate Augmentation Help Empty Nose Syndrome Patients? Using Validated Disease Specific Questionnaires**  
Andrew V. Thamboo, MD MHSc, Vancouver, BC Canada; Navarat Tangbumrungham, MD, Palo Alto, CA; Nicole Bouchard, BA, Palo Alto, CA; Sachi Dholakia, BS, Palo Alto, CA;  
Vishal S. Patel, BS, Palo Alto, CA; Jayakar V. Nayak, MD PhD, Palo Alto, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to know that inferior turbinate augmentation can change the lives of empty nose syndrome patients.

**Objectives:** Our understanding of empty nose syndrome (ENS) continues to evolve and while our understanding of the pathophysiology is limited, the existence of this condition is slowly gaining acceptance. Prior studies evaluating the outcomes of inferior turbinate augmentation did not use a validated disease specific questionnaire; therefore, it is unclear the true impact these surgeries. We report our experience performing surgery on ENS patients using a validated disease specific questionnaire, empty nose syndrome 6 item questionnaire (ENS-6Q), and include outcomes on anxiety, depression and nasal airflow. **Study Design:** Retrospective case series. **Methods:** A single center case series was performed for all patients diagnosed with ENS who underwent inferior turbinate augmentation (ITA) using small intestinal submucosa, Biodesign graft, or acellular dermal matrix, AlloDerm, between January 2010 to December 2016. Subjective outcomes of ITA included comparisons of preoperative and postoperative assessments (1 week, 1 month, 3 months and 6 months) of the ENS6Q, Patient Health Questionnaire-9 (PHQ-9), Generalized Anxiety Disorder 7-item Scale (GAD-7), and the Sino-Nasal Outcome Test-22 (SNOT-22). Objective outcomes included evaluation of preoperative and postoperative peak nasal inspiratory flow (PNIF). **Results:** Twelve patients with ENS meeting surgical inclusion criteria underwent ITA with appropriate 6 month followup. The change in ENS6Q maintained statistical significance at 6 months (p=0.0012). Similar results were achieved with the PHQ-9, GAD-7 and SNOT-22 (p=0.0002, 0.0004, 0.0097 respectively). The mean PNIF increased but not significantly. **Conclusions:** Inferior turbinate augmentation for ENS patients can have a dramatic improvement in their quality of life with respect to their ENS specific symptoms as well as improve their psychological state.

# Saturday

**11:50**                    **Factors Associated with Patient Nonattendance in Rhinology Clinics**  
Benjamin N. Hunter, MD, Springfield, IL; Arun Sharma, MD MS, Springfield, IL;  
Dana Crosby, MD, Springfield, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate ability to use simple means to identify patients at high risk of no-showing for clinic appointments.

**Objectives:** 1) Describe no-show rates in rhinology clinics; and 2) evaluate for predictors of nonattendance. **Study Design:** Retrospective review from a tertiary care academic medical center. **Methods:** Descriptive statistics, chi-squared analysis, and a multivariate logistic regression model were used to analyze de-identified data from clinic appointments. **Results:** There were 1,630 clinical encounters over a 12 month period at a rhinology clinic that were evaluated. Sixty-three percent of patients kept their appointments and 6% did not. The other appointments were cancelled or rescheduled for other reasons. Sex, season of visit, type of visit (new vs established), and time of visit (AM vs PM) were not associated with patient's attendance status. Univariate analysis showed that patients aged 50 ( $p=0.001$ ), primary insurance type ( $p<0.001$ ), and presence of secondary insurance ( $p=0.034$ ) were associated with nonattendance. Medicaid as the primary insurance type was associated with clinic nonattendance. Multivariable analysis showed that primary insurance type (Medicaid: OR 5.85 (95% CI 3.55-9.62),  $p<0.001$ ) and presence of secondary insurance (OR 2.04 (95% CI 1.26-3.31),  $p=0.004$ ) remained significant predictors of nonattendance. **Conclusions:** Insurance status is associated with risk of missing rhinology clinic appointments. Medicaid as the primary insurance type and presence of secondary insurance were associated with nonattendance in the multivariable analysis. As a subspecialty, delivery of timely care and clinical efficiency could be optimized by interventions directed towards improving attendance among this population.

**11:55**                    **Q&A**

**12:00 - 1:00**            **Lunch Break**

1:00 - 5:00            SCIENTIFIC SESSION

GENERAL AND SLEEP MEDICINE

**1:00 - 1:50**            **PANEL: WHAT TO EXPECT WHEN BABY BOOMERS GO BUST**  
**Moderator:** Kathleen L. Yaremchuk, MD MSA, Detroit, MI  
**Panelists:**    **Age Is More Than a Number: Frailty**  
Christine G. Gourin, MD FACS, Baltimore, MD  
                  **Do Not Go Gentle Into That Good Night: Aging Up**  
M. Boyd Gillespie, MD MSc FACS, Memphis, TN  
                  **Caring for Older Adults Who Are Dizzy and Giddy**  
Justin S. Golub, MD, New York, NY  
                  **The Voice of the Baby Boomer**  
Katherine A. Kendall, MD FACS, Salt Lake City, UT

**Moderators: Nasir I. Bhatti, MD FACS, Baltimore, MD**  
**Kourosh Parham, MD PhD, Farmington, CT**

**1:55**                    **Lingual Tonsillectomy and Pediatric Obstructive Sleep Apnea: Does Doing More Improve Outcomes?**  
Habib G. Zalzal, MD, Morgantown, WV; Michele M. Carr, MD, Morgantown, WV;  
Steven W. Coutras, MD, Morgantown, WV

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the effectiveness of lingual tonsillectomy and midline posterior glossectomy alone to combined surgery in the treatment of obstructive sleep apnea in children.



**Objectives:** To evaluate changes in apnea hypopnea index (AHI) in children undergoing lingual tonsillectomy (LT), mid-line posterior glossectomy (MPG) or both together for obstructive sleep apnea (OSA). **Study Design:** Retrospective chart review. **Methods:** Ninety-eight consecutive patients with persistent OSA were evaluated by sleep endoscopy and had lingual tonsil hypertrophy, macroglossia, or both. Age, sex, body mass index (BMI) percent for age, polysomnograms, and postoperative complications were also evaluated. Success was defined by resolution of sleep apnea symptoms, improvement of AHI by at least 1.0 event/hour or 10% of total AHI, and no further surgery or CPAP use. **Results:** Ninety-eight children (age range 2-17 years) underwent LT (N=55), MPG (N=17) or LT+MPG (N=26). There was no difference in preoperative AHI or BMI Z-score between the groups. For all weight categories, AHI in the LT+MPG group improved by 5.74, while in the LT and MPG group, AHI improved by 2.78 and 2.52 respectively (P = 0.21). For patients with BMI Z-score < 1, no difference in AHI improvement was found between these different surgeries. Patients with a BMI Z-score > 1 were more likely to have AHI improvement with LT+MPG (8.73) compared to MPG (-1.97) (P < 0.05). Resolution of sleep apnea symptoms was not significantly different between surgeries or among weight categories. Overall clinical success criteria were met by 63% of patients. **Conclusions:** Children undergoing LT+MPG had greater postoperative change in AHI compared to those undergoing MPG, particularly in overweight and obese patients. No other factor was significantly related to resolution of sleep apnea.

2:00

### Upper Airway Stimulation (UAS) and Sleep Outcomes: A Meta-Analysis

Anvesh R. Kompelli, BA, Charleston, SC; Jonathan S. Ni, BA, Charleston, SC;  
Shaun A. Nguyen, MD, Charleston, SC; Eric J. Lentsch, MD, Charleston, SC;  
David M. Neskey, MD, Charleston, SC; Ted A. Meyer, MD PhD, Charleston, SC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the benefits and risks associated with upper airway stimulation in the treatment of obstructive sleep apnea.

**Objectives:** Obstructive sleep apnea (OSA) is a prevalent disease with significant health impacts. While first line therapy is CPAP, long term compliance is low and device misuse is common, highlighting the need for alternative therapies. Upper airway surgery is one alternative, but substantial side effects hamper efficacy. A new alternative is the implantable upper airway stimulator (UAS). These devices utilize neuromodulation to dilate/reinforce the airway and reduce side effects associated with traditional surgery. Several recent trials investigated the efficacy of these devices. The purpose of this study was to perform meta-analysis of available UAS studies investigating treatment of OSA to analyze objective and subjective outcomes and side effects. **Study Design:** A comprehensive literature search of PubMed and Scopus was performed. **Methods:** Two independent reviewers examined clinical trials investigating UAS in treatment of sleep apnea in adults. Studies with objective and subjective endpoints in sleep were included for analysis. Adverse events from trials were also recorded. **Results:** A total of 381 patients across 16 studies were analyzed. At 6 months (p=0.008), mean SAQLI improved by 1.2 (95% CI, 0.3-2.2). At 12 months (p<0.0001), mean AHI was reduced by 19.5 (95% CI, 16.6-22.3), mean ODI was reduced by 15.0 (95% CI, 13.3-16.7), mean ESS was reduced by 4.8 (95% CI, 4.2-5.4), mean FOSQ improved by 3.06 (95% CI, 2.7-3.4). Pain (6.2%:0.7-16.6), tongue abrasion (11.0%:1.2-28.7), and internal (3.0%:0.3-8.4)/external device (5.8%:0.3-17.4) malfunction were common adverse events. **Conclusions:** UAS is a safe and effective treatment for CPAP refractory OSA. Further study comparing UAS to other therapies is required.

2:05

### Sex Bias in Human Otolaryngology Clinical Research

Zainab Farzal, MD, Chapel Hill, NC; Elizabeth D. Stephenson, BA, Chapel Hill, NC;  
Lauren A. Kilpatrick, MD, Chapel Hill, NC; Brent A. Senior, MD, Chapel Hill, NC;  
Adam M. Zanation, MD, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the present state of gender bias in otolaryngology clinical research and the importance of diminishing this bias in future research and clinical care.

**Objectives:** Recent initiatives have highlighted substantial gender bias in surgical research. The objective was to determine whether gender bias is prevalent in the otolaryngology literature and whether sex is appropriately analyzed as an independent variable in otolaryngology clinical research. **Study Design:** Literature review. **Methods:** We reviewed all articles in 2016 in three major otolaryngology journals: The Laryngoscope, JAMA Otolaryngology-Head & Neck Surgery (HNS), and Otolaryngology-HNS. Extracted data included type of study, location, subspecialty, number/gender of subjects, gender matching, and gender based statistical analysis. **Results:** 600 of 1209 articles comprising original nonbasic science research were reviewed including 8,997,307,856 subjects (males: 3,898,559,067 [43.33%]; females:

# Saturday

5,095,592,663 [56.63%]; and unknown: 3,156,126 [0.04%]). 533/600 (88.8%) studies included both genders, 7 (1.2%) included females only, 5 (0.8%) included males only, and 55 (9.2%) did not document participant gender. Only 280 studies (46.7%) analyzed data by gender and 393 studies (65.5%) had at least 50% participant gender matching. International studies performed statistical analysis by gender more frequently than domestic (57.7% vs. 40.8%,  $p < 0.0001$ ) although gender matching was similar in both groups (61.7% vs. 61.3%, respectively,  $p > 0.05$ ). Amongst subspecialties, analysis by gender was more frequently performed in head and neck surgery (53.6%) and pediatric otolaryngology (51.3%) while 50%+ gender matching was highest in pediatric otolaryngology (86.8%) and otology (82.4%). **Conclusions:** Gender bias is prevalent in the clinical otolaryngology/HNS literature with less than 50% of studies analyzing gender. Acknowledging the intertwinement of gender with human pathology and outcomes is important. Eliminating this bias in both clinical care and research should become a major focus for otolaryngologists.

## 2:10 Analysis of Patient Factors Associated with Mortality after Tracheostomy Using the Global Tracheostomy Collaborative Database

Khaled Kashlan, MD, Detroit, MI; Steven S. Chang, MD, Detroit, MI; Amy Williams, PhD, Detroit, MI; Kathleen L. Yaremchuk, MD, Detroit, MI; Ross M. Mayerhoff, MD, Detroit, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss patient characteristics that are independently associated with lower survival after tracheostomy.

**Objectives:** Likely owing to a multitude of comorbidities in many patients undergoing tracheostomy, mortality has been reported as being approximately 22-45% 1,2. In order to better counsel patients and families, the aim of this study is to analyze comorbidities and other factors independently associated with shorter survival following tracheostomy. Additionally, this study serves as one of the first to integrate the Global Tracheostomy Collaborative database with a retrospective review in adults undergoing tracheostomy. **Study Design:** Retrospective review. **Methods:** A retrospective review was performed of patients enrolled in the Global Tracheostomy Collaborative database at a tertiary care adult hospital from 2015-2016. Univariate and multivariate analyses are used. **Results:** During the study period, 326 tracheostomies were performed and the overall mortality rate was 45%. Analysis is performed of the association of socioeconomic status, Charlson comorbidity index, primary diagnosis, and BMI with short (< 30 days) and long term mortality after tracheostomy. **Conclusions:** The Global Tracheostomy Database provides a framework for studying factors that may be associated with decreased survival after tracheostomy. Going forward, this can be used to aggregate data to perform a similar analysis across multiple member institutions in order to provide greater statistical power and generalizability. It is unusual for mortality to be caused by tracheostomy complications specifically, but patients undergoing tracheostomy have a high mortality rate owing to the underlying conditions that might lead to needing the operation.

## 2:15 Otolaryngology Hospitalist Provides Effective and Efficient Tracheostomy Service

Mohamad R. Issa, MD MS, Pittsburgh, PA; Sara Mater, BS, Pittsburgh, PA; Carl H. Snyderman, MD MBA, Pittsburgh, PA; Yan W. Ho, MD, Pittsburgh, PA

**Educational Objective:** The concept of a dedicated hospitalist has been well established, with the findings of reduced length of stay thereby increasing healthcare savings. The role of an ENT hospitalist has not been studied. At the conclusion of this presentation, the participants should be able to understand the role of an ENT hospitalist in a large tertiary care hospital through analyzing a common procedure--tracheostomies.

**Objectives:** The aim of this study is to assess the effects of a dedicated ENT hospitalist on a common procedure--tracheostomy. **Study Design:** A retrospective review of all tracheostomies performed at one center was performed. **Methods:** A retrospective review of all tracheostomies performed by ENT at a large tertiary care hospital between July 2015-July 2017 were reviewed for both patient information as well as outcomes. An ENT hospitalist was available in the academic year 2016-2017. **Results:** Compared to other ENT faculty within the same year, the hospitalist's tracheostomy patients had longer ICU stays, and patients had shorter trach delay times. However, when comparing the year before the hospitalist and the year with the addition of an ENT hospitalist, there was a shorter trach delay and shorter ICU stay post trach for the entire department. In the year with the ENT hospitalist, there was a greater proportion of percutaneous to open tracheostomies seen in all subgroup analysis. Percutaneous trachs had shorter delay times and shorter ICU stays. **Conclusions:** Our study demonstrates a positive effect of having a dedicated ENT hospitalist on tracheostomies performed at a tertiary care hospital. With an ENT hospitalist, we see shorter wait times, shorter times to ICU discharge and a higher number of percutaneous tracheostomies, which decreases use of limited hospital operative room resources.

**2:20 Sex Bias and Reporting in Basic Science and Translational Otolaryngology****Research**

Elizabeth D. Stephenson, BA, Chapel Hill, NC; Zainab Farzal, MD, Chapel Hill, NC (Presenter); Lauren A. Kilpatrick, MD, Chapel Hill, NC; Brent A. Senior, MD, Chapel Hill, NC; Adam M. Zanation, MD, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the current research and reporting patterns of animal and/or cell gender in the basic science and translational otolaryngology literature.

**Objectives:** Recent studies revealed sex bias in surgical research. While many diseases exhibit sex based clinically relevant differences, otolaryngology research has not been analyzed for sex reporting and disparity. We postulate that a similar bias is prevalent in otolaryngology literature. **Study Design:** Literature review. **Methods:** Manuscripts published in 2016 from The Laryngoscope, Otolaryngology-Head and Neck Surgery, and JAMA-Otolaryngology were reviewed. Manuscripts with animal subjects, human subject cells or commercial cell lines were included. Data collected included study type, cell/animal sex and sex based data analysis. **Results:** Of 1209 articles, 73 basic/translational research articles were identified. 50.7% (37/73) lacked sex breakdown. Of studies that reported gender, 25.0% (9/36) included both sexes, and 11.1% (4/36) analyzed data by sex. Sixty-two (84.9%) used animal subjects, of which 28 (45.2%) lacked sex breakdown. Among animal studies 48.4% (30/62) included only one gender, and 3.2% (3/62) analyzed data by gender. Eighteen (24.7%) cell studies used a total of 22 cell groups. None (0.0%) reported cell sex in the manuscript. Among cell groups, 40.9% (9/22) were of unknown sex, and 22.7% (5/22) were single sex. Data analysis by sex was included in 13.6% (3/22). Of all studies, 55.0% (22/40) of domestic and 45.5% (18/33) of international studies lacked sex breakdown. 40% (16/40) and 77.8% (14/33) of domestic and international studies analyzed a single sex, respectively. **Conclusions:** Gender may influence outcomes significantly but is vastly underreported (49.3%) and underanalyzed (11.1%) in basic/translational otolaryngology research. Since this research frequently lays the groundwork for clinical trials and standards of care, future research must address these sex based discrepancies.

**2:25 A Standardized Clinical Assessment and Management Plan (SCAMP) to Optimize Treatment for Adults with Obstructive Sleep Apnea**

David R. Lee, MD, Cincinnati, OH; Nithin S. Peddireddy, BS, Cincinnati, OH; Rahul N. Prasad, MBA, Cincinnati, OH; Matthew T. Maksimoski, MD, Chicago, IL; Hannah E. Qualls, MD, Cincinnati, OH; Stacey L. Ishman, MD MPH, Cincinnati, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the utility of a standardized clinical assessment and management plan (SCAMP) in the care of adults with obstructive sleep apnea and discuss the common areas of deviation from the SCAMP in this patient population.

**Objectives:** Standardized clinical assessment and management plans (SCAMPs) are patient care algorithms designed to optimize patient outcomes by standardizing practice. Our aim was to assess SCAMP deviations for adults with obstructive sleep apnea (OSA) in order to optimize the SCAMP and patient outcomes. **Study Design:** Single institution prospective study. **Methods:** After a literature review, physicians, nurses and a quality manager for a multidisciplinary upper airway center in a tertiary pediatric hospital created the SCAMP. Deviations were recorded and classified by algorithm step and reason for deviation for patients  $\geq 18$  years. **Results:** We treated 45 adults (mean age=22.1, 31% female); 41 (91%) had moderate/severe OSA, and 4 (9%) had mild OSA. Twenty-four (53%) had Down syndrome, Pierre-Robin sequence, or Treacher-Collins. Overall, there were 11 deviations in 10 patients (22%); 3/4 (75%) of those with mild OSA, and 8/41 (20%) of those with moderate/severe OSA. Four of the deviations were related to initiating and managing continuous positive airway pressure (CPAP) - typically deciding not to use CPAP, while 3 were related to the timing of clinic visits. **Conclusions:** For adults with OSA, the SCAMP was used without deviation in 80% of those with moderate/severe OSA and 25% in those with mild OSA. When deviations occurred, they most commonly involved management of CPAP and timing of clinic visits. These results suggest that our care plans may benefit from optimization of care, especially for those with mild OSA, although the small sample size of those with mild OSA suggests that further investigation is necessary.

**2:30 Q&A****2:35 - 3:05 Break with Exhibitors**

# Saturday

3:05 - 3:55

## PANEL: POTPOURRI

**Moderator:** Thomas L. Carroll, MD, Boston, MA

**Panelists:** **Patenting and Commercializing Your Intellectual Property: Important Lessons**

Subinoy Das, MD FACS, Columbus, OH

**Effective Teaching for the Next Generation**

Kevin Fung, MD FRCS(C) FACS, London, ON

**CPG's in Your Practice**

Eunice Y. Chen, MD PhD, Lebanon, NH

**Use Your EMR to Document Quality**

Jennifer J. Shin, MD, Boston, MA

**Simulation for the Practitioner**

Marvin P. Fried, MD FACS, Bronx, NY

## CLINICAL FUNDAMENTALS AND GENERAL

**Moderators:** Charles A. Hughes, MD FACS, Houston, TX

Oliver F. Adunka, MD, Columbus, OH

3:55

## Critical Care Resources Utilized in High Risk Adenotonsillectomy Patients

Jennifer M. Lavin, MD MS, Chicago, IL; Craig M. Smith, MD, Chicago, IL;

Zena Leah Harris, MD, Chicago, IL; Dana M. Thompson, MD MS, Chicago, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand that there is an opportunity to improve efficiency of care of high risk adenotonsillectomy patients.

**Objectives:** Children at high risk for respiratory complication after adenotonsillectomy are often admitted to pediatric intensive care units (PICU) postoperatively. While many patients receive care in such units, it is unknown how many utilize critical care resources. **Study Design:** Retrospective review. **Methods:** A review was conducted to audit intensive care needs of post-adenotonsillectomy patients admitted to the PICU at a tertiary, academic, pediatric hospital between July, 2013 and March, 2017. Demographic information, ICU indication, polysomnogram results, and comorbidities were collected. Patients were defined as needing ICU resources based on supplemental oxygen requirements >2L between 3-24 hours postoperatively, >2 desaturation events in a two hour period, or greater than hourly nursing intervention. Factors associated with utilization of critical care resources were assessed. **Results:** 110 patients were admitted to the PICU after adenotonsillectomy. Median age was 4.2 years, median body mass index was 90.8 percentile, and median apnea hypopnea index was 34.3. Twenty patients (18.2%) utilized ICU resources by criteria defined. Of these patients, 16 were known to need such resources by three hours postoperatively (80%, NPV 95.7%). Neither AHI nor obesity status was correlated with need for resources, however resource need was associated with gastrostomy tube status and neuromuscular disorders ( $p = 0.002$  and  $0.01$  respectively). **Conclusions:** Most high risk adenotonsillectomy patients do not utilize critical care resources despite their increased perioperative risk. Patients with respiratory complications are frequently identifiable within the first three hours of surgery. Such findings support a model of prolonged PACU observation of this patient population to improve efficiency of care.

4:00

## Implementation of a Nurse Telephonic Triage Service for After Hour Patient Calls in Otolaryngology

Shannon F. Rudy, MD, Palo Alto, CA; Jennifer Y. Lee, MD, Palo Alto, CA;

Nidhi Rohatgi, MD, Palo Alto, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the concept of a nursing telephone triage service, discuss the possible benefits of such a service in the setting of a university hospital based otolaryngology program, and compare the results of such a telephone triage program to other alternatives, such as a system in which on call residents serve as the primary responders to outpatient phone calls.

**Objectives:** Telephone triage is a growing clinical practice area that provides opportunity for standardized, efficient after



hours care for patients. A project was designed to implement an after-hours nurse telephone triage program within the department of otolaryngology at a tertiary care center through a hospital wide initiative called the Clinical Advice Service (CAS) to improve quality, speed, and consistency of responses to patient concerns in the outpatient setting. **Study Design:** Quality improvement initiative. **Methods:** In November 2016, our institution launched the Clinical Advice Service (CAS) to provide a patient centric, nurse run telephone triage service for after-hour calls from otolaryngology patients. Clinical protocols were created for use by CAS staff by otolaryngology clinicians. **Results:** Between November 2016 and June 2017, CAS has accepted 626 after-hours calls from otolaryngology patients. CAS escalated 18.1% of the calls to the on call otolaryngology physician. 4.1% otolaryngology patients were triaged to the emergency room by CAS. On followup within 24 hours of initial call, over 95% of patients stated that they were satisfied with CAS, understood the advice they had been given, and had had all of their needs met. **Conclusions:** Data from the first 8 months of CAS implementation in our otolaryngology department suggest this is a safe and effective program for answering after-hours outpatient phone calls with high levels of patient satisfaction. CAS has been able to provide well coordinated care to otolaryngology patients while reducing physician workload.

#### 4:05 **Operating Room Ergonomics: A Practical Approach for Reducing OR Ergonomic Hazards**

Yona Vaisbuch, MD, Stanford, CA; Ksenia Aaron, MD, Stanford, CA (Presenter);  
Justin M. Moore, MD PhD, Palo Alto, CA; John Vaughan, CPE MSE, Palo, CA;  
Robert K. Jackler, MD, Stanford, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the OR ergonomic hazards and the prevalence of back pain among otolaryngologists.

**Objectives:** To establish the rate and severity of back pain among surgeons at various career stages and its impact on occupational and daily activities. To assess ergonomic practice in clinical and operating room settings. **Study Design:** Survey and field observation. **Methods:** A survey of otolaryngologists at a US academic medical center. The survey evaluated ergonomic practice, the operating room environment, and ergonomic education. Using the validated Rapid Entire Body Assessment (REBA) system to identify ergonomic hazards, we conducted intraoperative observations, assessing operating room personnel during different subspecialty ENT techniques. **Results:** 73% of surgeons suffered back pain with cervical symptoms most common (55%). Only 27% reported no back pain while operating, remarkably residents were just as likely to be affected as senior surgeons. 43.8% of surgeons had most pain when standing while only 12.5% suffered pain when sitting. Importantly, 10% said the back pain impacted their work. Only 24% of surgeons had ergonomic training. REBA scores identified standing as the highest risk posture and found that surgeons failed to utilize the adjustability present in the OR. **Conclusions:** As back pain is widespread among otolaryngologists and is an important cause of disability, all surgeons should be trained to optimize ergonomics in both clinic and operating room and to learn that particular postures and room arrangements may lessen the probability of injury.

#### 4:10 **Lean Thinking in an Inpatient Otolaryngology Consult Service**

Kristen D. Pitts, MD, Jackson, MS; Jonathan E. Sorrel, MD, Jackson, MS;  
Alexandra S. Brown, MD, Jackson, MS

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the lean principles used to optimize an inpatient otolaryngology consult service. They should be able to compare tools used and have the ability to duplicate these methods in their own practice to help streamline any process in the clinical setting.

**Objectives:** Lean is a process improvement methodology that reduces waste and improves efficiency. With this project, we sought to optimize the inpatient otolaryngology consult service at a single academic institution using lean. **Study Design:** During a kaizen event involving multiple stakeholders, the following core processes were identified: inventory management, flexible laryngoscope storage, processing and transport, and staff coverage of consults. We built a value stream map for each key process and identified actionable items for improvement. For supply management, this process led to the reorganization of our supply room using the lean tools 5S and Kanban. New storage, transport, and logging systems were developed for the flexible laryngoscopes, and advanced practice providers were assigned to daytime consult coverage. **Methods:** To quantify improvement in efficiency of the inpatient consult service, surrogate cost measures were analyzed, simulated timed consult trials were conducted, and laryngoscope send outs for breakage were tracked and compared to baseline. **Results:** In multiple simulated inpatient consults, average time required gathering necessary supplies decreased from 10 minutes, 14 seconds to 2 minutes, 53 seconds. Stocking lists and par levels for the supply

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room were developed and standardized. Laryngoscope send outs for repair decreased from an average of 4.4 per year to 0 per year, representing a cost savings of a mean of \$13,294.08 in yearly repair fees. Lastly, inpatient consult charges increased significantly after adding advanced practice provider coverage. **Conclusions:** Applying lean principles to an inpatient academic otolaryngology consult service led to significant cost savings, fewer damaged laryngoscopes and an increase in net billing revenue.

## 4:15 I Dream of Gini: Quantifying Inequality in Otolaryngology Residency Interview Invitations

Andrew H. Lee, MD, Baltimore, MD; Patrick J. Young, BS, Baltimore, MD;  
Ross S. Liao, BS, Baltimore, MD; Paul H. Yi, MD, Baltimore, MD; Douglas D. Reh, MD,  
Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain and discuss the inequality in distribution of otolaryngology interview invitations among residency applicants.

**Objectives:** Otolaryngology applicants routinely decry conflicting interview dates as it limits the number of interviews that one can attend, despite being offered an interview. Conversely, applicants also perceive that a majority of interviews are hoarded by a minority of competitive applicants. We sought to verify and quantify the inequality in distribution of interview invitations. **Study Design:** Retrospective review of the National Resident Matching Program (NRMP) 2016 Charting Outcomes in the Match and 2016 Main Residency Match Data. **Methods:** The Gini coefficient, a commonly used indicator of economic inequality, was calculated using data from the 2016 Charting Outcomes in the Match to estimate the distribution of interviews attended. This data was compared to Diagnostic Radiology, a competitive but larger field with a wider selection of interview dates. **Results:** About a quarter (100/370, 27%) of otolaryngology applicants accounted for nearly half (1581/3435, 46%) of all possible interview positions. The Gini coefficient among otolaryngology applicants was 0.355, indicating moderate inequality. In comparison, the distribution of interviews in Diagnostic Radiology was more unequal, with a Gini coefficient of 0.488. For reference, according to the CIA World Factbook, the Gini coefficient of the distribution of family income in Greenland was 0.34, compared to 0.45 in the United States and 0.49 in Nigeria. **Conclusions:** There is an unequal distribution of interview invitations, which likely reflects the reality of asymmetry in applicant competitiveness. On the other hand, interview conflicts likely allow for a natural redistribution of interviews among candidates. Residency programs may utilize conflicting dates to limit hoarding and improve efficiency.

## 4:20 Q&A

## 4:25 Evaluation of the Program Specific Paragraph in the Otolaryngology Residency Application

Katelyn O. Stepan, MD, New York City, NY; Vivian F. Kaul, MD, New York City, NY;  
Aaishah Raquib, BA, Boston, MA; Rosh K. Sethi, MD MPH, Boston, MA;  
Stacey T. Gray, MD, Boston, MA; Marita S. Teng, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, participants should be able to discuss the general characteristics and recurrent narratives of the program specific paragraph as it relates to the otolaryngology residency application process, as well as the degree of variability among applicants and across institutions.

**Objectives:** The recent addition of mandatory program specific paragraphs within the personal statement during the Otolaryngology-Head and Neck Surgery Match process has been controversial. It is unclear whether applicants customize these paragraphs for individual programs, or if they are largely uniform across applications. The objective of our study is to assess the degree of variability among program specific paragraphs. **Study Design:** Retrospective cohort analysis. **Methods:** After obtaining IRB approval we analyzed de-identified program specific paragraphs of 2016 otolaryngology residency applicants at two institutions. Applicants that applied to both and had program specific paragraphs were included. Demographics and application characteristics were descriptively analyzed. Paragraphs were assessed for 24 parameters, including quantitative content analysis. Subjective and objective similarity scores were assigned to each pair, using a five point scale and Levenshtein distance function respectively. Differences between institutions were calculated using chi-squared and two sided t-tests (STATA v13). **Results:** 285 applications were reviewed. 181 applied to both programs and had program specific paragraphs. The average subjective similarity score among all paragraphs was mildly similar (2.3/5.0). The mean objective similarity score was 0.59. There were statistical differences between institutions in

13 parameters. One institution garnered more applicants who mentioned interest in research or global surgery (71.3% vs 57.5%, 17.7% vs 4.4%), whereas the other attracted mention of clinical aspects and geographical ties (80.0% vs 45.3%, 72.4% vs 45.3%). **Conclusions:** Our study suggests that applicants tailor program specific paragraphs to the individual residency programs. These findings may aid programs and students in understanding the role of this new element of the application.

#### 4:30 Patient Opinions Regarding Surgeon Presence, Trainee Participation, and Overlapping Surgeries

Alexandra M. Arambula, BS BA, Nashville, TN; Kemberlee Bonnet, MA, Nashville, TN;  
David G. Schlundt, PhD, Nashville, TN; Alexander Langerman, MD FACS, Nashville, TN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss and appreciate the range of values and surgical factors important to patients when considering decisions regarding surgery and surgical logistics.

**Objectives:** To explore patient opinions regarding overlapping surgery scenarios, specifically evaluating the effect of 1) attending surgeon presence; and/or 2) trainee participation on patient comfort level and identifying what patient values affect these comfort levels. **Study Design:** Mixed methods. **Methods:** Forty adults participated in semi-structured interviews. Interviews included: vignettes involving three scenarios varying by attending presence/availability; visual analog scale (VAS) ratings of participants' comfort with scenarios; and cognitive debriefing. Themes and subthemes were identified using hierarchical coding of transcripts, and quantitative and qualitative analyses were conducted. **Results:** Quantitative analysis revealed anticipated decreases in comfort with decreasing attending presence/availability (94% vs. 78% vs. 63% for scenarios 1 vs. 2 vs. 3,  $p < 0.005$ ). Participants demonstrated a preference for less trainee involvement ( $p < 0.005$ , scenario 1) and greater trainee experience ( $p < 0.05$ , all scenarios). However, not all individuals were uncomfortable with attending absence or trainee participation--quantitative data led to identification of three distinct subgroups based on responses to vignette scenarios, which demonstrated three unique patterns of values and perceptions of trade-offs in the qualitative analysis. Themes important for decision making included trust in the surgeon, surgeon experience, trainee involvement, disease severity, cost, and wait time, with differing subgroup responsiveness to surgical incentives, confidence in trainees, and perceived importance of surgeon relationship and experience. **Conclusions:** Overlapping surgery involves trade-offs between factors of variable importance to individuals, with some patients finding an overlapping surgery schedule and trainee involvement acceptable. The patient subgroups and value sets we identified will guide further exploration of surgeon patient decision making, patient perspectives on surgical logistics, and methods of informed consent.

#### 4:35 Eliminating Tracheostomy Tube Related Pressure Injuries in Adults

Daniel J. Carroll, MD, Augusta, GA; Christopher J. Leto, MD, Augusta, GA;  
Mark A. Fritz, MD, Lexington, KY; James K. Byrd, MD, Augusta, GA;  
Stilianos E. Kountakis, MD PhD, Augusta, GA; Gregory N. Postma, MD, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand how small changes made intraoperatively and postoperatively can eliminate pressure injuries in adult patients following tracheotomy. This is a medical and financial benefit for the patient and the hospital system.

**Objectives:** Create and implement a cost effective protocol to eliminate or decrease tracheostomy tube related pressure injuries (TTRPI) in adults who underwent tracheotomy at a tertiary care hospital. **Study Design:** Case series. **Methods:** All adult patients who underwent tracheotomy by the otolaryngology department from July 1, 2016, to October 1, 2017, had the following modifications to the established surgical technique: foam collar placed rather than twill tie to secure the tracheostomy tube around the neck; two pieces of hydrocolloid placed superior and inferior to the skin incision to buffer the trach flange; a deliberate air knot thrown in the four point securing sutures anchoring the tracheostomy tube to the neck. On postoperative day 3, the hydrocolloid was removed and the sutures cut. Increased communication with nurses and respiratory therapists enhanced attention to neck flexion, the beginning stages of pressure injuries, and optimal placement of ventilator trees. **Results:** TTRPIs occurred in 8% of tracheotomized patients in the year prior to the above changes; 71% were from the tracheostomy tube flange and 29% from the twill tie. In the fifteen month study period after protocol implementation, there were zero TTRPIs in 180 adult patients who underwent tracheotomy. In addition, no accidental decannulations occurred in the study group. **Conclusions:** Enhanced communication, awareness, responsibility, and changes to perioperative tracheotomy protocols eliminated TTRPIs in adult patients at our institution. Our results



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suggest that further study is warranted and potential widespread implementation may significantly decrease the incidence of TTRPIs in adults who undergo tracheotomy.

## 4:40 Otolaryngology Head and Neck Surgery Resident Well Being and Perceptions of the Clinical Learning Environment

Kelley M. Dodson, MD, Richmond, VA; Nital P. Appelbaum, PhD, Richmond, VA;  
Nathaniel A. Lee, MD, Richmond, VA; Michael F. Amendola, MD, Richmond, VA;  
Brian J. Kaplan, MD, Richmond, VA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the measurement of organizational and well being factors in otolaryngology residency programs and associate these perceptions with pursuit of advanced fellowship training and performance on in-training examinations.

**Objectives:** To measure the current state of organizational and well being factors in otolaryngology residency programs, and associate these perceptions with the pursuit of subspecialty fellowships and performance on in-training examinations.

**Study Design:** Survey study. **Methods:** Survey study of otolaryngology residents from the Southern, Mid-Atlantic and East South Central regions of the United States, using validated scales of well being (i.e., burnout, resilience, work/life strain, and job satisfaction) and the clinical learning environment (i.e., perceived organizational support, workplace climate). Respondents self-reported their approximate percentile scores (high= >61st percentile; low= <40th percentile) on their most recent in-training examination and whether they plan to pursue fellowship training (yes/no). **Results:** A total of 46 otolaryngology residents across 14 residency training programs (22% response rate) completed our survey. Residents reporting less burnout, less work/life strain, and greater perceived organizational support to their peers planned to pursue fellowship training. High OTE performers had greater perceptions of organizational support compared to low OTE performers. **Conclusions:** For otolaryngology residents in this survey sample, the perception of organizational support and self-reported well being may influence resident performance (on OTE examinations) and ultimate career goals (fellowship applications). Program directors and coordinators, in conjunction with their institutional graduate medical education offices, can use this information to strengthen the perceptions of organizational support as well as improve the clinical learning environment for improved well being to optimize training conditions for their residents. Similarly, residency program directors can use the identified study measures to assess resident perceptions of the clinical learning environment and well being for annual evaluation and improvement purposes.

## 4:45 Occult Malignancy in Adult Tonsillectomy for Benign Indication: Systematic Review and Case Series

Noah P. Syme, MD, Albuquerque, NM; Noah P. Syme, MD, Albuquerque, NM;  
Ashley M. Dorneden, BS, Albuquerque, NM; Therese J. Bocklage, MD, Albuquerque, NM;  
Fred S. Herzon, MD, Albuquerque, NM; Duncan A. Meiklejohn, MD, Albuquerque, NM

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the indications for sending benign tonsillectomy specimens for histopathology.

**Objectives:** 1) To investigate the necessity of routine histopathologic analysis of tonsil specimens for adults who undergo tonsillectomy for benign indications. 2) To establish the rate of occult malignancy within the largest combined series (literature and previously unreported data) of adult tonsillectomy patients reported to date. 3) To define criteria to effectively stratify patients into high and low risk categories and identify which require full pathologic analysis. **Study**

**Design:** Systematic review of the literature and retrospective case series from one academic medical center. **Methods:** A systematic review was performed using the search terms tonsillectomy + pathology, tonsillectomy, tonsil + pathology and tonsil. Eighteen articles published between 1965 and 2015 were combined with case series data for analysis, and the rate of occult malignancy determined. Previously described criteria based on preoperative and intraoperative factors were applied to malignant specimens. A subset of 845 cases from our own series was analyzed to determine the implications of prospective application of the proposed criteria on tonsillectomy specimens performed for benign indication. **Results:** Over 10,000 combined cases from the literature and our newly reported case series underwent statistical analysis. Application of the proposed criteria resulted in an expected rate of occult malignancy in these 10,000+ cases of <0.01%.

**Conclusions:** Application of the proposed criteria may reduce the rate of occult malignancy in adult tonsillectomy to a rate comparable to that described in the pediatric literature and allow for a decrease in routine histopathologic analysis of tonsillectomy specimens. Environmental and fiscal implications are discussed.

- 4:50**            **Q&A**
- 4:55**            **Introduction of President-Elect by Mark Persky, MD  
Sigsbee W. Duck, MD, Rock Springs, WY**
- 5:00**            ***Adjourn***

Saturday

**I 1. The Utility of Preoperative Imaging and Intrathecal Fluorescein in the Operative Management of Cerebrospinal Fluid Rhinorrhea**

John P. Flynn, MD, Kansas City, KS; Anna C. Pavelonis, BS, Kansas City, KS;  
Alexander G. Chiu, MD, Kansas City, KS; Jennifer A. Villwock, MD, Kansas City, KS

**Educational Objective:** At the conclusion of this presentation, participants will be familiar with utilization rates of intrathecal fluorescein for CSF leak repair and proportion of cases in which fluorescein was beneficial in localizing the site of the leak. Participants will also gain insight into the diagnostic yield of preoperative imaging and skull base defect localization.

**Objectives:** To evaluate the utility of intrathecal fluorescein in the localization of skull base defects and associated CSF leaks. To determine the diagnostic yield of computed tomography (CT) scans in definitively diagnosing the site of skull base defect. **Study Design:** Retrospective case series with chart review. **Methods:** Patients admitted for CSF rhinorrhea between 2003 and 2016 were identified using the Healthcare Enterprise Repository for Ontological Narration (HERON). Demographics, location and laterality of leak, and complications were collected. Diagnostic yield of preoperative imaging for definitive leak identification and utility of intrathecal fluorescein for intraoperative identification of leak site was analyzed. Fisher's Exact test was used for comparisons between groups as appropriate. **Results:** 101 patients with CSF rhinorrhea at a single institution were included. With respect to laterality, 30 cases were identified in the right cribriform or ethmoid cavities versus 28 cases on the left. All patients underwent preoperative imaging. Skull base defects were identified in 67%. Intrathecal fluorescein was used in 56 cases and deemed helpful in leak localization, per operative reports, in 73%. Intrathecal fluorescein was more helpful for leak localization in cases of multiple defects compared to single (9/9 vs 27/47,  $P=.019$ ). 6 patients receiving lumbar drain experienced complications: spinal headache (50%) and other neurologic issues (50%). 1 patient required a blood patch. **Conclusions:** The diagnostic yield of intrathecal fluorescein and preoperative imaging were equivalent, with each modality localizing leak site approximately two-thirds of the time. Fluorescein may be of increased utility in instances of multiple leak sites.

**I 2. Safety and Feasibility Endoscopic Sinus Surgery in the Geriatric Patient**

Samuel N. Helman, MD, New York, NY; Brian Deutsch, BS, New York, NY; Robert Chouake, BS, New York, NY; Alfred M. Illoreta, MD, New York, NY; Anthony Del Signore, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand and identify the feasibility, safety, and outcomes of geriatric functional endoscopic sinus surgery (gFESS).

**Objectives:** Demonstrates feasibility, safety, and outcomes of geriatric functional endoscopic sinus surgery (gFESS). **Study Design:** Retrospective study in tertiary referral center. Review of patients aged 65 years and older who underwent gFESS from 2008 to 2017. Patients undergoing skull base, craniofacial, or oncologic surgery were excluded. Patients younger than 65, but older than 40 years of age were included for comparison. **Methods:** Multivariate analysis was performed to identify independently associated patient characteristics and perioperative variables. **Results:** Ninety-one (91) patients met inclusion criteria. 21.2% of the geriatric patients were taking systemic anticoagulation prior to surgery, and underwent conservative treatments with nasal steroids (25.0%), oral antibiotics (67.7%), nasal irrigations (48.4%), and systemic steroids (37.5%) over an average of 7.3 months prior to surgery. There was an average postoperative reduction of 15.0 points ( $p<0.0001$ ) and 42.5 points ( $p=0.0008$ ) for SNOT-22 and NOSE scores, respectively. Average operative time was 117.4 minutes in geriatric patients compared to 183.4 minutes in younger patients ( $p=0.004$ ), with an average estimated blood loss of 55.6 milliliters (mL) compared to younger patients (111.8 mL) ( $p=0.04$ ). Linear regression identified revision surgery as associated with reductions in SNOT-22 scores ( $p=0.011$ ). Being over 65 was associated with a shorter operative time ( $p=0.011$ ) while male sex was associated with a longer operative time ( $p=0.014$ ). Negative predictors for blood loss during surgery were age ( $p=0.041$ ) and HIV infection ( $p=0.039$ ) while male sex was associated with increased blood loss ( $p=0.008$ ). Being over 65 had a protective effect on the occurrence of minor complications ( $p=0.01$ ); There were no major complications. **Conclusions:** Geriatric sinus surgery is effective, well utilized, and safe.

# Poster Program

## I 3. Unilateral Hyposmia: A Case of Sinonasal Glomangiopericytoma

Jessica B. Howell, MD, Richmond, VA; Sherna S. Sheth, DDS, Richmond, VA; Adele O. Kraft, MD, Richmond, VA; Ryan S. Nord, MD, Richmond, VA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) discuss pathophysiology, workup, differential diagnosis, and treatment for glomangiopericytoma of the nasal cavity; 2) discuss histopathology of glomangiopericytoma, with an emphasis on unique immunohistochemical staining pattern.

**Objectives:** 1) Discuss pathophysiology, workup, differential diagnosis, and treatment for glomangiopericytoma of the nasal cavity; and 2) discuss histopathology of glomangiopericytoma, with an emphasis on unique immunohistochemical staining pattern. **Study Design:** Case report and literature review. **Methods:** Case report and literature review. **Results:** A 51 year old male presented with complaints of right sided nasal obstruction, hyposmia and epistaxis. Physical exam revealed a polypoid mass filling the entire right nasal cavity. Computed tomography of the sinuses demonstrated an expansile mass within the right nasal cavity that produced downward remodeling of the inferior meatus, near complete effacement of the middle meatus, leftward septal deviation, and post-obstructive changes to the adjacent sinus cavities. Biopsy of the lesion revealed a final diagnosis of sinonasal glomangiopericytoma. The patient was taken to the operating room for endoscopic resection where the lesion was found to be pedicled to the superior septum. To date, over six months after complete excision, the patient is asymptomatic and without recurrence. **Conclusions:** Sinonasal glomangiopericytoma is a rare entity distinct from other hemangiopericytomas. Diagnosis requires histopathological confirmation as radiographic and gross findings are nonspecific. These neoplasms tend to be radioresistant but have an excellent prognosis when treated surgically. Long term followup is essential as recurrence rates are not insignificant.

## I 4. Safety and Efficacy of Frontal Sinus Stents: A Systematic Review

Ahmed Awad Hussein, MD, Cairo, Egypt

**Educational Objective:** At the conclusion of this presentation, the participants should know that current literature evaluating the use of frontal sinus stents is limited and comprised entirely of level 4 studies. The efficacy of frontal sinus stenting could not be accurately evaluated due to the small number of studies and variable outcome measures. Larger, high quality studies are needed to support the use of stents in endoscopic surgery of the frontal sinus.

**Objectives:** Post-surgical stenosis of the frontal sinus can be a challenging problem for the endoscopic sinus surgeon. Frontal sinus stents are often used in an attempt to maintain frontal outflow patency. The current study systematically reviews the literature to determine the safety and efficacy of frontal stents. **Study Design:** Systematic review. **Methods:** The PubMed, Google Scholar, and Cochrane databases were reviewed and studies evaluating the usage and reliability of frontal sinus stents were extracted based on defined inclusion criteria. **Results:** Fourteen studies comprising a total of 251 patients met inclusion criteria and were evaluated for stent material, stenting duration, surgical techniques, patient outcomes and complications. All studies were classified as level 4 evidence per definition provided by the Oxford Center for Evidence Based Medicine. Multiple stent materials were used with varying durations. Complications were generally minor and included stent migration, pain, epistaxis, and infection. Frontal sinus patency following stent placement varied from 71.4% to 100%, however, the efficacy of stent placement in maintaining frontal sinus patency could not be evaluated due to a lack of controlled studies. **Conclusions:** Current literature evaluating the use of frontal sinus stents is limited and comprised entirely of level 4 studies. The efficacy of frontal sinus stenting could not be accurately evaluated due to the small number of studies and variable outcome measures. Larger, high quality studies are needed to support the use of stents in endoscopic surgery of the frontal sinus.

## I 5. Using Mucosal Eosinophilic Count as a Guide in the Management of Chronic Rhinosinusitis

Mingsi Li, MD, Augusta, GA; Christopher J. Ito, MD, Augusta, GA; Stilianos E. Kountakis, MD, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to use mucosal eosinophilic count to help guide their postoperative management of patients with chronic sinusitis.

**Objectives:** Intranasal steroid spray, steroid irrigation and leukotriene receptor antagonists or 5 lipoxygenase inhibitors are medications commonly used in the treatment of chronic rhinosinusitis (CRS). The goal of this study is to assess the treatment outcomes of CRS using these agents based on mucosal eosinophilic count after functional endoscopic sinus

surgery (FESS). **Study Design:** Retrospective chart review. **Methods:** We performed retrospective analysis of patients who underwent FESS for CRS from January of 2004 to June of 2017 at a tertiary center. The patients were divided into three groups based on their mucosal eosinophilic count (MEC). Patients were treated using a combination of intranasal steroid spray, steroid irrigation and leukotriene receptor antagonists or 5 lipoxygenase inhibitors. The outcomes of these treatment options were compared using the chi square test. **Results:** A total of 158 patients were included in this study. Twenty-three patients had MEC of 0 (group 1), 35 patients with MEC between 1 to 20 (group 2), and 100 patients with MEC >20 (group 3). The rate of revision surgery was 4.34% in group 1, 8.57% in group 2 and 20% in group 3 (p=NS). There was a significantly higher incidence of nasal polyposis in group 3 compare to group 1 and group 2 (72% vs. 27% and 28.5% p<0.001, respectively). The need for maximum postoperative therapies consisted of intranasal steroid spray, steroid irrigation, and leukotriene receptor antagonist or 5 lipoxygenase inhibitors was significantly higher in group 3 compared to the other groups (53% vs. 8.7% and 20%, p<0.001). **Conclusions:** High mucosal eosinophilic count is associated with an increased incidence of nasal polyposis, and it requires a more aggressive management strategy.

## I 6. Crowd vs. Surgeons: Assessing Skill in Functional Endoscopic Sinus Surgery for Tasks that Require Anatomical Knowledge

Anand Malpani, PhD, Baltimore, MD; Masaru Ishii, MD PhD, Baltimore, MD (Presenter); Narges Ahmidi, PhD, Baltimore, MD; Lisa Ishii, MD MHS, Baltimore, MD; S. Swaroop Vedula, MBBS PhD, Baltimore, MD; Gregory D. Hager, PhD, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand two approaches for crowdsourced assessment of skill in functional endoscopic sinus surgery viz. absolute rating and relative rating based on pairwise comparisons, and to compare the efficiency and accuracy in skill ratings by crowd (individuals without surgical training) and experienced surgeons.

**Objectives:** To determine whether crowd workers (individuals without surgical training) can accurately assess skill in FESS tasks that require anatomical knowledge. **Study Design:** Cross-sectional survey. **Methods:** We used a video dataset of surgeons using a straight, blunt pointer to enter the nose and navigate to one of nine anatomical targets: carotid artery, sella turcica, optic nerve, maxillary sinus, eustachian tube, basal lamella, medial wall of bulla, lamina papyracea, and uncinate process. Expert surgeons (ES) and crowd workers (CW; Amazon Mechanical Turk) rated videos using two methods: absolute (ABS), and relative (REL). ABS rating involved reviewing a single video and binary responses on 5 criteria--success in reaching intended anatomy, motion smoothness, efficiency, tissue awareness, and overall performance. REL rating involved choosing better skilled performance (preference), given two videos side by side. We computed Fleiss' kappa for interrater agreement and accuracy in CW ratings using ES ratings as ground truth. **Results:** Five ES and 25 CW provided 36 ABS and 36 REL ratings. Interrater agreement on ABS ratings seemed higher within ES than CW (0.49 vs 0.44, 0.56 vs 0.48, 0.54 vs 0.50, 0.44 vs 0.34, 0.65 vs 0.48, respectively). Interrater agreement on REL ratings didn't appear to be different between ES and CS (0.39 vs 0.40). ABS ratings from CW were more accurate than REL ratings (91.67, 83.33, 83.33, 88.89, and 88.89, for ABS respectively, versus 83.33 for REL). **Conclusions:** Crowdsourcing is reliable and valid for skill assessment in FESS.

## I 7. Endoscopic Removal of Intranasal Supernumerary Tooth Presenting as Nasal Obstruction and Epistaxis

Tiffany T. Pham, MS, Irvine, CA; Steven M. Chau, MD, Irvine, CA; Ifegwu O. Ibe, MD, Irvine, CA; Beverly Y. Wang, 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 describe the diagnostic workup and management of intranasal supernumerary teeth.

**Objectives:** Supernumerary teeth, which present in excess of normal teeth, are most commonly found in the upper incisor area. However, the occurrence of supernumerary teeth in the nasal cavity is rare and should be investigated with both imaging and pathology. We present a case report describing the diagnosis and endoscopic removal of an intranasal supernumerary tooth. **Study Design:** N/A. **Methods:** A 47 year old male patient presented with difficulty breathing through his right nasal cavity and intermittent epistaxis. He also noted a decreased sense of smell and discomfort of his right nasal airway and right upper teeth. Speculum exam and computed tomography scan demonstrated a 1 cm irregular calcification of the right nasal airway at the anterior aspect of the inferior turbinate, lateral to the maxillary crest. **Results:** Intraoperatively, the right nasal vault showed friable granulation tissue over a calcified mass. Endoscopic excision of the mass was performed with partial resection of the right inferior turbinate. Pathology reports this specimen as a tooth, con-



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sistent with supernumerary tooth. At 1 month followup patient reported resolution of right nasal obstruction and showed well healed nasal mucosa. **Conclusions:** This case highlights that the differential diagnosis for nasal obstruction is broad and that supernumerary teeth, though rarely, may be found in the nasal cavity. Pathology is imperative to rule out concerning differential diagnoses, such as a calcified inverted papilloma, osteoma, or malignant mass, which may require further surgical intervention. Endoscopic extraction affords many advantages such as optimal visualization, good illumination, more precise dissection, and improved postoperative course.

## I 8. Intraseptal Mucocele as a Long Term Complication of Revision Septorhinoplasty: A Case Report and Review of a Rare Entity

Jordan W. Rawl, MD, Galveston, TX; Nicholas A. Rossi, BA, Galveston, TX;  
Mohamad R. Chaaban, MD, Galveston, TX; Paul C. Brindley, MD, Galveston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) discuss the differential diagnosis for intraseptal mucocele; 2) discuss the most effective surgical treatments for intraseptal mucocele and understand why simple aspiration of cyst contents does not work; and 3) identify intraseptal mucocele as a late complication of nasal surgery.

**Objectives:** To highlight nasal septal mucocele as a rare and late complication of septorhinoplasty. **Study Design:** A case report and review of the current literature. **Methods:** A thorough literature search was conducted through PubMed and Ovid using search terms septal mucocele, intraseptal mucocele and septal mass yielding 10 cases of nasal septal mucocele. **Results:** Septal mucoceles are very rare. There are only 10 cases reported in the literature. Patients are typically male, in their middle years, usually with a history of trauma or nasal surgery. The most common presentations include nasal obstruction and headaches. Endoscopic marsupialization or excision is the mainstay of treatment with no reported recurrences. We report our case of a 57 year old male with a 3 year history of nasal obstruction. He had a history of revision open septorhinoplasty 35 years ago that was complicated by septal hematoma. He had a 2.4cm mass involving the anterior septum with dystrophic bone formation on computed tomography scan. Chronic hematoma, reparative granuloma and mucocele were suspected as possible diagnoses. The mass was surgically excised using a transnasal endoscopic approach and was found to be a mucocele. **Conclusions:** This is the first reported case of a septal mucocele arising as a complication of septorhinoplasty. It is unclear if it occurred as a result of his revision surgery or as a long term complication of septal hematoma requiring incision and drainage. This case highlights the need to include septal mucocele in the differential with any midline septal mass regardless of its rarity.

## Clinical Fundamentals

## I 9. Factors Impacting Otolaryngology in Training Exam (ITE) Scores

Kristan P. Alfonso, MD, Lexington, KY; Frank W. Dicken, BS, Lexington, KY;  
Marcia V. Rojas Ramirez, DDS, Lexington, KY; Matthew L. Bush, MD PhD, Lexington, KY;  
Brett T. Comer, MD, Lexington, KY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the factors associated with performance on the Otolaryngology in Training Exam (ITE).

**Objectives:** To examine factors associated with performance on the Otolaryngology in Training Exam (ITE) at a single academic institution. **Study Design:** Retrospective review. **Methods:** Data of ITE scores from 2010-2017 at a single academic training program were collected and compared to factors including residency year, clinical service relative to time of exam, call schedule relative to time of exam, didactic lecture series schedule relative to time of exam, AOA status as a medical student, and USMLE step I and step II CK scores. All data were obtained from archived program coordinator or program director files. **Results:** Preliminary results suggest a significant inverse performance on the ITE with resident year. There was a trend toward worse performance on the ITE while on a busier (e.g. head & neck oncology) clinical service, as well as with increased time from a didactic lecture series. Multivariate analysis is ongoing with regards to associations among the aforementioned factors as well as AOA status, USMLE scores, and ITE scores. **Conclusions:** Otolaryngology resident ITE scores may be affected by several factors, some of which are potentially modifiable. Program directors may want to take these variables into account when approving call, clinical and didactic schedules, as obviously resident academic confidence can be affected and some fellowships are using ITE scores as part of the evaluation process.

## I 10. Citation and Quotation Errors in Otolaryngology Journals: An Update

Michael F. Armstrong, BS, Richmond, VA; Joseph H. Conduff, BS, Richmond, VA;  
John E. Fenton, FRCSEd, Limerick, Ireland; Daniel H. Coelho, MD, Richmond, VA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the prevalence of referencing errors within OHNS journals and to consider that such errors may impact the interfaith of our specialty's medical literature.

**Objectives:** Proper use of both citation and quotation is crucial to the integrity of medical literature. The purpose of this study was to determine prevalence of quotation and citation errors in otolaryngology/head and neck surgery (OHNS) journals and how they have changed over time. **Study Design:** Literature review. **Methods:** Fifty references were randomly selected from the first issue of 2017 in eight leading OHNS journals. These were analyzed for errors in citation (data elements by which the article is referenced) and quotation (factual inaccuracies of the reference). Citation errors were categorized as major, intermediate, or minor. Quotation errors were categorized as major or minor. Results were compared with historical data from 1997 articles. **Results:** Citation errors occurred in 17% of all references studied, with 26% classified as major. Quotation errors occurred in 9%, with 69% classified as major. There was no association between journal impact factor and total number of errors ( $r=-0.31$ ,  $p=0.45$ ). This compares with a 37% citation (32% major) and 17% quotation (65% major) error rate from 1997. **Conclusions:** Citation and quotation errors are still prevalent in OHNS literature albeit decreased from previously reported data. Improvement in citation errors may be due to technological improvements in reference management. However, it is the continued responsibility of the authors, reviewers, and editors to further reduce quotation rates in order to maintain the integrity of our publications.

## I 11. Word Cloud Visual Letters of Recommendation Non-Inferior to Standard Letters of Recommendation

Sinehan B. Bayrak, MD, Kansas City, KS; Mark R. Villwock, MS, Kansas City, KS;  
Jennifer A. Villwock, MD, Kansas City, KS; Alexander G. Chiu, MD, Kansas City, KS;  
Kevin J. Sykes, PhD MPH, Kansas City, KS

**Educational Objective:** At the conclusion of this presentation, we aim to introduce the concept of word cloud based visual letter of recommendation (VLOR) and illustrate the successful implementation of VLORs into applicant screening processes.

**Objectives:** Our prior research has demonstrated VLORs are more efficient than standard narrative letters of recommendation (NLOR). This prospective study sought to validate our word cloud based VLOR's utility and to evaluate its ability to discern applicant quality compared to standard narrative letters of recommendation (NLORs) during a real time application review session. **Study Design:** Prospective cohort study. **Methods:** NLORs for randomly selected otolaryngology residency applicants from the 2017 application cycle were identified and mined for descriptive terms. These were then aggregated to generate a single word cloud VLOR. Each applicant's NLORs (ranging from 3-4 each) were evaluated by one faculty member and rated on a four point scale. Each faculty member then evaluated de-identified VLORs for the same applicants. Matched pairs of VLOR and NLOR scores for each candidate were compared using the Wilcoxon signed-rank test. Significance was set at  $\pm = 0.05$ . **Results:** Thirteen faculty members participated in total. Seventy-nine applicant materials were reviewed, including 79 unique VLORs. There was no significant difference between mean scores for VLORs and NLORs (3.42 (SD:0.61) vs 3.47 (SD:0.57),  $p=0.553$ ). Equivalence between NLOR and VLOR scores was noted in 42/79 (53%) cases. **Conclusions:** VLORs are a novel and non-inferior method of screening otolaryngology residency applicant letters of recommendation. In addition to our previous research proving their efficiency, VLOR scores do not significantly vary from NLOR scores.

## I 12. Comparison of Otolaryngologic Surgery Referral Pathways at a Public Safety Net Hospital versus a Private Tertiary Care Academic Hospital

Caitlin R. Bertelsen, MD, Los Angeles, CA; Anna Jackanich, BS, Los Angeles, CA; Marshall Ge, BA, Los Angeles, CA; Janet S. Choi, MD MPH, Los Angeles, CA; Gordon Sun, MD MS, Downey, CA; Tamara N. Brown, MD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) appreciate differences between referral time points at a public safety net hospital versus an academic tertiary referral center; and 2) appreciate

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ate sociodemographic factors associated with longer wait times between referral and surgical intervention.

**Objectives:** To compare time between initial referral and surgical intervention for index otolaryngologic procedures between a public safety net hospital (PSNH) and tertiary care academic center (TAC). **Study Design:** Retrospective cohort study. **Methods:** Chart review of demographic and clinical data for adults undergoing eligible otolaryngologic procedures at a PSNH (n=216) and a TAC (n=161) over a two year period. Multivariate analysis was used to examine factors associated with various time intervals between referral and surgical intervention. **Results:** PSNH patients had more comorbidities and were younger, more likely to be female, Hispanic or Asian, and to lack insurance compared with TAC patients. Mean time between referral and first clinic visit was shorter at the PSNH than TAC (36±48 vs 48±60 days, respectively; [95%CI for difference: 2-24], p=0.03). Mean time between referral and surgical intervention did not differ between PSNH and TAC (129±90 vs 141±130 days, respectively; [95% CI for difference: -10 to 35], p=0.30). After adjusting for demographic and clinical variables, TAC had more patient related delays in care than PSNH (OR: 3.7 [95% CI: 1.8-7.7], p<0.001). On multivariate analysis, time from referral to surgery at a PSNH was associated with age, cardiovascular disease, source of referral, type of surgery, and type of diagnostic workup, and at a TAC was associated with gender, hypertension, and type of surgery. **Conclusions:** Sociodemographic differences between PSNH and TAC patients, as well as differences in referral pathways between the types of institutions, influence progression of surgical care in otolaryngology. These differences may be targets for interventions to streamline care.

## I 13. Quality Improvement: Improving Education amongst Healthcare Providers in Management of Obligate Neck Breathers

Elizabeth S. Burckardt, MD, Louisville, KY; Craig H. Ziegler, PhD, Louisville, KY;  
Swapna K. Chandran, MD, Louisville, KY; Jeffrey M. Bumpous, MD, Louisville, KY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss specific gaps in knowledge amongst different medical specialties in the management of obligate neck breathers. It will be demonstrated that providing education to these medical providers improves knowledge and confidence in management of obligate neck breathers and creates changes in the hospital that improve patient safety.

**Objectives:** To assess baseline knowledge and improve understanding of anatomy, function, and airway management of obligate neck breathers amongst medical providers. **Study Design:** Quality improvement. **Methods:** A pre and post lecture survey was given to assess baseline knowledge and knowledge gained in regard to anatomy, speech and swallowing, and airway management of tracheostomy and laryngectomy patients amongst providers in otolaryngology (n=9), internal medicine (n=44), emergency medicine (n=11), anesthesia (n=21), family medicine (n=24), respiratory therapy (n=35), and medical school (n=44). **Results:** On the initial survey, the average participant answered 66% of questions regarding management of obligate neck breathers correctly. This improved 20% to 86% of questions correct in the post lecture survey (95% CI: 1 17%- 23%, p<0.001). The most commonly missed questions involved managing the airway of an obligate neck breather. Initially, 37% of participants planned to orally intubate a laryngectomy patient in respiratory distress. Although all participants report management of obligate neck breathers, only 59% could describe how to replace a tracheostomy correctly, only 41% have changed a tracheostomy tube, and only 24% feel comfortable doing so. Participants in primary care improved by the greatest percentage compared to other groups (28.2%; 95% CI: 19.8% - 36.7%, p<0.001). Following the lecture, participants reported an 18.4% improved confidence in management of tracheostomy patients (<0.001) and 22.8% improved confidence in management of laryngectomy patients (p<0.001). **Conclusions:** There are gaps in understanding the function, anatomy, and airway management of obligate neck breathers, but giving appropriate education improves medical provider knowledge and confidence of the management of these patient populations.

## I 14. Otolaryngologists in the Veterans Health Administration: Is There a Gender Gap?

Sarah M. Dermody, BS, Washington, DC; Sonya Malekzadeh, MD, Washington, DC;  
Jamie R. Litvack, MD MS, Seattle, WA; Jessica H. Maxwell, MD MPH, Washington, DC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss gender disparities within otolaryngology in the Veterans Health Administration and compare salaries between male and female otolaryngologists at complex Veterans Affairs medical centers.

**Objectives:** To determine if gender disparities exist among otolaryngologists employed by the Veterans Health Administration. **Study Design:** Retrospective analysis. **Methods:** Board certified otolaryngologists employed by the Veterans Health Administration at all complex Veterans Affairs (VA) medical centers in 2016 and 2015 were identified. Salaries

were collated for each year using the Enterprise Human Resources Integration-Statistical Data Mart (EHRI-SDM) dataset. Additional variables, including gender, h-index, geographic location, and years since medical school graduation were collected. The finalized dataset was stratified by gender. Due to the sample sizes and normality of data, the parametric unpaired two sample t-test was used to test the null hypothesis that the mean salaries of male and female otolaryngologists at complex VA hospitals are not significantly different. **Results:** In the Veterans Health Administration, 69 inpatient surgical programs with an operative designation of complex were identified. Within these systems, 260 board certified otolaryngologists were identified, of which 197 (75.8%) were male and 63 (24.2%) were female. In 2016, the mean salary for male otolaryngologists was \$267,068 and for female otolaryngologists was \$261,400. There was no statistically significant difference between mean salaries of male and female otolaryngologists in 2016 (\$267,068 vs \$261,400,  $p=0.29$ ) or 2015 (\$262,331 vs \$261,456,  $p=0.87$ ). **Conclusions:** Male otolaryngologists outnumber female otolaryngologists at complex VA medical centers by a ratio of 3:1. There is no statistically significant difference between average salaries of male and female otolaryngologists employed at complex VA medical centers.

## I 15. Insurance Barriers for Tracheotomy Related Durable Medical Equipment

Palmer L. Foran, Baltimore, MD; Simon R. Best, MD, Baltimore, MD;  
Vinciya Pandian, PhD MSN CRNP, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the barriers tracheostomy patients face in relation to the acquisition of insurance information and proper care. These barriers include ease of access to information, variability in available data, and insurance company transparency.

**Objectives:** Proper tracheostomy care requires significant durable medical equipment (DME) expenses, and lack of access to these critical supplies could lead to poor health outcomes. Health insurance currently resembles a marketplace, in which consumers are expected to best match an insurance plan to their needs. Our objective was to study the barriers patients face with tracheostomy related DME, and we hypothesized that they would find information about insurance coverage difficult to obtain, with highly variable copays, deductibles, and payments. **Study Design:** Telephone survey. **Methods:** Survey and website analysis of all state insurance carriers for tracheostomy related DME coverage. Each company contacted four times with a script to reduce call variability. A four point scale assessed information variability, with 1 signifying no inconsistency, and 4 representing contradictory results. **Results:** Eleven insurance carriers were surveyed. DME was covered by 98.1% (53/54) of plans and copays/deductibles were required in 42.6% (23/54). There was significant variability in personal expense for DME (fixed co-pays ranged \$0-30, and floating co-pays ranged 0-40%). Insurance company's websites were awkward to navigate, and required extensive vetting to find information. When companies were contacted via phone, the mean call time was  $19\pm 10$  minutes with an average amount of transfers to another agent occurring  $2\pm 1$  times. Repeated calls resulted in high information variability (mean score  $2.4\pm 1.5$ ). **Conclusions:** Patients face barriers in insurance coverage of DME with a substantial lack of transparency in obtaining vital information. These factors contribute to poor access for tracheostomy associated DME and may be a risk factor for suboptimal tracheostomy care.

## I 16. The Role of Otolaryngology in a Tracheostomy Care Team

Mohamad R. Issa, MD MS, Pittsburgh, PA; Sara Mater, BS, Pittsburgh, PA;  
Carl H. Snyderman, MD MBA, Pittsburgh, PA; Yan W. Ho, MD, Pittsburgh, PA

**Educational Objective:** The concept of a tracheostomy care team (TCT) has been validated in the literature, demonstrating more decannulations and shorter length of stays with decreased healthcare costs. The size, composition, and protocols for each TCT vary by institution. At the conclusion of this presentation, the participants should be able to understand the types of consults seen by TCT, procedures performed by TCT and the role of an ENT in optimizing TCTs.

**Objectives:** In this study, we aim to review the types of tracheotomy care consults seen by ENTs at a tertiary care hospital to assess the common types of tracheotomy care consults, which is critical to understanding the cost and revenue generating potential of these consults as well as understanding the personnel needed in a TCT. **Study Design:** A retrospective review of tracheotomy consults seen by an ENT lead TCT at a large tertiary care hospital over one year. **Methods:** All sequential tracheotomy care consults seen by the ENT consult service over the course of 1 year at a tertiary hospital from July 1, 2016, to June 30, 2017, were analyzed. **Results:** Ninety-one tracheostomy care consults were performed by the ENT team with 22 requiring flexible laryngoscopes, 41 tracheoscopies, 40 new and 51 old (with well formed tracts) tracheostomy changes. The tracheostomies were initially performed by unaffiliated hospitals (27), general surgery (24), critical care medicine (16), ENT (15), cardiothoracic surgery (8), and pulmonology (1). The ENT consult team decannulated 24 patients prior to discharge. Patients without tracheostomies were more likely to be discharged home (37.5%) than



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patients with tracheostomies (22%). **Conclusions:** An effective TCT helps to manage tracheostomy care, which is critical to decrease healthcare costs and to increase safe patient discharges. ENT providers have the ability to perform necessary procedures and have the proper training to optimally lead TCTs.

## I 17. Otolaryngology Residency Interviewing Dates and Practices: What Should an Applicant Expect?

Andrew H. Lee, MD, Baltimore, MD; Ross S. Liao, BS, Baltimore, MD; Patrick J. Young, BS, Baltimore, MD; Paul H. Yi, MD, Baltimore, MD; Douglas D. Reh, MD, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss common patterns and trends in otolaryngology interview dates.

**Objectives:** Scheduling otolaryngology interviews may be a challenge for residency applicants due to overlapping interview dates. Our objective was to identify otolaryngology interview date patterns and potential scheduling conflicts over the past 5 application cycles. **Study Design:** Retrospective review of an otolaryngology match related online forum (otomatch.com). **Methods:** Online threads related to residency interview dates posted during the 2012-2013 through 2016-2017 interview seasons on otomatch.com were reviewed. Data for the number of applicants interviewed and incomplete interview data was obtained by contacting program coordinators directly. **Results:** Data from an average of 99 programs per year was obtained. The majority of invitations arrived late October (44%), followed by early November (39.5%). Interviews occurred primarily in December (47.8%) and January (37.8%). Programs on average scheduled 2.45 interview dates, interviewing 16.9 (range 5-41) candidates per date and 14.4 (range 6-30) candidates per residency position. Programs ranked in the top 25 among Doximity Residency Rankings interviewed significantly fewer residents per position than those outside the top 25 (9.8 vs. 16.0,  $p=0.000002$ ). Interviews fell disproportionately on Fridays (29.3%) and Saturdays (22.4%), with an increasing trend towards interviewing on consecutive days. There was substantial overlap in interview dates, with 6 dates alone accounting for an average of 30.3% of all interviews in a given interview cycle. **Conclusions:** The majority of otolaryngology interviews occurs in December or January and fall on a Friday or Saturday. There is considerable overlap with potential for scheduling conflicts. Our findings can help set expectations for applicants regarding interview invitations, as well as a strategy for scheduling interviews.

## I 18. Reaching Across the Aisle: The State of Cross-Disciplinary Collaboration in Otolaryngology

Andrew H. Lee, MD, Baltimore, MD; Sun Joo J. Kim, BS, Baltimore, MD; Won Kyu P. Choi, BS, Baltimore, MD; Paul H. Yi, MD, Baltimore, MD; Emily F. Boss, MD, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain and discuss the degree of cross-disciplinary collaboration in otolaryngology research.

**Objectives:** Collaboration and diversity of expertise are increasingly emphasized in the production of successful research, however, the degree of cross-disciplinary collaborative research in otolaryngology is unknown. In this study we describe cross-disciplinary collaboration in otolaryngology literature. **Study Design:** Retrospective cohort analysis of individual and team authorship characteristics in key peer reviewed otolaryngology journals. **Methods:** We reviewed all original articles published from 1/2014 to 12/2016 in Laryngoscope, Otolaryngology-Head & Neck Surgery, and JAMA Otolaryngology-Head & Neck Surgery. Affiliations of authors and online searches were used to determine specialty information. Subspecialty topic, study design, and funding sources were also recorded. Pearson's chi squared test was used to compare demographics of manuscripts with single and multidisciplinary authorship teams. **Results:** 2378 articles were reviewed from 2014 to 2016, of which 1312 (55%) articles contained a coauthor from another specialty. Among articles with cross-disciplinary authorship, the most represented specialties were biostatistics (17.6%), pathology (13.2%), and radiology (9.8%). Specialties closely tied to otolaryngology were also highly represented including speech language pathology (9.8%) and audiology (4%). Cross-disciplinary studies did not significantly vary in subspecialty topic, but were significantly more likely to be of basic science/translational design than single disciplinary studies (16.4% vs. 9.6%,  $p<0.0001$ ). Funded studies were significantly more likely to have a cross-disciplinary team vs. nonfunded (71% vs. 54%,  $p<0.00001$ ). **Conclusions:** There is a large amount of cross-disciplinary authorship in otolaryngology, particularly among specialties with knowledge pertaining to research methods such as statistical analysis or imaging. There is potential opportunity for further leveraging expertise, funding opportunities, and dissemination of key findings through collaborative research.



## I 19. Representation of Developing Countries in Otolaryngology Research: A Survey of Three Influential Otolaryngology Journals

Andrew H. Lee, MD, Baltimore, MD; Sun Joo J. Kim, BS, Baltimore, MD; Won Kyu P. Choi, BS, Baltimore, MD; Paul H. Yi, MD, Baltimore, MD; Kofi O. Boahene, MD, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to determine the representation of developing countries in influential otolaryngology journals and to describe characteristics of studies from developing countries.

**Objectives:** The developing world contains more than ¼ of the global population and carries the largest burden of head and neck disease. The purpose of our study was to determine the representation of otolaryngology studies from developing countries. **Study Design:** Retrospective review of 3 influential otolaryngology journals. **Methods:** We reviewed all original research articles published from January 2014 through December 2016 in *The Laryngoscope*, *Otolaryngology-Head & Neck Surgery*, and *JAMA Otolaryngology-Head & Neck Surgery*. Author country of affiliation, subspecialty topic, study design, and level of evidence (LOE) were recorded. Developing country designation was from the 2017 International Monetary Fund's World Economic Outlook Report. Pearson's chi square test was used to compare studies from developing and developed countries. **Results:** 2378 articles were reviewed, of which 221 (9%) articles had a first author from a developing country. Articles with any author from sub-Saharan Africa represented only 6 (0.3%) studies. Among first author articles from developing countries, the most represented countries were China (33%) and Turkey (28%). The most common subspecialty topics were otology (23%) and head and neck (17%). Significantly more prospective clinical studies (case series or cohort) were published by authors from developed countries (48% vs. 20%,  $p < 0.0001$ ). The most common LOE of developing country studies was level 4 (39%), which was similar to that of developed countries. **Conclusions:** Studies from developing countries are robust but underrepresented in otolaryngology journals. We recommend developing strategies for increasing research activity from parts of the world where head and neck disease burden is the greatest.

## I 20. Resident Selection Process: Comparison of Traditional Ranking to Talent Based Assessment on Two Interview Days

Kelly A. Scriven, MD, Washington, DC; Christine E. Demason, MD, Chapel Hill, NC; Sonya Malekzadeh, MD, Washington, DC; Michael J. Reilly, MD, Washington, DC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand our institution's experience comparing our traditional residency rank list to one based on a talent based questionnaire.

**Objectives:** Identifying characteristics predictive of success in residency is a crucial part of the residency selection process. The Otolaryngology Research Talent Assessment (ORTA) was introduced during last year's application cycle as a tool for applicant selection. Though it has not been validated, we previously described a positive correlation found between the ORTA and our residency rank list for rotating fourth year students. In this study, we sought to determine whether our applicants' ORTA scores correlated with their rank list positions after a single interview day. **Study Design:** Cross-sectional. **Methods:** A rank list of all applicants who interviewed with our residency program on two interview days was generated. The ORTA scores, provided to residency programs in graph form, were measured by two investigators. These scores were averaged to give an overall score for each applicant. The ORTA scores and the department rank list were compared using the Spearman rank correlation. **Results:** Thirty-two applicants interviewed with our residency program on one of two interview days. Comparing our department's rank list to the rank list of the ORTA scores on interview day one, we found a moderate negative correlation ( $r = -0.59$ ). For interview day two, we found a slight negative correlation ( $r = -0.12$ ). **Conclusions:** This study found a moderate negative correlation between ORTA scores and our rank list for interview day one and a slight negative correlation for interview day two. Given the previously demonstrated positive correlation between the ORTA and the rotating student rank list, this suggests that the program interview process could be improved upon.

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## I 21. Time Driven Activity Based Costing (TDABC) in Otolaryngology - Head & Neck Surgery: Dissecting the Cost of an Adenotonsillectomy in an Academic Medical Center

Jonathan C. Simmonds, MD, Boston, MA; Russell J. Hollis, BS, Boston, MA;  
Ruby K. Tamberino, MBA, Allston, MA; Mark A. Vecchiotti, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand how time driven activity based costing can be used to accurately determine the cost of procedures and services within the field of otolaryngology.

**Objectives:** 1) To illustrate how time driven activity based costing (TDABC) can be used to accurately measure procedure and service costs and improve efficiency within the field of otolaryngology; and 2) using TDABC, we estimate the cost of treating obstructive sleep apnea with adenotonsillectomy in pediatric patients. **Study Design:** Retrospective chart review. **Methods:** A clinical process map was created for pediatric patients undergoing outpatient adenotonsillectomy for obstructive sleep apnea in an academic medical center. A total of 53 patients were followed through a complete care cycle starting from their initial appointment, through surgery to their postoperative visit. Personnel were timed through each process, and non-personnel costs were gathered from administrative records. **Results:** Treating obstructive sleep apnea with an adenotonsillectomy in a pediatric patient costs \$2,032.71. The initial visit costs \$58.73 (2.9%) and lasts 59:40 minutes on average from rooming to checkout. Polysomnography is utilized in 28.6% of patients, contributing \$98.45 (4.8%) in costs, and the associated followup visit takes 56:44 minutes and contributes \$18.82 (0.9%). Outpatient adenotonsillectomy costs \$1,798.33 (88.5%) and takes 79:47 minutes from room turnover to arrival into the PACU. The surgical portion of the procedure takes 22.0 minutes (9:25-34:35 minutes), accounting for \$352.77 (\$16.03 per minute). Postop care in the PACU costs \$25.20 (1.2%) and the postoperative followup visit takes 32:37 minutes, costing \$33.19 (1.6%). **Conclusions:** Time driven activity based costing is an accurate way of measuring the cost of outpatient adenotonsillectomy and predicting utilization of resources. Through this method, healthcare organizations can more efficiently allocate personnel costs and apply overhead to improve efficiency and lower costs.

## I 22. Discharge by Noon: An Initiative by the Otolaryngology Service

Akina Tamaki, MD, Cleveland, OH; Kathryn Rose Hoppe, MD, Cleveland, OH;  
Nicole Catherine Maronian, MD, Cleveland, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the early discharge interventions implemented at our institution. We hope that this will encourage and provide a framework for other institutions to initiate similar quality initiatives.

**Objectives:** Hospital congestion is an issue affecting hospitals across the country. Late hospital discharges contribute to bottlenecks in the emergency department (ED), overcrowding in surgical and procedural areas, and limit patient transfers to tertiary care centers. Our goal was to increase our discharge by noon percentage to over 50%. We will describe the initiatives implemented at our institution and our outcomes. **Study Design:** This initiative was a quality improvement project within our institution. **Methods:** Admissions and discharge information were obtained for all patients admitted to the otolaryngology service from the time period of July 2015 to July 2017. During this time, we implemented several multidisciplinary interventions to facilitate more efficient discharge. Admission and discharge data was obtained from the electronic medical system. **Results:** Prior to our initiative, the percentage of patients discharged before noon was 8%. Throughout the intervention period, we saw a steady increase in the percentage of patients discharged by noon and reached our goal of over 50%. There was no significant difference in the patients' 30 day readmission, case mix index, or length of stay. **Conclusions:** We were successful at accomplishing the goal to increase discharge by noon to above our goal of 50%. Early discharge programs are achievable and sustainable in the otolaryngology service through multidisciplinary intervention.

### General/Facial Plastic & Reconstructive

## I 23. Orbital Fractures: A Retrospective Analysis of 173 Cases at a Nationally Recognized Trauma Center

Kareem M. Al-Mulki, Atlanta, GA; Oswaldo A. Henriquez, MD, Atlanta, GA; Angela Cheng, MD, Atlanta, GA; Steven M. Roser, DMD MD, Atlanta, GA; Dina Amin, DDS, Atlanta, GA

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

mechanisms of injury of orbital floor fractures treated at major urban trauma centers, identify common etiologies of orbital floor fractures, and explain the relevant demographics of orbital floor fracture patients.

**Objectives:** The purpose of this study was to retrospectively analyze orbital fractures treated at a nationally recognized level one trauma center. **Study Design:** A retrospective cohort chart review study was conducted for orbital fractures treated between 2012 and 2016. Cases were identified utilizing CPT codes. **Methods:** Our inclusion criteria are patients treated at our institute, older than 18 years of age, and treated by the craniomaxillofacial trauma team. Our exclusion criteria are patients younger than 18 years of age and patients that did not undergo surgical intervention. Patient and injury related variables were analyzed. **Results:** Based on our inclusion criteria, 173 patients were identified for the study. The average patient age was 40.7 years of age and the sample included significantly more males than females at a ratio of 3.3:1. Most fractures were caused by assault (38.7%), followed by motor vehicle accidents (31.2%) and falls (9.25%). The left orbit was fractured in 40.5% of the cases, the right orbit was fractured in 37% of the cases, and in 22.5% of the cases, the fractures were bilateral. The orbital floor was the most common anatomic location, accounting for 97.1% of the cases, followed by the medial orbital wall (43.9%) and the lateral orbital wall (40.5%). Of the patients treated, 27.2% tested positive for drugs and 19.7% tested positive for alcohol. Finally, 8.7 days was the average time between consult and treatment and 5.0 days was the average time between treatment and discharge. **Conclusions:** Orbital fractures are commonly seen in urban trauma centers. Our sample reflects one of the largest modern, population based studies of orbital fractures in the United States. Understanding the patterns and mechanisms of injury associated with orbital fractures can assist in the development of standardized treatment protocols.

## I 24. Epistaxis in Patients with Antithrombotic Treatment: A Comparison between Factor Xa Inhibitors, Warfarin and Antiplatelet Therapy

Eran Y. Glikson, MD, Ramat Gan, Israel; Ory Madgar, MD, Tel Aviv, Israel; Doron Sagiv, MD, Tel Aviv, Israel; Eran E. Alon, MD, Ramat Gan, Israel

**Educational Objective:** At the conclusion of this presentation, the participants should be able to appreciate the clinical parameters, severity and outcome of epistaxis episodes in patients under novel anticoagulants vs warfarin and anti-aggregates.

**Objectives:** To examine the characteristics and severity of epistaxis in patients under treatment of factor Xa inhibitors novel anticoagulants, warfarin and anti-aggregates (aspirin, clopidogrel). **Study Design:** Retrospective cohort study in a tertiary academic referral center. **Methods:** All adult patients hospitalized between the years 2011-2017 due to spontaneous epistaxis under the treatment of warfarin, rivaroxaban or apixaban were reviewed. A control group of patients under anti-aggregates therapy (aspirin, clopidogrel) was also included. We compared demographic data, location and severity of bleeding, hemoglobin level and amount loss, treatment methods, and outcome between the 4 groups. **Results:** The study included 109 patients (24 under rivaroxaban treatment, 11 under apixaban, 43 under warfarin and 31 under anti-aggregates). The 4 groups showed similar demographics except for a higher rate of chronic hypertension in the anti-aggregates group (84% vs 61%,  $p<0.05$ ). A higher mean number of epistaxis episodes prior to presentation and a higher rate of cases that required endoscopic surgery was found in the anti-aggregates group compared to a combined group of all anticoagulants (2.23 vs 1.44,  $p<0.05$ ) and (23% vs 6%,  $P<0.05$ ) respectively. Anterior epistaxis was seen in most patients (68%). A trend for a lower hemoglobin level decrease was found in the rivaroxaban group compared to warfarin (0.56g/dl vs 0.83g/dl,  $p=0.22$ ). Combined therapy (cauterization and packing) was needed more frequently in the apixaban group compared to the rivaroxaban and warfarin groups (64% vs 25% and 33% respectively,  $p<0.05$ ). This group also showed a trend for a higher rate of rebleeding versus the latter groups (36% vs 25%,  $p=0.3$ ) and (36% vs 16%  $p=0.14$ ) respectively. The rate of readmissions within 1 year was higher in the warfarin and anti-aggregate groups compared to the apixaban and rivaroxaban groups (16% Vs 0% and 4% respectively,  $p<0.05$ ). **Conclusions:** Patients under apixaban may require combined methods of treatment for control of epistaxis possibly due to more episodes of rebleeding. A lower rate of readmission and a tendency for a lower hemoglobin level decrease was found in the factor Xa inhibitor groups, which may be related to their predictable pharmacodynamic profile and shorter half-life. More episodes of epistaxis prior to hospitalization and a higher rate of episodes that required endoscopic surgery for epistaxis control were found in patients under anti-aggregates.

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## I 25. Evolving Trends in Thyroid Cancer among Pediatric and Adult Inpatient Populations

Aparna Govindan, BA, Newark, NJ; Monica C. Azmy, BS, Newark, NJ; Nirali M. Patel, BA, Newark, NJ; Evelyne Kalyoussef, MD FACS, Newark, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare temporal trends and characteristics of adults and children admitted for malignant thyroid cancer.

**Objectives:** Characterize inpatient cases of thyroid malignancies in children and adults. **Study Design:** Retrospective cohort study. **Methods:** The Nationwide Inpatient Sample (NIS) and Kids' Inpatient Database (KID) were queried for adult and pediatric cases of thyroid malignancy from 2003 to 2012. Frequencies and chi square analyses were conducted to analyze demographics, admission rates, comorbidities, and mortality. **Results:** 2880 pediatric cases met inclusion criteria and mean age was  $16.25 \pm 3.50$ . There was a 16.50% increase in admissions from 2003 to 2012, with no reported cases of mortality during this time period. Admission rates increased in the Northeast relative to other regions between 2003 (16.60% vs. 24.40%,  $P < 0.001$ ) and 2012 (31.40% vs. 24.60%,  $P = 0.005$ ). 302,886 adult cases were analyzed and mean age was  $50.36 \pm 16.05$ . From 2003 through 2012, there was a 21.50% decrease in admissions, and an 18.20% decrease in deaths per year. Among those admitted, there was a significant increase in the frequency of hypertension from 2008 onwards ( $P < 0.001$ ). **Conclusions:** While the rate of admission for thyroid cancer is decreasing among the adult population, reflecting the turn to outpatient management, it is increasing among the pediatric population over the same time period. Rates of hypertension increased in the adult cohort, which may reflect hypertension as a comorbid risk factor for admission. While regional data shows a significant increase in pediatric thyroid cancer in the Northeast, further studies are needed to delineate geographic trends.

## I 26. Dangers of Videolaryngoscopy Assisted Intubation: Risk for Multiple Otolaryngologic Complications

Jessica B. Howell, MD, Richmond, VA; Eric N. Appelbaum, MD, Richmond, VA; Thomas S. Lee, MD, Richmond, VA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the possibility for upper airway injuries associated with videolaryngoscope assisted endotracheal intubation, as well as the need for thorough otolaryngologic evaluation, to include direct laryngoscopy, given the high rate of multiple concurrent injuries.

**Objectives:** 1) Discuss the incidence of upper airway injuries associated with videolaryngoscope assisted endotracheal intubation in a single tertiary care institution; and 2) emphasize the need for thorough otolaryngologic evaluation, to include direct laryngoscopy, given the high rate of multiple concurrent injuries. **Study Design:** Retrospective chart review and literature review. **Methods:** Retrospective chart review and literature review. **Results:** Six intraoperative consults were requested of the otolaryngology service regarding traumatic videolaryngoscope assisted intubations at a single tertiary care institution. All patients had elevated BMI, and 5/6 patients had an ASA score of 3. All patients sustained a right sided injury, and 4/6 presented with concurrent injuries at multiple sites. All injuries were immediately appreciated after intubation. While 3/6 patients with pharyngeal lacerations were able to be closed with simple primary closure, 3/6 required palatoplasty due to transpalatal intubation. **Conclusions:** While most injuries secondary to traumatic intubation are minor, serious trauma can occur during videolaryngoscopy assisted intubation, requiring procedural intervention. The sequelae of unrecognized pharyngeal and palate injury include hemorrhage, infection, retropharyngeal abscess, and inability to perform safe extubation. The majority of patients present with multiple injuries to the aerodigestive tract, requiring thorough evaluation and procedural management. Proper training and direct visualization with insertion of the videolaryngoscope during intubation are essential. Otolaryngologists should be familiar with injury patterns seen in videolaryngoscope assisted intubation trauma and strategies for treatment.

## I 27. Unclogging the Drain: Case Report of a Rare Complication

Anna E. Jackanich, BS, Los Angeles, CA; Caitlin Bertelson, MD, Los Angeles, CA; Jasper Shen, MD, Chicago, IL; Karla O'Dell, MD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the rare complication and management of intrapharyngeal hirsutism following total laryngopharyngectomy with flap reconstruction.

**Objectives:** To review the rare complication of persistent postoperative dysphagia and inability to use tracheoesophageal



puncture (TEP) caused by pharyngeal hirsutism after flap reconstruction; to familiarize clinicians with this presentation and the role of laser depilation in management. **Study Design:** Case report and literature review. **Methods:** The presentation, management and outcome of a patient with intrapharyngeal hair growth and worsening dysphagia and difficulty voicing will be reviewed. **Results:** A 57 year old male with a T4aN2bM0 squamous cell carcinoma of the left pyriform sinus underwent total laryngopharyngectomy, modified radical neck dissection and pharyngeal reconstruction with pectoralis major rotational flap followed by postoperative chemoradiotherapy. He presented three years later with disabling dysphagia and extrusion of his TEP prosthesis. Flexible laryngoscopy revealed substantial neopharyngeal hair growth and excessive retained secretions. Modified barium swallow study (MBSS) was remarkable for bolus stasis in the neopharynx and at the level of the TEP site and residual swallowed material. The patient underwent esophagoscopy with hair trimming followed by CO2 laser fulguration of the hair follicles and esophageal dilation. He reported immediate improvement in symptoms. Postoperative MBSS revealed improved pharyngoesophageal transit and minimal bolus stasis. He regained his previous weight loss and underwent revision TEP placement. He is currently using his TEP without issues and tolerating a full oral diet. **Conclusions:** We are the first to report intrapharyngeal hirsutism following flap reconstruction, which is a rare but burdensome complication that can significantly impair speech and swallowing functions. Endoscopic CO2 laser depilation is one promising management strategy for these patients.

## I 28. Syphilis of the Oropharynx: Case Series of “The Great Masquerader”

Ameya A. Jategaonkar, MD, New York, NY; Jay Agarwal, MD, New York, NY;  
William M. Portnoy, MD, New York, NY; Raymond L. Chai, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, participants should be able to discuss the presentation of syphilis in the oropharynx and how it can be confused with oropharyngeal squamous cell carcinoma.

**Objectives:** Syphilis is a sexually transmitted infection caused by the spirochete *treponema pallidum* with various presentations. Although oropharyngeal manifestations of all three stages of syphilis are known to occur, the purpose of this study is to present the first case series in which the lesions were initially mistaken for human papillomavirus (HPV) related oropharyngeal squamous cell carcinoma (OPSCC). **Study Design:** This study represents a retrospective review. **Methods:** A retrospective review was conducted and patients with oropharyngeal manifestations of syphilis were included. **Results:** Five cases of oropharyngeal manifestations of syphilis were initially thought to be secondary to OPSCC due to presentation. Symptoms were vague and consisted of throat pain, globus sensation or neck pain. One of five patients was known to be HIV positive. Physical exam findings consisted of either a tonsillar mass with ulceration, base of tongue mass, or lymphadenopathy. Workup including fine needle aspiration and biopsies were negative for OPSCC in each of these patients. Further workup diagnosed syphilis, with resolution of both symptoms and lesions after appropriate antibiotic treatment. **Conclusions:** Head and neck manifestations of syphilis, including in the oropharynx, have been reported in the literature. However, this is the first case series reporting on oropharyngeal syphilis masquerading HPV related OPSCC. Given the epidemic of HPV related OPSCC, unsurprisingly, oropharyngeal carcinoma is often much higher on the differential diagnosis than syphilis for cases with similar presentations. Ultimately, otolaryngologists must maintain a high index of suspicion for syphilis in order to initiate the appropriate workup and treatment.

## I 29. Complementary and Alternative Medicine within Otolaryngologic Perioperative Care: A Review

Aron R. Kallush, BA, New York, NY; Charles A. Riley, MD, New York, NY;  
Ashutosh A. Kacker, MBBS MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate that complementary and alternative medicine can be highly effective tools within otolaryngologic perioperative care.

**Objectives:** In the perioperative period for otolaryngologic surgical cases, complications and delays can occur as the result of anxiety, pain, nausea, and vomiting. Conventional methods utilize medications that can be expensive, invasive, or introduce adverse effects. Due to the increasing concerns over opioid use in the United States, providers might consider alternative treatment plans either as adjunctive or primary methods of care. The objective of this manuscript was to review current knowledge on the clinical effectiveness of complementary and alternative medicine (CAM) for patients undergoing otolaryngologic surgeries. **Study Design:** Literature review. **Methods:** Current literature pertaining to CAM utilization in the perioperative period for patients undergoing otolaryngologic surgeries was reviewed using Medline, PubMed and Google Scholar searches. **Results:** Multiple relevant trials were selected after inclusion criteria were met. In order to allow for a comparative control group, the studies selected were primarily composed of randomized controlled trials. An analysis



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of the clinical trials revealed that CAM was effective at reducing preoperative anxiety, postoperative pain, and postoperative nausea and vomiting (PONV). No adverse side effects were associated with CAM utilization in these studies. **Conclusions:** The use of CAM in patients undergoing otolaryngological surgeries may relieve preoperative anxiety, postoperative pain, and PONV. Otolaryngology providers might consider implementing CAM in patients electing for surgery.

## I 30. A Review of Open Access Solicitation in Otolaryngology

Brandon J. Kim, MD, Los Angeles, CA; Albert L. Merati, MD, Seattle, WA;  
Jennifer A. Villwock, MD, Kansas City, KS; Michael M. Johns, MD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare different open access journals by utilizing several metrics to improve submission decision making and help avoid predatory publishers.

**Objectives:** 1) To describe the landscape of open access publication in otolaryngology in 2017; and 2) to provide authors with metrics in otolaryngology open access journals to assist in submission decision making. **Study Design:** Descriptive. **Methods:** All otolaryngology open access journal solicitations were collected by the senior author from mid-May to early October 2017. Journals were assessed for several metrics: fees, indexing sites, time of existence, editorial board composition, otolaryngology society or organization affiliation, and publisher number of journals. **Results:** 73 solicitations were received from 34 publishers for 38 journals. Each publisher produced an average of 90 distinct journal titles (range: 14 to 720) across various specialties and disciplines. Only 71% appeared on Beall's List of Predatory Journals and Publishers. 42% of journals listed article processing fees, averaging \$562 to \$902 (range: \$59 to \$2126). 89% of journals list an editorial board with on average 34 members (range: 5 to 133). 26% of journals had no published articles, and of those that did, the average first date was 5/6/2017 (earliest: 7/1/2011). 7.9% of journals were indexed in PubMed with 5.3% with any articles published in PubMed. No journals had otolaryngology society or organization affiliation. None were listed in the Directory of Open Access Journals or InCites Journal Citation Reports. **Conclusions:** Many choices exist in open access publication in otolaryngology, and it is challenging for authors to judge journal quality when considering submission. Predatory publishers are present and can be difficult to distinguish from legitimate open access journals.

## I 31. Secondary Syphilis: A Case of Unknown Primary

Jaclyn Klimczak, MD, New York, NY; Arvind K. Badhey, MD, New York, NY; Angela Damiano, MD, Arsdley, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to include secondary syphilis as part of the differential of a cervical neck mass and the workup of unknown primaries.

**Objectives:** Secondary syphilis of the tonsil is a rare manifestation of the disease in the absence of other clinical symptoms. We present a case of tonsillar syphilis to illustrate the importance of considering this diagnosis in patients who present with asymptomatic unilateral tonsillar enlargement. **Study Design:** Case report and literature review. **Methods:** We report a case of a 55 year old male with unilateral cervical lymphadenopathy and right sided tonsil asymmetry. The patient underwent a myriad of tests including a CT neck confirming physical exam findings and biopsies showing non-specific lymphocytes. The patient was treated as a case of unknown primary and was taken to the operating room for tonsillectomy and possible neck dissection. **Results:** In the operating room there was noted asymmetry of the right tonsil and tonsillectomy was performed. On clinical exam the right cervical lymphadenopathy had significantly improved and the decision was made to await final pathology of the right tonsil. The first pathology report showed reactive lymphoid tissue. In the office the patient was found to have a positive RPR test and diagnosed with what was likely secondary syphilis. Additional Warthin starry and spirochete stains were then done to confirm the diagnosis. **Conclusions:** Syphilis is well known for being difficult to diagnose in the secondary stage. Here we present a case of secondary syphilis masquerading as an unknown primary. For the otolaryngologist, carcinoma is always important to rule out. However, with a rise in atypical presentations and unknown primary cases, it is important that syphilis become part of the routine differential to prevent aggressive management.

## I 32. Cost Differences between Otic and Ophthalmic Drops

Jiahui Lin, MD, New York, NY; Lawrence R. Lustig, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the cost differences between otic and ophthalmic drops, as well as several factors that play a role in these differences.

**Objectives:** Otic drops are frequently prescribed in otolaryngology. However, they are often expensive and ophthalmologic formulations are commonly used to decrease the cost for patients. The goal of this study is to determine the cost differential between otic and ophthalmic drops. **Study Design:** Cross-sectional survey. **Methods:** Pharmacies were surveyed in the span of one month by telephone to evaluate the current prices of various otic and ophthalmic drops commonly prescribed by otolaryngologists. A literature review was also performed to evaluate the pharmacologic and safety properties of these medications. **Results:** A total of 31 pharmacies were surveyed. Surveyed drugs included ciprofloxacin/dexamethasone otic, neomycin/polymyxin B sulfates/hydrocortisone otic, acetic acid otic, acetic acid/hydrocortisone otic, ofloxacin otic, ofloxacin ophthalmic, and tobramycin/dexamethasone ophthalmic. Per milliliter, ciprofloxacin/dexamethasone otic was consistently the most expensive, at an average of \$33.30 per milliliter. Ofloxacin ophthalmic was significantly less expensive than the otic formulation, at \$11.04 vs \$25.43 per milliliter, respectively. In general, otic and ophthalmic formulations were not significantly different according to manufacturing information, although ophthalmic drops were more often packaged in a sterile fashion and with less abrasive ingredients for use in the more sensitive tissue of the eye. Although ofloxacin otic is largely no longer on a backorder that resulted from a temporary discontinuation of its manufacturing by multiple companies, its prices remain high. **Conclusions:** Significant price differences exist between otic and ophthalmic drops. Given the safety of ophthalmic drops used in the ears, it may be a more cost effective alternative to traditionally prescribed otic drops.

### I 33. Indications for Surgical Management of Hyoid Bone Syndrome

Jenny F. Ma, BA, Philadelphia, PA; Arvind K. Badhey, MD, New York, NY; Raymond L. Chai, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the surgical management of hyoid bone syndrome as a successful alternative to medical management.

**Objectives:** Surgical resection of the greater cornu of the hyoid bone is an uncommon approach for treating hyoid bone syndrome. Current practice favors steroid injections. However, for select patients who have suggestive findings on computed tomography (CT) imaging, surgical management can effectively resolve pain. **Study Design:** Case report and literature review. **Methods:** We report a case of a 27 year old female with a 3 month history of left sided throat pain and clicking. Based on CT evidence of elongation of the greater cornu of hyoid bone, a calcified thyrohyoid ligament, and failed steroid management, the patient was diagnosed with hyoid bone syndrome. She subsequently underwent surgical resection of the greater cornu of the hyoid bone and thyrohyoid ligament. **Results:** In the operating room, the hyoid bone was found to be severely elongated and calcified with a calcified thyrohyoid ligament. Dissection was carried out to isolate the greater cornu of the hyoid and superior cornu of the thyroid cartilages. The thyrohyoid ligament was disarticulated from the superior cornu. The hyoid bone was then transected at the lesser cornu and removed. The patient's symptoms were vastly improved by her one month followup. **Conclusions:** Hyoid bone syndrome is a rare cause of neck pain that can be difficult to treat medically. However, patients with characteristic imaging findings, such as a calcified thyrohyoid ligament, may benefit from surgical management of their pain. If identified and managed early, then the costs of further workup as well as unnecessary prolongation of the patient's symptoms can be avoided.

### I 34. Epidemiology and Resource Utilization of Ludwig's Angina Emergency Department Visits in the United States from 2006 to 2014

Jamiela A. McDonnough, BS, Washington, DC; Iason Yi, BS MA, Washington, DC; Adedoyin O. Kalejaiye, MD, Washington, DC; Gezzer Ortega, MD MPH, Washington, DC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the epidemiological makeup of patients presenting to the ED with Ludwig's angina and their subsequent resource utilization and need for airway management.

**Objectives:** Ludwig's angina is a potentially lethal submandibular space infection. We aim to describe the epidemiological characteristics of Ludwig's angina patients presenting to the emergency department (ED) and to examine outcomes and resource utilization to determine their burden on emergency departments and hospitals. **Study Design:** Population based descriptive epidemiological study. **Methods:** Using the Nationwide Emergency Department Sample (NEDS) database, a nationally representative all payer ED database, we retrospectively reviewed all ED visits between 2006 and 2014 for patients with a primary diagnosis of Ludwig's angina (ICD9-528.3) who were admitted. We collected information including demographics, ED and inpatient charges, airway interventions, length of stay, and mortality. Results were compared across insurance status, hospital type, and patient characteristics. **Results:** A total of 5,855 patients met our inclusion

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criteria. The mean age was 44 years, with 54.1% males, and 25% uninsured. Total mean ED charges were \$1,623 and mean inpatient charges were \$28,731, with a mean length of stay of 4 days. As part of their management, 3.3% required a surgical airway and 4.7% required a non-surgical airway. The overall mortality rate was 0.3%. **Conclusions:** Ludwig's angina remains a rare and potentially life threatening condition, with substantial emergency department visits nationwide. The mortality rate of 0.3% appears to be decreased from previous historical accounts, with airway intervention remaining a significant part of management.

## I 35. A Branchial Cleft Cyst of the Parapharyngeal Space

Kinneri Mehta, MD, Farmington, CT; Maheep Sohal, MD, Farmington, CT; Clinton Kuwada, MD, Farmington, CT; Gregory Bonaiuto, MD, Farmington, CT

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the different types of second branchial cleft cysts based on location and the utility of magnetic resonance imaging in diagnosis and surgical planning. They should also be able to discuss the different surgical approaches to this type of lesion.

**Objectives:** To discuss an uncommon presentation of a second branchial cleft cyst including the diagnostic workup and surgical considerations involved in management. **Study Design:** Case report and literature review. **Methods:** This is a case report describing a 22 year old patient with a history of tonsillectomy who presented with odynophagia and was found to have a right parapharyngeal space mass that was removed via transoral resection. **Results:** Though initially thought to be infectious based on the history and exam, the diagnosis was eventually clarified with the use of imaging and pathology results. Computed tomography demonstrated a well circumscribed isoattenuating lesion of the right parapharyngeal space. Magnetic resonance imaging further delineated a cystic lesion with signal hyperintensity on T1 weighted sequence and thin peripheral enhancement on post-contrast imaging suggestive of a branchial cleft cyst. Given the patient's persistent symptoms, surgical management was recommended. The patient has recovered well after transoral resection of the mass. **Conclusions:** Congenital lesions, specifically branchial cleft cysts, are rare causes of parapharyngeal space masses. While fine needle aspiration may be inconclusive, imaging modalities including computed tomography and magnetic resonance imaging can prove useful in the assessment and surgical planning of these lesions. This case demonstrates the diagnostic management of an uncommon cause of a parapharyngeal space mass and the surgical considerations involved in resection.

## I 36. Extracranial Carotid Artery Aneurysm Presenting as a Parapharyngeal Space Mass

Kinneri Mehta, MD, Farmington, CT; James G. Naples, MD, Philadelphia, PA; Kimberley D. Rutherford, MD, Farmington, CT

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand and describe the diagnostic evaluation of parapharyngeal space lesions. In particular they should be able to explain the imaging findings and management options for extracranial carotid artery aneurysms that present as parapharyngeal space lesions.

**Objectives:** To discuss the diagnosis and management of an extracranial carotid artery aneurysm presenting as a parapharyngeal space mass. **Study Design:** Case report and literature review. **Methods:** This is a case report and review of the literature regarding a patient who presented with symptoms suggestive of an acute cerebrovascular event and was found to have a parapharyngeal space mass of vascular etiology. **Results:** The diagnosis of extracranial carotid artery aneurysm was made based on history, exam, and imaging results. Though endovascular and surgical intervention were discussed, the patient elected for conservative management. A review of the literature reveals extracranial carotid artery aneurysms as rare causes of parapharyngeal space masses with 14 cases reported in systematic review of 1143 parapharyngeal space lesions. Various imaging modalities including computed tomography, magnetic resonance imaging and conventional angiography are useful in differentiating these lesions. Though endovascular and open surgical options have been proposed they carry significant risks related to vascular injury, CNS deficits and cranial nerve damage. **Conclusions:** Though rare, extracranial carotid artery aneurysms may present as parapharyngeal space masses and should be considered in the differential diagnosis for such lesions. Prior to intervention or biopsy, a thorough evaluation should be conducted with a focus on imaging studies which can distinguish this diagnosis from other parapharyngeal space lesions such as salivary neoplasms and paragangliomas. This case demonstrates the complementary role of computed tomography and magnetic resonance imaging in the evaluation of a parapharyngeal space lesion. Additionally, it emphasizes the importance of maintaining a broad differential for parapharyngeal space lesions.

## I 37. Maternity and Paternity Leave in Otolaryngology Residency Training

Adam A. Miller, BS, Cincinnati, OH; Jonathan R. Mark, MD, Cincinnati, OH;  
Charles M. Myer III, MD, Cincinnati, OH; Alice L. Tang, MD, Cincinnati, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to evaluate the presence of institutional support for maternity and paternity leave during residency training across the United States.

**Objectives:** This study evaluates the maternity and paternity leave policies for residents during otolaryngology training, the accommodations in place, and ways to improve support. Our aim is to evaluate if there is a positive, negative, or no impact on training and coresident work burden according to the program director's (PD) perspective. **Study Design:** Cross-sectional survey study. **Methods:** An electronic survey was sent to 103 otolaryngology residency directors. A link to a 10 page, 30 question survey was provided. Descriptive statistics and comments were collected. **Results:** Forty-one respondents (39.8%) completed the survey all of whom were from university based programs. Programs from the mid-west (n=11, 26.8%), northeast (n=12, 29.3%), south (n=12, 29.3%) and west (n=6, 14.6%) were represented. Twenty-two (56.1%) programs reported having no departmental/divisional maternity leave policy and 25 (64.1%) programs had no paternity specific policy. Four programs reported use of short term disability, while 11 programs reported using the Family Medical Leave Act (FMLA). Leave policies seem to primarily follow ACGME guidelines, with factors such as clinical duties and call schedules left to the programs' discretion. While the majority (56%) would support residents who planned to become pregnant during training, many expressed concern regarding the burdens on coresident and difficulty fulfilling training obligations. Fourteen PDs reported a negative impact on training for females taking leave while five PDs reported a negative impact for male trainees. **Conclusions:** Many programs do not have parental leave policies and logistics regarding leave are left to the discretion of the individual programs. Surveyed directors addressed challenges and suggested solutions for policy improvements.

## I 38. Frontal Sinus Obliteration by Autologous Fat Complicated by Infection: A Case Report

Omid Moshtaghi, MS, Irvine, CA; Sapideh Gilani, MD, San Diego, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe an infected autologous fat graft for frontal sinus obliteration.

**Objectives:** To present a case of a patient who underwent frontal sinus obliteration by autologous fat graft which subsequently became infected. **Study Design:** Case report. **Methods:** A patient presenting to a tertiary care outpatient otolaryngology office referred by an outside provider is described. Pertinent records, imaging, and history was reviewed. **Results:** Following an all terrain vehicle accident, the patient sustained a comminuted anterior table of the frontal sinus fracture. Sinus repair with plate fixation and mucosal removal and sinus obliteration with periumbilical free fat transfer was performed by an outside provider. Two weeks postoperatively, the patient experienced significant forehead swelling, upper eyelid edema and erythema with subjective fevers. Symptomatic improvement was achieved temporarily with antibiotics but symptoms relapsed. CT sinus showed soft tissue swelling of the forehead and upper eyelid. Five months postoperatively, the patient remained symptomatic and is considering possible surgical exploration. **Conclusions:** Autologous fat remains the most common graft substrate for frontal sinus obliteration. With new synthetic products under investigation, the ideal material for frontal sinus obliteration remains uncertain and endoscopic approaches to the frontal sinus outflow tract are increasingly used in cases with damage to the outflow tract from trauma. Although a significant body of literature highlights the overall success of fat grafts, this case underscores an important risk that must be considered.

## I 39. Assessing Basic Otolaryngology Competency among Medical Students: A Multi-Institutional Study

Luke J. Pasick, BS, Philadelphia, PA; Daniel A. Benito, MD, Washington, DC;  
Philip E. Zapanta, MD FACS, Washington, DC; Robert T. Sataloff, MD DMA FACS,  
Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand the need for increased otolaryngologic education and training among all medical students; and 2) compare basic otolaryngology competency and physical exam comfort among various cohorts of medical students.

**Objectives:** The prevalence of otolaryngic complaints in general practice is disproportionate to the extent of otolaryngol-



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ogy teaching in undergraduate medical education. This is the first multi-institutional validated study used to assess basic otolaryngology competency among medical students in order to better understand abilities in recognizing and managing these cases. **Study Design:** Multi-institutional validated questionnaire. **Methods:** A 9 question psychometrically validated multiple choice quiz was distributed to medical students of nine U.S. allopathic institutions as a measure of basic otolaryngology competency. Students were also asked about comfort levels, amount of exposure to otolaryngology, and number of times the head and neck physical exam was taught formally. **Results:** A total of 547 responses were received. Comfort in managing otolaryngic conditions correlated positively with competency ( $p < 0.001$ ,  $R^2 = 0.266$ ), in addition to otolaryngology exposure correlating positively with competency ( $p < 0.001$ ,  $R^2 = 0.284$ ). Students intending to enter otolaryngology reported higher competence ( $p = 0.002$ ), higher comfort levels ( $p < 0.001$ ) in managing otolaryngic cases, and higher comfort levels performing the head and neck exam ( $\chi^2 = 21.324$ ,  $p < 0.001$ ), than students intending to enter primary care or another surgical specialty. Clinical students in third and fourth years entering any surgical specialty (including otolaryngology), more often than students entering primary care ( $p = 0.007$ ), recognized the obturator as the instrument used to guide the insertion of the tracheotomy tube. Additionally, the number of times the head and neck exam was taught correlated positively with comfort in performing the exam ( $r_s = 0.095$ ,  $p = 0.022$ ). **Conclusions:** Our findings support the need for increased otolaryngologic education and training among all medical students, not only those entering otolaryngology.

## I 40. Nasal Fractures: Analysis of 255,533 Patients in the National Trauma Data Bank

Tiffany T. Pham, MS, Irvine, CA; Ellen K. Lester, BS, Irvine, CA; Areg Grigorian, MD, Irvine, CA; Rachel E. Roditi, MD, Boston, MA; Jeffry T. Nahmias, MD MHPE, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the incidence and risk factors of nasal fractures, as well as patient characteristics, associated injuries, treatments, and patient outcomes.

**Objectives:** Nasal fractures are common, accounting for 40-58% of facial fractures. However, the literature characterizing risk factors for nasal fractures is sparse. This study provides to our knowledge the largest descriptive analysis and identifies risk factors for nasal fractures using a national database. **Study Design:** A retrospective analysis of the National Trauma Data Bank from 2007-2015 was performed. **Methods:** Patients > 18 years of age with nasal fractures were included. A multivariate logistic regression identified risk factors for nasal fracture. **Results:** Of 5,494,609 patients, 255,533 (4.6%) had a nasal fracture. Most patients were male (74.8%) with a mean age of 45.6 years and median injury severity score of 10.0. Blunt trauma accounted for 90.5% of fractures with the most common mechanism being motor vehicle accident (27.5%). Closed fractures occurred in 93.0% of patients. Associated injuries included traumatic brain injury (TBI) (56.9%), maxilla/malar fracture (27.9%), and open wound of the face/nose (38.6%/9.5%). Of all patients, 10.1% underwent some form of surgical intervention (7.5% closed reduction; 2.6% open reduction). The mortality rate was 4.4%. The most common complication was pneumonia (4.3%). After covariate adjustment, the strongest independent risk factors for nasal fracture included open wound of the nose (OR=11.26, 95% CI 11.03-11.48,  $p < 0.001$ ), maxilla/malar fracture (OR=5.15, 95% CI 5.08-5.22,  $p < 0.001$ ) and orbital fracture (OR=4.33, 95% CI 4.26-4.39,  $p < 0.001$ ). **Conclusions:** Nasal fractures are common traumatic injuries with >90% occurring by blunt mechanism and over half suffering a concomitant TBI. The strongest independent risk factor for nasal fracture is an open wound of the nose followed by a maxilla/malar fracture.

## I 41. A Low Cost Simulator for Flexible Laryngoscopy

Apoorva T. Ramaswamy, MD, New York, NY; Tiffany Peng, MD, New York, NY; Wesley Davison, MD, New York, NY; Andrea Wang, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to develop a low cost simulator for laryngoscopy.

**Objectives:** Flexible fiberoptic laryngoscopy (FFL) is an important skill for many fields of medicine. However, simulators for this procedure can be very expensive and are not easily accessible. In this study, we seek to evaluate improvements in scope times and patient discomfort with the use of a short training session with a low cost simulator that can be quickly made from equipment readily found in the hospital. **Study Design:** Prospective randomized trial. **Methods:** The learning subjects were 19 medical students and emergency medical residents who had never before been exposed to FFL. Of these, 13 were randomized to be trained on the simulator while the other 6 were not. Both groups were shown a 10 minute presentation on FFL and upper airway anatomy. They were also given time prior to the trial to familiarize themselves with the equipment and controls. Volunteers for undergoing scoping and evaluation of pain were healthy with no known abnormality in the nasal or upper airway anatomy including uncorrected nasal septal deviation or septal perforation, no



nasal or upper airway surgery within the past year, no current upper respiratory infection and no history of allergy to lidocaine or oxymetazoline. These volunteers received \$50 in cash for their participation. Each subject was given 3 minutes to scope 2 subjects who had been appropriately anesthetized and decongested with 1% lidocaine with phenylephrine. The timing was started from entry into the naris and ended with removal of device from volunteer's nasal cavity. Pain was self-reported by Wong-Baker pain scale. **Results:** No significant differences were found in pain between subjects who underwent simulator training and who did not, with mean pain score for the overall procedure among simulator subjects 2.32, and those without 3,  $p=0.19$ . The timing of the scope exams also did not vary significantly, with 98.9 seconds for simulator trained subjects, and 103.6 seconds for non-simulator trained subjects,  $p=0.11$ . However, ability to visualize the larynx was significantly higher among simulator subjects compared to those not trained,  $p=0.048$ . **Conclusions:** Although limited by small sample size, this pilot study demonstrates a low cost simulator for flexible laryngoscopy can improve the ability to visualize the larynx in novice practitioners. Further investigation is necessary to determine the utility of this tool.

## I 42. Multifocal Extra Parotid Warthin's Tumor - An Uncommon Presentation of Bilateral Cervical Lymphadenopathy

Ryan A. Rimmer, MD, Philadelphia, PA; Elizabeth E. Cottrill, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate an understanding of multifocal Warthin's tumor (papillary cystadenoma lymphomatosum) presenting within cervical and mediastinal lymph nodes.

**Objectives:** To present a case of multifocal Warthin's tumor (papillary cystadenoma lymphomatosum) presenting within cervical and mediastinal lymph nodes, examine imaging and histopathology, and review relevant literature. **Study Design:** Case report and literature review. **Methods:** Retrospective chart review including history, imaging, and histopathology. Literature review examining relevant studies of prevalence and pathogenesis. **Results:** A 71 year old male smoker presented to our institution with bilateral parotid swelling along with cervical and mediastinal lymphadenopathy. He had a known history of Warthin's tumor of the parotid glands diagnosed in 2016. Serial CT scans demonstrated slow growing bilateral multilevel partially cystic cervical lymphadenopathy. A mediastinal lymph node was biopsied via EBUS and found to be negative for lymphoma or malignancy. A confirmatory tissue diagnosis of the cervical lymphadenopathy was sought prior to scheduling definitive treatment. He therefore underwent excision of a right neck level II nodal conglomerate. Flow cytometry was negative for lymphoma. Pathology demonstrated Warthin's tumor within multiple lymph nodes, the largest of which was 4.2cm. He has elected for conservative management and will be monitored for progression. **Conclusions:** Warthin's tumor is the second most common benign lesion of the parotid gland and is most typically seen in male smokers in the fifth and sixth decade of life. Uniquely, it can be seen bilaterally in 7-10% of cases. Very rarely, Warthin's tumor can mimic malignant or metastatic disease by presenting within cervical lymph nodes. A tissue diagnosis should be obtained to appropriately guide definitive treatment decisions.

## I 43. Balloon Sinuplasty for the Frontal Sinus Fracture Involving the Frontal Sinus Outflow Tract

Robert Saddawi-Konefka, MD PhD, San Diego, CA; Omid Moshtaghi, MS, Irvine, CA;  
Sapideh Gilani, MD, San Diego, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the use of balloon sinuplasty as an adjunctive option during repair of an anterior table frontal sinus fracture.

**Objectives:** To present the case of a patient who underwent anterior frontal sinus fracture repair with plating and balloon sinuplasty. **Study Design:** Case report. **Methods:** A patient presenting to a tertiary care outpatient otolaryngology office is described. Pertinent records, imaging, and history were reviewed. **Results:** After sustaining a comminuted anterior table of the frontal sinus fracture with radiographically intact frontal sinus outflow tract, the patient's injuries were repaired. The patient's injury spared both the posterior table and the frontal sinus outflow tract. To repair the defect, the fracture was exposed through the laceration of the forehead. The frontal sinus outflow tract did not appear to be patent when oxymetazoline was placed into the frontal sinus. A frontal sinus balloon was used to dilate the frontal sinus ostium and then oxymetazoline was able to flow freely from the frontal sinus into the nose. The comminuted and displaced anterior table fracture was then plated and repaired. There was negligible injury to the frontal sinus mucosa and no indication for sinus obliteration or grafting. At 6 week followup, the patient was healing well and had no clinical evidence of frontal sinusitis. **Conclusions:** The use of balloon sinuplasty may be used as an adjunct technique when there is a comminuted and displaced anterior table fracture and the status of the frontal sinus outflow tract is intact radiographically but questionable intraoperatively. The use of this technique with plating of the anterior table fracture may obviate the need for both

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obliteration and fat grafting.

## I 44. Tracheotomy Care for the Nonsurgical Provider: A Quality Improvement Project

Marissa A. Schwartz, MD, Farmington, CT; Kinneri Mehta, MD, Farmington, CT;  
Todd E. Falcone, MD, Farmington, CT; Katherine Kavanagh, MD, Hartford, CT

**Educational Objective:** At the conclusion of this presentation, the participants should be able to assess the need and efficacy of a tracheotomy educational program for anesthesiology providers.

**Objectives:** To assess the need and efficacy of a tracheotomy educational program for anesthesiology providers. **Study Design:** Quality improvement project involving prospective classroom based study. **Methods:** All anesthesiologists, anesthesiology residents, student registered nurse anesthetists, and certified registered nurse anesthetists at one hospital were invited to attend the study. Participants were first given a pretest of objective medical knowledge, a pretest self-assessment questionnaire (including 5 point Likert Scale), and a demographics form. An educational session including a 30 minute PowerPoint and mannequin simulation was conducted with participants. Participants were then asked to complete a post-test, which included the same objective medical knowledge test and self-assessment questionnaire. **Results:** 47 participants attended the session, however, only 33 completed all pre and post-tests. There was a wide range in years of experience (from less than one year to more than twenty years). Seventy-nine percent (26/33) of participants reported never having inserted a tracheotomy tube before, even though almost half (16/33) reported having arrived to STAT airway of a patient with a tracheotomy first. There was statistically significant improvement in participant comfort after the educational session ( $p < 0.05$ ). There was also improvement in medical knowledge after the educational session with 50% of answers being statistically significant ( $p < 0.05$ ). **Conclusions:** Tracheotomy education is important for both surgical and nonsurgical providers. While anesthesiologists are highly experienced at intubation, they often do not receive formalized education regarding tracheotomy care. Our tracheotomy educational program benefited anesthesia providers by increasing fundamental knowledge, as well as comfort level dealing with both routine tracheotomy care and emergencies.

## I 45. The Otolaryngology Match: A Bibliometric Analysis of 222 First Year Residents

Loka P. Thangamathesvaran, MD, Newark, NJ; Robert Wayne, BS, Newark, NJ; Suat Kilic, MD, Newark, NJ; Wayne Hsueh, MD, Newark, NJ; Jean Anderson Eloy, MD, Newark, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the relevance of research in successfully matriculating into an otolaryngology residency program.

**Objectives:** Research is an important component of successfully matching into an otolaryngology residency position. Bibliometric analysis provides an objective analysis to quantify the importance of research output to students who matriculate into an otolaryngology residency program. **Study Design:** The study design was an observational analytic cohort study of first year otolaryngology residents for the 2016-2017 year. **Methods:** A list of all ACGME accredited otolaryngology residency programs was identified. Websites of the programs were reviewed to identify first year otolaryngology residents for the 2016-2017 academic year. Resident research output prior to 2015 were collected: publication count, publication type (original research, review article, case report), journal impact factor, number of first author publications, h-index and years since first publication. Residencies were tiered 1-5 by departmental research output. **Results:** 222 records for first year otolaryngology residents were identified in 106 programs. When adjusting for number of total publications, number of original research articles, number of review articles, number of case reports, highest journal impact factor, average journal impact factor, years since publication, only h-index was associated with tier of matriculation ( $P = 0.007$ ). H-index strongly correlated with the number of total publications ( $P = 0.027$ ). H-index increased by 1 point for every 2 publications ( $B = 0.475$ ). **Conclusions:** Research is an important component of successfully matriculating into an otolaryngology residency program. H-index is a reliable tool to quantify research output and predict the tier of program a student will matriculate into.

## I 46. Going Global: Interest in Global Health among US Otolaryngology Residents

Julia C. Toman, MD, New Haven, CT; Melynda A. Barnes, MD, New York, NY;  
Elias M. Michaelides, MD, New Haven, CT

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the various benefits of global health exposure during residency training including exposure to disease processes not regularly en-

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countered during training and provision of care in a resource limited environment. Additionally, they will be able to discuss matching educational goals of surgical training balanced against a desire for expanded humanitarianism and the barriers to undertaking global health experiences in residency.

**Objectives:** 1) Define level of interest in global health among otolaryngology residents in the USA; 2) assess degree of engagement of otolaryngology residencies in global health training for residents; and 3) determine barriers to global health training in residency. **Study Design:** Survey. **Methods:** A survey questionnaire was developed and sent to all otolaryngology residency program directors for distribution to all current otolaryngology residents in the US. Responses were recorded and analyzed. **Results:** There were 91 responses to the survey. Responses revealed that the majority of residents thought that global health was an important field, 56% would participate in an elective if offered, and 2/3 would likely or definitely involve global health in their future careers. However, only 1/3 of otolaryngology residency programs offered a global health elective. Reasons cited for interest in a global health included wanting to give back, feeling you can make a difference, and learning about different cultures. The most common barriers identified were insufficient funding and time offered away from training. **Conclusions:** Surgery and surgical subspecialties have an expanding role to play in the field of global health as the disease burden of noncommunicable diseases increases. However only 1/3 of residency programs offer these educational opportunities and there remain key limitations of time and financial support. Despite this, the majority of otolaryngology residents are interested in global health as part of their career raising the question of the role and importance of global health education during residency.

## I 47. Thyroglossal Duct Cyst in the Elderly: Case Report and Review of the Literature.

Weitao Wang, MD, Rochester, NY; Sveta Karelsky, MD, Rochester, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the epidemiological, radiographic, clinical and histopathologic characteristics of thyroglossal duct cysts and management options in the elderly population.

**Objectives:** To report a case of thyroglossal duct cyst (TDC) in an elderly patient and review the literature in regard to its management in this particular population. **Study Design:** Case report and literature review. **Methods:** We report a single case of thyroglossal duct cyst in an elderly patient. A PubMed review of the literature was also performed. **Results:** This 80 year old female presented with a progressively enlarging neck mass, dysphagia, and globus sensation. CT demonstrated a cystic midline neck mass between the hyoid bone and thyroid cartilage causing displacement and rotation of the hyoid bone without compression of the airway. She underwent a Sistrunk procedure without any complications. Pathology demonstrated a squamous lined cyst with granulation tissue and cholesterol clefts, consistent with TDC. There was no sign of recurrence at one year followup and patient reported improvement in deglutition. **Conclusions:** TDCs are common developmental cysts in the neck and have a bimodal age distribution most frequently seen in the pediatric and young adult population. To date, there have been 16 reported cases in patients older than 70 years and 5 in patients older than 80 years. Management in the elderly is controversial. Surgical excision should be considered in symptomatic cases over observation. The Sistrunk procedure remains the definitive surgical management in this population with low recurrence rates. Malignant transformation rates are low, with no reported cases in the elderly population. Rarely, TDCs may present intralingual and require a combined Trotter approach with Sistrunk for complete excision.

## Head & Neck

## I 48. Epidemiology and Survival Outcomes of Gingival Squamous Cell Carcinoma: A Comparison by Primary Site

Jose E. Alonso, MD, Los Angeles, CA; Thomas E. Heineman, MD, Los Angeles, CA;  
Edward C. Kuan, MD MBA, 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 discuss the factors predicting survival outcomes in gingival squamous cell carcinoma and compare these findings as they pertain to upper versus lower gum lesions.

**Objectives:** To identify factors predicting survival outcomes in gingival SCC and compare these determinants by primary tumor site. **Study Design:** Retrospective, population based cohort study of patients diagnosed with UG and LG SCC between 1973-2013 via the Surveillance, Epidemiology, and End Results database. **Methods:** Univariate and multivariate analysis of demographic and clinicopathologic variables. Survival analysis will be performed using the Kaplan-Meier

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method. **Results:** A total of 6,132 cases of UG/LG SCC were identified. The mean age at diagnosis was 70.6 years. 39.2% of patients presented with stage IV disease. LG was more common than UG SCC (69.9% vs 30.1%). The five year OS for UG and LG SCC were 45% and 41%, respectively. 53.5% of patients underwent primary surgical therapy. Radiation alone accounted for 11.1% of cases, with 27.8% comprising combined surgery and radiation approaches. Pathologic cervical lymph node involvement was identified in 23.9% of cases. Multivariate analysis revealed LG SCC, advanced stage, T, N, and tumor grade as variables predicting poorer OS and DSS. Primary surgical management predicted improved survival outcomes, whereas radiation alone or combined approaches exhibited poorer survival. **Conclusions:** A clinical understanding and established management principles for gingival SCC are lacking. Herein, we present the very first study identifying predictors of survival outcomes while comparing UG and LG SCC lesions with population level data. Primary surgery is the only modality leading to greater OS and DSS. Neck dissections should be carefully considered given the sizable incidence of pathologic cervical nodal involvement. LGSCC and advanced clinicopathologic variables predicted poorer survival.

## I 49. Patterns of Cervical Node Metastases and Their Prognostic Impact in Patients with Squamous Cell Carcinoma of the Lower Gingiva: A Population Based Analysis

Jose E. Alonso, MD, Los Angeles, CA; Thomas E. Heineman, MD, Los Angeles, CA;  
Edward C. Kuan, MD MBA, 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 discuss the pattern of cervical lymph node metastases and their prognostic impact in patients with lower gum squamous cell carcinoma.

**Objectives:** To describe the pattern of cervical regional node metastases in lower gum squamous cell carcinoma (LGSCC) and assess their predictive performance in survival outcomes. **Study Design:** Retrospective, population based cohort of patients diagnosed with LGSCC between 1973-2015 via the Surveillance, Epidemiology, and End Results database. **Methods:** Univariate and multivariate analysis on pathologic lymph node data. Survival analysis was performed utilizing the Kaplan-Meier method. **Results:** A total of 4,285 cases of LGSCC were identified. Most cases presented with stage 1 (26.8%) and stage 2 (19.8%) disease, though a sizeable number of cases (32.8%) presented with stage 4. The median age at diagnosis was 71.0 years. Regional nodal disease was identified in 504 cases. Of these, the majority (83.5%) involved varying combinations of levels I-III, with level I (45.8%) and level I with level II (13.5%) most frequently affected. Less patients (14.2%) involved levels IV-V and retropharyngeal (RP) nodal levels, though patients with level IV alone (63.9%) and level V alone (22.2%) were observed more frequently. Regional metastases to levels I-III and/or levels IV-V, RP nodes independently predicted poorer OS [HR 1.005, 95% CI (1.004-1.007),  $p < 0.001$ ; HR 1.009, 95% CI (1.006-1.012),  $p < 0.001$ ], respectively. **Conclusions:** Regional nodal involvement in patients with LGSCC portends poorer OS and DSS. Most patients with nodal disease involved levels I-III, though level IV-V, and retropharyngeal involvement was not uncommon. Similarly, levels I-III and IV-V, RP as categories independently predicted inferior survival. We present the very first and largest analysis describing the distribution of affected nodal levels and their prognostic value in patients with LGSCC.

## I 50. The Impact of Sentinel Lymph Node Biopsy and Neck Dissection on Survival of Patients with Early Stage Merkel Cell Carcinoma of the Head and Neck

Jennifer L. Anderson, PhD, Irvine, CA; Yarah M. Haider, MD, Irvine, CA; Tjason Tjoa, MD, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare survival outcomes for differential nodal management in patients with Merkel cell carcinoma of the head and neck.

**Objectives:** To determine the impact of sentinel node lymph node biopsy (SLNB) and neck dissection (ND) on survival in patients with early stage Merkel cell carcinoma (MCC) of the head and neck. **Study Design:** Retrospective cohort study utilizing the Surveillance, Epidemiology, and End Results (SEER) registry. **Methods:** The SEER 18 registry (November 2016 submission) was used to compare disease specific survival (DSS) in patients with early stage MCC (T1-T3N0M0 disease) of the head and neck diagnosed between 2004 and 2014 who underwent SLNB, ND, or observation. Patients who did not receive primary surgery were excluded. **Results:** A total of 599 patients met inclusion criteria. Five year DSS for MCC patients who received SLNB was 85.6% compared to 72.6% for those who underwent observation (log rank  $p = 0.0399$ ). SLNB was also associated with improved 5 year DSS in patients with T1N0M0 disease (87.1% compared to 73.5% with observation,  $p = 0.0330$ ). Five year DSS in MCC patients who received ND was 82.1% compared to 72.6% for those who underwent observation ( $p = 0.1005$ ). ND was associated with improved 5 year DSS in patients with T2-3N0M0



disease (95.2% compared to 70.4% with observation,  $p = 0.0413$ ). **Conclusions:** In patients with early stage MCC of the head and neck including T1N0M0 disease, SLNB was significantly associated with increased 5 year DSS compared to observation. ND was associated with significant improvement in survival for patients with T2-3N0M0 disease.

## I 51. National Evaluation of Sentinel Lymph Node Biopsy for Early Stage Oral Cavity Cancer

John D. Cramer, MD, Pittsburgh, PA; Robert L. Ferris, MD PhD, Pittsburgh, PA;  
Sandeep Samant, MD, Chicago, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be aware of the indications, morbidity and outcomes for sentinel lymph node biopsy for oral cavity cancer.

**Objectives:** Sentinel lymph node biopsy (SLNB) has been shown to be an accurate technique for staging the neck in early stage oral cavity squamous cell carcinoma (OCSCC) and has been incorporated in treatment guidelines as an option instead of elective neck dissection (END). However utilization of SLNB in the United States remains unclear and existing prospective studies did not directly compare survival between SLNB versus END. **Study Design:** Retrospective cohort study. **Methods:** We identified patients with stage I-II OCSCC (T1-2N0M0) that underwent staging of the neck in the National Cancer Database from 2012-2014. We compared the utilization, hospital length of stay, perioperative mortality and overall survival of patients who underwent SLNB versus END. **Results:** We identified 5,698 eligible patients with a median followup of 23.8 months (range 0.1-49.4 months). SLNB was used for 107 patients or 1.9% of stage I-II OCSCC. The percentage of patients treated with SLNB increased significantly over time (0.2% of cases in 2012 to 2.7% of cases in 2014,  $p < 0.001$ ). Completion neck dissection was avoided in 65.4% of patients undergoing SLNB. SLNB was associated with reduced perioperative morbidity with median length of hospital stay of 1.0 days after SLNB and 3.0 days after END ( $p < 0.001$ ). Perioperative 90 day mortality was 0% after SLNB versus 1.6% after END ( $p = 0.37$ ). After adjustment, overall survival was equivalent between patients who underwent SLNB versus END (hazard ratio 0.83, confidence interval 0.37-1.86). **Conclusions:** SLNB for early stage OCSCC is associated with decreased perioperative morbidity and equivalent long term survival. Despite these advantages, SLNB is uncommonly utilized for OCSCC.

## I 52. Cervical Thoracic Duct Cyst: A Case Report and Discussion of Diagnosis and Management

Anna Frants, MD, New York, NY; Sonya Marcus, MD, New York, NY; Elcin Zan, 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 demonstrate understanding of the presentation, radiologic features, intraoperative findings and treatment of cervical thoracic duct cysts.

**Objectives:** Describe a case report of a young female with a cervical thoracic duct cyst, a rare entity, including the presentation, radiologic features, intraoperative findings, and treatment. **Study Design:** Case report. **Methods:** Examination of medical records; literature review. **Results:** An otherwise healthy 31 year old female with left arm and shoulder pain was palpated to have a left supraclavicular mass by her physical therapist. Computed tomography (CT) of the soft tissue of the neck with contrast revealed a well circumscribed, round, hypotense 3 cm left neck mass posterior to the sternoclavicular joint. Ultrasound guided FNA revealed a milky fluid aspirate, positive for normal lymphocytes. The patient was taken to the operating room for planned excision of the mass. The neck mass, measuring approximately 3-4 cm was identified, sitting on the phrenic nerve over the anterior scalene muscles. It was wedged deep to the clavicle and abutted the subclavian artery, vein, and the internal jugular vein. The mass originated from the thoracic duct and appeared to be a cystic dilation of the duct. Therefore, the thoracic duct was clipped to prevent postoperative chyle leak. **Conclusions:** Cervical thoracic duct cysts are exceedingly rare entities. Awareness and high suspicion for thoracic duct cysts based on location, preoperative imaging, and fine needle aspiration (FNA) as well as intraoperative ligation of the thoracic duct proximal and distal to the cyst is key when managing patients with supraclavicular masses in order to optimize patient outcomes and minimize postoperative chyle leak.

## I 53. Transplanted Human Bone Marrow Derived Mesenchymal Stem Cells Do not Engraft in the Injured Rat Tongue

Alexander N. Goel, BA, Los Angeles, CA; Jonathan W. Frederick, MD, Los Angeles, CA;  
Andrew M. Vahabzadeh-Hagh, MD, Los Angeles, CA; Jennifer L. Long, MD PhD, Los Angeles, CA

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



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anisms of action, potential clinical applications, and current challenges facing the use of stem cell therapy for tongue fibrosis.

**Objectives:** Cellular therapy offers a novel approach to treat dysphagia due to tongue fibrosis. We have previously demonstrated that human bone marrow derived mesenchymal stem cell (hMSC) injection reduces tongue scarring in a rat partial glossectomy model. The fate of implanted cells and the mechanisms for this improvement, however, remain undefined. Here we investigated the survival of hMSC after local injection in the injured tongue. **Study Design:** Translational science investigation and rodent model. **Methods:** hMSC were labeled with the fluorescent membrane dye CM-Dil. Fourteen nude rats underwent unilateral partial glossectomy. After 2 weeks for scar formation, 10 rats received hMSC injection in the tongue scar and 4 rats received control media injection. Tongues were harvested for postmortem evaluation at 1, 2, and 4 weeks post-injection. Persistence of hMSC was determined through localization of CM-Dil signal on histologic sections and quantitative polymerase chain reaction (qPCR) for human DNA. **Results:** Dil-positive cells steadily decreased over the study period, with few to none detected at 4 weeks. Human DNA was detected by qPCR in all animals at 1 and 2 weeks and in none of the animals at 4 weeks. Treated animals demonstrated decreased smooth muscle actin expression suggesting reduced fibrotic activity. **Conclusions:** This study represents the first report tracking MSC in the injured tongue and demonstrates that cells do not survive long term. Because the animals lacked mature immune function, the cellular elimination was likely via apoptosis. The regenerative benefit conferred by hMSC is triggered early after administration and does not require MSC persistence in the tongue.

## I 54. Impact of Retropharyngeal Lymph Node Involvement in Squamous Cell Carcinoma of the Soft Palate and Uvula

Albert Y. Han, MD PhD, Los Angeles, CA; Jose E. Alonso, MD, Los Angeles, CA;  
Christine M. Kim, MD, Los Angeles, CA; Karam W. Badran, MD, Los Angeles, CA;  
Edward C. Kuan, MD MBA, Philadelphia, PA; Maie A. St. John, MD PhD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the significance of retropharyngeal lymph node involvement in squamous cell carcinoma of the soft palate and uvula.

**Objectives:** Squamous cell carcinoma of the soft palate and uvula (SCC-SP/U) is a relatively infrequent tumor in the oropharynx. Despite its unique lymphatic drainage pattern, which includes the retropharyngeal lymph node (RPLN) group, the significance of its involvement is poorly understood. The objectives of this study were to examine the incidence, overall survival (OS), and disease specific survival (DSS) of patients with squamous cell carcinoma of the soft palate and uvula with metastasis to the RPLN group. **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](http://www.seer.cancer.gov)). Patients with squamous cell carcinoma of the soft palate and uvula from 1973 to 2014 were identified using the primary site codes of C05.1 (soft palate, NOS) and C05.2 (uvula). Clinicopathologic parameters and survival data were extracted and analyzed for univariate and multivariate analysis. **Results:** A total of 690 cases of squamous cell carcinoma of the soft palate and uvula with lymph node metastasis were identified. Out of the 690 cases, 4.1% (n=28) of patients had metastatic disease to the retropharyngeal lymph nodes. Most patients with RPLN involvement had N1 disease (35.7%, n=10), which was similar to the no RPLN cohort (35.3%, n=208). The overall distribution of the N stage was not significantly different (p=0.315). Kaplan-Meier survival analysis showed that involvement of the RPLN group was associated with worse OS (28.80 ± 7.13 months) compared to the no RPLN group involvement (51.12 ± 2.37 months). However, DSS of the RPLN group (46.53 ± 11.85 months) was not significantly different from the absence of RPLN group involvement (68.52 ± 3.05 months). A Cox regression analysis showed that RPLN involvement was an independent prognosticator for worse OS (Hazard ratio (HR), 1.68; 95% CI [1.07, 2.66]) even when controlled for the N stage, sex, and race. **Conclusions:** SCC-SP/U is a relatively infrequent tumor associated with a poor prognosis. A small percentage of patients with SCC-SP/U have RPLN group involvement. Metastasis to the RPLN group worsens the OS, but does not impact disease specific survival.

## I 55. Compressed Management Pathway for Thyroid and Parathyroid Surgery

Norman H. Heindel, BS, Augusta, GA; Seth T. Kay, MD, Winfield, IL; David J. Terris, MD, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the safety and convenience of a compressed management pathway for thyroid and parathyroid surgery.

**Objectives:** To investigate the safety and convenience of a compressed surgical pathway for patients undergoing thyroid and parathyroid surgery, where office visits, preoperative testing, and surgical procedures are completed within 24 hours. **Study Design:** Retrospective cohort. **Methods:** A prospectively maintained database of all patients undergoing thyroid and parathyroid surgery over a three year period was interrogated. A comparison of patient demographics, surgical outcomes, and travel history between patients in the compressed and conventional pathways was undertaken. **Results:** 913 surgeries were performed during the study period: 617 (67.6%) thyroidectomies and 296 (32.4%) parathyroidectomies (including 46 with concurrent thyroidectomies). A total of 327 patients (35.8%) utilized the compressed pathway and 586 patients (64.2%) underwent surgery by the conventional pathway. The rate of serious adverse events in thyroidectomy and parathyroidectomy patients in the compressed pathway was 1.0% and 0.8%, respectively, compared with 1.7% and 2.9% in the conventional pathway. For patients living >65 miles away, the compressed pathway resulted in one trip made, a mean travel distance of 468.2 miles, an average of 7.2 hours spent traveling, and a mean estimated travel cost of \$331.70. In contrast, patients living >65 miles away utilizing the conventional pathway made four clinical visits, traveled a mean of 1,238.7 miles, spent an average of 19.1 hours traveling, and incurred a mean estimated travel cost of \$451.05. **Conclusions:** A compressed surgical pathway is both safe and convenient for patients undergoing thyroidectomy and parathyroidectomy, particularly for patients living more than one hour from the surgical facility.

**I 56. Utilizing Consumer Photoplethysmography Technology to Augment the Modified Allen's Test in Measuring Collateral Circulation to the Hand: A Proof of Concept**  
Allison C. Hu, BA, Irvine, CA; Brian J.F. Wong, MD PhD, Irvine, CA; Tjason Tjoa, MD, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to utilize consumer photoplethysmography devices to augment the MAT in the assessment of collateral supply to the hand.

**Objectives:** The radial forearm free flap (RFFF) is a reliable reconstructive option for a variety of complex head and neck defects. Advantages include its ease of dissection, tissue match, low complication rates, and high vascularity. Prior to surgery, it is essential to evaluate collateral circulation to the donor hand to prevent postoperative ischemia. Conventional methods use the modified Allen's test (MAT), a qualitative test that measures the time needed for palmar blush refill after release of the ulnar artery compression with occlusive pressure of the radial artery. However, recent studies have demonstrated the inadequacy of the MAT to assess the patency of hand collateral circulation. **Study Design:** A proof of concept study evaluating the feasibility of using a consumer photoplethysmography device as a quantitative tool to augment the MAT. **Methods:** The Apple watch's heart rate sensor uses photoplethysmography, which illuminates the skin and measures changes in green LED light absorption. The body of the watch was placed on the palm of the hand and a pulse oximeter was attached to the index finger of the same side while performing the MAT. Heart rate was measured for the resting palm, when radial and ulnar arteries were occluded, and when the ulnar artery was recovered. **Results:** The watch was precise when compared to the finger pulse ox at measuring resting palmar HR ( $p=0.35$ ) and HR after ulnar artery recovery ( $p=0.41$ ). When both ulnar and radial arteries were compressed, the watch captured a HR significantly lower than the resting HR ( $p=0.0030$ ). When the ulnar occlusive pressure was released, the watch measured a HR significantly higher than the fully occluded HR ( $p=0.0016$ ). **Conclusions:** Ultimately, this work serves as a proof of concept study, demonstrating the potential use of a consumer photoplethysmography device as an objective tool to augment the MAT in the assessment of collateral supply to the hand.

**I 57. Perioperative Outcomes Associated with Bipolar versus Cold Knife Dissection in Parotid Gland Surgery**  
Meredith A. Lilly, BA, Washington, DC; Bruce J. Davidson, MD FACS, Washington, DC;  
Stanley H. Chia, MD FACS, Washington, DC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the advantages and disadvantages of cold knife versus bipolar dissection of the facial nerve during parotid gland surgery.

**Objectives:** To assess the differences in perioperative outcomes between cold knife and bipolar dissection in parotid gland surgery. **Study Design:** Retrospective chart review. **Methods:** Adult patients undergoing parotid gland surgery from January 2013 through January 2017 were reviewed. Dissection technique, operative time, blood loss, and House-Brackmann scores at the first postoperative visit were reviewed. Dissection technique was defined as bipolar if the operative note indicated that the parotid tissue was divided with bipolar during the nerve dissection and was defined as cold knife if the tissue was divided with a #12 scalpel and subsequent bleeding controlled with bipolar as needed. Exclu-

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sion criteria were history of prior parotid surgery or radiation, intentional facial nerve sacrifice, vague operative reporting, or multiple procedures. **Results:** A total of 196 charts from 9 attending surgeons were identified for review. 118 charts were included in the analysis, 47 cold knife and 71 bipolar, after exclusion criteria were applied. Operative time in the bipolar group was 170.6 min  $\pm$  6.7 vs. 208.1 min  $\pm$  6.5 for the cold knife group ( $p=0.0002$ ). Intraoperative blood loss in the bipolar group was 29.9 mL  $\pm$  2.9 vs. 41.1 mL  $\pm$  5.1 in the cold knife group ( $p=0.03$ ). No significant difference was detected in incidence of postoperative complications or House-Brackmann scores between the groups, though followup data was available for only 92 patients. **Conclusions:** This study demonstrates that bipolar dissection in parotid gland surgery is associated with reduced operative time and reduced intraoperative blood loss and similar rates of facial nerve injury when compared to cold knife dissection.

## I 58. Investigating the Role of Adjuvant Chemotherapy during Primary Treatment of Esthesioneuroblastoma

John P. Marinelli, BS, Rochester, MN; Kevin C. Miller, BS, Rochester, MN;  
Jamie J. Van Gompel, MD, Rochester, MN; Robert L. Foote, MD, Rochester, MN;  
Katharine A. Price, MD, Rochester, MN; Ashish V. Chintakuntlawar, MBBS PhD, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the role of adjuvant chemotherapy in addition to surgical resection and adjuvant radiation during primary treatment of esthesioneuroblastoma, especially as it pertains to Kadish stage C patients.

**Objectives:** Past research established that surgical resection plus adjuvant radiation (S+AR) improves overall survival (OS) in patients with esthesioneuroblastoma (ENB). However, limited data exist surrounding the additional role of adjuvant chemotherapy (AC). The objective of this study was to examine the efficacy of AC during primary treatment of ENB compared to S+AR alone. **Study Design:** Retrospective chart review. **Methods:** Retrospective analysis of patients treated at our institution from 1994 to 2015 who met inclusion criteria for the control group (S+AR) or experimental group (S+AR+AC). **Results:** Thirty-eight patients were identified, 23 (61%) of which treated with S+AR, and 15 (39%) treated with S+AR+AC. The two groups did not significantly differ in age ( $P=0.55$ ), Charlson Comorbidity Index ( $P=0.21$ ), sex ( $P=0.31$ ), or Hyams grade ( $P=0.10$ ). Ten (67%) Kadish C and 5 (33%) Kadish D patients received S+AR+AC, while 1 (4%) Kadish A/B, 21 (91%) Kadish C and 1 (4%) Kadish D patient received S+AR ( $P=0.044$ ). All S+AR+AC patients received platinum based regimens, combined with etoposide in 10/15 (67%). Common dose limiting toxicities included myelosuppression (20%), nephrotoxicity (13%), ototoxicity (7%), and severe mucositis (7%). Recurrence free survival (RFS) and OS did not significantly differ between the two treatment groups ( $P=0.59$  and  $P=0.69$ , respectively). RFS and OS remained indistinguishable in a subgroup analysis of Kadish C patients only ( $P=0.78$  and  $P=0.90$ , respectively). **Conclusions:** Kadish C patients who received AC did not exhibit improved RFS or OS when compared to S+AR alone. Kadish D patients may experience improved survival outcomes with AC, however further research is needed to delineate the role of AC in this setting.

## I 59. Factors Affecting Readmission Rate Following Major Salivary Gland Surgery

Suresh Mohan, MD, Boston, MA; Neil Bhattacharyya, MD FACS, Boston, MA

**Educational Objective:** At the conclusion of this presentation, participants will recognize national readmission rates for major salivary gland surgeries and the relevant diagnoses and procedures related to readmission.

**Objectives:** Determine nationally representative readmission rates and associated factors after major salivary gland surgery. **Study Design:** Cross-sectional analysis of national admissions database. **Methods:** The 2014 Nationwide Readmissions Database was analyzed for major salivary gland surgery inpatient admissions and subsequent readmission within 30 days. Readmission rate, length of stay (LOS), disposition, mortality rate, and total charges were determined alongside demographic data, readmission associated diagnoses and procedures, and clinical factors portending readmission. **Results:** 7,888 major salivary gland surgery inpatient admissions (mean age, 60.4 years; 63% male) were analyzed. Nationally representative metrics for salivary gland surgery were mean LOS: 3.1 $\pm$ 0.1 days, disposition: home without services 85.1%, home healthcare 10.2% and skilled facility 4.2%, mortality rate: 0.1 $\pm$ 0.1%, and total charges: \$59,399 $\pm$ 2,950. The readmission rate was 4.3 $\pm$ 0.4%, occurring at a mean of postoperative day 16.5 $\pm$ 0.5, with readmission LOS: 5.4 $\pm$ 0.7 days, mortality rate: 2.1 $\pm$ 1.6%, and total charges of \$43,874 $\pm$ 4,314. Most common diagnosis groupings at readmission included septicemia (7.4%), intestinal infection (6.5%), cardiac dysrhythmias (3.5%), pneumonia (3.4%), and congestive heart failure (2.1%). Most common procedures associated with readmission included incision and drainage (6.5%), unilateral radical neck dissection (4.2%), and central venous catheter placement (3.6%). In multivariate anal-

yses, increasing all patient refined diagnostic related group severity score was associated with readmission (odds ratio 1.37 [95% confidence interval, 1.06-1.77]), whereas age ( $p=0.829$ ) and female sex ( $p=0.683$ ) were not. **Conclusions:** Major salivary gland surgery readmission is associated with significant increase in mortality and additional total healthcare cost. Common readmission diagnoses after such surgery are presented for potential preventative efforts and clarity on procedures most prone to readmission.

## I 60. 39 Years of Trends in Oral Cavity Cancer in New York State

William T. Reed, BS, Syracuse, NY; Susannah C. Orzell, MD MPH, Syracuse, NY;  
Martha A. Wojtowycz, PhD, Syracuse, NY

**Educational Objective:** At the end of this presentation, participants should be able to explain trends in oral cavity cancer in New York state and discuss the role of HPV as a driver in disease biology and how that manifests as demographic changes.

**Objectives:** To characterize recent trends in oral cavity cancer in the state of New York. **Study Design:** Retrospective time series analysis. **Methods:** Descriptive statistics were calculated using a combination of data sources, including: New York State Cancer Registry State Level Data (1976-2014), the National Program of Cancer Registries and SEER Program(2003-2013) and the EBRFSS, State Level Data (1996-2016). **Results:** Among New York state males, the percentage of oral cavity cancers (OCC) detected at an early stage fell from 43.5% in 1976 to 27.9% in 2014, a 35.9% decrease. There has been relatively little change among female patients during this time period, with 46% of OCC being diagnosed at an early stage in 1976 and 43.4% in 2014. The rate of HPV related OCC has increased over the last decades, especially in white men, with a +3.9% average annual percent change between 2000-2009. **Conclusions:** There has been a decline in incidence of oral cavity cancer within New York state as well as commensurate decline of known risk factors, including cigarette smoking. Despite these findings, there has been an increase in the rates of advanced disease at diagnosis. These findings support emerging evidence describing role of the high risk strains of the human papilloma virus (HPV) as a cause OCC, with distinct features from non-HPV related OCC.

## I 61. Esophageal Adenocarcinoma Presenting as a Metastatic Nasal Mass

Brandon A. Shepherd, MD, Jackson, MS; Lana L. Jackson, MD, Jackson, MS; Issam N. Eid, MD, Kansas City, MS

**Educational Objective:** At the conclusion of this presentation, the participants should be able to better understand an unusual site of metastasis of esophageal adenocarcinoma to the nasal vestibule.

**Objectives:** Metastatic carcinoma to the nose and paranasal sinuses is a rare entity but has been described in the literature from multiple primary sites. We present a case of esophageal adenocarcinoma (EAC) metastatic to the nasal tip skin and vestibule. **Study Design:** Case report. **Methods:** The data was obtained via retrospective chart review in compliance with institutional IRB requirements. **Results:** A 78 year old male with heavy smoking history and prior skin cancers was referred for 6 week history of a growing mass in the right nasal vestibule. He complained of local bleeding and discomfort but denied dysphagia, weight loss, or poor appetite. Biopsy demonstrated moderately differentiated adenocarcinoma of sinonasal (colonic) type. Computed tomography imaging demonstrated 3.3 x 2.8 x 2.1 cm heterogeneously enhancing mass of the right nasal ala, cartilaginous septum, and nasal dorsum. Staging imaging was performed and revealed a 10.3 x 4.5 x 4.1 cm fungating mid/distal esophageal mass, pulmonary metastases, and occipital lobe metastases. EGD with biopsy confirmed EAC. Each biopsy site was positive for HER-2-4B5, CK7, and CDX2. The patient was palliated with radiation, chemotherapy, and gamma knife therapy with some improvement. **Conclusions:** Metastatic EAC to the nose is a very rare entity with only one other case reported. The case masqueraded as cutaneous malignancy in a patient with prior cutaneous cancers. The unusual pathology on biopsy directed the metastatic workup and finding of the primary. The case stresses the importance of metastatic workup in unusual pathology. The mechanism of metastasis to skin and mucosa of the nose remains to be elucidated.



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## I 62. Sublingual Epidermoid Cyst Mimicking a Plunging Ranula: Case Report and Literature Review

Richard W. Thompson, MD, Shreveport, LA; Shehanaz K. Ellika, MD, Shreveport, LA;  
Nestor E. Dela Cruz, MD, Shreveport, LA; Cherie-Ann O. Nathan, MD, Shreveport, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to create a differential diagnosis and explain an ideal workup for floor of mouth cystic masses in addition to their treatment.

**Objectives:** A slow growing, painless cystic mass in the floor of mouth and neck should prompt the development of a broad differential diagnosis covering a variety of pathologies. Dermoid and epidermoid cysts are relatively rare pathologies and represent less than 0.01% of all oral cavity cysts. These lesions may appear similarly to sublingual ranulas on physical exam and imaging. We describe a case of an epidermoid cyst in a young adult mimicking a plunging ranula.

**Study Design:** Case report. **Methods:** A 24 year old female presented to clinic with a history of a progressively enlarging neck mass since her teens and progressive dysphagia over the last year. Physical exam was significant for bilateral floor of mouth and right submandibular fullness which was nontender, soft, and fluctuant on palpation. CT neck with IV contrast revealed a 4.6 x 6.4 x 3.8 cm cystic mass in the floor of mouth extending to the submandibular space consistent with a plunging ranula. **Results:** The patient underwent uncomplicated intraoral excision of the mass and sublingual gland. On excision the mass was noted to contain saliva and yellow, sebaceous material. Histological diagnosis confirmed epidermoid cyst. **Conclusions:** Although rare, epidermoid and dermoid cysts have previously been described in the floor of mouth. Similar findings on clinical evaluation and variable results on diagnostic workup make differentiating these entities from sublingual ranulas challenging. Magnetic resonance imaging and cytology may prove paramount to correct diagnosis. Various surgical approaches have been described for removal. We describe surgical excision using an intraoral approach with a good cosmetic and functional result.

## I 63. Impact of Abnormal Coagulation Profile on Postoperative Complications after Major Head and Neck Surgeries

Joseph S. Weisberger, MS, Newark, NJ; Greg L. Barinsky, PharmD, Newark, NJ;  
Marcus L. Elias, BS, Newark, NJ; Jean A. 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 the impact of hemostatic disorder on postoperative outcomes in patients undergoing major head and neck surgeries.

**Objectives:** To investigate the impact of an abnormal hemostatic profile on postoperative complications following major head and neck surgeries. **Study Design:** Retrospective database review. **Methods:** The National Surgical Quality Improvement Program (NSQIP) database was queried for all major head and neck surgeries (glossectomy, mandibulectomy, laryngectomy, pharyngectomy and esophagectomy) performed by otolaryngologists between 2005 and 2014 (n=2084). The independent variables analyzed via univariate and multivariate logistic regression were defined as thrombocytopenia (platelets<150,000), thrombocytosis (platelets>450,000), anemia (male hematocrit<39%; female hematocrit<36%), abnormal INR (>1.1), and bleeding disorders (deficiencies of blood clotting elements). **Results:** Binary logistical regression-controlling for age, sex, race, and significant comorbidities found through univariate analysis-yielded statistically significant differences in postoperative outcomes for all independent variable cohorts except the thrombocytopenia group. Thrombocytosis predicted the risk for superficial surgical site infection (OR=3.159, p=0.004), surgical complications (OR=2.397, p=0.001) and overall complications (OR=2.307, p=0.003). The abnormal INR subgroup demonstrated increased risk for urinary tract infection (OR=7.592, p=0.002). Anemic patients showed an increased risk for wound disruption (OR=2.131, p= 0.002), being placed on a ventilator for more than 48 hours (OR=1.708, p=0.034), bleeding (OR=4.262, p<0.001), surgical complications (OR=3.015, p<0.001), medical complications (OR=1.476, p=0.010), and overall complications (OR=2.6705, p<0.001). Patients with bleeding disorders were at an increased risk of surgical complications (OR=2.357, p=0.004), and overall complications (OR=1.839, p=0.040). **Conclusions:** Hemostatic disorder predicted the likelihood of several different postoperative outcomes in patients undergoing major head and neck surgeries. However, thrombocytopenia did not indicate variations in outcome probability.



## I 64. Direct Infiltration of Papillary Thyroid Carcinoma to the Trachea: A Case Report and Systematic Review

Kevin Wong, BA, Boston, MA; Leah Sax, BA, Boston, MA; Gregory A. Grillone, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss common practice patterns and available treatment options for papillary thyroid carcinomas (PTC) that invade the airway.

**Objectives:** To present a case report demonstrating direct infiltration of PTC to the trachea. Radiologic findings, diagnosis and treatment are discussed. **Study Design:** Case report and systematic review of the literature. **Methods:** The clinical course of a young adult is described based on clinical interactions and chart review. Two coauthors independently searched PubMed and EMBASE using controlled search terms for studies reporting on PTC with tracheal metastasis. The review is summarized, with an emphasis on treatment and outcomes. **Results:** A 20 year old male who underwent a total thyroidectomy at an outside facility presented after an MRI demonstrated lymphadenopathy, tumor invasion of the tracheal wall, and tumor invasion of the right recurrent laryngeal nerve. The patient underwent tracheal resection, anastomosis, and a modified radical neck dissection at levels 2, 3, 4, and 6. There has been no evidence of residual or recurrent tumor. In total, 21 studies from a systematic review of the literature have reported on tracheal metastasis from PTC. **Conclusions:** Papillary carcinoma is the most common form of thyroid cancer and is known for its indolent nature and excellent prognosis. Tracheal invasion is a rare but well documented risk and leads to a significantly worse prognosis. Surgery with complete resection is the most common and most effective treatment modality for locally advanced thyroid cancer, with negative margins as the primary goal. Given the risks associated with extensive resection of the upper aerodigestive tract, additional treatment options have also commonly been described, including combinations of tracheal shaving, radioactive iodine, chemotherapy, and radiation.

## I 65. Management of a Rare Complete Fourth Branchial Cleft Fistula Presenting as a Discharging Pharyngocutaneous Fistula in an Adult: A Case Report and Review of the Literature

Paul Zhang, MD MPH, Los Angeles, CA; Ksenia A. Aaron, MD, Los Angeles, CA;  
Ronica R. Patel, MD, Los Angeles, CA; Niels Kokot, MD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the clinical presentation, radiographic findings, diagnosis, and successful management of fourth branchial cleft fistula.

**Objectives:** To report a rare clinical presentation of a complete fourth branchial cleft fistula in an adult. **Study Design:** Case report and literature review. **Methods:** We report a case of a 61 year old male with a forty year history of recurrent left sided neck abscesses that he would incise and drain himself every three to four years. Over the past year, food and beverage would intermittently leak from a hole in his neck. A computed tomography scan evaluating for an esophageal cutaneous fistula was read as unremarkable and he was referred to otolaryngology for further workup. A flexible laryngoscopy was unremarkable. The computed tomography scan was reviewed by the provider and clearly demonstrated a fistula tract traveling posterior to the left thyroid lobule and penetrating the piriform sinus posterior lateral to the thyroid cartilage. A modified barium swallow study (MBSS) confirmed the same pharyngocutaneous fistula between the anterior cervical region and left piriform sinus. **Results:** The patient was taken to the operating room for a direct laryngoscopy, which demonstrated a small fistula opening in the left piriform sinus. A 5 French Fogarty arterial occlusion catheter was introduced through the superficial opening and threaded until it was visualized in the left piriform sinus. The fistula tract surrounding the Fogarty catheter was dissected transcervically and followed as it penetrated posterior to the left thyroid cartilage, where it was suture ligated and excised. Postoperative direct laryngoscopy was negative for residual fistula. The patient was discharged home with a nasogastric tube and kept NPO for seven days. A two week postoperative blue dye swallow evaluation and MBSS were negative for residual fistula and the patient has been asymptomatic since. **Conclusions:** Third or fourth branchial cleft anomalies are rarely identified in the adult population. The presence of chronic cutaneous drainage in the anterior cervical skin is an even more uncommon mode of presentation and warrants a thorough otolaryngologic workup. While piriform sinus fistulas may be treated with endoscopic transoral cauterization, an open transcervical approach was used in this case for total excision of the fistula tract, later confirmed with postoperative imaging.

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## Laryngology/Bronchoesophagology/Sleep Medicine

- I 66. Iatrogenic Pneumothorax during Hypoglossal Nerve Stimulator Implantation**  
Alberto A. Arteaga, MD, Jackson, MS; Kristen D. Pitts, MD, Jackson, MS; Andrea F. Lewis, MD, Jackson, MS

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the pathophysiology of an iatrogenic pneumothorax. Participants should be able to discuss and demonstrate appropriate intraoperative and postoperative treatment of a pneumothorax.

**Objectives:** Hypoglossal nerve stimulation surgery is a new and exciting innovation for patients with obstructive sleep apnea (OSA) unable to tolerate continuous positive airway pressure (CPAP). In the initial stimulation therapy for apnea reduction (STAR) trial, the overall rate of serious adverse events was less than 2%. No cases of iatrogenic pneumothorax were reported. To our knowledge there have been no reported cases of iatrogenic pneumothorax during hypoglossal nerve stimulator implantation reported in the literature to date. **Study Design:** Case report. **Methods:** We present the case of a 52 year old male who developed an iatrogenic pneumothorax during the placement of the chest sensor lead between the inner and outer intercostal muscles. An intraoperative chest X-ray demonstrated a small pneumothorax which was treated expectantly. The surgery was continued and the chest lead inserted in the same intercostal space without further complication. **Results:** Postoperatively, the patient was observed overnight. Supplemental oxygen was given via nasal cannula to expedite reabsorption. The patient did well postoperatively and experienced no desaturations or shortness of breath. **Conclusions:** In the following review, we discuss the pathophysiology of an iatrogenic pneumothorax, the appropriate management intraoperatively and postoperatively, as well as the expected outcomes. Surgeons performing hypoglossal nerve stimulation surgery should be well versed in the possible complications and prepared to manage a pneumothorax.

- I 67. Hypoglossal Nerve Stimulation for Obstructive Sleep Apnea in the Veteran Population**  
Keith J. Basler, MD, Tampa, FL; Karel Calero, MD, Tampa, FL; William Anderson, MD, Tampa, FL; Matthew L. Carmichael, MD, Tampa, FL; Alexander M. Malone, MD, Tampa, FL; Tapan A. Padhya, MD, Tampa, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the potential benefit of hypoglossal nerve stimulation and discuss the future of this therapy in veteran institutions.

**Objectives:** 1) Understand the utility of hypoglossal nerve stimulation devices; 2) demonstrate our results with these devices in the veteran population; and 3) discuss future goals with this therapy in this population. **Study Design:** Retrospective chart review of polysomnogram (PSG) data in veteran patients who underwent implantation of a hypoglossal nerve stimulator (HGNS) for obstructive sleep apnea. **Methods:** Patients within a single veterans hospital who underwent placement of the Inspire II hypoglossal nerve stimulator were queried. PSG findings of AHI and O2 nadir measured at ideal settings during postoperative voltage titration study were compared to preoperative PSG values. The primary outcome was reduction in AHI and O2 Nadir. Patients were considered potential responders if they had a reduction of AHI of at least 50% from baseline and was <20 events per hour. Paired t-test was used to compare pre and postoperative values. **Results:** A total of 10 veterans underwent placement of HGNS. Mean preoperative AHI was 29.61 (range 9.5-49.5). Mean preoperative O2 nadir was 81.6% (range 72-91%). Mean postoperative AHI was 18.91 (range 0 - 91.5). Mean postoperative O2 nadir was 87.8% (range 84-91%). Out of 10 patients, 8 were considered potential responders. When evaluating pre and post O2 nadir, there was a statistically significant difference (p=0.003) found, whereas pre and post AHI was not found to be significant (p=0.387). However, further analysis revealed a significant outlier in our data, thus skewing results. When accounting for this outlier and excluding this data point, AHI reached statistical significance. **Conclusions:** In our experience, HGNS for veterans with OSA intolerant to CPAP has potential to considerably reduce AHI and O2 nadir if titrated appropriately. Long term data and followup will be needed to ascertain if these results will continue.

- I 68. Changes in Proton Pump Inhibitor Prescribing Patterns in 2014-2016: A Single Institution Study**  
Abel P. David, BS, Charlottesville, VA; Heather A. Koehn, MD, Charlottesville, VA; Reed C. Gilbow, MD, Charlottesville, VA; James J. Daniero, MD, Charlottesville, VA

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

that key studies regarding the long term adverse effects of proton pump inhibitor therapy have on the prescribing patterns of otolaryngologists at an academic medical center.

**Objectives:** Proton pump inhibitors (PPIs) have been associated with adverse outcomes: dementia, osteoporosis, and kidney disease. We hypothesize that the number of PPI prescriptions decreased after the publication of pivotal studies in 2014 and 2015. **Study Design:** A retrospective cohort study. **Methods:** We reviewed the electronic health records of patients seen in the otolaryngology clinics at an academic medical center with ICD-9 codes related to laryngopharyngeal reflux (LPR) from 2014-2016 (n=5692). **Results:** Of the 1544-2210 visits/year, the most common diagnosis codes were for esophageal reflux, dysphagia NOS, and laryngeal disease NEC. There was a 55% decrease (from 331 to 149) in the number of annual PPI prescriptions from 2014-2016 ( $p<0.001$ ). Patients who received prescriptions were five to six years younger in 2014 and 2015 ( $p<0.001$ ), and no difference was found in 2016. In 2014, a higher proportion of females were prescribed PPIs ( $p=0.005$ ), and in other years there was no difference. Of the patients prescribed PPIs, patients in 2014 were five years younger than in 2016 ( $p=0.003$ ), and no difference in the proportion of females. **Conclusions:** Between 2014-2016, the number of PPI prescriptions significantly decreased and those prescribed PPIs were once younger and more predominantly female. We believe this change is due to shifts in public perception regarding PPI safety after recently published studies linked PPIs to serious adverse outcomes. Future studies examining referral and followup patterns may also identify ways to improve LPR care.

## I 69. Is Drug Induced Sleep Endoscopy Safe?

Tanner M. Fullmer, MD, Houston, TX; Julina Ongkasuwan, MD, Houston, TX;  
Mas Takashima, MD, Houston, TX

**Educational Objective:** Describe the relative safety of drug induced sleep endoscopy, potential complications, and important anesthesia considerations necessary for a successful procedure. This is done in the context of our first complication, post obstructive pulmonary edema.

**Objectives:** Drug induced sleep endoscopy (DISE) is a rapidly growing diagnostic tool for the surgical management of obstructive sleep apnea (OSA). To date, few complications have been reported with DISE and most have been anesthesia related including the need for intubation and allergy to induction medications. Here we review patient, anesthesia, and surgeon factors necessary for a successful procedure in the context of a rare complication, post obstructive pulmonary edema (POPE). **Study Design:** Retrospective review/case report. **Methods:** At our high volume institution, we have performed 702 DISE from 2008 to 2017. These cases were reviewed with only one complication. **Results:** Our only adverse event is a 36 year old, otherwise healthy male with a BMI of 27 and mild OSA (apnea hypopnea index 6.6, oxygen nadir 92%), who experienced post obstructive pulmonary edema (POPE) shortly after induction and insertion of the flexible nasolaryngoscope into the upper nasopharynx. There was no laryngeal manipulation during the DISE. The patient was treated with positive pressure ventilation via face mask and diuretics and admitted for observation. He underwent repeat DISE three weeks later without complication. **Conclusions:** Although POPE is a known, rare, complication of general anesthesia, to our knowledge this is the first reported incidence of POPE associated with DISE. Anesthesiologists unfamiliar with DISE may be hesitant to induce apnea in those with known OSA due to concerns about difficult airway management at the levels of sedation required. Our data however reveal that DISE is an extremely safe procedure to perform, even in patients with OSA.

## I 70. The Relationship between Obstructive Sleep Apnea and Posturography

Meha Goyal, MD, Houston, TX; Helen S. Cohen, EdD, Houston, TX;  
Haleh Sangi-Haghpeykar, PhD, Houston, TX; Masayoshi Takashima, MD FACS, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss obstructive sleep apnea and balance deficits as well as posturography.

**Objectives:** The detrimental effects of obstructive sleep apnea (OSA) on motor function and balance are the basis of governmental regulations in occupations where OSA may affect public welfare (i.e., air traffic controllers, pilots, truck drivers). Data on the relationship between OSA and balance, which affects motor function in untreated patients, remain limited. This study sought to determine if chronic sleep deprivation associated with OSA adversely affects balance and if the severity of OSA correlates with the degree of balance deficit. **Study Design:** Prospective. **Methods:** Adults with a polysomnogram establishing diagnosis of OSA were recruited from an academic tertiary care referral clinic. Patients completed the Epworth Sleepiness Scale, the Stanford Sleepiness Scale, and the STOP-BANG questionnaire, and underwent

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the Sensory Organization Test (SOT) of computerized dynamic posturography (CDP). Deficiencies on SOT conditions 5 and 6 have been associated with vestibular dysfunction. The primary outcome studied was the score on the first trial of SOT condition 5. Secondary outcomes included the score on the first trial of SOT condition 6, the composite equilibrium score and the visual score. **Results:** Sixteen subjects, 8 females and 8 males, participated in the study. Three patients (18.75%) suffered from mild OSA, 6 patients (37.5%) from moderate OSA, and 7 patients (43.75%) from severe OSA. Analysis yielded no relationship between apnea-hypopnea index, respiratory disturbance index, oxygen saturation nadir and CDP scores. **Conclusions:** Balance and chronic sleep deprivation associated with OSA were not related in this study. This finding is in contrast to studies demonstrating balance deficits in the setting of acute sleep deprivation.

## I 71. Perioperative Considerations for Airway Evaluation and Management in the Setting of Tracheal Diverticulosis

Frances Mei L. Hardin, MD, Columbia, MO; Craig A. Bollig, MD, Columbia, MO;  
Tabitha L. Galloway, MD, Columbia, MO

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss safety considerations and potential complications associated with positive pressure ventilation, endotracheal intubation, and airway instrumentation in patients with tracheal diverticulosis.

**Objectives:** Tracheal diverticula are an uncommon phenomenon that pose unique concerns in the perioperative setting. There have been multiple reports of airway rupture in the literature as a result of barotrauma and endotracheal intubation. We report the case of airway management, evaluation, and intervention for a supraglottic lesion in a patient with multiple, large tracheal diverticula. **Study Design:** Case report and literature review. **Methods:** Discussion and photographic depiction of tracheal diverticulosis in a case of direct laryngoscopy/bronchoscopy in a patient with a supraglottic cystic lesion. **Results:** A 70 year old patient presented with globus sensation and hoarseness. She also had known tracheal diverticulosis, discovered four years ago at the time of her chronic obstructive pulmonary disease diagnosis and evaluation. A computed tomographic (CT) scan showed the presence of several tracheal diverticula in addition to a hyper enhancing mass of the right false vocal cord. In order to minimize the risk of potential diverticula rupture with endotracheal intubation and positive pressure ventilation, she was sedated with intravenous propofol and spontaneous respirations were maintained for the length of the procedure. Oxygen saturations of greater than 94% were sustained throughout the case. Direct laryngoscopy/bronchoscopy revealed extensive tracheal diverticulosis as well as a benign cystic lesion of the supraglottis, without evidence of laryngocele. The cystic lesion of the right false cord and aryepiglottic fold was marsupialized. **Conclusions:** Tracheal diverticular disease is uncommon, but presents unique airway considerations in the perioperative setting. Certain considerations can mitigate potential risks of diverticular rupture. Avoidance of endotracheal intubation and positive pressure ventilation are particularly important in this context.

## I 72. Ossification of the Cartilage Island after Type I Thyroplasty

Luke A. Miller, MD, Memphis, TN; Diana M. Orbelo, PhD, Rochester, MN;  
Rebecca L. Pittelko, MS CCC-SLP, Rochester, MN; Dale C. Ekbohm, MD, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the complications that may occur from retaining and medializing the cartilage island during a type I thyroplasty.

**Objectives:** Type I thyroplasty is commonly performed to treat unilateral vocal fold paralysis. During the procedure, the thyroid cartilage island is often removed but some surgeons choose to maintain and medialize it instead. There have been reports that maintenance of the cartilage island may result in shifting or resorption that may affect voice outcomes. **Study Design:** We present a novel case describing a patient who underwent a type I thyroplasty in which the cartilage island was medialized but soon after shifted and ultimately ossified resulting in severe dysphonia. Videostroboscopy showed a thickened, non-vibrating area of tissue deep in the right mid true vocal fold. The patient underwent two different endoscopic excisions, the second was six years after the first. Symptoms improved after partial resection of the cartilage island via a microflap procedure. We report on this patient's multi-year history and surgical treatments which resulted in improved voice quality. **Methods:** While thyroplasty remains an excellent surgical procedure to improve voice after unilateral vocal fold paralysis, there are known risks with cartilage island retention such as shifting, growth or resorption over time. This is the first case reported in which ossification of the medialized cartilage island is described. Given the complication we describe and the challenges reported by others, removal of the cartilage island should be considered when performing a type I thyroplasty. **Results:** Case report. **Conclusions:** Case report.



## I 73. The Need for Preoperative Echocardiogram in Pediatric Population with Severe Obstructive Sleep Apnea prior to Adenotonsillectomy

Calvin W. Myint, MD, Augusta, GA; Chien Wei Wang, BS, Augusta, GA;  
Kathleen Tarrant McKie, MD, Augusta, GA; J. Drew Prosser, MD, Augusta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to determine whether echocardiogram is needed prior to adenotonsillectomy in children with very severe sleep apnea.

**Objectives:** Children with obstructive sleep apnea syndrome (OSAS) typically undergo adenotonsillectomy. OSAS is associated with cor pulmonale and right heart strain. Previous studies reported increased perioperative complications for children with OSAS. The need to obtain a preoperative echocardiogram is still debatable. The objective of this study was to determine if a cutoff apnea hypopnea index (AHI) and nadir oxygen saturation (NspO<sub>2</sub>) from PSG could aid in making decision for ordering preoperative echocardiogram. **Study Design:** Retrospective. **Methods:** Retrospective charts review from 2001 to 2016 was performed on children aged 1-18 who underwent echocardiogram and polysomnography (PSG) within a year. Children with mild to moderate sleep apnea, tracheostomy, ventilator dependence or congenital heart disease were excluded. Only children with AHI >10 (severe OSAS) and NspO<sub>2</sub> < 80% were included. Chi square and receiver operating characteristic (ROC) curve were used for statistical analysis. **Results:** 43 males and 22 females with a median age 7.78, BMI 25.7, AHI 37.2 and nadir oxygen saturation of 68% were included. 6 of the 65 children (9.2%) showed evidence of right heart strain. Chi square analysis showed a significant difference between two groups starting at AHI cutoff of 45 (502 4.478) and NspO<sub>2</sub> 70% (502 6.81). ROC analysis showed NspO<sub>2</sub> was more predictive than AHI. 42.8% of children showed evidence of right heart strain with AHI>50 and NspO<sub>2</sub><55%. **Conclusions:** Physicians should consider obtaining echocardiogram for children with AHI > 45 and/or NspO<sub>2</sub> < 55%. However, clinical history, physical examination and cardiopulmonary symptoms should also be taken into consideration.

## I 74. Prevalence of Obstructive Sleep Apnea and Associated Symptoms by Validated Questionnaires in a Tertiary Care Cardiology Clinic

Melissa S. Oh, BA, Atlanta, GA; Donald L. Bliwise, PhD, Atlanta, GA; Andrew L. Smith, MD, Atlanta, GA; Nancy A. Collop, MD, Atlanta, GA; Arshed A. Quyyumi, MD, Atlanta, GA;  
Raj C. Dedhia, MD, Atlanta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the prevalence of obstructive sleep apnea (OSA) and sleep symptoms in a tertiary care cardiology clinic and their association with cardiovascular disease.

**Objectives:** To determine the prevalence of OSA and symptoms of snoring, daytime sleepiness, insomnia, restless leg syndrome, and abnormal sleep duration in patients with cardiovascular disease. **Study Design:** Cross-sectional survey. **Methods:** A questionnaire about cardiovascular and sleep history, sleep symptoms, and validated questionnaires including Epworth Sleepiness Scale and Insomnia Severity Index were distributed to 202 patients at a tertiary referral cardiology clinic. A total of 193 responses were included in this study. Student's t-test and chi-square test were used to compare continuous and categorical variables respectively. **Results:** Patients had a mean age of 60.8 years and 57% were male. Mean BMI was 29.1. Forty patients (20.7%) reported a diagnosis of OSA with a sleep study. One hundred twenty-five patients (64.8%) had previously heard of OSA, of which 36% reported that their cardiologist had discussed OSA with them. Twenty-eight patients (18.7%) without OSA reported often or almost always snoring, and 56.2% had at least one sleep symptom with the symptom frequency ranging between 14.6% (clinically significant insomnia) to 33.6% (abnormal sleep duration). Clinically significant insomnia was significantly associated with coronary artery disease (p=0.04), prior MI or CVA (p=0.01), and heart failure (p=0.009). **Conclusions:** The prevalence of OSA in patients with cardiovascular disease was 20.7% in our tertiary care cardiology clinic, and the majority of patients with cardiovascular disease were experiencing at least one sleep symptom. An understanding of the association of sleep symptoms with cardiovascular disease could lead to earlier assessment and treatment of patients with OSA and other sleep disorders.

## I 75. Hyoid Bone Movement along Multiple Planes as a Result of Hyomandibular Suspension to Treat Obstructive Sleep Apnea

Dustin A. Platter, BS, Alexandria, VA; Michael R. Abidin, MD, Alexandria, VA

**Educational Objective:** At the conclusion of this presentation, the participants should have an understanding of how far



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they should be advancing the hyoid bone during hyomandibular suspension.

**Objectives:** To measure how far the hyoid bone moves during hyoid suspension. **Study Design:** Retrospective study with n= 12 examining successful hyoid suspension patients. **Methods:** Using OR fluoroscopy, a lateral cephalogram was taken of the hyomandibular suspension patients immediately prior to and following the procedure. Cephalograms were then measured along 3 planes to determine the average distance the hyoid bone moved along these 3 planes as a result of the hyoid suspension. Ratios were used as it allowed us to account for different techniques among cephalograms and fluoroscopy. In older literature Panorex films with fixed distances and known scales could be easily compared, but now we have different radiology techniques, technicians, etc. Variability in the operating room is another impetus for comparing ratios versus precise distances. **Results:** The average decrease in distance between the anterior most point of the hyoid bone and mandibular plane (MPH) was  $45.5\% \pm 13.4\%$ . Meanwhile the hyoid bone moved on average  $33.3\% \pm 7.2\%$  closer to the anterior mentum (HMD). The distance between the anterior mentum and the plane used to calculate MPH (MPD) decreased an average of  $35.8\% \pm 11.4\%$ . Lastly, the distance between the center of the anterior C3 vertebrae and the hyoid bone increased an average of  $19.0\% \pm 23.8\%$ . **Conclusions:** Hyomandibular suspension is one form of hyoid suspension. As a result of this procedure, successful advancement of 45.5%, 33.3%, 35.8% and 19.0% has been achieved among 4 pertinent planes. Successful advancement of the hyoid in this range results in a significant reduction in sleep disordered breathing and will be reported elsewhere.

## I 76. Combined Anterograde Retrograde Pharyngoesophageal Dilation Followed by Serial Self-Dilation in Patients with an Intact Larynx

Lindsay S. Reder, MD, Los Angeles, CA; Brenda C. Villegas, CCC-SLP, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss indications for rendezvous procedure, demonstrate understanding of safe self-esophageal dilation.

**Objectives:** Complete hypopharyngeal and proximal cervical stenosis is rare, but most commonly occurs as a sequela treatment for head and neck malignancy of caustic ingestion. This leads to diminished quality of life due to feeding tube dependence, reliance on suction or expectoration of saliva, and risk of aspiration. Recently, combined anterograde retrograde dilation (CARD), also known as a rendezvous dilation, has been described as a method of treatment for complete pharyngoesophageal segment (PES) stenosis. Patients often require multiple repeat dilations, and sometimes indwelling stents to try to promote patency of the stenotic region. Additionally, there have been several reports describing technique and success of patient self-dilation for benign esophageal strictures. We hypothesized that in select patients, even those with an intact larynx, these strategies could be combined to reestablish a pharyngoesophageal lumen and allow for resumption of oral intake. **Study Design:** Retrospective case series. **Methods:** A retrospective review was performed and identified 3 patients that met inclusion criteria. All subjects were diagnosed with 100% PES stenosis that occurred after chemoradiation to treat pharyngeal and esophageal malignancy. The patients were treated during a 3 year period by a multidisciplinary team. All patients had an intact larynx. Subjects 1 and 2 had hypopharyngeal stenosis after treatment for hypopharyngeal squamous cell carcinoma (SCCA) (subject 1) and laryngeal SCCA (subject 2). Subject 3 had proximal esophageal stenosis after treatment for SCCA at that site. The subjects initially underwent an endoscopic rendezvous procedure with a thoracic surgeon and otolaryngologist. Serial self-dilation was initiated within 5 days of surgery and was performed using a bougie (Maloney) dilator. This was initiated with a speech language pathologist coaching the patient to pass the dilator and the otolaryngologist monitoring for complications and tolerance. The bougie dilators were gradually increased in size. **Results:** All subjects resumed an oral diet. Subject 1 had the gastrostomy tube removed at approximately 6 months post initial dilation and is tolerating full oral diet. This subject continues monthly self-dilations at home to maintain patency. Subjects 2 and 3, at 8 and 6 months postop respectively, are tolerating a modified oral diet and supplementing with the gastrostomy tube as they undergo swallowing therapy in addition to continued dilation. **Conclusions:** We conclude that patients with complete PES stenosis can be rehabilitated with CARD and serial self-dilations. This procedure is safe and effective and may result in fewer surgical dilations in select patients, including those with an intact larynx. Oral intake improves quality of life for these patients.

- I 77. The Indication of a Concomitant Use of Venovenous Extracorporeal Membrane Oxygenation (V-V ECMO) in Tracheostomy**  
Koji Saida, MD, Kobe, Hyogo Japan; Shogo Shinohara, MD PhD, Kobe, Hyogo Japan;  
Tetsuhiko Michida, MD, Kobe, Hyogo Japan; Shinji Takebayashi, MD PhD, Kobe, Hyogo Japan;  
Keizo Fujiwara, MD, Kobe, Hyogo Japan; Yasushi Naito, MD PhD, Kobe, Hyogo Japan

**Educational Objective:** At the conclusion of this presentation, the participants should be able to acquire knowledge of the tracheostomy with a concomitant use of venovenous extracorporeal membrane oxygenation (V-V ECMO). This is a safety way to perform a tracheostomy to the patient with severe airway obstruction and/or hypoxemia.

**Objectives:** It is challenging and sometimes life threatening to secure airway of patients whose upper airway is obstructed by large tumors and other causes. The venovenous extracorporeal membrane oxygenation (V-V ECMO) is a technique to oxygenate the venous blood using cardiopulmonary bypass in respiratory failure. We evaluate the indication of a concomitant use of V-V ECMO in tracheostomy by reviewing 4 cases in our hospital. **Study Design:** Case series and literature review. **Methods:** Retrospective review of 4 cases inserted V-V ECMO before or after tracheostomy to prevent or resolve critical hypoxemia from April 2016 to February 2017. **Results:** The patients consisted of 2 males and 2 females, age ranged 61 to 74. All cases had a symptom of dyspnea with malignancy (lung cancer, laryngeal cancer, esophageal cancer and malignant lymphoma) which severely obstructed their airway. In 3 cases, V-V ECMO was activated before tracheostomy. In 1 case, we emergently inserted V-V ECMO after tracheostomy due to endobronchial tumor embolism. The median time to activate V-V ECMO was 40.5 (40-78) minutes and the median time to perform tracheostomy was 30.5 (7-57) minutes. No severe sequelae occurred associated with hypoxemia and V-V ECMO surgery in all cases. However, an anatomic disorientation by large tumor and the heparinization during V-V ECMO prolonged the operation times in 2 cases (46 and 57 minutes). **Conclusions:** Although V-V ECMO is costly and operable facilities are limited, we should consider a concomitant use of V-V ECMO before attempting to secure airway to a patient who is highly likely to suffocate during intubation or tracheostomy.

- I 78. Vocal Cord Paralysis as a Relapse Symptom of Otitis Media with ANCA Associated Vasculitis (OMAAV)**  
Nao Takahashi, Niigata, Japan; Yuka Morita, Niigata, Japan; Hironori Baba, Niigata, Japan;  
Takanobu Sasaki, Niigata, Niigata Japan; Arata Horii, Niigata, Niigata Japan

**Educational Objective:** At the conclusion of this presentation, the participants should be able to pay attention to any otorhinolaryngological symptoms during followup of OMAAV.

**Objectives:** Otitis media with antineutrophil cytoplasmic antibody (ANCA) associated vasculitis (OMAAV) is a novel concept of ear disease that is characterized by progressive hearing loss with occasional systemic involvement. Despite appropriate remission maintenance, aural symptoms such as hearing loss and otitis media can sometimes recur. We present two rare cases of OMAAV which showed vocal cord paralysis as a relapse symptom. **Study Design:** Case report. **Methods:** N/A. **Results:** Case 1: 69 year old male OMAAV patient showing repetitive otitis media, bilateral progressive hearing loss, and left facial nerve palsy was treated with 60mg of prednisolone (PSL). Six months after the induction therapy, he complained of hoarseness and swallowing difficulties due to left vocal cord paralysis. MPO-ANCA and CRP were reelevated, indicating a relapse of vasculitis. He had no recurrence of ear disease. He had been still receiving 27.5mg of PSL, which was then increased to 50mg. Left vocal cord paralysis improved soon after. Case 2: 80 year old female OMAAV patient showing repetitive otitis media, bilateral progressive hearing loss, and left vocal cord paralysis was treated with 40mg of PSL, which was effective for hearing loss. Seven months later maintained with 15mg of PSL and 50mg of azathioprine, she complained of wheezing due to bilateral vocal cord paralysis. CRP and MPO-ANCA were reelevated, indicating a relapse of vasculitis. Increasing of PSL to 30mg was effective for right but not left vocal cord paralysis. She had no relapse of ear disease. **Conclusions:** Since relapse does not necessarily coincide with initially involved organ, we should pay attention to any otorhinolaryngological symptoms during followup of OMAAV.

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## Otology/Neurotology

### **I 79. Optimizing Testing for BPPV: (The Loaded Dix-Hallpike)**

Luke N. Andera, MD, Danville, PA; William J. Azeredo, MD, Danville, PA; Joseph S. Greene, MD, Danville, PA; Jeffrey W. Walter, DPT, Danville, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate the loaded Dix Hallpike improved testing and accuracy of diagnosis of benign paroxysmal positional vertigo when compared to the standard Dix-Hallpike.

**Objectives:** Improve testing and accuracy of diagnosis of patients with benign paroxysmal positional vertigo. **Study Design:** 28 patients participated in this prospective study comparing the standard Dix-Hallpike maneuver to the loaded Hallpike maneuver (head flexed forward to 30 degrees for 1 minute). **Methods:** Patients were randomized into 2 groups. 14 patients underwent 3 rounds of standard Dix-Hallpike testing followed by 3 rounds of the loaded Hallpike modification. The other 14 patients underwent 3 rounds of the loaded Hallpike modification followed by 3 rounds of standard Dix-Hallpike maneuver. Patients' eye movements were recorded with infrared video goggles during testing. Patients rated the severity of their symptoms following each maneuver. 2 coinvestigators blinded to the video number analyzed each video. Duration of nystagmus and latency prior to nystagmus starting was measured for each video. **Results:** The duration of nystagmus of modified maneuver was 3.24 seconds longer than duration of standard Hallpike. The patients' severity score of loaded Hallpike was statistically significantly higher when compared to the standard Dix-Hallpike. The loaded Hallpike produced significantly less false negative trials. **Conclusions:** Benign paroxysmal positional vertigo (BPPV) is the most common cause of inner ear related vertigo. The loaded Dix-Hallpike produces statistically significant longer objective nystagmus, stronger subjective symptoms, and less false negative tests than the standard Dix-Hallpike.

### **I 80. Recurrent Spontaneous Pneumocephalus Caused by Middle Fossa Encephaloceles**

Amy P. Bansal, MD, Newark, NJ; James K. Liu, MD, Newark, NJ; Yu-Lan M. Ying, MD, Newark, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to better characterize the presentation, differential diagnosis, and management of spontaneous pneumocephalus with attention to the tegmen tympani and middle cranial fossa floor.

**Objectives:** To characterize the presentation, differential diagnosis, and management of a patient with recurrent spontaneous pneumocephalus, who was found to have multiple middle fossa encephaloceles. **Study Design:** Case report and literature review. **Methods:** A case report of a 68 year old male who presented with symptoms of altered mental status and radiographic evidence of pneumocephalus on separate hospital admissions. He underwent a right middle fossa exploration and was found to have multiple encephaloceles involving the tegmen tympani and middle fossa floor. **Results:** A case of recurrent spontaneous pneumocephalus with CT findings of thin tegmen tympani and middle fossa floor. The patient underwent a middle fossa exploration. Multiple small encephaloceles with dural defects and cerebrospinal fluid leakage (CSF) were noted along the middle fossa floor. Wide exposure and repair of the middle cranial fossa floor was performed using bone cement and AlloDerm. The pneumocephalus resolved postoperatively and the patient had resolution of his symptoms without recurrence. **Conclusions:** Spontaneous pneumocephalus is a rare occurrence, with only sporadic cases reported in the literature. Diagnosis requires exclusion of possible traumatic, infectious, or anatomic abnormalities. Pneumocephalus is believed to be caused by a ball valve mechanism allowing one way airflow and can be exacerbated by CSF leakage causing negative pressure and air entry into the intracranial cavity. Early consideration of the potential causes of pneumocephalus is necessary for appropriate management.

### **I 81. Utility of Annotated Surgical Case Videos for Resident Education: A Pilot Study**

Clifford Scott Brown, MD, Durham, NC; Walter T. Lee, MD MHS FACS, Durham, NC; Liana Puscas, MD MHS, Durham, NC; Calhoun D. Cunningham III, MD, Durham, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the impact of surgical videos on resident training as an adjunct to surgical atlases and procedural textbooks.

**Objectives:** To assess the educational value of annotated surgical videos on comprehension of surgical anatomy and operative procedures. **Study Design:** One group pretest/posttest design. **Methods:** Otolaryngology residents at a single

program were asked to participate in a pretest to assess their knowledge of patient presentation, surgical anatomy, and procedural steps for a glomus tympanicum tumor. After one week, residents were then asked to watch a narrated and annotated 20 minute video of the procedure, and to complete a posttest to determine their understanding of the same pretest concepts. Questions were designed to encompass general knowledge as well as attending specific preferences. Residents were blinded to both pretest and posttest scores. A paired samples t-test was performed to compare the means of pretest and posttest scores. **Results:** Thirteen residents completed the pretest. The average percentage correct of the seven questions was 59.4% ( $\bar{X} = 27.2$ , 14-100). Eleven residents watched the video and participated in the posttest, with an average of 93.6% ( $\bar{X} = 9.8$ , 71-100). There was a significant difference in the scores for the posttest and the pretest;  $t(10) = 4.338$ ,  $p = 0.001$ . **Conclusions:** These results suggest that residents can effectively learn key surgical anatomy and procedural steps and techniques from watching an annotated surgical video. These findings are important as they augment information found in textbooks. Future studies should compare the efficacy of surgical videos in other subspecialties and institutions, with subgroup analysis based upon year of residency and procedure specific experience.

## I 82. Individual Minimally Clinically Important Difference for Patients with Vestibular Schwannoma: A Step Beyond Statistical Significance

Matthew L. Carlson, MD, Rochester, MN; Panagiotis Kerezoudis, MD, Rochester, MN;  
Nicole M. Tombers, RN, Rochester, MN; Maria Peris-Celda, MD PhD, Rochester, MN;  
Michael J. Link, MD, Rochester, MN

**Educational Objective:** By the conclusion of this session, participants should be able to 1) describe the importance of PROs in evaluating treatment success; 2) discuss, in small groups, the different MCID calculation methods; and 3) discuss the specific individual MCID thresholds for vestibular schwannoma.

**Objectives:** The diagnosis and treatment of vestibular schwannoma (VS) may significantly compromise patient quality of life (QOL). The concept of the minimum clinically important difference (MCID) has been put forth as the smallest amount of change in a patient reported outcome (PRO) score perceived as important by the patient. Herein, we sought to determine within subject MCID values for the Penn Acoustic Neuroma QOL (PANQOL) instrument using 12 month prospectively collected data. **Study Design:** Data from a prospectively maintained VS QOL database were queried and all patients with a minimum of 12 months of followup were examined. **Methods:** Anchor based (seven different anchors) and distribution based [half a standard deviation, standard error of measurement (SEM), minimum detectable change] methods were used to calculate the within subject MCID for the total and 7 PANQOL domain scores. Only anchors with a correlation coefficient greater than 0.3 were considered suitable for the MCID threshold calculations. MCID values smaller than the SEM were excluded from further analysis. **Results:** A total of 804 patients with complete 12 month PRO data were analyzed. Based on the median of the acceptable MCID values for each domain and the total score, the MCID thresholds are 25 points for hearing, 26 points for balance, 36 points for pain, 30 points for face, 28 points for energy, 31 points anxiety, 25 points for general and 17 points for total. **Conclusions:** The percentage of patients reaching these MCID values may serve as an appropriate endpoint when evaluating the efficacy of treatment modalities for VS patients and interpreting the clinical significance of VS-QOL studies.

## I 83. Malignant Transformation of Paraganglioma Following Radiation: A Case Report

Zachariah K. Chandy, MD, Los Angeles, CA; Gregory P. Lekovic, MD PhD, Los Angeles, CA;  
Derald E. Brackman, MD, Los Angeles, CA; Conrad H. Lu, MD, Los Angeles, CA;  
Kevin A. Peng, MD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the potential of malignant transformation of paraganglioma following radiation.

**Objectives:** To present a case of malignant transformation of paraganglioma following radiation. **Study Design:** Retrospective case report. **Methods:** The medical records of a 24 year old female with multiple paragangliomas were reviewed. She presented with bilateral submandibular swelling and was found to have bilateral carotid sheath tumors, initially diagnosed as carotid body tumors. **Results:** She underwent resection of the left carotid body tumor and radiation to the right neck mass. Surveillance imaging demonstrated interval stability of the right neck mass over two years. She then developed right neck and otalgia with a growing right neck mass measuring 7.0cm in greatest dimension encompassing the jugular foramen and extending to the carotid bifurcation. Operative resection was planned, and preoperative balloon occlusion study was uneventful. She underwent a Fisch type A approach with neck dissection and carotid sacrifice for gross total resection. Pathology revealed a malignant peripheral nerve sheath tumor, likely radiation induced, adjacent to



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a distinct benign paraganglioma. Within two months, she developed local recurrence and pulmonary metastases. Chemotherapy with vincristine, doxorubicin, cyclophosphamide, and ifosfamide initially resulted in regression in metastases, but following disease progression, she expired five years after initial diagnosis. **Conclusions:** Radiation, which is widely used to treat paragangliomas, has long since been associated with radiation induced sarcomas. To our knowledge, this is the first report in the head and neck of radiation induced malignant transformation of a benign paraganglioma to malignant peripheral nerve sheath tumor.

## I 84. Supporting Cell Survival after Cochlear Implant Surgery

Alvin T. Detorres, MD, Washington, DC; Rafal T. Olszewski, PhD, Bethesda, MD;  
Ivan A. Lopez, PhD, Los Angeles, CA; Akira Ishiyama, MD, Los Angeles, CA;  
Fred H. Linthicum, MD, Los Angeles, CA; Michael Hoa, MD, Bethesda, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain 1) the role of cochlear supporting cells under physiologic conditions and in the setting of damage to the organ of Corti, 2) the role that surviving cochlear supporting cells may play in the setting of cochlear implants.

**Objectives:** To describe the histopathology of temporal bones and the cochlea after cochlear implantation including the presence of surviving supporting cells which has not previously been described. **Study Design:** Case report. **Methods:** The temporal bones and cochlea of a patient with progressive sensorineural hearing loss due to otosclerosis, who underwent a right cochlear implant, were collected, fixed, decalcified, and processed for hematoxylin and eosin staining as well as immunohistochemistry. Immunohistochemistry staining was performed for acetylated tubulin, a known marker for adult cochlear supporting cells, and 4',6-diamidino-2-phenylindole, a marker for nuclear structures. Sections were examined under light microscopy as well as confocal laser microscopy. **Results:** Spiral ganglion cell count was 19,404 in the left, nonimplanted ear, compared to 13,693 in the right, implanted ear. In the implanted cochlea, endolymphatic hydrops was seen in the apical and middle turns and less noticeably in the basal turn. Hair cells were largely absent in the visualized organ of Corti in the apical, middle and basal turns of the cochlea. Fluorescence immunohistochemistry with confocal laser microscopy demonstrated intact supporting cells in the apical, middle, and basal turns of the implanted cochlea. **Conclusions:** The finding of surviving supporting cells in cochlear implant has implications for their role in maintaining electrical hearing as well as the candidacy of these patients for hair cell regeneration therapies in the future.

## I 85. Durability of Hearing Preservation Following Microsurgical Resection of Vestibular Schwannoma

Eric M. Dowling, MD, Rochester, MN; Neil S. Patel, MD, Rochester, MN; Michael J. Link, MD, Rochester, MN; Matthew L. Carlson, MD, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the likelihood of retaining serviceable hearing following successful hearing preservation microsurgical resection of sporadic vestibular schwannoma (VS).

**Objectives:** To ascertain the durability of hearing preservation following microsurgical resection of sporadic vestibular schwannoma (VS). **Study Design:** Retrospective chart review. **Methods:** All subjects with VS that had serviceable hearing (AAOHNS class A/B) on their initial postoperative audiogram following microsurgical resection with a minimum of 2 postoperative audiograms available for review were included. Durability of serviceable hearing among patients with postoperative AAO-HNS class A/B hearing was the main outcome measure. **Results:** A total of 39 patients met inclusion criteria. The mean age was 43 years and 62% were women. 25 patients underwent retrosigmoid craniotomy while 14 patients underwent middle fossa approach. The mean decline in pure tone average and word recognition following surgery at time of the first audiogram was 10.5 PTA dB HL and 6.2%, respectively -- 19 patients had class A hearing and 20 patients had class B hearing. The median duration of audiological follow up was 30 months (IQR 13-86 months; range 2-137 months). 5 patients progressed to non-serviceable hearing at last followup. At 1, 2, and 5 years following surgery, the Kaplan-Meier estimate of survival free of non-serviceable hearing was 100%, 97%, and 90%, respectively. Factors associated with the development of non-serviceable hearing will be presented. **Conclusions:** The greatest risk to loss of serviceable hearing with microsurgery occurs upfront. If patients retain serviceable hearing immediately after surgery, the majority maintain class A/B hearing during short and intermediate term followup. Future studies with longer followup are required to further understand the risk of delayed hearing loss following microsurgical resection.



## I 86. Comparison of Microscopic and Endoscopic Approaches for Auditory Brainstem Implantation: A Cadaveric Study

Vivek V. Kanumuri, MD, Boston, MA; Sullivan S. Smith, MD, Boston, MA; Lorenz Epprecht, MD, Boston, MA; Osama Tarabichi, MD, Boston, MA; Elliott 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 discuss the potential utility of the endoscope in several approaches for auditory brainstem implantation.

**Objectives:** One of the most vexing challenges in auditory brainstem implant (ABI) surgery is the limited microscopic view of the lateral recess when placing the ABI electrode paddle in close proximity to the cochlear nucleus. The blind insertion may contribute to variability of electrode placement and clinical outcomes. Endoscopes have been increasingly utilized in ear and lateral skull base surgery and have shown promise in improving visualization of target of regions. Herein, we compare microscopic and endoscopic visualization of ABI placement via three different approaches to the lateral recess in human cadavers. **Study Design:** Cadaveric study. **Methods:** Fresh cadaveric heads were utilized. Retrosigmoid, retrolabyrinthine, and translabyrinthine approaches to the lateral recess were performed on both sides of each available head. ABI placement was simulated under visualization using the microscope, 0 degree and 30 degree 14cm Hopkins rod endoscopes following completion of each dissection. **Results:** The lateral recess and foramen of Luschka were successfully visualized using all three approaches in all available heads. The retrolabyrinthine approach provided the most limited visualization with the microscope and required gentle retraction of the sigmoid sinus to provide sufficient access to the lateral recess. The endoscope, particularly the 30 degree endoscope, provided significantly enhanced visualization of implant placement in all three approaches and was especially beneficial with the retrolabyrinthine approach. **Conclusions:** In this cadaveric study, the endoscope assists in improved visualization of ABI placement and may enable approaches with more limited exposure such as the retrolabyrinthine approach.

## I 87. Tragal Cartilage Graft Anterior Perforation Tympanoplasty: Surgical Technique and Outcomes

Grace S. Kim, MD, Stanford, CA; Jennifer C. Alyono, MD, Stanford, CA; Nikolas H. Blevins, MD, Stanford, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss a new surgical technique for the repair of anterior tympanic membrane perforation and compare its outcomes to other surgical options.

**Objectives:** Anterior tympanic membrane (TM) perforations can present a surgical challenge, resulting in a number of techniques described to optimize outcomes. We present our results using tragal cartilage to span the anterior TM graft interface as part of an underlay tympanoplasty. **Study Design:** Retrospective review of sequential adults undergoing anterior cartilage graft tympanoplasty at a tertiary care referral center by a single surgeon over a 3 year period. **Methods:** Patients with an anterior TM perforation who underwent a cartilage graft tympanoplasty were included in the study. Outcome measures included recurrent perforation, retraction, and audiometric results. Clinical and demographic information were analyzed to assess potential predictors of success. **Results:** 52 patients were included in this study with an average age of  $50.4 \pm 18$  years and mean followup of 11 months. Both postauricular (58%) and transcanal (42%) approaches were used. The average perforation was 57% of the TM. Seventeen patients (33%) had previous tympanomastoid surgery in the same ear. All TMs were intact at the first (3 week) postoperative visit. Seven of 52 (13%) developed recurrent perforations. Average initial perforation size in this group was 67%. All 19 patients with perforations limited to the anterior half of the TM maintained intact TMs at latest followup. Average postoperative air bone gap improved by 9 dB HL. Two patients developed postoperative TM retractions. **Conclusions:** Anterior cartilage graft tympanoplasty using tragal cartilage to reinforce the anterior margin of the TM graft interface is an effective option, yielding acceptable hearing results and recurrence rates. Large perforations and ongoing infections can still predispose patients to recurrence.

## I 88. Auditory Rehabilitation for the Otolaryngologist: A Systematic Review

Renata M. Knoll, MD, Boston, MA; Renata M. Knoll, MD, Boston, MA; Jenny Chen, MD, Boston, MA; Aaron K. Remenschneider, MD, Boston, MA; David H. Jung, MD PHD, Boston, MA; Elliott D. Kozin, MD, Boston, MA

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

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cacy of auditory training in adults with hearing loss.

**Objectives:** Auditory training aims to improve hearing outcomes for patients suffering from auditory dysfunction. An evaluation of the published evidence base for auditory training is needed to assess outcomes in improving speech intelligibility, cognition and communication abilities in adults with sensorineural hearing loss. **Study Design:** Systematic review. **Methods:** A systematic review of the literature was performed using the Preferred Reporting Items for Systematic Reviews and Meta-analyses recommendations. Articles were searched in PubMed, Embase and Cochrane Library, and selected according to English language, adult age ( $\geq 18$  years), and diagnosis of sensorineural hearing loss with or without use of amplification. **Results:** Three hundred and sixty-three articles were identified. After review, 8 randomized controlled trials met inclusion/exclusion criteria, comprising different techniques of aural rehabilitation (analytic, synthetic, nonsense syllable, phoneme discrimination, community based group program and computer based auditory training). Five articles showed improvement in speech intelligibility in training groups, whereas one was statistically significant compared to control groups. In terms of self-reported hearing abilities, this same study showed a significant difference between controls, while other three articles showed improvement only within the training groups. One study included cognitive outcome measures, suggesting that auditory training significantly increases cognitive skills in challenging situations. **Conclusions:** Auditory training is a feasible intervention for people with hearing loss. However, efficacy of auditory rehabilitation to improve speech intelligibility, cognition and hearing abilities for adults with hearing loss has limitations.

## I 89. Patient Oriented Assessment of Online Bone Anchored Hearing Aid Resources

Andrew H. Lee, MD, Baltimore, MD; Ross S. Liao, BS, Baltimore, MD; Patrick J. Young, BS, Baltimore, MD; Paul H. Yi, MD, Baltimore, MD; Heather M. Weinreich, MD MPH, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss and compare the readability, understandability, and actionability of online resources available to patients exploring bone anchored hearing aid treatment.

**Objectives:** Patients are increasingly turning to online sources for information, which may be more relevant in those who are hearing impaired and seeking information regarding bone anchored hearing aids (BAHA). This study evaluates the understandability and actionability of current online sources for BAHAs. **Study Design:** Cross-sectional descriptive design. **Methods:** The top 100 online search results for the query bone anchored hearing aid were reviewed. BAHA related educational materials were evaluated using the validated Patient Education Materials Assessment Tool (PEMAT) for understandability and actionability. Readability was calculated using the Flesch-Kincaid Grade Level (FKGL). **Results:** The first 100 articles for the query bone anchored hearing aid were reviewed, of which 63 articles were geared towards patients. Alternatively, when searching for BAHA, the majority (72%) of the top results were spurious, with most unrelated results related to the Bahá í Faith. Among the websites directed towards patients, the overall FKGL was 10.6 (range, 4.4-14.7). Only 9 articles (14.2%) were written at or below the 8th grade level (average reading ability of US adults) and 3 (4.8%) were written at or below the 6th grade level (recommended level for patient education materials). The mean PEMAT understandability score was 80% (range, 50-100%). The mean actionability score was 67% (range 16.7-100%). **Conclusions:** Online BAHA information is generally too difficult for the average person to read, understand, or act upon. Revisions are recommended to benefit a wider audience. Furthermore, the visibility of BAHA on search platforms should be increased, as the most likely query, BAHA, provides unrelated results, which may confuse patients.

## I 90. Using Virtual Reality to Help Depict Round Window Exposure for Cochlear Implantation

Justin T. Lui, MD, Calgary, AB Canada; Garrett D. Locketz, MD, Philadelphia, PA; Joseph C. Dort, MD MPH, Calgary, AB Canada; Sonny K. Chan, PhD, Calgary, AB Canada; J. Kenneth Salisbury, PhD, Stanford, CA; Nikolas H. Blevins, MD, Stanford, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize and critically appraise the use of virtual reality simulation in preoperative planning in both temporal bone and lateral skull base surgeries.

**Objectives:** To assess the ability of a patient specific virtual reality (VR) rehearsal platform to portray intraoperative exposure of the round window (RW) during cochlear implantation (CI). **Study Design:** Prospective cohort study. **Methods:** Twenty-one patients who had undergone RW CI by a single surgeon were selected. Based on operative notes and video, RW exposure was either grade I (greater or equal to 50%) or grade II (less than 50%). Segmented preoperative clinical CT datasets were loaded into a custom surgical rehearsal platform. Six experienced CI otologists (including the operative

surgeon) from four institutions performed virtual transfacial recess RW exposure, blindly grading RW exposure in each. Grades from actual and virtual dissections were compared. **Results:** Intraoperatively, 14 (67%) cases were grade I and 7 (33%) were grade II. Virtual dissection grades by the operative surgeon was accurate in 81% of cases. The other 5 (nonoperative) otologists' virtual grades correlated with intraoperative in 78% (range 71% - 86%). The operative surgeon accurately identified all intraoperative grade II cases, while the other 5 otologists were correct in 57% (range 29% to 100%). **Conclusions:** Subtle surgically relevant patient specific temporal bone anatomic variations can be accurately identified with VR rehearsal. Not surprisingly, accuracy is improved when the operative surgeon also performs the virtual exploration. Accuracy may depend on individual techniques, as one surgeon's findings may not be replicated by another's rehearsal. Further prospective correlations will help further establish the utility of VR rehearsal in CI preparation.

## I 91. **Audiometric Findings in Children with Unilateral Enlarged Vestibular Aqueduct**

Robert J. Macielak, BS, Columbus, OH; Jameson K. Mattingly, MD, Columbus, OH;  
Ursula M. Findlen, PhD, Columbus, OH; Oliver F. Adunka, MD, Columbus, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain that the true prevalence of bilateral hearing loss in children with unilateral enlarged vestibular aqueduct may be lower than previously reported in the literature.

**Objectives:** To evaluate the prevalence of bilateral hearing loss in children with unilateral enlarged vestibular aqueduct (EVA) at a single institution. **Study Design:** A retrospective case review conducted at a tertiary care pediatric referral center. **Methods:** Electronic medical record review was performed to identify children with radiologic findings of unilateral EVA and normal labyrinthine anatomy of the contralateral ear diagnosed via high resolution CT and/or MRI. Audiologic data including PTA, type of hearing loss, and followup time period were also recorded. **Results:** Fifty-nine patients with unilateral EVA and normal contralateral inner ear anatomy were identified. Thirty-eight patients were diagnosed via CT, 15 patients were diagnosed via MRI, and 6 patients were diagnosed via both imaging modalities. Three (5.1%) patients were noted to have bilateral hearing loss with a PTA of 33.3 dB HL in the better hearing ear while 56 patients (94.9%) were diagnosed with unilateral hearing loss with a PTA of 10.0 dB HL in the better hearing ear. On average, patients were followed audiotically for 48 months. **Conclusions:** The true prevalence of bilateral hearing loss in children with unilateral EVA may be lower than previously reported in the literature. Observed differences could stem from inaccuracies in utilizing CT morphologic and radiographic parameters to diagnose EVA cases. Further, MRI appears more definitive in identifying the fluid signal in the endolymphatic sac to determine enlargement as compared to morphometric analysis. Further studies incorporating strict diagnostic and imaging criteria could more definitively elucidate the prevalence of this clinical finding.

## I 92. **Clinician Adherence to the Clinical Practice Guideline: Acute Otitis Externa**

Nicholas R. Mildenhall, MD, Durham, NC; Adam L. Honeybrook, MD, Durham, NC;  
David M. Kaylie, MD, Durham, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the impact of the Clinical Practice Guideline: Acute Otitis Externa on clinicians.

**Objectives:** Over 10 years have elapsed since the Clinical Practice Guideline: Acute Otitis Externa (AOE-CPG) was published. We sought to 1) assess clinicians' adherence to the guideline, and 2) identify management deviations and reasons for specialist referral. **Study Design:** Digital survey. **Methods:** A 23 question survey was distributed to various groups of regional clinicians who provide primary care. The survey evaluated demographic data, adherence to the guideline action statements, and reasons for specialist referral. **Results:** 61 clinicians completed the survey. 5/61 (8.2%) respondents had reviewed the AOE-CPG. Only 30/61 (49.2%) always prescribe ototopical therapy when managing uncomplicated acute otitis externa. Those who were more likely to prescribe oral antibiotics were less likely to prescribe ototopical therapy ( $p=0.002$ ) and were more likely to refer to a specialist ( $p=0.0001$ ). Those who had reviewed the guideline were more likely to prescribe ototopical therapy as first line treatment ( $p=0.001$ ). The top reasons for specialist referral include symptoms present > 4 weeks (50/61), poor response to topical therapy (42/61), and no improvement after 1 week of treatment (30/61). Other popular reasons for referral included ear canal edema (10/61), inability to assess the tympanic membrane (20/61) and minimal response to oral antibiotic treatment (27/61). **Conclusions:** Of those primary care providers who responded, very few had reviewed the AOE-CPG, and adherence to the guideline was poor in this cohort. As a result, reasons for specialist referral varied from appropriate to unnecessary. Those few clinicians who read the guideline were more adherent and indicated their practice management had been positively influenced.

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## I 93. Characterizing Mid-Frequency Sensorineural Hearing Loss

Jack L. Birkenbeuel, BS, Irvine, CA; Omid Moshtaghi, MS, Irvine, CA; Afsheen Moshtaghi, BS, Irvine, CA; Sammy Sahyouni, Irvine, CA; Hossein Mahboubi, MD, Irvine, CA; Hamid R. Djalilian, MD, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to better understand the natural progression of mid-frequency hearing loss.

**Objectives:** To characterize congenital mid-frequency sensorineural hearing loss (MFSNHL) also known as a cookie bite audiogram and describe its change over time. **Study Design:** A retrospective chart review spanning 2012 to 2017 was completed at an outpatient audiology office. **Methods:** MFSNHL was defined as having a 1, 2, and 4 kHz pure tone average (PTA) greater than 10 dB compared to the average of the threshold at 0.5 and 8 kHz. All patients had normal tympanometry and otoscopic examination. **Results:** In total, 27 patients were found to meet criteria for MFSNHL. Average age at initial presentation was 10 years old (ranging from 2 to 41 years old) with 5 (18%) patients exhibiting unilateral hearing loss. Average mid-frequency PTA was 46 dB compared to 28 dB at 0.5 and 8kHz averages. In this cohort, 16 (59%) had multiple audiograms with a 2.8 year average followup time from first to last audiogram collected. Of those with serial audiograms, 6 (38%) showed an average improvement of 7dB in MFSNHL while 9 (56%) experienced 10 dB worsening of mid-frequency loss over time. Average speech recognition threshold and word recognition scores were 28 dB and 90% respectively. Although etiology was not assessed, 2 patients endorsed a family history of MFSNHL. **Conclusions:** MFSNHL is an uncommon audiometric finding with presumed hereditary etiology. In patients with serial audiograms, 56% experienced worsening thresholds. Some of the changes that were seen may be due to the test-retest variability that is more significant in children. Longer term data will be needed to better understand the prognosis in these patients.

## I 94. Retinal Detachment Secondary to Otitic Hydrocephalus Associated with Acute Otitis Media in a Child: A Case Report

Koshi Otsuki, MD PhD, Fukushima, Japan; Mitsuyoshi Imaizumi, MD PhD, Fukushima, Japan; Shigeyuki Muroto, MD PhD, Fukushima, Japan

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize that the episodes of vomiting, headache, and visual impairment and a history of acute otitis media seem to be indicative for otitic hydrocephalus.

**Objectives:** The incidence of intracranial complications following acute otitis media (AOM) has decreased considerably with the introduction of new antibiotics. However, the clinical presentation of otogenic dural sinus thrombosis as a complication of AOM can be masked by antibiotic treatment. Serious consequences can ensue if otitic hydrocephalus by dural sinus thrombosis is not identified and treated appropriately. We review a rare case of otitic hydrocephalus in a child resulting in retinal detachment with papilledema. **Study Design:** Retrospective case review. **Methods:** We reviewed a case of retinal detachment in a pediatric patient who initially complained of symptoms of AOM and was referred to our university hospital. Patient: A 4 year old girl was referred to us with episodes of vomiting, headache, and visual impairment after 2 weeks of treatment for AOM. She subsequently developed lethargy. **Results:** Our patient presented with right acute mastoiditis and thrombosis of the right sigmoid and lateral sinus, demonstrated by contrast-enhanced computed tomography and magnetic resonance imaging. Lumbar puncture revealed an opening pressure of 500 mmH<sub>2</sub>O (normal, 70-180 mm-H<sub>2</sub>O). Intravenous antibiotics were initiated. Bilateral placement of pressure equalization tubes and a right mastoidectomy were performed. Heparin anticoagulation therapy was subsequently administered. The thrombosis at both sites and visual acuity improved two weeks later. **Conclusions:** This case study showed that symptoms of increased intracranial pressure and a history of AOM could be suggestive of otitic hydrocephalus. More cases should be prospectively examined and reviewed to facilitate early diagnosis of similar cases.

## I 95. Effect of Cochlear Implant Candidacy Delay on Speech Perception Outcomes in Children with Hearing Loss

Elizabeth L. Perkins, MD, Chapel Hill, NC; Lisa R. Park, AuD, Chapel Hill, NC; Kevin D. Brown, MD PhD, Chapel Hill, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the potential worse outcomes of delaying second side cochlear implantation in children with hearing loss after reaching a conservative



CNC candidacy.

**Objectives:** Timing of second side cochlear implantation in children with residual acoustic hearing is a difficult clinical decision that balances the loss of residual hearing with the benefits achieved with cochlear implantation. Specific audiologic criteria for consideration of second side cochlear implantation do not exist (outside of manufacturer's labeling), and there is limited data on the implications of delaying implantation. We wished to determine the impact of time interval after reaching a conservative CNC word score criteria of 40% or less. **Study Design:** Retrospective chart review. **Methods:** 61 bimodal children who underwent sequential, second side cochlear implantation (>1 year experience) were identified. Differences in CNC word scores of the second device compared to the first device were determined (each subject acts as own control). Linear regression analysis was performed comparing differences with length of time elapsed after an aided CNC word score of less than 40% was reached preoperatively. **Results:** CNC differences plotted against time interval demonstrated a highly significant negative correlation between interval and CNC word score outcome ( $p = 0.0052$ ). Subjects delaying implantation after reaching conservative candidacy criteria were far more likely to have a poorer outcome in their second ear compared to the first ear. Multivariate analysis did not identify any other influencing co-factors. **Conclusions:** These results suggest delaying CI after reaching a conservative CNC candidacy of less than 40% leads to worse outcomes in children receiving a second implant. Parents of children with hearing loss should be advised of the risk of delaying implantation beyond this conservative standard.

## I 96. Recurrent Apocrine Hidrocystoma of the External Auditory Canal

Jack L. Birkenbeuel, BS, Irvine, CA; Ronald Sahyouni, MS, Irvine, CA; Omid Moshtaghi, MS, Irvine, CA; Afsheen 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 what an apocrine hidrocystoma is and its differential diagnosis and treatment.

**Objectives:** To describe a case of recurrent apocrine hidrocystoma of the external auditory canal (EAC) and discuss its differential diagnosis and management process. **Study Design:** Case report and review of the literature. **Methods:** Patient's medical record was reviewed. **Results:** The patient is a 49 year old male with a history of a right recurrent lesion within the lateral EAC. The lesion was initially biopsied twice in 2003, which demonstrated seborrheic keratosis. The lesion recurred in 2007, at which point it was biopsied and diagnosed as an apocrine hidrocystoma. The patient presented in 2013 with bloody ear drainage after cleaning his ear with a Q-tip. Examination demonstrated a papillomatous lesion along the superior cartilaginous EAC, with a clear tympanic membrane with no effusion or retraction. The patient denied hearing loss and tinnitus. The lesion was again excised and recurred in 2016 as a papillomatous lesion along the posterior cartilaginous EAC with overlying bloody crusting blocking 40-50% of the canal. Silver nitrate was applied to prevent further bleeding. Reexcision was discussed but the patient opted for observation. **Conclusions:** Apocrine hidrocystomas are rare, slow growing, and benign cysts arising from the apocrine secretory glands. They usually appear as solitary dome shaped translucent papules or nodules and are most commonly located on the eyelids. Apocrine hidrocystomas in the EAC are extremely rare, with only two other known cases that never recurred following excision. Apocrine hidrocystoma may be misdiagnosed as seborrheic keratosis or eccrine cystadenomas and close observation for recurrence is critical.

## I 97. Clinical Outcomes in Patients with Eustachian Tube Dysfunction

Stephen S. Schoeff, MD, Charlottesville, VA; Candice L. Wilson, BS, Charlottesville, VA; Brian O. Hernandez, MD, Charlottesville, VA; Brad W. Kesser, MD, Charlottesville, VA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the lifelong impact of eustachian tube dysfunction.

**Objectives:** Describe the clinical course of eustachian tube dysfunction (ETD) and identify trends associated with disease progression. **Study Design:** Retrospective cohort study of adults seen at a tertiary care center otolaryngology department with a diagnosis of ETD over a 7.5 year period. **Methods:** Patients were identified through a database search. The primary outcome measure was surgery free survival; secondary outcome measures included audiologic outcomes, use of hearing aids, and number of surgeries. Kaplan-Meier curves and Pearson correlations were used for statistical comparison. **Results:** 255 patients were seen in 1361 encounters with average followup of 43 months. A total of 325 lifetime surgeries were performed on 152 patients. The majority (208 patients) had bilateral disease. Age at first surgery did not differ significantly when comparing use of intranasal steroids ( $p=0.058$ ), CPAP use ( $p=0.19$ ), smoking ( $p=0.482$ ),



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and allergic rhinitis ( $p=0.587$ ). Speech discrimination score significantly worsened in both ears over the course of followup for all patients. Laterality and gender were not predictive of cholesteatoma development, need for surgery, and need for hearing aids. Age at first surgery correlated with age at hearing aid acquisition (0.948,  $p=0.000$ ) and inversely correlated with total number of surgeries ( $-0.262$ ,  $p=0.002$ ). Age at presentation was significantly lower among patients requiring surgery than those not requiring surgery ( $p=0.001$ ). **Conclusions:** Eustachian tube dysfunction remains a challenging disease to quantify with a substantial burden on adults and children. Our data add to the existing data in further clarifying the course of the disease, its significant outcomes, and covariates.

## I 98. Epidemiological Analysis of Vestibular Sequelae among Patients with Concussions in United States Emergency Rooms

Rosh K.V. Sethi, MD MPH, Boston, MA; Renata Knolls, MD, Boston, MA;  
Aaron Remenschneider, MD MPH, Boston, MA; David Jung, MD PhD, Boston, MA;  
Elliott Kozin, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe nationwide trends in concussive head trauma and the incidence of otologic and vestibular complications among patients who are examined in the ED setting.

**Objectives:** This study aims to characterize the frequency and nature of vestibular diagnoses associated with concussion among patients who present to the emergency department in the United States. **Study Design:** Retrospective cohort analysis of the Nationwide Emergency Department Sample (NEDS) 2009-2011. **Methods:** NEDS was queried for patients presenting to the emergency department (ED) with a primary diagnosis of concussion (ICD9CM 959.01, 850.0-850.9). Primary outcome was the incidence of associated vestibular diagnoses, including vertigo (780.4), or abnormal vestibular function test (ICD9CM 794.16), and associated auditory diagnoses including hearing loss (389.x, 388.1x, 388.2,) tinnitus (388.3x), abnormal auditory perception (388.4x), or abnormal auditory function test (794.15). The presence of skull base fracture (801.x) was also characterized. **Results:** A total of 4,651,383 visits were associated with a primary diagnosis of concussion. The majority of patients were male (52.5%) and mean age was 31.8 years (SEM 0.3). The majority of patients were discharged home (95.0%). Major vestibular diagnoses included vertigo (2.2%,  $n=101,661$ ). Other audiovestibular diagnoses were hearing loss (0.1%,  $n=5,946$ ) and tinnitus (0.04%, 1,864). CT imaging of the head was rarely performed (2.6% of visits). Skull base fractures were identified in 4,130 patients (0.09%). Vertigo was significantly more common among patients without skull base fracture (2.2% vs. 0.3%,  $p<0.0001$ ). **Conclusions:** Vertigo, and other audiovestibular diagnoses, in patients with concussion in the ED setting appears rare. However, given high prevalence of concussions, otolaryngologists may be called to evaluate vestibular symptoms following head injury. Further study is needed to understand whether audiovestibular symptoms are of peripheral or central etiology in the acute setting.

## I 99. Mastoid Obliteration Using Autologous Bone Dust Following Canal Wall Down Mastoidectomy

Pedrom C. Sioshansi, MD, Stanford, CA; Jennifer C. Alyono, MD, Stanford, CA;  
Nikolas H. Blevins, MD, Stanford, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe a technique for mastoid obliteration following canal wall down mastoidectomy for chronic otitis media, and review its early results in producing a dry, safe ear and a small mastoid cavity.

**Objectives:** To describe a technique for mastoid obliteration following canal wall down mastoidectomy for chronic otitis media, and review its early results in producing a dry, safe ear and a small mastoid cavity. **Study Design:** Retrospective review at a tertiary referral center of forty-seven consecutive canal wall down procedures using bone dust obliteration for chronic otitis media. **Methods:** All patients underwent canal wall down mastoidectomy and, if indicated, concurrent tympanoplasty and ossicular chain reconstruction. Bone dust harvested from healthy mastoid cortex was used to obliterate selected portions of the tympanomastoid defect. Temporalis fascia and/or an inferiorly based periosteal flap were used for coverage of the bone dust. Outcomes measured include postoperative infection, need for mastoid bowl cleaning, incidence of recurrent cholesteatoma, need for revision surgical intervention. **Results:** 98% of ears have remained dry and safe since mastoid obliteration, with a lack of symptoms and no evidence of recurrent disease. Cholesteatoma recurrence rate was 2%, and occurred only in the middle ear. Postoperative otorrhea, while rare, was managed successfully with topical medication in all affected patients. Clinical, radiographic, and surgical appearance of grafted bone dust suggests good take with long term viability. **Conclusions:** The described technique used for mastoid obliteration using autologous

bone dust and cartilage is simple, effective, and safe to reduce the size of the mastoid cavity in patients undergoing canal wall down mastoidectomy. It may help to reduce morbidity by improving the surgeon's control over mastoid bowl size and shape.

## **I 100. Symptoms in Cervical Vertigo**

Adam C. Thompson-Harvey, BA, St. Louis, MO; Timothy C. Hain, MD, Chicago, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) identify characteristics endorsed by patients diagnosed with cervical vertigo; 2) distinguish differences in symptoms between patients with cervical vertigo, vestibular migraine, and BPPV; and 3) discuss the implications of characteristics found in cervical vertigo on criteria used for diagnosis and neurotologic variants.

**Objectives:** There is no consensus of expert opinion that defines the entity of cervical vertigo. However, neck injury or neck pain is generally required to diagnose a patient as having cervical vertigo or cervicogenic dizziness. Dizziness is reported in 52% of whiplash subjects from previous studies, while subjects with neck injuries due to other processes than whiplash have also reported dizziness. Symptoms of subjects who have both neck disorders and dizziness may overlap with other exclusionary diagnoses. **Study Design:** In this study, a 39 item questionnaire was prospectively administered to 48 patients diagnosed with cervical vertigo, migraine, and vestibular vertigo to test the hypothesis that cervical vertigo can be characterized by a set of distinct symptoms. **Methods:** Responses between the three diagnostic groups were compared to identify questions which differentiated patients based on their symptoms. **Results:** Nine questions were successful in differentiating vestibular vertigo from migraine and/or cervical vertigo. Symptoms endorsed by subjects with cervical vertigo overlapped substantially with subjects with well established vestibular disturbances as well as symptoms of subjects with migraine. 27% of cervical vertigo subjects reported having true vertigo, 50% having headache and 94% having neck pain. **Conclusions:** Lacking knowledge of neck disturbance, the symptoms we elicited in our questionnaire suggest that cervical vertigo subjects may resemble migraine subjects who also have evidence of neck injury. Whether or not subjects with cervical vertigo also overlap with other diagnoses defined by a combination of symptoms and exclusion of objective findings such as chronic subjective dizziness and other variants of psychogenic dizziness remain to be established.

## **I 101. Utility of Neuropsychological Evaluation in Predicting Audiometric and Speech Outcomes Following Cochlear Implantation**

Andrew G. Tritter, MD, Shreveport, LA; Maura K. Cosetti, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the utility of preoperative neurocognitive testing in patients undergoing cochlear implantation.

**Objectives:** Cochlear implantation is a safe and effective treatment for severe sensorineural hearing loss in elderly individuals. Recent research suggests those with greater degrees of hearing loss are at highest risk of cognitive decline and dementia. We investigated the relationship between pre-implant cognitive function and postoperative speech perception in elderly CI recipients. **Study Design:** Retrospective cohort review. **Methods:** Ten CI recipients over age 65 underwent pre-implant neurocognitive evaluation from 2013-2015. Data from standardized neuropsychological tests and postoperative audiologic performance, including pure tone averages (PTA), speech reception thresholds (SRT), and postoperative speech perception were collected. Associations between specific neuropsychological tests and postoperative audiologic data were then analyzed. **Results:** Mean 12 month postoperative PTA and speech perception scores were 29.3 dB and 69%. Performance for all subjects across the 19 point battery of neuropsychological tests fell within the average to borderline range. Poorer performance on the Hopkins Verbal Learning Test Word Recognition section and Part A of the Trail Making Test were significantly associated with poor speech perception at 12 months ( $p=0.04$  and  $p=0.05$ , respectively). Poorer performance on the Rey Complex Figure Test was associated with increased PTA thresholds at six and 12 months ( $p=0.04$  and  $p=0.01$ , respectively), and also with an increased SRT at 12 months ( $p=0.04$ ). A poorer score on the Geriatric Depression Scale was associated with an increased SRT at 12 months ( $p=0.01$ ). **Conclusions:** Decreased performance on preoperative testing appears to predict lower postoperative speech performance in the year following implantation. This relationship may have utility in counseling elderly CI candidates and tailoring postoperative rehabilitation strategies.

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## I 102. Phosphaturic Mesenchymal Tumor of the Cerebellopontine Angle

Erika M. Walsh, MD, Farmington Hills, MI; Jeffrey Jacob, MD, Farmington Hills, MI;  
David R. Lucas, MD, Ann Arbor, MI; Eric Sargent, MD, Farmington Hills, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the pathophysiology and clinical presentation of phosphaturic mesenchymal tumors. They should be able to explain the clinical implications of these physiologically active entities. Though rare in the cerebellopontine angle, they should be prepared to add this lesion to their differential diagnosis.

**Objectives:** To describe a phosphaturic mesenchymal tumor of the cerebellopontine angle (CPA) and internal auditory canal (IAC) and the current body of literature on these rare tumors. **Study Design:** Case report with literature review. **Methods:** Report of case with review of literature. **Results:** Phosphaturic mesenchymal tumor is a recently described, rare tumor that can result in osteomalacia and electrolyte abnormalities, including lowered serum phosphorus and elevated urine phosphorus. This process may be mediated by fibroblast growth factor 23. These tumors have typically been described in the axial and appendicular skeleton in both soft tissue and bony sites, often present with bone pain, and most are clinically benign. The electrolyte abnormalities correct with resection. Here we describe a 36 year old female who presented with left asymmetric sensorineural hearing loss and tinnitus. MR imaging revealed a 2 cm, gadolinium enhancing mass of the left IAC and CPA with the appearance of a schwannoma. Preoperative laboratory studies demonstrated serum phosphorus of 1.1 mg/dL and serum calcium of 7.9 mg/dL, both below normal values. She underwent left translabyrinthine resection, with final pathology revealing a phosphaturic mesenchymal tumor that was histologically benign. Her serum phosphorus and calcium normalized in the postoperative period. **Conclusions:** Phosphaturic mesenchymal tumors are rare tumors with potentially severe effects on phosphorus levels and bone health. We describe the first case of a phosphaturic mesenchymal tumor of the IAC/CPA masquerading as an acoustic neuroma reported in literature. This rare entity is important to recognize, given its deleterious effects on bone health.

## I 103. Outcomes of Round Window Vibroplasty - A United States Experience

Scott K. Walton, MD, Tacoma, WA; Jaqueline A. Anderson, MD, Fort Belvoir, VA;  
James V. Crawford, MD, Bethesda, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain how the Vibrant Sound Bridge® (VSB) implantable middle ear device can benefit patients who suffer from both mixed and conductive hearing loss, and more fully discuss the utility of implanting this device in the round window niche.

**Objectives:** To describe our experience in patients with conductive or mixed hearing loss who were implanted with the Vibrant Sound Bridge® (VSB) via the round window vibroplasty (RWV) technique at our institution. **Study Design:** This is a retrospective chart review. **Methods:** Clinical records of patients, who either underwent successful VSB implantation or attempted implantation, were reviewed to assess both the surgical and audiological outcomes. For patients who were successfully implanted, pre and postoperative audiometric data were compared to assess functional gain. Also, intra and postoperative complications are presented for review. **Results:** VSB implantation was attempted in 9 ears from eight patients. Of these, 6 implants were successfully placed. Analysis revealed a statistically significant functional gain in postoperative aided thresholds when compared to preoperative unaided air conduction thresholds. Pure tone average (500, 1k, 2k, 4k Hz) functional gain was 33 dB ( $p < 0.005$ ). Two patients failed implantation due to inadequate visualization intraoperatively and the third was complicated by postoperative infection with subsequent extrusion. **Conclusions:** This is the first series of VSB implants for the indication of conductive or mixed hearing loss in the United States to our knowledge. Implantation of the VSB via the RWV technique appears to be a safe method that may be considered in patients with this indication. Our data is similar to outcomes from prior European studies and verifies that hearing thresholds significantly improve. We feel that this procedure can be completed in a safe and effective fashion in most patients with good hearing outcomes.

## I 104. High Rates of Hearing Loss in Survivors of Ebola Virus Infection

Mary J. Xu, MD, San Francisco, CA; Josephine A. Czechowicz, MD, San Francisco, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate knowledge of our current understanding of the impact of the Ebola virus on hearing, to discuss the emerging literature on the otologic implications of the Ebola pandemic, and to compare Ebola to other viral causes of hearing loss.

**Objectives:** To investigate the prevalence and severity of otologic symptoms in survivors of infection with the Ebola virus. To call attention to a commonly described but poorly characterized sequela of the Ebola pandemic. **Study Design:** Systematic review of the literature. **Methods:** Computerized and manual searches (PubMed, EMBASE, Cochrane Library) were performed to identify human studies on patients who survived Ebola virus infection, and in whom otologic or auditory outcomes were reported. All study designs were evaluated. **Results:** A total of 12 publications were identified that met inclusion criteria (3 case control studies, 8 cross-sectional studies and 1 case report). These studies included 1706 survivors of Ebola virus infection from the Democratic Republic of the Congo, Uganda, Guinea, Liberia and Sierra Leone. The duration of followup ranged from 2-29 months. A total of 199 Ebola survivors (12%) reported hearing loss. Of the studies that compared Ebola survivors to control subjects, the reported odds ratios for hearing loss in Ebola survivors ranged from 1.4 to 12.1. Other otologic symptoms reported included tinnitus (4.3%) and aural fullness (4.2%). No data was reported on symptoms of otorrhea, otalgia, and vertigo. **Conclusions:** There is a high prevalence of hearing loss in many study populations of Ebola virus infection survivors. Further research is needed to better characterize the hearing loss, to understand its pathophysiology and to develop treatments.

## I 105. Long Term Outcomes of Cartilage Buttressed T-Tube Tympanoplasty for Prolonged Middle Ear Ventilation

Steven A. Zuniga, MD, Philadelphia, PA; Sean P. Larner, DO, Pittsburgh, PA;  
David M. Souza, DO, Pittsburgh, PA; Todd A. Hillman, MD, Pittsburgh, PA; Douglas A. Chen, MD,  
Pittsburgh, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the technique of cartilage buttressed T-tube tympanoplasty and discuss the efficacy and safety of this technique for long term middle ear ventilation.

**Objectives:** To report on the safety and efficacy of cartilage buttressed T-tube tympanoplasty for long term middle ear ventilation, specifically by examining duration of tube survival, as well as adverse events associated with prolonged middle ear intubation, including persistent tympanic membrane perforation. **Study Design:** Retrospective case series of patients undergoing cartilage buttressed T-tube tympanoplasty between January 2005 and December 2016 in a tertiary care neurotology private practice. **Methods:** Patients who underwent cartilage T-tube tympanoplasty with complete pre and postoperative audiometric data and a minimum followup duration of 12 months were analyzed. T-tube survival and adverse events including persistent tympanic membrane perforation were recorded and compared to published data for other long term middle ear ventilation techniques. **Results:** The study cohort included 72 cartilage buttressed T-tube tympanoplasties in 68 patients. Median tube survival was 34 months (2-131 months). Incidence of persistent tympanic membrane perforation (n=1) was 1.4%. **Conclusions:** Cartilage buttressed T-tube tympanoplasty is a safe and effective means of accomplishing long term middle ear ventilation with a considerably lower rate of persistent tympanic membrane perforation as compared to alternative methods of prolonged middle ear ventilation.

## Pediatric Otolaryngology

## I 106. Retrospective Comparison of Velcro and Twill Tie Outcomes Following Pediatric Tracheostomy

Anna C. Bitners, BS, Bronx, NY; William B. Burton, PhD, Bronx, NY; Christina J. Yang, MD,  
Bronx, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss outcomes of Velcro versus twill tracheostomy tie use following pediatric tracheostomy and their potential influence on choice of tracheostomy tie at the time of tube placement.

**Objectives:** To compare the rates of skin related complications and accidental decannulation in pediatric patients who received Velcro ties versus twill ties during the early postoperative period following tracheostomy. We hypothesized that the rates of skin related complications and accidental decannulation in patients with Velcro ties would be the same or lower than in patients with twill ties. **Study Design:** Retrospective cohort study. **Methods:** Medical records of 109 patients < 18 years old who underwent elective tracheostomy were reviewed: 70 received twill ties and 39 received Velcro ties. Patients were followed for the first seven postoperative days. The primary outcome was skin related complications, which were further categorized into mild (irritation) and severe (breakdown). The secondary outcome was accidental decannulation. Rates of skin related complication and accidental decannulation were compared across the two groups using chi-square



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analysis. **Results:** Skin irritation occurred in 32 patients (45.7%) with twill ties and 10 patients (25.6%) with Velcro. Skin breakdown occurred in 20 patients (28.6%) with twill ties and 6 patients (15.4%) with Velcro. There were no accidental decannulation events. The use of Velcro ties was associated with a decreased rate of skin irritation (OR: 2.44; 95% CI: 1.03 - 4.77; P = 0.039) but not skin breakdown (OR: 2.20; 95% CI 0.80 - 6.06; P = 0.122). **Conclusions:** The use of Velcro ties was associated with a decrease in the rate of skin irritation but not skin breakdown. There were no accidental decannulation events. These findings support the use of Velcro ties at the time of pediatric tracheostomy placement.

## I 107. Comparing iPad's and Vecta Mobile Sensory Station's Influence on Pediatric Patients' Experiences in a Same Day Surgery Unit

Kristin E. Davis, BS, Morgantown, WV; Katharina M. Mitchell, BS, Morgantown, WV;  
Bridget A. Radmer, BS, Morgantown, WV; Denise R. Holcomb, RN, Morgantown, WV;  
Jad A. Ramadan, MS, Morgantown, WV; Michele M. Carr, MD, Morgantown, WV

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the use of the Vecta machine and iPads in a pediatric preoperative area.

**Objectives:** Our objective was to compare the use of an iPad and Vecta sensory station in a pediatric perioperative area. **Study Design:** A Vecta sensory station and an iPad were loaned for 90 days for use in the same day surgery unit to determine their influence on children's experiences. **Methods:** Children in the pediatric perioperative wing of a hospital were given the opportunity to play with either the Vecta machine or an iPad while waiting. Parents and nurses were surveyed asking their opinion of the intervention and whether or not their child had a diagnosed behavior disorder/autism or required a premed before surgery. **Results:** Forty children used an iPad in the perioperative area, and 108 used the Vecta machine. Mean age was 5.4 with a standard deviation of 3.3. Every caregiver indicated that they would ask for either device again; all said that the wait to go to the OR was manageable. All but 2 caregivers said the device (iPad or Vecta) helped calm their child. Two nurse responses indicated that the Vecta interfered with their ability to deliver care. One device was not more effective than the other for calming the child ( $p=0.182$ ). Fewer Vecta users than iPad users required a premed ( $p=0.041$ ). Sixty percent of iPad users got a premed; 40.7% of Vecta users required a premed. Vecta users were significantly younger than iPad users ( $p<0.001$ ). **Conclusions:** Both devices were received well by this group. Further attention into interventions that reduce the need for premedications in this group are needed.

## I 108. Delayed Saddle Nose Deformity after Pediatric Septoplasty: A Cautionary Tale of Three Cases

Linh T. Dang, BA, Boston, MA; Zachary J. Quay-de La Valle, MD, Boston, MA; Arnold S. Lee, MD, Boston, MA; Andrew R. Scott, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare septoplasty techniques for adults versus those recommended for children, explain the rationale for conservative resection and the use of cartilage sparing techniques in pediatric patients, and discuss options for grafting material for the repair of saddle nose deformity in adolescent patients.

**Objectives:** To describe cases of saddle nose deformity presenting years after childhood septoplasty. To review the benefits, risks, alternatives and limitations of septal surgery in young children and to discuss methods for saddle nose repair in the adolescent population. **Study Design:** Case series with chart review. **Methods:** Medical records and clinical photographs for 3 teenage patients who presented with iatrogenic saddle nose deformity after prior septal surgery were examined. A literature search was performed to identify similar cases and reports regarding the indications and methods of pediatric septoplasty were reviewed. **Results:** There was one male and two female patients (mean age: 17 years (range 16-17 years)). All presented with severe bilateral nasal obstruction, middle vault collapse, underdeveloped skin and soft tissue envelope, poor nasal airflow and minimal palpable septal cartilage. All 3 patients had undergone septoplasty years prior by the same surgeon (mean age at prior surgery: 11 years (range 9-12 years)). All were subsequently treated with bilateral spreader grafting and dorsal augmentation performed through an open approach using either autologous auricular cartilage or costal cartilage. Postoperatively, all 3 patients reported improvement in obstructive symptoms and satisfactory correction of their deformity. **Conclusions:** Pediatric septoplasty should be conservative, with the goal of achieving adequate airflow with removal of as little cartilage as possible. Although conservative septoplasty surgery may not achieve maximal correction of all deviated segments, saddle nose deformity and severe nasal valve obstruction may result following aggressive cartilage resection in children.



## I 109. CO2 Laser for Oropharyngeal Lymphangioma

Brian C. Deutsch, BS, New York, NY; Annika M. Meyer, MD, New York, NY;  
Michael R. Shohet, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to evaluate, diagnose, and decide on the best method to treat oral cavity and oropharyngeal lymphangioma.

**Objectives:** To report a rare case of oropharyngeal lymphangioma in a pediatric patient and discuss methods of diagnosis and treatment. Lymphangiomas may be surgically resected or treated with sclerotherapy, however this may not be feasible in the oral cavity or oropharynx for anatomic reasons. We suggest CO2 laser as an alternative for treating lymphangioma in this area. **Study Design:** A 10 year old male presented with a lymphangioma tracking from the posterior soft palate down the lateral pharyngeal wall into the vallecula and left pyriform sinus. The lesion was treated with CO2 laser ablation. **Methods:** Each treatment consisted of several passes of a CO2 laser at 5 watts and 100 millijoules with removal of debris between passes and assessment of the remaining tissue to prevent palatal fistula. **Results:** The lymphangioma was partially ablated due to anatomic constraints and recurred in the hard and soft palate after 9 years, after which the patient was treated with a second ablation with complete resolution of symptoms. **Conclusions:** CO2 laser is an excellent option for controlling superficial, spreading lymphangiomas of the oral cavity and the oropharynx that are otherwise not amenable to surgical excision or sclerotherapy.

## I 110. Hair Follicle Nevus--The Great Masquerader

Julia L. Cowenhoven, BA, Burlington, VT; Sharon X. Li, MD, Burlington, VT;  
Donna Jean Millay, MD, Burlington, VT

**Educational Objective:** At the conclusion of this presentation, the participants should be able to know the characteristic of and recognize a hair follicle nevus, and know how it can be distinguished from other very similar lesions.

**Objectives:** NA. **Study Design:** NA. **Methods:** NA. **Results:** NA. **Conclusions:** Hair follicle nevus, also known as congenital vellus hamartoma, is an extremely rare benign tumor that usually presents as a flesh colored papule or nodule in the head and neck region in the pediatric population. It can be easily confused with an accessory tragus or trichoeplithelioma, both of which also commonly occur in the same region of the body with similar clinical appearance. Histological evaluation reveals numerous mature vellus hair follicles, occasionally accompanied by sebaceous glands and pilar muscles. It can be distinguished from an accessory tragus by the absence of cartilage and abundant subcutaneous fat and from a trichofolliculoma by the absence of a central cyst. We present a 5 year old girl with a small persistent midline mass which was initially diagnosed as a nasal dermoid. However, excisional biopsy of the lesion was consistent with a hair follicle nevus. Knowledge of this rare entity is important in formulating a thorough differential diagnosis of lesions of the head and neck.

## I 111. Safety of Preoperative Oral Ibuprofen in Adenoidectomy and Tonsillectomy

Alexander Michael, BS, Philadelphia, PA; Glenn C. Isaacson, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the bleeding risk during adenoidectomy and tonsillectomy in children who received preoperative oral ibuprofen compared to those that did not receive preoperative oral ibuprofen.

**Objectives:** The use of preoperative ibuprofen administration in pediatric adenoidectomy and tonsillectomy is not well studied. Debate exists regarding the risk of postoperative bleeding associated with ibuprofen use. We aim to assess the safety of using ibuprofen as a preoperative, opioid sparing analgesic. **Study Design:** Patients that underwent adenoidectomy and/or tonsillectomy from June 2014 to December 2015 did not receive preoperative ibuprofen. Those that underwent adenoidectomy/tonsillectomy from January 2016 to May 2017 were administered oral ibuprofen 7mg/kg preoperatively. Inclusion criteria were that patients underwent adenoidectomy, tonsillectomy, or adenotonsillectomy and 18 years of age or younger. **Methods:** Pre and postoperative records were reviewed retrospectively, with intraoperative bleeding greater than 50 ml or postoperative bleeding requiring surgical control being the primary outcome parameters. **Results:** 334 children met inclusion criteria. 142 patients did not receive preoperative ibuprofen, 192 patients received preoperative ibuprofen. Mean age was 7.03 years old (range: 1-18) in the control/non-ibuprofen cohort and 6.69 years old (range: 1-18) in the ibuprofen cohort. In the non-ibuprofen cohort 98 patients underwent adenoidectomy, 16 underwent tonsillectomy, and 28 underwent adenotonsillectomy. In the ibuprofen cohort, these figures were 117 adenoidectomies,

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23 tonsillectomies, and 52 adenotonsillectomies. In the non- ibuprofen cohort, 0 patients experienced bleeding events. In the ibuprofen cohort, 0 patients experienced bleeding events. **Conclusions:** Patients treated with preoperative ibuprofen did not experience higher rates of bleeding after adenoidectomy and tonsillectomy compared to those that did not receive ibuprofen. Ibuprofen can be used preoperatively as an opioid sparing analgesic in children to help control pain following adenoidectomy and tonsillectomy.

## I 112. Evaluation of Bevacizumab (Avastin®) Use for Treating Recurrent Respiratory Papillomatosis (RRP) in Children

Kasey W. Rawlins, BS, Columbus, OH; Charles A. Elmaraghy, MD, Columbus, OH;  
Vinita B. Pai, PharmD, Columbus, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the role bevacizumab in pediatric recurrent respiratory papillomatosis.

**Objectives:** Determine efficacy of use of bevacizumab as adjuvant therapy for pediatric recurrent respiratory papillomatosis. **Study Design:** Retrospective chart review. **Methods:** Efficacy was assessed by comparing number of procedures needed, interval in days between surgical procedures and average Derkey scoring before and after the use of bevacizumab. Safety was assessed by evaluating for adverse effects. **Results:** Six patients had a total of 95 surgeries and 25 bevacizumab (2.5 mg/mL) injections (0.5 mg to 5 mg per injection). Side effects such as tachycardia, hypertension, and oxygen requirement were noted during 7/25 injections. These were transient, resolved without intervention and did not delay discharge. On average, interval between procedures increased by 47 days ( $P=0.31$ ) after bevacizumab use. Derkey score decreased by an average of 6 ( $P=.056$ ). Although there was no noticeable difference between average number of procedures per year between the two groups (4 each), 3/6 patients are papilloma free at followup (427, 537, and 796 days since last surgery). **Conclusions:** Use of bevacizumab as an adjunct to surgery is safe and efficacious in treating RRP in children.

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*1963 . . . . .	Howard P. House, MD	*1996 . . . . .	William R. Hudson, MD
*1964 . . . . .	John E. Bordley, MD	1997 . . . . .	H. Bryan Neel, MD
*1965 . . . . .	George E. Shambaugh, Jr., MD	1998 . . . . .	Stanley M. Blaugrund, MD
*1966 . . . . .	Francis W. Davison, MD	*1999 . . . . .	Mansfield F. W. Smith, MD
*1967 . . . . .	Shirley H. Baron, MD	2000 . . . . .	Charles W. Gross, MD
*1968 . . . . .	G. Slaughter Fitz-Hugh, MD	2001 . . . . .	Edward L. Applebaum, MD
*1969 . . . . .	Jerome A. Hilger, MD	2002 . . . . .	Gerald B. Healy, MD
*1970 . . . . .	Joseph L. Goldman, MD	2003 . . . . .	Roger L. Crumley, MD
*1971 . . . . .	Victor Goodhill, MD	*2004 . . . . .	Robert A. Jahrsdoerfer, MD
*1972 . . . . .	Victor R. Alfaro, MD	*2005 . . . . .	Patrick E. Brookhouser, MD
*1973 . . . . .	Walter P. Work, MD	2006 . . . . .	Stanley M. Shapshay, MD
*1974 . . . . .	Raymond E. Jordan, MD	2007 . . . . .	David F. Wilson, MD
*1974 . . . . .	Louis E. Silcox, MD	2008 . . . . .	Harold C. Pillsbury, MD
*1975 . . . . .	David D. DeWeese, MD	2009 . . . . .	Myles L. Pensak, MD
*1976 . . . . .	James A. Harrill, MD	2010 . . . . .	Frank E. Lucente, MD
*1977 . . . . .	Joseph H. Ogura, MD	2011 . . . . .	Gerald S. Berke, MD
*1978 . . . . .	Daniel Miller, MD	2012 . . . . .	Robert H. Ossoff, DMD MD
*1979 . . . . .	Francis A. Sooy, MD	2013 . . . . .	Jesus E. Medina, MD
*1980 . . . . .	Beverly W. Armstrong, MD	2014 . . . . .	Jonas T. Johnson, MD FACS
*1981 . . . . .	G. O'Neill Proud, MD	2015 . . . . .	Derald E. Brackmann, MD
*1982 . . . . .	John A. Kirchner, MD	*2016 . . . . .	Fred D. Owens, MD
*1983 . . . . .	Robin Michelson, MD	2017 . . . . .	Charles W. Beatty, MD FACS
*1984 . . . . .	Carl N. Patterson, MD	2018 . . . . .	Mark S. Persky, MD FACS
*1985 . . . . .	William H. Saunders, MD		
*1986 . . . . .	Wesley H. Bradley, MD		

\* deceased

## Guests of Honor

1947 . . . . .	J. McKenzie Brown, MD	1973 . . . . .	Dean Lierle, MD
1948 . . . . .	Harold Walker, MD	1974 . . . . .	Raymond Jordon, MD
1949 . . . . .	Claude C. Cody, Jr., MD	1975 . . . . .	Frank Lathrop, MD
1950 . . . . .	Harris P. Mosher, MD	1976 . . . . .	John Bordley, MD
1951 . . . . .	Duncan McPherson, MD	1977 . . . . .	Max Soni, MD
1952 . . . . .	D.C. Jarvis, MD		W.E.N. Harrison, MD
1953 . . . . .	Charles A. Thigpan, MD	1978 . . . . .	Moses Lurie, MD
1954 . . . . .	J. Parsons Schaeffer, MD	1979 . . . . .	Shirley Baron, MD
1955 . . . . .	Edward P. Fowler, MD	1980 . . . . .	Frank Lathrop, MD
1956 . . . . .	Harold L. Lillie, MD		Harry Rosen-Wasser, MD
1957 . . . . .	Not Available	1981 . . . . .	Ben Senturia, MD
1958 . . . . .	Arnold S. Diehl, MD	1982 . . . . .	Harold Schuknecht, MD
1959 . . . . .	Frederick T. Hill, MD		Ugo Fisch, MD
1960 . . . . .	Terence Cawthorne, MD	1983 . . . . .	Walter Work, MD
1961 . . . . .	Milton J. Robb, MD		Roy B. Cohn, MD
1962 . . . . .	Thomas C. Galloway, MD	1984 . . . . .	Beverly Armstong, MD
1963 . . . . .	Robert C. Martin, MD	1985 . . . . .	G.O. Proud, MD
1964 . . . . .	C. Stewart Nash, MD	1986 . . . . .	Daniel Miller, MD
1965 . . . . .	Georges Portmann, MD	1987 . . . . .	Paul Ebert, MD
1966 . . . . .	Gordon D. Hoople, MD	1988 . . . . .	Robert W. Brown, MD
1967 . . . . .	Albery C. Furstenberg, MD	1989 . . . . .	Hallowell Davis, MD
1968 . . . . .	Francis E. LeJeune, MD	1990 . . . . .	George Reed, MD
1969 . . . . .	Lawrence R. Boies, MD	1991 . . . . .	Victor Goodhill, MD
1970 . . . . .	Victor Alfaro, MD	1992 . . . . .	Roger Boles, MD
1971 . . . . .	Vern O. Knudsen, PhD	1993 . . . . .	C. Ryan Chandler, MD
1972 . . . . .	Carlos Munoz-MacCormick, MD	1994 . . . . .	John Conley, MD

## Guests of Honor (cont'd)

1995	Paul H. Ward, MD	2007	William F. House, MD
1996	Bobby Ray Alford, MD	2008	Patrick E. Brookhouser, MD
1997	Robert Cantrell, MD	2009	Harry R. van Loveren, MD
1998	Patrick J. Doyle, MD	2010	Gady Har-El, MD
1999	Richard L. Goode, MD	2011	Harold C. Pillsbury, MD
2000	A. Paul Keller, MD	2012	Paul A. Levine, MD
2001	Charles W. Cummings, MD	2013	Robert H. Mathog, MD
2002	Stanley M. Shapshay, MD	2014	Michael M.E. Johns, MD
2003	Brian F. McCabe, MD	2015	Gerald S. Berke, MD FACS
2004	Byron J. Bailey, MD	2016	William H. Owens
2005	Robert H. Miller, MD MBA	2017	H. Bryan Neel, III, MD PhD FACS
2006	Gerald B. Healy, MD	2018	Dana M. Thompson, MD FACS

## Joseph H. Ogura, MD Lecturers

1986	Hugh F. Biller, MD	2003	Arnold G. D. Maran, MD
1987	Paul H. Ward, MD	2004	Ernest A. Weymuller, Jr., MD
1988	John Conley, MD	2005	Gerald B. Healy, MD
1989	George A. Sisson, MD	2006	Jonas T. Johnson, MD
1990	Sir Donald F.N. Harrison	2007	Byron J. Bailey, MD
1991	Robert W. Cantrell, MD	2008	Paul A. Levine, MD
1992	Michael E. Johns, MD	2009	Robin T. Cotton, MD
1993	John A. Kirchner, MD	2010	Marvin P. Fried, MD
1994	John Lewis, MD	2011	Lord Bernard Ribeiro Kt CBE FRCS FACS (Hon.)
1995	Eugene Myers, MD	2012	James L. Netteville, MD
1996	Charles W. Cummings, MD	2013	Randal S. Weber, MD
1997	Harold C. Pillsbury III, MD	2014	David E. Eibling, MD FACS
1998	Frank E. Lucente, MD	2015	Uttam K. Sinha, MD FACS
1999	Haskins Kashima, MD	2016	Jonas T. Johnson, MD FACS
2000	Christopher Perry, MD	2017	Eric J. Moore, MD FACS
2001	Richard R. Gacek, MD	2018	Dana M. Thompson, MD FACS
2002	David G. Nathan, MD		

## Fifty Year Club

<b>1949</b>	Ernest R.V. Anderson, MD . . . . . Camarillo, CA	<b>1959</b>	Seymour J. Brockman, MD . . . . . Pacific Palisades, CA
	Julio Quevedo, MD . . . . . Guatemala City		Peter A. Wallenborn Jr., MD . . . . . Huntsville, AL
			Warren E. Wiesinger, MD . . . . . Oakland, CA
<b>1950</b>	Arthur L. Juers, MD . . . . . Ivins, UT	<b>1960</b>	John T. Bickmore, MD . . . . . Bonita Springs, FL
<b>1951</b>	Howard C. High, Jr., MD . . . . . Milwaukee, WI		James M. Cole, MD . . . . . Danville, PA
			James M. Timmons, MD . . . . . Lexington, SC
<b>1953</b>	Bert A. De Bord, Jr., MD . . . . . Temple, TX	<b>1961</b>	Richard T. Fariior, MD FACS . . . . . Tampa, FL
<b>1955</b>	G. Dekle Taylor, MD . . . . . Jacksonville, FL		Irwin Harris, MD FACS . . . . . Los Angeles, CA
			Fred H. Linthicum Jr., MD . . . . . Los Angeles, CA
<b>1956</b>	J.H. Thomas Rambo, MD . . . . . New York, NY		Ludwig A. Michael, MD FACS . . . . . Dallas, TX
			William F. Robbett, MD . . . . . Manhasset, NY
<b>1957</b>	William Skokan, MD . . . . . Fort Worth, TX	<b>1962</b>	Irving M. Blatt, MD FACS . . . . . Schriever, LA
			M. Stuart Strong, MD . . . . . Bedford, MA
<b>1958</b>	Hershel H. Burston, MD . . . . . Studio City, CA		John H. Webb Jr., MD . . . . . Orlando, FL
	James F. Gardner, MD . . . . . Pittsford, NY		

## Fifty Year Club (cont'd)

### 1963

H.A. Ted Bailey, Jr., MD . . . . . Little Rock, AR  
 Arthur J. Gorney, MD . . . . . Sarasota, FL  
 William C. Livingood, MD . . . . . Orlando, FL  
 George T. Nager, MD . . . . . Baltimore, MD  
 Michael M. Paparella, MD . . . . . Minneapolis, MN

### 1964

Ned I. Chalut, MD FACS . . . . . Grosse Pointe, MI  
 Daniel J. Fahey, MD FACS . . . . . Williamsville, NY  
 Sidney S. Feuerstein, MD FACS . . . . . Palm Beach, FL  
 Merrill Goodman, MD FACS . . . . . Port Washington, NY  
 John C. Lillie, MD . . . . . Rochester, MN

### 1965

Sidney N. Busis, MD FACS . . . . . Pittsburgh, PA  
 George D. Lyons Jr., MD . . . . . New Orleans, LA  
 Francis L. McNelis, MD FACS . . . . . Warren, RI  
 Richard C. Parsons, MD . . . . . Hartwell, GA

### 1966

William J. Follette, MD FACS . . . . . North Palm Beach, FL  
 Arthur J. Kuhn, MD . . . . . Naples, FL  
 Harry W. McCurdy, MD FACS . . . . . Bethesda, MD

### 1967

William P. Beatrous, MD . . . . . New Orleans, LA  
 Gordon R. Freeman, MD FACS . . . . . Dyersburg, TN  
 George T. Singleton, MD . . . . . Gainesville, FL  
 Ted N. Steffen, MD . . . . . Louisville, KY  
 White M. Wallenborn, MD . . . . . Charlottesville, VA  
 Harold H. Wanamaker, MD . . . . . Syracuse, NY

### 1968

Leslie Bernstein, MD . . . . . El Macero, CA  
 Arndt J. Duvall, III, MD . . . . . White Bear Lake, MN  
 Edward L. Hendershot, MD . . . . . Lodi, OH  
 I. Sidney Jaffee, MD FACS . . . . . Gainesville, FL  
 Robert J. Richardson, MD FACS . . . . . Minneapolis, MN  
 John J. Shea Jr., MD . . . . . Memphis, TN  
 Roger A. Simpson, MD . . . . . Iowa City, IA  
 Howard W. Smith, MD DMD FACS . . . . . New York, NY  
 James Byron Snow Jr., MD FACS . . . . . West Grove, PA

Please report discrepancies to the Triological Administrative Office ([beth@triological.org](mailto:beth@triological.org))

## In Memoriam

The following deaths have been reported to the Administrative Office since the publication of the 2017 Annual Program.

	<b>Elected</b>	<b>Died</b>
Bobby R. Alford, MD . . . . . Houston, TX . . . . .	1968 . . . . .	2018
F. Owen Black, MD . . . . . Portland, OR . . . . .	1982 . . . . .	2012
Richard A. Buckingham, MD . . . . . Wilmette, IL . . . . .	1961 . . . . .	2015
James A. Donaldson, MD . . . . . Redmond, WA . . . . .	1968 . . . . .	2016
John M. Fredrickson, MD . . . . . Vancouver, BC . . . . .	1984 . . . . .	2017
John H. Gladney, MD . . . . . St. Louis, MO . . . . .	1975 . . . . .	2011
John R. Jacobs, MD FACS . . . . . Bloomfield Hills, MI . . . . .	1988 . . . . .	2017
Michael E. Glasscock III, MD FACS . . . . . Asheville, NC . . . . .	1972 . . . . .	2018
James H. Kelly, MD FACS . . . . . Baltimore, MD . . . . .	1992 . . . . .	2018
Wilfred Leach, MD . . . . . St. Louis, MO . . . . .	1974 . . . . .	2000
Robert H. Lofgren, MD FACS . . . . . Hingham, MA . . . . .	1970 . . . . .	2017
Harry R. Morse, MD . . . . . Lebanon, NH . . . . .	1962 . . . . .	2016
J. Gail Neely, MD FACS . . . . . St. Louis, MO . . . . .	1981 . . . . .	2017
Shokri Radpour, MD FACS . . . . . Indianapolis, IN . . . . .	1976 . . . . .	2017
William H. Saunders, MD . . . . . Columbus, OH . . . . .	1961 . . . . .	2018
Irwin F. Stewart, MD . . . . . New Westminster, BC . . . . .	1984 . . . . .	2017
George J. Viscomi, MD . . . . . Northville, MI . . . . .	1976 . . . . .	2017

# Member Directory

## Active Fellows

Mona M. Abaza, MD  
Elliot Abemayor, MD PhD FACS  
Oliver F. Adunka, MD  
Yuri Agrawal, MD  
Syed F. Ahsan, MD FACS  
Lee Michael Akst, MD  
Kathey Alexander  
Kenneth W. Altman, MD PhD FACS  
Ronald G. Amedee, MD FACS  
Vijay K. Anand, MD FACS  
Vinod K. Anand, MD FACS  
Brian Thomas Andrews, MD MA  
Simon I. Angeli, MD  
Jack B. Anon, MD FACS  
Justin L. Antisdell, MD FACS  
Patrick J. Antonelli, MD FACS  
William B. Armstrong, MD FACS  
Moises A. Arriaga, MD FACS  
Jonathan E. Aviv, MD FACS  
Seilesh Chodavarapu Babu, MD  
Douglas D. Backous, MD FACS  
Manohar Bance, MD  
Stephen F. Bansberg, MD  
Soly Baredes, MD FACS  
Jose E. Barrera, MD FACS  
David M. Barrs, MD FACS  
Loren J. Bartels, MD FACS  
Devraj Basu, MD PhD FACS  
Pete S. Batra, MD FACS  
Carol A. Bauer, MD FACS  
Charles W. Beatty, MD FACS  
Peter C. Belafsky, MD PhD MPH  
James E. Benecke Jr., MD FACS  
Michael S. Benninger, MD FACS  
John P. Bent III, MD  
Leonard P. Berenholz, MD  
Gerald S. Berke, MD FACS  
Wayne E. Berryhill, MD  
Neil Bhattacharyya, MD FACS  
Nasir I. Bhatti, MD FACS  
Michael J. Biavati, MD FACS  
Merrill A. Biel, MD FACS  
Steven A. Bielamowicz, MD FACS  
Gail Binderup  
Brian W. Blakley, MD PhD FACS  
Joel H. Blumin, MD FACS  
Kofi Derek Boahene, MD FACS  
Jonathan M. Bock, MD  
Emily Frances Boss, MD  
Carol R. Bradford, MD FACS  
Joseph A. Brennan, MD FACS  
Dale H. Brown, MD  
Jimmy J. Brown, MD FACS  
J. Dale Browne, MD FACS  
Craig Alan Buchman, MD FACS  
Robert Arthur Buckmire, MD  
Jeffrey M. Bumpous, MD FACS  
Lawrence P. A. Burgess, MD FACS  
James A. Burns, MD FACS  
Nicolas Y. Bu-Saba, MD FACS  
Matthew L. Bush, MD FACS  
Patrick Joseph Byrne, MD FACS  
Karen H. Calhoun, MD FACS

Bruce H. Campbell, MD FACS  
Paolo Campisi, MD  
C. Ron Cannon, MD FACS  
Ricardo L. Carrau, MD FACS  
Thomas Leigh Carroll, MD  
Roy R. Casiano, MD FACS  
John D. Casler, MD FACS  
Paul F. Castellanos, MD  
Kenny H. Chan, MD FACS  
Sujana S. Chandrasekhar, MD FACS  
Kay W. Chang, MD  
Amy Y. Chen, MD FACS  
Douglas A. Chen, MD FACS  
Eunice Yuzu Chen, MD PhD  
Joseph M. Chen, MD  
Steven W. Cheung, MD FACS  
Dinesh K. Chhetri, MD  
Wade Wei-De Chien, MD  
Alexander Guang-Yu Chiu, MD  
Sukgi S. Choi, MD FACS  
Daniel I. Choo, MD FACS  
Francisco J. Civantos, MD FACS  
Keith F. Clark, MD PhD FACS  
Daniel Henriques Coelho, MD FACS  
Shelagh Ann Cofer, MD  
Noam Aryeh Cohen, MD PhD  
Seth M. Cohen, MD  
Stephen F. Conley, MD FACS  
Steven P. Cook, MD FACS  
Susan Rachelle Cordes, MD FACS  
Peter D. Costantino, MD FACS  
Mark S. Courey, MD  
Benjamin T. Crane, MD PhD FACS  
Roberto A. Cueva, MD FACS  
Michael J. Cunningham, MD FACS  
Seth H. Dailey, MD  
Edward J. Damrose, MD FACS  
Sam Joseph Daniel, MD MSC  
Subinoy Das, MD FACS  
Louise Davies, MD MS  
John M. DelGaudio, MD FACS  
M. Jennifer Derebery, MD FACS  
Daniel G. Deschler, MD FACS  
Ellen S. Deutsch, MD  
Anand Devaiah, MD FACS  
Laurence J. DiNardo, MD FACS  
Elizabeth A. Dinces, MD  
Hamid R. Djalilian, MD  
H. Peter Doble II, MD FACS  
Joni Kristin Doherty, MD PhD FACS  
Donald T. Donovan, MD FACS  
John L. Dornhoffer, MD FACS  
Amelia F. Drake, MD FACS  
Colin L.W. Driscoll, MD  
Sigsbee Walter Duck, MD FACS  
Larry G. Duckert, MD PhD FACS  
Robert K. Dyer Jr., MD  
Roland D. Eavey, MD FACS  
Thomas L. Eby, MD FACS  
David R. Edelstein, MD FACS  
Charles V. Edmond Jr., MD FACS  
David E. Eibling, MD FACS  
David W. Eisele, MD FACS  
Ravindhra G. Elluru, MD PhD FACS  
Karen J. Enright, MD PhD

Joel A. Ernster, MD FACS  
Adrien Eshraghi, MD  
Carole Fakhry, MD MPH  
Joseph B. Farrior III  
Jose N. Fayad, MD  
Joseph G. Feghali, MD FACS  
Robert L. Ferris, MD PhD FACS  
Bruce L. Fetterman, MD FACS  
Cynthia B. Fisher, MD  
Valerie A. Flanary, MD FACS  
Paul W. Flint, MD  
L. Arick Forrest, MD  
David Oliver Francis, MD MS  
Howard W. Francis, MD  
Ramon A. Franco Jr., MD  
David R. Friedland, MD PhD  
Ellen M. Friedman, MD FACS  
Michael Friedman, MD FACS  
Rick A. Friedman, MD PhD  
Michael H. Fritsch, MD FACS  
Kevin Fung, MD FRCS(C) FACS  
Arun K. Gadre, MD MS FACS  
Thomas J. Gal, MD FACS  
Bruce J. Gantz, MD FACS  
Glendon M. Gardner, MD  
C. Gaelyn Garrett, MD MMHC  
Eric M. Genden, MD FACS  
Tamer Ghanem, MD PhD FACS  
Soha Nadim Ghossaini, MD FACS  
Gerard J. Gianoli, MD FACS  
Paul W. Gidley, MD FACS  
William Giles, MD  
M. Boyd Gillespie, MD MSc FACS  
Douglas A. Girod, MD FACS  
Lyon L. Gleich, MD FACS  
George Goding Jr., MD FACS  
Joel A. Goebel, MD  
Andrew N. Goldberg, MD MSCE FACS  
David Goldenberg, MD FACS  
Julie L. Goldman, MD BS FACS  
Nira A. Goldstein, MD  
Carlos Gonzalez, MD FACS  
Steven Lawrence Goudy, MD FACS  
Christine G. Gourin, MD FACS  
Jennifer Rubin Grandis, MD FACS  
Stacey Tutt Gray, MD FACS  
J. Douglas Green Jr., MD FACS  
John Herman Greinwald Jr., MD  
Gregory A. Grillone, MD FACS  
Samuel Paul Gubbels, MD  
Thomas J. Haberkamp, MD FACS  
Joseph Haddad Jr., MD FACS  
Theresa A. Hadlock, MD  
Stacey L. Halum, MD  
Joseph K. Han, MD  
Matthew M. Hanasono, MD FACS  
Marlan R. Hansen, MD  
Gady Har-El, MD FACS  
Willard C. Harrill, MD FACS  
Christopher J. Hartnick, MD FACS  
George T. Hashisaki, MD FACS  
Bruce H. Haughey, MBChB FACS  
David S. Haynes, MD  
Gerald B. Healy, MD FACS  
Yolanda D. Heman-Ackah, MD FACS



Active Fellows (cont'd)

- Robert A. Hendrix, MD FACS  
 Douglas G. Hetzler, MD FACS  
 Wesley Hicks Jr., MD FACS  
 Kevin M. Higgins, MD  
 Allen D. Hillel, MD FACS  
 Michael L. Hinni, MD FACS  
 Keiko Hirose, MD  
 Michael Hoa, MD  
 Michael E. Hoffer, MD FACS  
 Henry T. Hoffman, MD FACS  
 Norman D. Hogikyan, MD FACS  
 Eric H. Holbrook, MD  
 David B. Hom, MD FACS  
 Paul Hong, MD FRCSC  
 Karl L. Horn, MD  
 Steven M. Houser, MD FACS  
 Amanda Chia-Ming Hu, MD FRCSC  
 Charles Anthony Hughes, MD FACS  
 Gordon B. Hughes, MD FACS  
 Timothy E. Hullar, MD FACS  
 Peter H. Hwang, MD FACS  
 Glenn C. Isaacson, MD FACS  
 Lisa E. Ishii, MD MHS  
 Stacey L. Ishman, MD MPH  
 Robert K. Jackler, MD FACS  
 Carol A. Jackson, MD  
 Abraham Jacob, MD  
 Ian Neal Jacobs, MD FACS  
 Scharukh Jalisi, MD FACS  
 Adrian L. James, MD  
 Herman A. Jenkins, MD FACS  
 Michael M. Johns III, MD  
 Jonas T. Johnson, MD FACS  
 Romaine Fitzgerald Johnson, MD MPH  
 Lamont Randall-Desean Jones, MD  
 Raleigh Olson Jones, MD MBA FACS  
 Gary D. Josephson, MD FACS  
 Ashutosh Kacker, MD FACS  
 Jan L. Kasperbauer, MD FACS  
 David M. Kaylie, MD FACS  
 Robert M. Kellman, MD FACS  
 Katherine Ann Kendall, MD FACS  
 Margaret A. Kenna, MD FACS  
 David W. Kennedy, MD FACS  
 Robert C. Kern, MD FACS  
 Joseph E. Kerschner, MD FACS  
 Bradley W. Kesser, MD  
 Eric J. Kezirian, MD  
 Samir Suresh Khariwala, MD  
 Sid Khosla, MD  
 Harold H. Kim, MD  
 Hung Jeffrey Kim, MD  
 Jean Kim, MD PhD FACS  
 Barry P. Kimberley, MD  
 Charles P. Kimmelman, MD MBA FACS  
 Todd T. Kingdom, MD FACS  
 Adam Matthew Klein, MD FACS  
 Glenn Knox, MD FACS  
 Wayne M. Koch, MD FACS  
 Darius Kohan, MD  
 Richard D. Kopke, MD FACS  
 Alan D. Kornblut, MD FACS  
 Karen M. Kost, MD  
 Jamie Koufman, MD FACS  
 Stilianos E. Kountakis, MD PhD FACS  
 Dennis H. Kraus, MD FACS  
 Greg A. Krempf, MD FACS  
 Yosef P. Krespi, MD FACS  
 John H. Krouse, MD PhD FACS  
 Ronald B. Koppersmith, MD FACS  
 David I. Kutler, MD FACS  
 John F. Kveton, MD FACS  
 Robert F. Labadie, MD PhD  
 Anil K. Lalwani, MD FACS  
 Paul R. Lambert, MD FACS  
 Andrew P. Lane, MD  
 Miriam Lango, MD FACS  
 Pierre Lavertu, MD FACS  
 Joseph L. Leach, MD FACS  
 Richard A. Lebowitz, MD FACS  
 Kenneth H. Lee, MD PhD  
 Scott Lungchi Lee, MD BA FACS  
 John P. Leonetti, MD  
 Mark J. Levenson, MD FACS  
 Roger J. Levin, MD FACS  
 Samuel C. Levine, MD  
 Kasey K. Li, MD FACS  
 Judith E.C. Lieu, MD MSPH  
 Ho-Sheng Lin, MD FACS  
 Sandra Y. Lin, MD  
 Vincent Yu-Wen Lin, MD  
 Robin Williams Lindsay, MD BA  
 William H. Lindsey, MD FACS  
 Philip D. Littlefield, MD  
 Todd A. Loehrl, MD  
 Thomas B. Logan, MD FACS  
 Jennifer Lynn Long, MD PhD  
 Larry B. Lundy, MD  
 Lawrence R. Lustig, MD FACS  
 Daniel D. Lydiatt, MD FACS  
 Corey S. Maas, MD FACS  
 Carol J. MacArthur, MD FACS  
 John D. Macias, MD FACS  
 John Maddalozzo, MD FACS  
 J. Scott Magnuson, MD  
 Benjamin Daniel Malkin, MD FACS  
 Aditi H. Mandpe, MD FACS  
 Scott C. Manning, MD FACS  
 Steven C. Marks, MD FACS  
 Sam J. Marzo, MD FACS  
 Bruce H. Matt, MD FACS  
 Douglas E. Mattox, MD  
 Ted Mau, MD PhD  
 Jennifer L. Maw, MD  
 John S. May, MD FACS  
 Judith C. McCaffrey, MD FACS  
 Thomas V. McCaffrey, MD PhD FACS  
 Timothy Michael McCulloch, MD FACS  
 John T. McElveen Jr., MD  
 Michael McGee, MD  
 Brian J. McKinnon, MD MBA MPH FACS  
 Cliff A. Megerian, MD FACS  
 Albert L. Merati, MD FACS  
 Anna Hopeman Messner, MD  
 Ralph B. Metson, MD FACS  
 Tanya Kim Meyer, MD  
 Alan G. Micco, MD FACS  
 Brett A. Miles, MD DDS FACS  
 Mia E. Miller, MD  
 Robert H. Miller, MD MBA FACS  
 Lloyd B. Minor, MD FACS  
 Natasha Mirza, MD FACS  
 Ron B. Mitchell, MD  
 Vikash K. Modi, MD BS  
 Kris S. Moe, MD FACS  
 Eric J. Moore, MD FACS  
 Gary F. Moore, MD FACS  
 William H. Moretz Jr., MD  
 J. Paul Moxham, MD  
 Terrence P. Murphy, MD FACS  
 Andrew H. Murr, MD FACS  
 George L. Murrell, MD  
 Charles M. Myer III, MD FACS  
 Jeffrey N. Myers, MD FACS  
 David Myssiorek, MD FACS  
 Vishad Nabili, MD FACS  
 Cherie-Ann Nathan, MD FACS  
 H. Bryan Neel III, MD PhD FACS  
 Brian A. Neff, MD  
 Erik G. Nelson, MD FACS  
 James L. Netterville, MD FACS  
 Shawn D. Newlands, MD PhD MBA FACS  
 Quyen T. Nguyen, MD PhD  
 Jacob Pieter Noordzij, MD  
 Peggyann Nowak, MD  
 Brian Nussenbaum, MD FACS  
 John S. Oghalai, MD FACS  
 Kerry D. Olsen, MD FACS  
 Bert W. O'Malley Jr., MD FACS  
 Julina Ongkasuwan, MD  
 Robert C. O'Reilly, MD FACS  
 Richard R. Orlandi, MD FACS  
 Laura J. Orvidas, MD FACS  
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