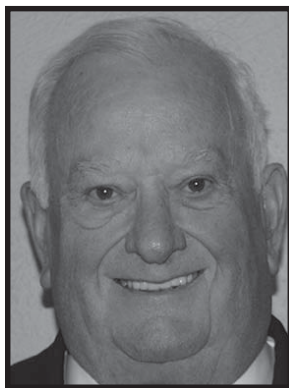


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## Message from the President, Fred D. Owens, MD

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Welcome to our 119th Annual Meeting at COSM. It has been a pleasure to serve the membership as President this year and I am very proud of the outstanding program that has been assembled by our Program Chair, Harold Pillsbury, MD, and our Program Committee. Some of the highlights include Dr. Jonas Johnson's Ogura Lecture "The Changing Fabric of Health Care". Our Friday panels include "The Value Equation: Navigating the Affordable Care Act, CMS, and Payment Reform to Optimize Otolaryngology Care", "Hearing Loss in Elderly Patients: Case Presentations". Panels on Saturday include "High Risk HPV Associated Oropharyngeal Cancer", "Managing Patients with Maximal Sinus Complaints and Minimal Sinus Disease on CT", "Who's the Boss of Airway in Surgery - Otolaryngology or Anesthesiology?", "Contemporary Management of Adult Recurrent Respiratory Papillomatosis". This meeting will be of great value in assisting you with the care of your patients, your research endeavors, and your teaching. I look forward to renewing old friendships and meeting new colleagues. Welcome to Chicago.

## SCHEDULE HIGHLIGHTS AT A GLANCE

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### Friday - Grand E/F

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- 7:00 - 7:55 Business Meeting/New Fellow Ceremony/Reception
- 8:00 Honored Guests Introductions
- 8:25 Presidential Address
- 8:47 - 9:05 Mosher and Hannley Thesis Award Presentations

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### Friday - Concurrent Session 1 - Grand E/F - 9:05 am - 12:00 noon

---

- 9:05 - 12:00 Clinical Fundamentals Session
- 9:40 - 10:10 *Break/View Posters*
- 11:20 - 11:55 Panel - The Value Equation: Navigating the Affordable Care Act, CMS, and Payment Reform to Optimize Otolaryngology Care

---

### Friday - Concurrent Session 2 - Grand C/D - 9:05 am - 12:00 noon

---

- 9:05 - 12:00 Otology/Neurotology Session
- 9:40 - 10:10 *Break/View Posters*
- 11:20 - 11:55 Panel - Hearing Loss in Elderly Patients: Case Presentations
- 12:00 Adjourn
- 5:30 - 7:00 TRIO, ANS, AOS, ASPO Meet the Authors Poster Reception

---

### Saturday - One Session - Grand E/F - 8:00 am - 5:00 pm

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- 7:00 - 7:55 Business Meeting (TRIO Fellows only)
- 8:00 - 9:25 Head and Neck Session
- 8:00 - 8:35 Panel - High Risk HPV Associated Oropharyngeal Cancer
- 9:31 - 9:55 *Break/View Posters*

---

Saturday - One Session - Grand E/F - 8:00 am - 5:00 pm

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- 9:55 - 10:25 Ogura Lecture - The Changing Fabric of Health Care
- 10:25 - 12:00 Rhinology Session
- 10:25 - 11:00 Panel - Managing Patients with Maximal Sinus Complaints and Minimal Sinus Disease on CT
- 12:00 - 1:00 *Lunch Break*
- 1:00 - 2:55 Pediatrics, Laryngology and Sleep Session
- 1:00 - 1:30 Panel - Who's the Boss of Airway in Surgery - Otolaryngology or Anesthesiology?
- 2:53 - 3:20 *Break with Exhibitors*
- 3:20 - 5:00 General Session
- 3:20 - 3:50 Panel - Contemporary Management of Adult Recurrent Respiratory Papillomatosis
- 5:00 *Adjourn*

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# 119TH ANNUAL MEETING HYATT REGENCY CHICAGO CHICAGO, ILLINOIS MAY 20-21, 2016

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## **About the Triological Society**

The American Laryngological, Rhinological and Otological Society, Inc., aka The Triological Society, was founded in 1895 in New York, NY. In the 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 journal, The Laryngoscope. The Society promotes research into the causes of and treatments for otolaryngic diseases by attracting promising physicians to scholarly otolaryngology research and supporting their development, providing financial support for the research efforts of young scientists, and promoting the highest standards in the field of otolaryngology-head and neck surgery.

## **Mission Statement**

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

## **Goals**

- To disseminate the latest basic and evidence based clinical research findings pertaining to the diagnosis, treatment and prevention of the full spectrum of disorders of the head and neck and related structures in pursuit of improved patient care.
- To provide a forum 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 otolaryngologists-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 requirements.
- To ensure the continuation of the noble legacy of the Triological Society by mentoring young otolaryngologists to become scholars and leaders.

To facilitate the above goals, the Society sponsors educational meetings. The Society's journal, The Laryngoscope, serves as a means of disseminating the latest basic and clinical research results. The Society encourages clinical and basic research by providing research grants and awards on a competitive basis.

## **Learning Objectives**

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

1. Describe how contemporary management of adult papillomatosis has changed and be well versed in current understanding of the pathophysiology of the human papilloma virus as it relates to recurrent respiratory papillomatosis.
2. Demonstrate indications for cochlear implants in elderly individuals as well as management of patients with severe unilateral deafness who may be cochlear implant candidates; discuss cochlear implant surgery complications and management.

3. Identify and evaluate new approaches to controversial issues in otolaryngology-head and neck surgery including clinical and operative issues in the management of the patient.
4. Recognize implications of health care reform on academic and private practice otolaryngology, identify opportunities to provide care to the underserved minority and pediatric populations, and assess possible impact on cancer care and research.
5. Describe contemporary management of the patient with chronic sinusitis
6. Explain risk stratification of HPV associated oropharyngeal cancer, discuss clinical and molecular characteristics of high-risk patients, discuss indications and potential contraindications to treatment de-intensification, and the role of the trans-oral surgery in this patient population.

**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 • 402-346-5500

**CONTINUING MEDICAL EDUCATION CREDIT INFORMATION**

**Accreditation**

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of the American College of Surgeons and The 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 **10.00** AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.



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## Program Planning and Advisory Committee

---

**President**

**Fred D. Owens, MD**  
Dallas, TX

**Program Chair**

**Harold C. Pillsbury, MD FACS**  
Chapel Hill, NC

**Oliver F. Adunka, MD**

Columbus, OH

**Michael S. Benninger, MD FACS**

Cleveland, OH

**Jimmy J. Brown, MD FACS**

Augusta, GA

**Robert Arthur Buckmire, MD**

Chapel Hill, NC

**Sigsbee Walter Duck, MD FACS**

Rock Springs, WY

**C. Gaelyn Garrett, MD MMHC**

Nashville, TN

**M. Boyd Gillespie, MD MSc FACS**

Charleston, SC

**Earl Herberto Harley, MD FACS**

Washington, DC

**David B. Hom, MD FACS**

Cincinnati, OH

**Steven M. Houser, MD FACS**

Cleveland, OH

**Greg A. Kreml, MD FACS**

Oklahoma City, OK

**Sandra Y. Lin, MD**

Baltimore, MD

**Lawrence R. Lustig, MD FACS**

New York, NY

**Cliff A. Megerian, MD FACS**

Cleveland, OH

**Ralph B. Metson, MD FACS**

Boston, MA

**Hassan H. Ramadan, MD FACS**

Morgantown, WV

**Wm. Russell Ries, MD FACS**

Nashville, TN

**Kristina W. Rosbe, MD FACS**

San Francisco, CA

**William W. Shockley, MD FACS**

Chapel Hill, NC

**Mark K. Wax, MD FACS**

Portland, OR

**Mark C. Weissler, MD FACS**

Chapel Hill, NC

**Kathleen L. Yaremchuk, MD MSA**

Detroit, MI

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**DISCLOSURE INFORMATION**  
**TRILOGICAL SOCIETY 119TH ANNUAL MEETING**  
**MAY 20 - 21, 2016**  
**CHICAGO, ILLINOIS**

In accordance 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. Therefore, it is mandatory that both the program planning committee and speakers complete disclosure forms. Members of the program committee were required to disclose **all** financial relationships and speakers were required to disclose any financial relationship **as it pertains to the content of the presentations**. The ACCME defines a 'commercial interest' as "any entity producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients". It does not consider providers of clinical service directly to patients to be commercial interests. The ACCME considers "relevant" financial relationships as financial transactions (in any amount) that may create a conflict of interest and occur within the 12 months preceding the time that the individual is being asked to assume a role controlling content of the educational activity.

ACS is also required, through our joint providership partners, to manage any reported conflict and eliminate the potential for bias during the activity. All program committee members and speakers were contacted and the conflicts listed below have been managed to our satisfaction. However, if you perceive a bias during a session, please report the circumstances on the session evaluation form.

**Please note we have advised the speakers that it is their responsibility to disclose at the start of their presentation if they will be describing the use of a device, product, or drug that is not FDA approved or the off-label use of an approved device, product, or drug or unapproved usage.**

The requirement for disclosure is not intended to imply any impropriety of such relationships, but simply to identify such relationships through full disclosure and to allow the audience to form its own judgments regarding the presentation.

SPEAKERS / MODERATORS / DISCUSSANTS	NOTHING TO DISCLOSE	DISCLOSURE		
		COMPANY	ROLE	RECEIVED
Oliver F. Adunka, MD		1. Advanced Bionics Corporation; 2. Cochlear Corporation; 3. MED-EL Corporation	1. advisory board; 2. speaker; 3. speaker	1. honorarium; 2. honorarium; 3. (travel expenses)
Eric N. Appelbaum, MD	X			
Christopher H. Azbell, MD	X			
Andrew B. Baker, BS	X			
Michael S. Benninger, MD FACS	X			
Joel H. Blumin, MD FACS	X			
Lauren B. Bonzelaar, MD	X			
Jimmy J. Brown, MD FACS	X			

SPEAKERS / MODERATORS / DISCUSSANTS	NOTHING TO DISCLOSE	DISCLOSURE		
		COMPANY	ROLE	RECEIVED
Robert A. Buckmire, MD	X			
Kevin J. Choi, MD MS	X			
Kevin J. Contrera, MPH	X			
Mark S. Courey, MD	X			
Jill N. D'Souza, MD	X			
Edward J. Damrose, MD FACS		1. Fibrocell, Inc.; 2. Olympus, Inc.	1. researcher; 2. advisory board	1. grant support; 2. consulting fees
Subinoy Das, MD FACS	X			
Elise. A. Delagnes, MA BA	X			
Karuna Dewan, MD	X			
Colin L.W. Driscoll, MD		Advanced Bionics	consultant	fee
Sigsbee W. Duck, MD FACS	X			
David E. Eibling, MD FACS,	X			
Robert L. Ferris, MD PhD FACS		1. AZ/Medimmune; 2. AZ/Medimmune; 3. Bristol Myers Squibb; 4. Bristol Myers Squibb; 5. Celgene; 6. Merck	1. ad hoc consultant; 2. institution research; 3. ad hoc consultant; 4. institution research; 5. ad hoc consultant; 6. ad hoc consultant	1. nothing received; 2. grant funding; 3. nothing received; 4. grant funding; 5. nothing received; 6. nothing received
Howard W. Francis, MD	X			
John W. Frederick, MD	X			
William Z. Gao, MD	X			
Glendon M. Gardner, MD	X			
C. Gaelyn Garrett, MD MMHC	X			
Eric M. Genden, MD FACS	X			

SPEAKERS / MODERATORS / DISCUSSANTS	NOTHING TO DISCLOSE	DISCLOSURE		
		COMPANY	ROLE	RECEIVED
M. Boyd Gillespie, MD MSc FACS	X			
Christine G. Gourin, MD FACS	X			
Ariel B. Grobman, MD	X			
Yarah M. Haidar, MD	X			
Earl H. Harley, MD FACS	X			
David S. Haynes, MD		1. Advanced Bionics Corp.; 2. Cochlear Corporation; 3. Med EL; 4. Stryker	1. advisory board; 2. advisory board; 3. advisory board; 4. consultant	1. nothing received; 2. nothing received; 3. nothing received; 4. nothing received
Houmehr Hojjat, MD	X			
David B. Hom, MD FACS	X			
Paul Hong, MD FRCSC	X			
Steven M. Houser, MD FACS	X			
Phillip A. Huyett, MD	X			
Jonas T. Johnson, MD FACS	X			
Raleigh O. Jones, MD MBA FACS	X			
Matthew E. Jung, MD	X			
Judith S. Kempfle, MD	X			
Sid Khosla, MD	X			
Rijul S. Kshirsagar, BS	X			
Miriam N. Lango, MD	X			
June R.J. Lin, MD	X			
Sandra Y. Lin MD	X			
Yuan F. Liu, MD	X			



SPEAKERS / MODERATORS / DISCUSSANTS	NOTHING TO DISCLOSE	DISCLOSURE		
		COMPANY	ROLE	RECEIVED
Lawrence R. Lustig, MD FACS		1. Advanced Bionics Corp; 2. Med El Corp	1. medical advisory board member; 2. medical advisory board member	1. reimbursement for travel/participation in their annual medical advisory board meeting; 2. reimbursement for travel/participation in their annual medical advisory board meeting
Ted Mau, MD PhD	X			
Alice Z. Maxfield, MD	X			
Cliff A. Megerian, MD FACS	X			
Taha S. Meraj, BS	X			
Ralph B. Metson, MD FACS	X			
Aaron C. Moberly, MD	X			
Cherie-Ann Nathan, MD FACS	X			
Matthew R. Naunheim, MD MBA	X			
Navid Zahedi Niaki	X			
Daniel C. O'Brien, MD	X			
Adrian A. Ong, MD	X			
Allison G. Ordemann, MD	X			
Fred D. Owens, MD	X			
Robert M. Owens, MD	X			
Jeamarie Pascual-Marrero, MPh MD	X			
Erin H. Peeden, MS	X			
Kevin Albert Peng, MD	X			
Nathan E. Pierce, MD	X			

SPEAKERS / MODERATORS / DISCUSSANTS	NOTHING TO DISCLOSE	DISCLOSURE		
		COMPANY	ROLE	RECEIVED
Harold C. Pillsbury, MD FACS		Med El corporation	advisor	honorarium
Michael P. Platt, MD MS		Plural Publishing	co-editor	contract for a textbook
Hassan H. Ramadan, MD FACS	X			
Hani M. Rayess, MD	X			
Aaron K. Remenschneider, MD	X			
Camilo Reyes, MD	X			
William Russell Ries, MD FACS	X			
Zachary N. Robinett, MD	X			
Kristina W. Rosbe, MD FACS	X			
Mahmoud A. Salam, MB BCh FRCS MD	X			
Adam C. Satteson, MD	X			
Stefanie S. Saunders, MD	X			
Amy E. Schell, MD	X			
Grace M. Scott, MSc	X			
Brent A. Senior, MD FACS		1. Acclarent; 2. ENTvantage; 3. Karl Storz; 4. Olylmpus; 5. Parion; 6. Spirox; 7. Stryker	1. speaker; 2. consultant; 3. speaker; 4. consultant; 5. consultant; 6. stockholder; 7. speaker	1. speaker fees; 2. consultant fees; 3. speaker fees; 4. consultant fees; 5. consultant fees; 6. nothing received; 7. speaker fees
Ravi R. Shah, BS	X			
Sophie G. Shay, MD	X			
Brandon A. Shepherd, BSc	X			

SPEAKERS / MODERATORS / DISCUSSANTS	NOTHING TO DISCLOSE	DISCLOSURE		
		COMPANY	ROLE	RECEIVED
William W. Shockley MD FACS	X			
Aaron M. Smith, MD	X			
Alden Folsom Smith, BMus	X			
Timothy L. Smith, MD MPH FACS		Intersect ENT	consultant (ended 10/2015)	consultant fee
Resha S. Soni, MD	X			
Erich M. Sturgis, MD FACS	X			
Giovana R. Thomas, MD FACS	X			
Andrew G. Tritter, MD	X			
Eric W. Wang, MD	X			
Mark K. Wax, MD FACS	X			
Mark C. Weissler, MD FACS	X			
Matthew G. Yantis, MD	X			
Kathleen L. Yaremchuk, MD MSA	X			
Adam M. Zanation, MD		1. Acclarent; 2. Medtronic; 3. Stryker	1. consultant; 2. consultant; 3. consultant	1. consulting fee; 2. consulting fee; 3. consulting fee
Joseph Zenga, MD	X			

PLANNING COMMITTEE	NOTHING TO DISCLOSE	DISCLOSURE		
		COMPANY	ROLE	RECEIVED
Oliver F. Adunka, MD	X			
Michael S. Benninger, MD FACS		1. Arthrocare; 2. Merck	1. consultant; 2. consultant	1. honoraria; 2. honoraria
Jimmy J. Brown, MD FACS	X			
Robert Arthur Buckmire, MD	X			
Sigsbee Walter Duck, MD FACS	X			
C. Gaelyn Garrett, MD	X			
Marion Boyd Gillespie, MD MSc FACS		1. Medtronic; 2. Olympus; 3. Zelegent	1. consultant; 2. consultant, investigator; 3. advisory board	1. consulting fee; 2. consulting fee, research grant; 3. stock options
Earl Herberto Harley, MD FACS	X			

PLANNING COMMITTEE	NOTHING TO DISCLOSE	DISCLOSURE		
		COMPANY	ROLE	RECEIVED
David B. Hom, MD FACS		1. KLS grant; 2. US Dept of Defense	1. researcher; 2. educational speaker	1. wound healing research grant; 2. honoraria
Steven M. Houser, MD FACS	X			
Greg A. Krempf, MD FACS	X			
Sandra Y. Lin, MD	X			
Lawrence R. Lustig, MD FACS		1. Advanced Bionics Corp; 2. Med El Corp	1. medical advisory board; 2. surgical advisory board	1. reimbursement for meeting travel; 2. reimbursement for meeting travel
Cliff A. Megerian, MD FACS	X			
Ralph B. Metson, MD FACS	X			
Fred D. Owens, MD	X			
Harold C. Pillsbury, MD FACS	X			
Hassan H. Ramadan, MD FACS	X			
Wm. Russell Ries, MD FACS	X			
Kristina W. Rosbe, MD FACS	X			
William W. Shockley, MD FACS	X			
Mark K. Wax, MD FACS	X			
Mark C. Weissler, MD FACS	X			
Kathleen L. Yaremchuk, MD MSA	X			

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## Table of Contents

<b>Honorees</b> .....	<b>14</b>
<b>Scientific Program - Friday</b> .....	<b>27</b>
<b>Scientific Program - Saturday</b> .....	<b>39</b>
<b>Poster Program</b> .....	<b>53</b>
<b>Presidents, Guest of Honor, Ogura Lecturers, Other</b> .....	<b>110</b>
<b>Fifty Year Club</b> .....	<b>112</b>
<b>In Memoriam</b> .....	<b>113</b>

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## Member Directory

<b>Active Fellows</b> .....	<b>114</b>
<b>Emeritus Fellows</b> .....	<b>116</b>
<b>Senior Fellows</b> .....	<b>117</b>
<b>Inactive Fellows</b> .....	<b>119</b>
<b>Honorary/Associate Fellows</b> .....	<b>119</b>
<b>Candidates Preparing Theses</b> .....	<b>119</b>
<b>PostGraduate Members</b> .....	<b>120</b>
<b>Resident Members</b> .....	<b>121</b>

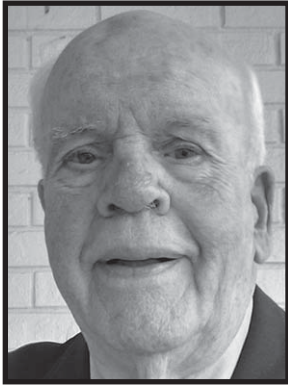
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## Honorees

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### GUEST OF HONOR

#### William H. Owens



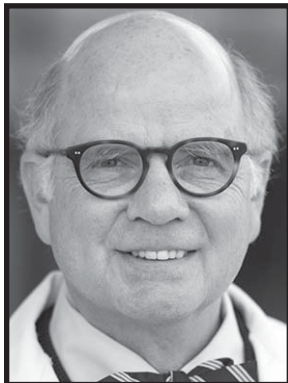
Bill Owens was born in Neon, Kentucky and lived in Hazard, Kentucky through high school. He graduated from Georgetown College (Georgetown, KY) in 1953 with a major in physics and minors in math, psychology, and history. He then served in the U.S. Army where he was assigned to the first battalion in the Army to have Nike Missiles. He began his teaching career at the U.S. Naval Academy in Annapolis, Maryland during which time he completed a Master's Degree in Physics at the Catholic University of America in Washington, D.C. Mr. Owens completed additional graduate work at the University of Louisville and the University of Kentucky. He accepted a position as Assistant Professor of Physics at Western Kentucky State College, returning to Georgetown College to teach math and physics. He served as Director of Admissions and Assistant Dean/Registrar at Centre College in Danville, Kentucky for five years, and spent the next fifteen years in the classroom as Professor of Applied Mathematics.

Heeding the call of the mountains in 1985, Bill became President of Pikeville College where he served until his retirement in 1997. During his tenure at Pikeville College, the enrollment doubled, the College became debt free and the Pikeville College School of Osteopathic Medicine was established. Honorary Degrees were conferred on him by Centre College in 1997, Pikeville College in 1997, Georgetown College in 1998 and the University of Pikeville in 2014. Bill served on the Board of Directors for several years and was President/CEO of the Presbyterian Child Welfare Agency, aka Buckhorn Children's Home from 2007 until 2011. Throughout his career, he served on several local, state and national committees and boards.

Bill and his wife, Jacqueline Combs, married in 1952 and are blessed with two children: Michael William Owens and Diane Owens Kennedy; four grandchildren: William Patrick Kennedy, Lauren Combs Kennedy, Michael Desmond Kennedy, and Bradford James Owens; and two great granddaughters: Lucy Kennedy and Camille Kennedy.

### PRESIDENTIAL CITATION AWARDEE

#### Sigsbee W. Duck, MD FACS



Dr. Duck was raised in Mars Hill, a small rural community in western North Carolina, the son of Betty and Dr. Otis Duck, a general practitioner. He attended Wake Forest University (where he was proud to have been the Demon Deacon), the Mercer University School of Pharmacy and the East Carolina University School of Medicine. He was a surgical intern at the University of Kentucky Hospitals and completed an otolaryngology residency at Emory University. He practiced in North Carolina for the first part of his career and in the mid 1990's moved to Wyoming where he has been in practice for 20 years. Dr. Duck received an Honorable Mention for his Triological Thesis in 1997 and was Vice President of the Western Section of the Triological Society in 2008. Dr. Duck is involved in local as well as state medical care issues. He is a member and immediate past President of the Rock Springs-Sweetwater County Airport Board, a member of the Wyoming State Board of Pharmacy, Chief of Staff of the Memorial Hospital of Sweetwater County, a clinical instructor in otolaryngology at the University of Washington School of Medicine and current President of the Wyoming Medical Society.

Dr. Duck has been married to his lovely wife, Cindy, for 34 years and they have three children; Marguerite, a Wake Forest graduate and marriage and family therapist who has recently returned to nursing school to pursue a NP degree; Riley, a University of Kentucky graduate and attorney who is now attending the University of Louisville School of Medicine; and Zachary, a First Officer for Frontier Airlines and graduate of Utah Valley University. Cindy and Sigsbee enjoy cooking, golfing, reading and hanging out with their children and dogs in Jackson Hole; Harley, a particularly poorly mannered Basset Hound; Mandog, a fearless miniature Dachshund; and Blaze, a Border Collie who needs a job.

## **PRESIDENTIAL CITATION AWARDEE**

### **Robert M. Owens, MD**



Dr. Owens was born in Bowling Green, Kentucky during the time that Dr. Fred Owens was practicing family practice in nearby Franklin, Kentucky. He grew up moving across the country while Fred pursued training in General Surgery, Otolaryngology, and a fellowship in Otology/Neurotology at the House Ear Clinic in Los Angeles. He spent many evenings at the House Clinic with Dr. Fred as a child, becoming comfortable with the sights and sounds (and smells) of a temporal bone lab and ear clinic. He grew up primarily in Dallas, Texas, where Dr. Fred chose to establish practice. Dr. Owens graduated from Southwest Texas State University as an undergraduate and attended the University of Texas Medical Branch at Galveston for Medical School. He completed a residency in Otolaryngology/Head and Neck Surgery at West Virginia, and followed in his father's footsteps in completing a fellowship at the House Ear Clinic in Los Angeles. Dr. Owens was awarded the Neurotology Fellowship Award at the 1999 ANS Meeting for authoring a paper on Predicting Hearing Preservation in Acoustic Neuroma Surgery. Dr. Bob joined his father Fred Owens, MD in practice in the Dallas/Ft. Worth area in 1999.

Dr. Owens has been very active in the AAO-HNS over the years, having served multiple terms on the Hearing Subcommittee and Facial Nerve Disorders Committee and teaching Instructional Courses on Tympanoplasty and Ossicular Reconstruction for 14 years. He was awarded the AAO-HNS Honor Award in 2006 and completed a Triological Society Thesis on Baha Outcomes in 200 patients. He serves as the Temporal Bone Lab Director and President of the Dallas Foundation of Otology, and with Dr. Fred and associated faculty of the Lab have provided training in temporal bone anatomy for hundreds of physicians. Dr. Owens has served as President of the Texas Academy of Otolaryngology and continues to serve on the board. He also serves on the board of the Hearing School of the Southwest. He has been an invited speaker to meetings in Central America and Europe on multiple occasions.

He and his wife, Dawn, have been married for 17 years; they have three children: Caitlin, Conor, and Molly. He enjoys boating, hunting, and fishing in the Florida Keys.

## **PRESIDENTIAL CITATION AWARDEE**

### **David F. Wilson, MD**



Dr. David Wilson was born and raised in Millville, Iowa and received his MD from the University of Iowa. He completed his residency training at the Mayo Clinic in 1970. From 1966-1968, he served in the U.S. Navy as a medical officer. He has enjoyed his private practice in otology and neurotology in Portland, Oregon since finishing a House Ear Institute Fellowship in 1972. He previously held an appointment as Assistant Clinical Professor at Oregon Health Sciences University.

Dr. Wilson served on the Triological Society Council for ten years. He was the Western Section Vice-President in 1997 and the President of the Triological Society in 2006-2007. Dr. Wilson was President of the Otosclerosis Study Group in 2009 after serving as Secretary-Treasurer for five years. He remains in private practice in Portland, Oregon.

He and his wife, Leigh, have four children and five grandchildren. Dr. Wilson enjoys golf, fly-fishing, vacations with family and escaping from the Oregon winter rain to their home in Indian Wells, California, whenever possible.



## **PATRICK E. BROOKHOUSER AWARD OF EXCELLENCE**

**Frank E. Lucente, MD**



Dr. Lucente is Professor and former Chairman at SUNY-Downstate and LICH who is a graduate of Yale University School of Medicine. He completed his residency at Washington University. Dr. Lucente was President of the Triological Society in 2010 and served as President of SUO-HNS. He has been Vice President and Coordinator for Instruction Courses for the AAOHNSF. Dr. Lucente has been the Guest of Honor for the American Broncho-Esophagological Association, the American Laryngological Association and the American Society of Geriatric Otolaryngology. He has been on the Executive Editorial Board of The Laryngoscope and is the author, coauthor or editor of 17 books and 200 scientific publications and chapters. Dr. Lucente served on the ACGME RRC Otolaryngology and has been Chair of the AMA's CME Advisory Committee.

Dr. Lucente serves as Vice Dean for Faculty and Educational Affairs for SUNY Downstate UHB @ LICH and Director of the Medical Student Career Advisement Office at SUNY. He has received the SUNY Chancellor's Award for Distinction in Teaching and, in 2001, was honored with the Teacher of the Decade Award from the Department of Otolaryngology. In 2008 he received the Graymoor Award from the Franciscan Friars of the Atonement for his service to that organization.

## **JOSEPH H. OGURA, MD, LECTURER**

**Jonas T. Johnson, MD FACS**



The 2016 Ogura Lecturer, Jonas T. Johnson, MD of Pittsburgh, PA is well-known to the Society and the discipline. Dr. Johnson joined the faculty in the Department of Otolaryngology at the University of Pittsburgh School Medicine in 1979. He currently holds the rank of Distinguished Service Professor in Otolaryngology with joint appointments in Radiation Oncology in the School of Medicine as well as Oral and Maxillofacial Surgery in the School of Dental Medicine and Communication Science and Disorders in the School of Health and Rehabilitation Science.

Dr. Johnson is a past President of the American Academy of Otolaryngology-Head and Neck Surgery (2003) as well as the American Head and Neck Society (2004). Jonas Johnson was Editor in Chief of our journal, The Laryngoscope, from 2003-2011. Dr. Johnson served the Society as President-Elect (2013) and President of the Triological Society (2014).

Dr. Johnson's activities in Pittsburgh include chairing the Department of Otolaryngology, serving as interim chair of the Department of Ophthalmology and chairing the Perioperative and Surgical Services team for the UPMC system hospitals. He is accompanied today by his wife, Janis. Most of his leisure time is spent pursuing senseless exercise and visiting with their three children and five grandchildren.



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## 2016 Thesis Award Winners

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### **Edmund Prince Fowler Award**

**Gregory A. Grillone, MD FACS, Boston, MA**

*The Color of Cancer: Margin Guidance for Oral Cancer Resection Using Elastic Scattering Spectroscopy (ESS)*

### **Harris P. Mosher Award**

**Giovana R. Thomas, MD FACS, Miami, FL**

*Human Papillomavirus (HPV) Induced Oropharyngeal Cancer in Hispanics in the US: Differences in Clinical Presentation and Survival Outcomes*

### **Maureen Hannley Award**

**Paul Hong, MD FRCSC, Halifax, NS Canada**

*Parental Decision Making in Pediatric Otoplasty: The Role of Shared Decision Making in Parental Decisional Conflict and Decisional Regret*

### **Honorable Mention for Basic Science Award**

**Lamont Randall-Desean Jones, MD, Detroit, MI**

*Biological Significance of Genome Wide DNA Methylation Profiles in Keloids*

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## New Fellows to Be Inducted

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New Fellow Ceremonies followed by the reception with Triological Fellows is scheduled on Friday, May 20th from 7:00 - 7:50 am.

<b>Joni Kristin Doherty, MD PhD FACS</b>	Seal Beach, CA
<b>Carole Fakhry, MD MPH</b>	Baltimore, MD
<b>Steven Lawrence Goudy, MD FACS</b>	Atlanta, GA
<b>Gregory A. Grillone, MD FACS</b>	Boston, MA
<b>Samuel Paul Gubbels, MD</b>	Aurora, CO
<b>Paul Hong, MD FRCSC</b>	Halifax, NS Canada
<b>Amanda Chia-Ming Hu, MD FRCSC</b>	Philadelphia, PA
<b>Lamont Randall-Desean Jones, MD</b>	Detroit, MI
<b>Raleigh Olson Jones, MD MBA FACS</b>	Lexington, KY
<b>Adam Matthew Klein, MD FACS</b>	Atlanta, GA
<b>Timothy Michael McCulloch, MD FACS</b>	Madison, WI
<b>Mia E. Miller, MD</b>	San Francisco, CA
<b>Julina Ongkasuwan, MD</b>	Houston, TX
<b>Gregory W. Randolph, MD FACS</b>	Boston, MA
<b>Richard Joseph Schmidt, MD FACS</b>	Wilmington, DE
<b>Leigh J. Sowerby, MD FRCSC</b>	London, ON Canada
<b>Giovana R. Thomas, MD FACS</b>	Miami, FL
<b>Jay Allen Werkhaven, MD</b>	Nashville, TN
<b>Ramzi Tamer Younis, MD FACS</b>	Miami, FL



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## Edmund Prince Fowler Award Citation

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In recognition of the excellence of his/her Candidate's Thesis in Basic Research, the Society confers upon \_\_\_\_\_ the Edmund Prince Fowler Award.

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.

In witness whereof the Society has caused this certificate to be signed and its seal affixed on the \_\_\_\_\_ day of \_\_\_\_\_, Two Thousand and Sixteen.

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## Recipients

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1971	Richard R. Gacek, MD	1994	Paul Lambert, MD
1972	Duane W. Nagle, MD	1995	Michael Pratt, MD
	Raimund G. Rueger, MD	1996	P. Ashley Wackym, MD
1973	Robert J. Ruben, MD	1997	Allen Hillel, MD
1974	Robert I. Kohut, MD		D. Bradley Welling, MD
	Willard B. Moran, Jr., MD	1998	No award
	Gershon J. Spector, MD	1999	Debra L. Tucci, MD
1975	Gregory J. Matz, MD	2000	Rick A. Friedman, MD
	Richard L. Vorhees, MD		Michael D. Seidman, MD
1976	Shokri Radpour, MD	2001	J. Christopher Post, MD
1977	LaVonne Bergstrom, MD	2002	Richard D. Kopke, MD
1978	Diran O. Mikaelian, MD	2003	Chung-Ku Rhee, MD PhD
1979	William L. Meyerhoff, MD	2004	Shawn D. Newlands, MD
	Clarence T. Sasaki, MD	2005	Steven W. Cheung, MD
1980	Robert A. Schindler, MD	2006	Alan G. Micco, MD
1981	Don E. Gebhart, MD	2007	Bradley W. Kesser, MD
1982	Michael E. Johns, MD	2008	Eric M. Genden, MD
1983	Bruce W. Jafek, MD		Marlan R. Hansen, MD
1984	David E. Schuller, MD	2009	Ravindhra G. Elluru, MD PhD
1985	Marvin P. Fried, MD		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	Quyen 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		

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## Edmund Prince Fowler • 1872-1966

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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.

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## Harris P. Mosher Award Citation

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In witness whereof the Society has caused this certificate to be signed and its seal affixed on the \_\_\_\_\_ day of \_\_\_\_\_, Two Thousand and Sixteen.

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## Recipients

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

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## Harris P. Mosher • 1867-1954

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Highly respected, feared yet 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 associated with the Massachusetts Eye and Ear Infirmary and the Harvard Medical School as an instructor in the department of anatomy.

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.

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## Maureen Hannley Award

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The Maureen Hannley Award was established 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, 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 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.

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## Recipients

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2016 Paul Hong, MD FRCSC



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## Honorable Mention for Basic Science Award

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In recognition of the excellence of his/her Candidate's Thesis in Clinical Research, the Society confers upon \_\_\_\_\_ the Honorable Mention Award for Basic Research.

In witness whereof the Society has caused this certificate to be signed and its seal affixed on the \_\_\_\_\_ day of \_\_\_\_\_, Two Thousand and Sixteen.

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## Recipients

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2016 Lamont Randall-Desean Jones, MD



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TRIOLOGICAL SOCIETY 119TH ANNUAL MEETING  
HYATT REGENCY, CHICAGO, ILLINOIS  
MAY 20-21, 2016

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FRIDAY, MAY 20, 2016

GRAND E/F

- 7:00**            **TRIO Business Meeting/New Fellow Ceremony/Reception**
- 8:00 - 9:05**    **SCIENTIFIC SESSION**
- 8:00**            **Welcome by President**
- 8:05**            **Introduction of Guest of Honor and Remarks**  
William H. Owens, Danville, KY
- 8:10**            **Presidential Citations**  
Sigsbee W. Duck, MD FACS, Rock Springs, WY  
Robert M. Owens, MD, Dallas, TX  
David Wilson, MD, Portland, OR
- 8:25**            **Presidential Address**  
**Friends**  
Fred D. Owens, MD, Dallas, TX
- 8:40**            **Introduction of Patrick E. Brookhouser Award of Excellence**  
Awardee - Frank E. Lucente, MD, New York, NY
- 8:45**            **Introduction of 2016 Thesis Award Presenters**  
Fred D. Owens, MD, Dallas, TX and Dana M. Thompson, MD, Chicago, IL
- 8:47**            **Harris P. Mosher Thesis Award Presentation**  
**Human Papillomavirus (HPV) Induced Oropharyngeal Cancer in Hispanics in the US:  
Differences in Clinical Presentation and Survival Outcomes**  
Giovana R. Thomas, MD FACS, Miami, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) Describe the differences in clinical presentation between Hispanic and non-Hispanic white patients with HPV-related oropharyngeal squamous carcinoma; and 2) Discuss the differences in survival outcomes between non-Hispanic white, and Hispanic HPV-related oropharyngeal squamous carcinoma patients treated at a large multicultural academic medical center in the USA.

**Objectives:** The objective of this study was to determine whether disparities in survival outcome and differences in clinical presentation exist between Hispanic and non-Hispanic White patients with HPV-positive oropharyngeal squamous cell carcinoma (OPSCC). **Study Design:** Clinical research. Retrospective study. **Methods:** Clinical data on Hispanics and non-Hispanic white patients with diagnosis of HPV/p16-positive OPSCC were drawn from tumor registry dataset from a large, clinically well characterized multi-ethnic academic medical center from 2008 to 2014. Of 436 patients with oropharyngeal squamous cell carcinoma, 236 patients met inclusion criteria. Patient's age, gender, smoking history, alcohol history, race/ethnicity, tumor T stage, nodal N stage, and American Joint Commission on Cancer (AJCC) composite TNM stage were collected from dataset and included in the analysis. Associations between race and other categorical variables were explored with chi-square test or Fisher's exact test where appropriate. Survival curves were generated using Kaplan-Meier's method for race, gender, smoking history, and alcohol usage history. **Results:** Significant differences in clinical presentation was detected between Hispanic (N=70) and non-Hispanic white (N=167) HPV-positive OPSCC patients in an academic center serving a diverse multicultural patient population. Hispanic HPV-positive OPSCC patients showed a higher proportion of women with disease; a higher proportion of patients presenting with tonsil rather than tongue base primary subsite cancer; and a higher proportion of patients who do not consume alcohol compared to non-Hispanic White HPV-positive OPSCC

# Friday

patients. A statistically significant survival difference between these two ethnic groups was not detected in the current dataset. **Conclusions:** Unique differences in clinical presentations between Hispanic patients and non-Hispanic whites with HPV-positive OPSCC were detected. This may be the first study to report novel clinical presentation in Hispanic HPV-positive patients with OPSCC living in the U.S.

**8:54**      **Maureen Hannley Thesis Award Presentation**  
**Parental Decision Making in Pediatric Otoplasty: The Role of Shared Decision Making in Parental Decisional Conflict and Decisional Regret**  
Paul Hong, MD FRCSC, Halifax, Nova Scotia

**Educational Objective:** At the conclusion of this presentation, the participants should be able to: 1) describe the importance of measuring decisional conflict and decisional regret in clinical encounters and 2) appreciate the significance of shared decision-making in otolaryngology.

**Objectives:** To date, there has been little research on shared decision making and decisional outcomes in pediatric surgery. The objectives of this study were to describe the level of decisional conflict and decisional regret experienced by parents considering otoplasty for their children, and to determine if they are related to perceptions of shared decision making. **Study Design:** Prospective cohort clinical study. **Methods:** Sixty-five consecutive parents of children who underwent surgical consultation for otoplasty were prospectively enrolled. Participants completed the Decisional Conflict Scale and the Shared Decision Making Questionnaire after the consultation visit. The consulting surgeons completed the physician version of the Shared Decision Making Questionnaire. Six months after surgery, parents completed the Decisional Regret Scale. **Results:** The median decisional conflict was 15.63; 21 (32.8%) scored 25 or above, a previously defined cut-off indicating clinically significant decisional conflict. Parent ratings of shared decision making and decisional conflict were significantly negatively correlated ( $P = 0.000$ ); however, there was no significant correlation between physician ratings of shared decision making and parental decisional conflict. Significant decisional regret was reported in two (3.2%) participants. Decisional regret and parent and physician ratings of shared decision making were significantly negatively correlated ( $P = 0.044$  and  $P = 0.001$ , respectively). Decisional regret and decisional conflict scores were significantly positively correlated ( $P = 0.001$ ). Parent and physician ratings of shared decision making were correlated (intra-class correlation = 0.625,  $P = 0.000$ ). **Conclusions:** Many parents experienced significant decisional conflict when making decisions about their child's elective surgical treatment. Fewer parents experienced significant decisional regret after the procedure. Parents who perceived themselves as being more involved in the decision making process reported less decisional conflict and decisional regret. Parents and physicians had varied perceptions of the degree of shared decision making. Future research should develop interventions to increase parents' involvement in decision making and explore the influence of significant decisional conflict and decisional regret on health outcomes.

**9:05 - 12:00**      **CONCURRENT SCIENTIFIC SESSIONS**

## CONCURRENT SESSION 1 - CLINICAL FUNDAMENTALS GRAND E/F

**Moderators: William Russell Ries, MD FACS, Nashville, TN**  
**William W. Shockley MD FACS, Chapel Hill, NC**

**9:05**      **The Geographic Distribution of the Otolaryngology Workforce in the United States**  
Miriam N. Lango, MD, Philadelphia, PA; Elizabeth A. Handorf, PhD, Philadelphia, PA; Ellis M. Arjmand, MD MMM PhD, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the significance of different measures of otolaryngology physician supply.

**Objectives:** An otolaryngology workforce shortage has been predicted; however, the deployment of otolaryngologists across the United States has not been well described. **Study Design:** Cross-sectional study. **Methods:** The otolaryngology physician supply was defined as the number of otolaryngologists per 100,000 in the hospital referral region (HRR). The otolaryngology physician supply was derived from American Medical Association Masterfile and the Medicare Enrollment and Provider Utilization Data. Multivariable linear regression included population demographics, income, and education data from the United States census. **Results:** The overall supply of otolaryngology workforce varies across HRRs by a factor of 4.8; the supply of those enrolled in Medicare varies by a factor of 21.4. Nevertheless, the two measures are correlated (Pearson coefficient .513,  $p = .0001$ ). Regardless of measure, otolaryngologists are concentrated in regions with high concentrations of other physicians; the association was strongest for regions with a high supply of general surgeons and medical specialists and lowest for those with many family practitioners. The otolaryngology supply also increases with regional population income and education levels. The supply of otolaryngologists enrolled in Medicare decreases in regions without an otolaryngology residency training program by .54 per 100,000 accounting for other variables (95%CI

.14-.85,  $p=.007$ ); however, the distribution of the overall otolaryngology workforce is unrelated to the presence of an otolaryngology residency program. **Conclusions:** The distribution of the otolaryngology workforce varies in important ways depending on how it is measured. The pattern of distribution of otolaryngologists enrolled in Medicare suggests beneficiaries may have limited access to care in some regions.

### 9:12 Predictors of Regional Medicare Expenditures for Otolaryngology Physician Services

Alden Folsom Smith, BMus; Elizabeth A. Handorf, PhD, Philadelphia, PA; Ellis M. Arjmand, MD MMM PhD, Houston, TX; Miriam N. Lango, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand some factors that influence the cost of otolaryngology physician services in different geographic regions of the United States.

**Objectives:** Health care reform favors preventative and generalist care over specialist and tertiary care; the factors influencing the cost of otolaryngology physician services for beneficiaries in different geographic regions are poorly understood. **Study Design:** Cross-sectional study. **Methods:** The aggregate cost of otolaryngology physician services was standardized for each hospital referral region (HRR) from the Provider Utilization file obtained from the CMS.gov website by using total work relative value units (wRVUs) per thousand Medicare beneficiaries in the region. Predictors of per capita Medicare expenditures by region were tested in a multivariable regression model that included physician and hospital bed supply as well as sociodemographics (age, sex, race, income, education). **Results:** Medicare expenditures for otolaryngology physician services by HRR in 2013 and 2012 were highly correlated (Pearson coefficient .997,  $p=.0001$ ). The cost of otolaryngology physician services increased with the supply of otolaryngologists, medical specialists and hospital beds, but decreased with the supply of primary care physicians in the region. The addition of an otolaryngologist per 100,000 population increased costs by 21.5 wRVUs per 1000 beneficiaries (95% CI 13.7-29.2,  $p=.001$ ); the presence of an otolaryngology residency training program decreased costs by 36 wRVUs per 1000 beneficiaries (95% CI 11.3-60.6,  $p=.004$ ), after adjusting for the supply of otolaryngologists, other physicians, hospital beds and population sociodemographic factors. **Conclusions:** The relative supply of otolaryngologists, medical specialist and primary care physicians is strongly associated with the regional expenditures on otolaryngology physician care. The impact of a residency training program on Medicare spending for otolaryngology physician services requires further investigation.

### 9:19 The Value of Acute Specialty Care: Contingent Valuation Analysis of an Otolaryngology and Ophthalmology Emergency Room

Matthew R. Naunheim, MD MBA, Boston, MA; Elliott D. Kozin, MD, Boston, MA; Rosh K. Sethi, MD MPH, Boston, MA; H. G. Ota, MD, Boston, MA; Stacey T. Gray, MD, Boston, MA; Mark G. Shrime, MD MPH FACS, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the increasingly important methodology of contingent valuation, as well as the impact of this patient centric value on acute specialty care and resource utilization.

**Objectives:** Dedicated specialty emergency rooms provide a unique mechanism of healthcare delivery, but the value they add to the medical system is not known. This study aims to assess the feasibility of contingent valuation (CV) methodology using willingness to pay (WTP) surveys to evaluate specialty emergency services, in the context of an ophthalmology and otolaryngology specific emergency room (ER). **Study Design:** Contingent valuation analysis with prospective survey data. **Methods:** English speaking adults presenting to a dedicated otolaryngology and ophthalmology ER were included in a validated survey. Sociodemographic data, self-reported level of distress, referral data, and income were recorded. WTP valuation questions were assessed using a payment card format, with reference to an alternative modality of treatment (i.e., general ER), and were analyzed with multivariate regression. **Results:** The response rate was 75.9% and 327 patients were included in the final analysis (116 ophthalmology; 211 otolaryngology). The average WTP for specialty specific ER services was \$377.42 for ophthalmology patients and \$320.99 for otolaryngology patients (\$340.15 overall) without significant difference between groups ( $p=0.254$ ). Self-reported level of distress was higher among ENT patients than ophthalmology patients ( $p=0.001$ ), but neither distress, income, nor demographic variables influenced WTP. In aggregate, patients were willing to travel an extra 55 minutes and wait an extra 94 minutes for a specialty, rather than general, emergency room. **Conclusions:** Patients place an explicit value on specialty emergency services of \$340.15 per visit on average. Ultimately, CV data using WTP methodology may help inform statewide resource allocation and the availability of direct to specialist services.

### 9:26 Prevalence of Wrong Site Surgery in California Hospitals

Yaser Ghavami, MD, Irvine, CA; Yarah M. Haidar, MD, Irvine, CA (Presenter); Omid Moshtaghi, BS, Irvine, CA; Afsheen Moshtaghi, BS, Irvine, CA; Jay M. Bhatt, MD, Irvine, CA; Harrison W. Lin, MD, Irvine, CA; Hamid R. Djalilian, MD, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the incidence and etiologic factors contributing to wrong site surgeries in the state of California.

# Friday

**Objectives:** The implementation of universal surgical safety protocol in 2004 was intended to minimize the incidence of wrong site surgeries (WSS). However, complete elimination of WSS remains one of the most perplexing challenges in operating rooms. This study was undertaken to evaluate the incidence and etiologic factors contributing to WSS in the state of California. **Study Design:** Retrospective analysis of patient information. **Methods:** A retrospective analysis of patient information provided by the California Department of Public Health was performed. Records starting three years after the implementation of the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) Universal Protocol (2007-2014) were evaluated. In particular, the incidence of overall and specialty specific WSS, causative factors, and recommendations on further improvement are described and discussed. **Results:** A total of 143 records were reviewed and 81 cases were included. The most common error was operating on the wrong side of the patient (60.5%), wrong body part (28.4%), and performing the wrong procedure (7.4%). WSS was most prevalent in orthopedic surgery (39.5%), followed by general surgery (24.7%), and neurosurgery (14.8%). Otolaryngology had a low incidence of 2.5%. Commonly identified causes were miscommunication (24.7%), inadequate medical record keeping (23.5%), failure to mark the surgery site (21%) and failure to conduct a timeout (17.3%). **Conclusions:** Proper communication between team members in the perioperative setting and adequate medical record keeping should be reinforced. Additionally, correct marking of the surgery site, identification of the wrong site separately, and adherence to universal surgical safety protocols may substantially reduce the occurrence of WSS.

**9:33 - 9:40**     **Discussant:** Sigsbee W. Duck MD FACS, Rock Springs, WY

**9:40 - 10:10**     **Break/View Posters - Riverside Center**

**10:10**            **Pigmented Skin Lesion: Should We Biopsy Everything?**

Hani M. Rayess, MD, Detroit, MI; Amar M. Gupta, MD, Detroit, MI; Peter F. Svider, MD, Detroit, MI; Mahdi A. Shkoukani, MD, Detroit, MI; Giancarlo F. Zuliani, MD, Detroit, MI; Michael A. Carron, MD, Detroit, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the most common causes of melanoma litigation. Discuss the outcomes of litigation and which factors influence the most. Compare outcomes by location of melanoma head and neck vs other sites in the body and by specialty.

**Objectives:** This study evaluated factors raised in malpractice litigation related to the diagnosis and management of melanoma and further assessed issues impacting outcome. **Study Design:** Retrospective chart review. **Methods:** The authors used the Westlaw legal database to access litigation over the last 20 years relating to medical malpractice and melanoma. We performed a retrospective analysis of relevant cases for defendant specialty, awards, reason for litigation, outcomes and other allegations and clinical factors. **Results:** Of the 80 cases evaluated, 49.0% were resolved in the defendants' favor and 51.0% were resolved with payments, either via settlement or plaintiff verdict. Greater than 80% of cases involved allegations of misdiagnosis; in 35.2% of these cases, the patient died from melanoma. 64.3% of misdiagnosed cases involved dermatologists or pathologists. The mean delay in diagnosis was 736.9 days. Otolaryngologists and ophthalmologists won all cases brought against them whereas pathologists were only successful in 25.0% of cases. There was no statistical difference in payments upon comparison of cases with and without alleged mortality. The most common locations for melanoma were the extremities and the head and neck region at 32.5% and 22.5% respectively. Location of melanoma was not significantly associated with litigation outcome. **Conclusions:** Cases in which physicians allegedly mismanaged melanoma were more likely to be resolved in the defendants' favor compared to those involving allegations of misdiagnosis. Furthermore, patients who were misdiagnosed had a significantly higher likelihood of having active disease the time of litigation. Factors such as death, persistent disease, and poor cosmetic outcome were not associated with litigation outcome.

**10:17**            **Crisis Resource Management Assessment of OtoHNS Residents at an Emergencies in Otolaryngology Boot Camp Course**

Grace M. Scott, MSc, London, ON Canada; Lily H.P. Nguyen, MD MSc FRCSC, Montreal, QC Canada; Ilana Bank, MD FRCP, Montreal, QC Canada; Sarah Bouhabel, MD, Montreal, QC Canada; Kevin Fung, MD FRCSC, London, ON Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the concept of crisis resource management and its application to the field of otolaryngology head and neck surgery.

**Objectives:** Originally rooted in aviation, crisis resource management (CRM) is a global approach that aims to handle human errors in a complex technological and human environment. Not unlike pilots, residents in otolaryngology-head and neck surgery (OtoHNS) will be exposed to numerous high stakes crisis situations. Certain types of CRM errors are preventable with adequate training. This study sought to assess if a simulation based CRM workshop could improve OtoHNS residents' ability of detecting CRM errors. **Study Design:** Prospective cohort study. **Methods:** Postgraduate year 1 and 2 residents in attendance at the 4th Annual Emergencies in OtoHNS Boot Camp were invited to participate. Boot camp attendees represented 10 postgraduate OtoHNS programs from across Canada and the regional United States. Partici-



participants viewed a CRM video and completed an associated survey before and immediately following the simulation based workshop. Through an iterative, multistep process, a qualitative thematic analysis was conducted on the responses. **Results:** Twenty-five (100%) attendees consented to participate. All 25 completed the pre-workshop survey and 23 (92%) completed the post-workshop task. Before participating in the workshop, participants identified leadership errors and breakdowns in communication. Following the workshop, participants had increased ability to recognize mistakes and used CRM language to describe errors. Lack of clear priority plan was the error most frequently acknowledged. This error was identified by 64% of participants pre-workshop and 87% of participants post-workshop. **Conclusions:** A half day simulation based CRM workshop has the capacity to deliver substantive educational outcomes to novice residents. Future research should assess the retention of such CRM knowledge and skills.

**10:24 Scary Cases: A New Way for Otolaryngologists to Learn**  
Michael P. Platt, MD MS, Boston, MA; Kenneth M. Grundfast, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand situations that present increased danger and be aware of how to provide risk management education to colleagues.

**Objectives:** Scary cases include near misses, complications, adverse outcomes, and cases involving litigation or ethical dilemmas. The traditional forum for discussion of complications is the morbidity and mortality conference but such conferences may not offer an optimal opportunity for learning or extension beyond an institution. The scary cases concept is an innovative forum that explores ways that decision making, a systems based approach to practice, and improved communication can minimize or prevent untoward outcomes. The purpose of this review is to understand where otolaryngologists encounter risk and convey a method for education in risk management. **Study Design:** Retrospective review. **Methods:** From 2011 to 2015, regional and national otolaryngology scary case conferences and mini-seminars were held. Trends in case data were analyzed to determine what kinds of cases are most troublesome for otolaryngologists. **Results:** A total of 101 cases that were presented in five regional conferences and four national panel discussions were analyzed to determine trends. Fifty-four percent of cases had scary medical problems, whereas 26% had legal issues, and 20% had ethical dilemmas. For the cases with medical problems, the majority of these involved airway obstruction (49%), followed by central or peripheral nerve injuries (27%), vascular injury (14%), and psychiatric problems (7%). Of the subspecialties in otolaryngology represented, these scary cases fell under the purview of laryngology (34%), rhinology (17%), pediatric otolaryngology (17%), otology/neurotology (14%), head and neck cancer (12%), and facial plastic surgery (6%). **Conclusions:** The scary cases format provides a forum for candid discussion among peers and experts. What scares otolaryngologists most frequently includes airway obstruction, nerve injury, legal involvement, and ethical dilemmas, although no subspecialty is without representation in this series.

**10:31 Predictors of Match Success in Otolaryngology Head and Neck Surgery: An Analysis of the Characteristics of Successful Applicants Based on National Resident Matching Program Data**  
Navid Zahedi Niaki, Montreal, QC Canada; Cinzia Marchica, MD, Montreal, QC Canada (Presenter); Lilly H.P. Nguyen, MD, Montreal, QC Canada; John Manoukian, MD, Montreal, QC Canada

**Educational Objective:** At the end of this presentation, participants should be familiar with the objective attributes of U.S. medical students that significantly impact successful matching into otolaryngology residency positions.

**Objectives:** Obtaining a residency position in otolaryngology residency programs has become an increasingly difficult endeavor. The primary purpose of this study was to characterize objective attributes of U.S. medical students that influence successful matching into otolaryngology head and neck surgery residency programs. **Study Design:** Retrospective analysis. **Methods:** Applicant characteristics were compiled and analyzed using data from the NRMP and ERAS from 2007, 2009, 2011 and 2014. Attributes analyzed included: specialty preference, self reported USMLE step 1 and step 2 scores, Alpha Omega Alpha (AOA) membership, research experience, work and volunteer experiences, graduation from a top40 NIH funded medical school and additional academic degrees. The impact of individual attributes was analyzed using odds ratios with 95% confidence intervals. **Results:** Between 2007 and 2014, the number of U.S. medical students applying to otolaryngology increased by 63, whilst the total number of residency positions offered increased by 25. USMLE step 1 (ORs ranging from 1.5 to 38) and step 2 scores, AOA membership (ORs > 2.78) and ranking multiple otolaryngology programs had a statistically significant impact on matching in all 4 years. However, graduating from a top 40 NIH funded university only demonstrated significant impact in 2009 and 2014. Multiple research experiences and publications did not have a statistically significant impact on successful matching. **Conclusions:** As with other highly competitive specialties, excellent academic performance was significantly correlated with successful matching into otolaryngology residency programs. Interestingly, research experience and graduation from a top 40 NIH funded university were not reliable predictors of successful matching.

**10:38 - 10:45 Discussant:** David B. Hom, MD FACS, Cincinnati, OH

# Friday

**10:45 Surgical Airway Safety: An Educational Model for Non-Otolaryngology Healthcare Providers**  
Jill N. D'Souza, MD, Philadelphia, PA; Colin T. Huntley, MD, Philadelphia, PA; Joseph R. Spiegel, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain and discuss the benefits to patient care of educating non-otolaryngology healthcare providers about surgically altered airways and their management in emergent situation. In addition, after the presentation, the audience should have to tools to establish such a program at their own institution.

**Objectives:** Airway management at a tertiary care center includes participation by physicians from numerous departments, specialties, and of varying experience levels. In addition, at a large referral center, many patients have altered airways, such as tracheostomy and laryngectomy, that can create difficulty and confusion during an urgent airway situation. We provided a seminar detailing management of various airways and measured success by surveying the audience before and after the lecture. **Study Design:** Prospective outcomes study. **Methods:** A seminar was provided to internal medicine residents detailing airway anatomy, various surgically altered airways, and clinical pearls to address airway emergencies. A survey was provided before and after the lecture to assess familiarity and comfort level with the surgically altered airway. The survey included subjective questions assessing comfort level in treating tracheostomy and laryngectomy patients, and three objective clinical scenarios. Statistical analysis of these responses were carried out using logistical regression and univariate analysis ( $P < 0.05$ , 95% CI). **Results:** Pre and post-seminar surveys were administered to 87 internal medicine residents. The survey included subjective measurement of comfort managing a patient with a surgically altered airway and objective questions on management of these patients in airway emergencies. A statistically significant increase in both comfort level and answers to the objective questions were seen ( $p < 0.001$ ). **Conclusions:** Implementation of a surgical airway education seminar is a valuable teaching adjunct to the non-otolaryngology specialist. Increased understanding of the surgically altered airway by all members of the care team is essential for best patient outcomes.

**10:52 Safe Trauma Decannulation Protocol: Seven Years of Experience**  
Jeamarie Pascual-Marrero, MPh MD, San Juan, PR; Carlos Torre-León, MD, San Juan, PR; Carlos González-Aquino, MD FACS, San Juan, PR; Ada Lebbrón, MS, San Juan, PR

**Educational Objective:** We evaluated our decannulation protocol for trauma patients established in a trauma hospital.

**Objectives:** Scarce standardized protocols for decannulation have been described. Determining the method and timing of removing a tracheostomy tube is still controversial. We evaluated our decannulation protocol for trauma patients established in our trauma hospital. **Study Design:** A retrospective cross-sectional study from 2005-2012 was conducted to assess the outcomes of the decannulation protocol collected by our trauma hospital and physicians of the department of otolaryngology-head and neck surgery. **Methods:** Protocol consisted of two phases: 1) phase I evaluates clinical characteristics determined by primary physician and an evaluation by speech pathologist; and 2) phase II consists of an evaluation by otolaryngologist with an indirect laryngoscopy. Inclusion criteria consisted of trauma patients 18 years and older with a tracheostomy performed at this institution following our decannulation protocol. Study variables included: sex, age, post-decannulation complications, and decannulation failure. Protocol success was defined as a patient not requiring a second tracheostome placement, intubation, tracheostomy revision in 72 hours post-decannulation. A univariate and bivariate analysis were performed utilizing SPSS. **Results:** Our study sample consisted of 840 trauma patients. The mean sample age was  $38.4 \pm 17.8$ . Population was predominantly male (85%). Twenty percent (164/840) of patients did not follow the protocol. Among those, 9% (79/840) died before ending protocol and 6% (54/840) were decannulated either by other physician not following the protocol or auto-decannulated. Only 4% (31/840) were poor candidates for decannulation. All patients that followed our protocol were successfully decannulated ( $n=676$ ); 100% success rate. **Conclusions:** Our study supports a safe multidisciplinary decannulation protocol to promote better health outcomes in trauma patients.

**10:59 Quality Improvement in Tracheostomy Care: Decreasing Complications through a Multidisciplinary Approach**  
Stefanie S. Saunders, MD, Boston, MA; Jacob Kuperstock, MD, Boston, MA; Sarah Rubin, JD, Boston, MA; Dominick Gadaleta, MD, Boston, MA; Gregory Grillone, MD, Boston, MA; Michael P. Platt, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) identify common issues that arise in patients with tracheostomies in the inpatient setting; 2) demonstrate an understanding of patient safety issues surrounding tracheostomy care and how to decrease associated complications; and 3) use this model as a guideline for quality improvement on an institutional level.

**Objectives:** There is wide variation in clinical management of patients with tracheostomy tubes, with no benchmarks for best practices. Clinical decisions regarding timing of surgery, surgical technique, and postoperative care can impact on the safety and cost effectiveness of patients with tracheostomy tubes. The objective of this study was to develop a model for quality improvement in tracheostomy care and decrease tracheostomy related complications. **Study Design:**



Prospective quality improvement project at an academic tertiary care hospital. **Methods:** A multidisciplinary team was assembled to create institutional guidelines for clinical care during the preoperative, intraoperative, and postoperative periods. Baseline data was compiled by retrospective chart review of 160 patients, and prospective tracking of select points over 8 months in 73 patients allowed for analysis of complications and clinical parameters. **Results:** Implementation of a quality improvement team was successful in creating guidelines, setting baseline parameters, and tracking data with run charts. Comparison of pre- and post-guideline data showed a trend toward decreased major complications by 71% ( $p=0.096$ ). Variables including time to tracheostomy for prolonged intubation, surgical technique, day of first tracheostomy tube change, and specialty performing surgery did not show increased risk of complications. There were increased tracheostomy related complications in cold months ( $p=0.04$ ). **Conclusions:** An interdisciplinary quality improvement team can improve tracheostomy care by identifying system factors, standardizing care among specialties, and providing continuous monitoring of select data points. The number of increased complications seen in cold months may represent the effect of decreased humidification from indoor heat.

**11:06 A Multicenter, Cross-Sectional Assessment of Otolaryngology Knowledge in Primary Care Trainees**

Daniel C. O'Brien, MD, Morgantown, WV; Aaron D. Robinson, MD, Sacramento, CA; Lane D. Squires, MD, Sacramento, CA; Rodney C. Diaz, MD, Sacramento, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the current limitations of undergraduate and graduate medical education in regard to common conditions and their related treatments.

**Objectives:** 1) Assess the quality of education in basic otolaryngology in primary care trainees, specifically family medicine, internal medicine, and emergency medicine. Identify knowledge deficits regarding alternate airways. 2) Identify knowledge deficits regarding basic conditions treated by an otolaryngologist. 3) Assess the need for improved medical education about care of head and neck patient. **Study Design:** Multi-center cross sectional survey. **Methods:** An anonymous 10 question, multiple choice survey was administered to medical students as well as resident and medical students at our institutions in the departments of emergency medicine, family medicine, pediatrics and otolaryngology. Scores from the physicians in the department of otolaryngology-head and neck surgery were compared to non-otolaryngology physician and medical student scores. These data were analyzed using ANOVA. **Results:** Otolaryngology physicians scored an average of 98%, while primary and undifferentiated providers scored 56%. Among non-otolaryngologists, there was no significant difference in the knowledge base between 4th year medical students and residents of any year. Only 14% of the primary care and undifferentiated providers survived felt comfortable with these basic questions and 88% of the respondents desired increased educational time devoted to these topics. **Conclusions:** Our preliminary findings identify significant knowledge gaps among non-otolaryngologists concerning basic head and neck anatomy and diseases. These deficits underscore the importance of undergraduate and graduate medical education on improving familiarity among primary care providers who are likely to encounter such conditions.

**11:13 - 11:20 Discussant:** Jimmy J. Brown, MD FACS, Augusta, GA

**11:20 - 11:55 Panel: The Value Equation: Navigating the Affordable Care Act, CMS, and Payment Reform to Optimize Otolaryngology Care**

**Moderator:** Michael S. Benninger, MD FACS, Cleveland, OH

**Panelists:** David E. Eibling, MD FACS, Pittsburgh, PA  
Christine G. Gourin, MD FACS, Baltimore, MD  
Earl H. Harley, MD FACS, Washington, DC  
Kathleen L. Yaremchuk, MD MSA, Detroit, MI

**12:00 Adjourn**

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

## CONCURRENT SESSION 2 - OTOLOGY/NEUROTOLOGY GRAND C/D

**Moderators: Oliver F. Adunka, MD, Columbus, OH  
Cliff A. Megerian, MD FACS, Cleveland, OH**

**9:05 Endoscopic Assisted Tympanoplasty Outcomes in the Pediatric Population**

Christopher H. Azbell, MD, Louisville, KY; Elizabeth L. Cash, PhD, Louisville, KY; Arun K. Gadre, MD, Louisville, KY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the advantages, disadvantages, and audiologic outcomes of endoscopic assisted tympanoplasty in the pediatric population.

**Objectives:** The goals of this study were to compare operative time, audiologic results, and complications of endoscopic assisted tympanoplasties with postauricular approach medial graft tympanoplasties in children. **Study Design:** Chart review with case control. **Methods:** A cohort of patients 0 to 18 years (N=30) who underwent tympanoplasty over a 6 year period at our institution were included. Inclusion criteria were preoperative and postoperative audiograms. Exclusion criteria were prior tympanoplasty, significant medical comorbidities, and insufficient followup. Patients who underwent an endoscopic assisted approach (n=15) were compared with age and diagnosis matched patients (n=15) who underwent a postauricular approach tympanoplasty. Data points were extracted from inpatient and outpatient charts. Independent t-tests and Chi-square tests were used to compare outcomes across groups. **Results:** Operative time for endoscopic assisted tympanoplasties was significantly shorter than for postauricular tympanoplasties (82 vs. 121 minutes,  $p < .001$ ). Both groups had an equivalent improvement in air bone gap from preoperative to postoperative audiogram at three different frequencies (500 Hz, 1000 Hz, and 2000 Hz). There were two graft failures in each group. The mean followup time was 18 months (range 4-60). **Conclusions:** Endoscopic assisted tympanoplasty is a relatively recent development in otologic surgery. When utilized in the properly selected patient, it can offer equivalent postoperative audiologic outcomes with similar complication rates when compared to the postauricular approach. Shorter operative times may reduce patient cost and anesthesia related complications. As endoscopic assisted cases become more common, larger retrospective and prospective studies are needed to determine whether endoscopic assistance confers significant clinical benefit in pediatric tympanoplasty outcomes.

**9:12 Audiologic Outcome in Neonatal Onset Multisystem Inflammatory Disease after Anakinra Therapy**

William Z. Gao, MD, Washington, DC; Carmen C. Brewer, PhD, Bethesda, MD; Kelly A. King, PhD, Bethesda, MD; Christopher Zalewski, MA, Bethesda, MD; Raphaela Goldbach-Mansky, MD MHS, Bethesda, MD; Jeffrey H. Kim, MD, Washington, DC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the clinical manifestations and pathogenesis of neonatal onset multisystem inflammatory disease (NOMID). Additionally, they should be able to characterize the natural history of hearing loss in patients with NOMID as well as the longitudinal effects of anakinra therapy on hearing outcomes.

**Objectives:** Neonatal onset multisystem inflammatory disease (NOMID) is a rare chronic auto-inflammatory disorder characterized by sequelae of dysregulated systemic inflammation including rash, fever, arthritis, meningitis, and sensorineural hearing loss. It is commonly associated with NLRP3 mutations contributing to interleukin-1 (IL-1) overproduction, and consequently IL-1 receptor antagonism with anakinra has arisen as a viable treatment. The objective is to describe baseline audiologic phenotypes in subjects with NOMID and subsequent longitudinal effects of anakinra on audiometric outcomes. **Study Design:** Retrospective and cross-sectional analysis of a prospective cohort (2003-2015). **Methods:** We studied a cohort of 53 patients with NOMID who were treated with anakinra. Comprehensive audiometric data was collected prior to treatment initiation as well as at followup visits. Various clinical assessments, laboratory markers, and imaging results were also gathered. **Results:** In our cohort, baseline hearing loss prior to anakinra treatment was primarily sensorineural in nature. Among those who underwent pure tone audiometry (0.25-8kHz), the degree of baseline hearing loss was positively correlated with age (all  $P < 0.05$ ). Additionally, the extent of higher frequency sensorineural hearing loss (2-4kHz) was significantly greater than that of lower frequencies (0.25-0.5kHz) ( $P < 0.0001$ ). After 1 year of anakinra treatment, the cohort had a significantly lower degree of sensorineural hearing loss ( $P = 0.0367$ ). **Conclusions:** These findings suggest that the natural history in NOMID results in progressive sensorineural hearing loss that more significantly impacts higher frequencies. However, anakinra treatment may halt or improve hearing loss and prevent progression of cochlear damage.

- 9:19**      **Prospective Study to Assess the Efficacy of Balloon Dilatation of Eustachian Tube for Patients with Eustachian Tube Dysfunction (ETD)**  
Philippe F. Bowles, BMBS BA MRCS, Ipswich, Suffolk England; Mahmoud A. Salam, MB BCh MS MSc FRCS MD FRCS, Ipswich, Suffolk England (Presenter); Satish K. Agrawal, MBBS MS DOHNS, Ipswich, Suffolk England

**Educational Objective:** Eustachian tube dysfunction (ETD) is a difficult problem to treat. This paper discusses the effectiveness of endoscopic balloon dilatation of the eustachian tube in the treatment ETD by conducting a prospective study and comparing pre and postoperative outcome measures.

**Objectives:** To assess the efficacy of endoscopic balloon dilatation of eustachian tube in treating ETD. **Study Design:** Prospective consecutive case series. **Methods:** Patients: Aged 18-65 years with a clinical history suggestive of ETD (including otalgia on flying/diving) despite at least 3 months of medical therapy (topical and oral steroids, autoinflation devices, regular Valsalva maneuvers and decongestants) with a positive ETDQ-7 score (>14.5). Preoperative screening included otoscopy, flexible nasendoscopy, tympanometry and ability to perform an effective Valsalva maneuver. Intervention: Transnasal endoscopic balloon dilation of the cartilaginous eustachian tube (Acclarant AERA Eustachian Tube Balloon Dilation System). Outcome measures: ETDQ-7 score, tympanometry and patients ability to do Valsalva after the procedure. The results are recorded at 6 weeks and 3 months. **Results:** Total patients n=21 (8 bilateral, 29 ears). Mean preoperative ETDQ-7 score was 34.9 (SD ±5.68), 18.24 (SD ±7.75) at 6 weeks (p<0.0001) and 13.31 (SD ±7.20) at 3 months (p<0.0001) (Gaussian distribution, parametric analyses). Patients able to perform an effective Valsalva maneuver increased from 0% (n=0) preoperatively to 76% (n=16) at 6 weeks and 86% (n=18) at 3 months. Type A tympanograms increased from 66% (n=19) preoperatively to 83% (n=24) at 6 weeks and 93% (n=27) at 3 months. No adverse events were recorded. **Conclusions:** Early results analysis suggests that balloon tuboplasty is a safe and effective treatment for symptoms of ETD. There is definite improvement of all outcome measures at 6 weeks and 3 months. Further studies are needed to assess the efficacy of this technique in cases of glue ear.

- 9:26**      **Cochlear Implantation in Early Childhood: Risk of Implanting a Serviceable Ear**  
Nathan E. Pierce, MD, Gainesville, FL; Thais Toledo, BA, Gainesville, FL; Melissa W. Hall, AuD, Gainesville, FL; Katherine L. Gray, AuD, Gainesville, FL; Patrick J. Antonelli, MD, Gainesville, FL

**Educational Objective:** At the conclusion of this presentation, the participants should understand the potential for serviceable hearing prior to proceeding with second side or bilateral cochlear implantation in young children.

**Objectives:** Review cases of children with severe to profound sensorineural hearing loss who underwent cochlear implantation and were subsequently found to have serviceable hearing in the contralateral, non-implanted ear. **Study Design:** Retrospective case series. **Methods:** Children with severe to profound sensorineural hearing loss who underwent prelingually and perilingually cochlear implantation and were subsequently found to have serviceable hearing were reviewed. **Results:** Eight children that were found to be audiological candidates for cochlear implantation were implanted 1.9 and 7.6 years of age and subsequently found to not be candidates for cochlear implant placement in the contralateral ear because auditory function exceeded existing thresholds for implantation. All had been preoperatively evaluated with a comprehensive audiologic test battery, including auditory brainstem response testing, otoacoustic emissions, speech perception assessment, and behavioral responses. All had failed a hearing aid trial prior to cochlear implantation. All are benefiting from bimodal stimulation. Reasons for not detecting the serviceable hearing included immaturity that precluded optimal behavioral testing and fluctuating hearing loss. **Conclusions:** Otologists and audiologists should consider the potential for serviceable hearing prior to proceeding with second side or bilateral cochlear implantation in young children in whom behavioral testing may be unreliable or responses are fluctuating, due to the risk of implantation in a serviceable ear.

- 9:33 - 9:40**      **Discussant:** Raleigh O. Jones, MD MBA FACS, Lexington, KY

- 9:40 - 10:10**      **Break/View Posters - Riverside Center**

- 10:10**      **To Image or Not to Image? A Cost Effectiveness Analysis of MRI for Patients with Asymmetric Sensorineural Hearing Loss**  
Houmehr Hojjat, MD, Detroit, MI; Peter F. Psvider, MD, Detroit, MI; Pedram Davoodian, BS, Detroit, MI; Adam J. Folbe, MD, Detroit, MI; Robert S. Hong, MD PhD, Detroit, MI; Mahdi Shkoukani, MD, Detroit, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to evaluate the cost effectiveness of magnetic resonance imaging (MRI) as a screening tool for diagnosis of an intracranial lesion among patients with asymmetric sensorineural hearing loss (A-SNHL).

**Objectives:** To evaluate the cost effectiveness of magnetic resonance imaging (MRI) as a screening tool for diagnosis of an intracranial lesion among patients with asymmetric sensorineural hearing loss (A-SNHL). **Study Design:** A decision tree was constructed to determine the incremental cost effectiveness ratio (ICER). Sensitivity analysis was utilized to calculate what the probability of detecting intracranial pathology would have to be to warrant MRI usage as a cost effective strategy. **Methods:** The decision pathways utilized were use of MRI IAC with gadolinium contrast versus observation in patients with A-SNHL and an asymmetric word recognition score. The probability of detecting intracranial pathology, treatability, and costs were extracted to construct the decision tree. The primary effectiveness was the ICER of MRI to provide a correct, treatable diagnosis. The outcomes included: treatable diagnosis (effectiveness = 1), untreatable diagnosis (effectiveness = 0.5), and incorrect diagnosis (effectiveness = 0). **Results:** The ICER of pursuing the MRI pathway vs. observation was \$25,018, below most acceptable willingness to pay (WTP) thresholds. The effectiveness of MRI and observation strategy were 0.54 and 0.45, respectively. Sensitivity analysis indicates that getting an MRI is more cost effective when the incidence of all intracranial pathology is above 8.8% at WTP threshold of \$30,000 and 5.3% at WTP threshold of \$50,000. **Conclusions:** This economic evaluation indicates that obtaining an MRI in patients with A-SNHL is a cost effective approach for diagnosis of intracranial pathologies.

## 10:17 Revision Surgery for Vestibular Schwannomas

Kevin Albert Peng, MD, Los Angeles, CA; Brian S. Chen, MD, Los Angeles, CA; Marc B. Lorenz, MD, Anchorage, AK; Marc S. Schwartz, MD, Los Angeles, CA; William H. Slattery, MD, Los Angeles, CA; Eric P. Wilkinson, MD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to summarize options for and the expected outcomes of patients undergoing revision microsurgical resection of vestibular schwannomas.

**Objectives:** To describe clinical outcomes of patients undergoing revision surgery for vestibular schwannomas. **Study Design:** Retrospective case series at a tertiary private neurotologic practice. **Methods:** Institutional review board approval was obtained. Patients who underwent revision surgeries for recurrent or residual vestibular schwannomas between January 1985 and June 2015 were identified. **Results:** 234 patients underwent 250 revision surgeries for recurrent or residual vestibular schwannomas. Of these, 86 patients carried a diagnosis of neurofibromatosis, type 2. The mean number of prior surgeries was 1.26, and 197 (85%) prior surgeries had been performed at other institutions. The average age at surgery was 43 (range, 12 to 88). The most common approach employed at the time of revision surgery was the translabyrinthine approach (217 surgeries, 87%), followed by transcochlear (14 surgeries, 6%), middle fossa (13 surgeries, 5%), and retrosigmoid (6 surgeries, 2%). Gross total resection was achieved in 212 surgeries (85%). Mean preoperative facial nerve function was 2.7 on the House-Brackmann scale; mean postoperative facial nerve function was 3.8 ( $p < 0.001$ , Wilcoxon signed-rank test). CSF fistulas were noted after 21 surgeries (8%); 6 patients (2%) required reoperation. **Conclusions:** To our knowledge, this is the largest series of revision surgery for vestibular schwannomas to date. Our preferred approach is the translabyrinthine craniotomy, which can be readily modified to include the transcochlear approach for improved tumor access. CSF fistula rates approach those of primary surgery, and gross total resection is an achievable goal in the vast majority of patients.

## 10:24 Facial Schwannomas of the Internal Auditory Canal Result in Sensorineural Hearing Loss Irrespective of Size and Location

Aaron K. Remenschneider, MD, Boston, MA; Robert Gaudin, BS, Boston, MA; Elliott D. Kozin, MD, Boston, MA; Tessa A. Hadlock, MD, Boston, MA; Michael J. McKenna, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, participants will understand that all patients presenting with a facial schwannoma, regardless of its location, should be screened for hearing loss. They will understand that conductive losses nearly always occur because of ossicular compression due to tympanic segment tumors. However, they will also learn that tumor location and size are not predictive of sensorineural hearing loss. Further research is necessary to better elucidate the biologic underpinnings of hearing loss in cases of both vestibular and facial schwannomas.

**Objectives:** Vestibular schwannomas (VS) and facial schwannomas (FS) frequently occupy similar locations within the fundus of the internal auditory canal (IAC), but little is known about the risk factors for hearing loss in patients with FS. Similar to VS, we hypothesize that the size and location of FS do not always correlate with hearing loss. **Study Design:** Retrospective case review. **Methods:** A review of all patients evaluated at our tertiary care center, presenting with facial weakness and facial schwannoma was performed. Demographic data, size of the tumor, anatomic segments involved, hearing loss type/severity and facial nerve function was recorded. **Results:** Thirty-one patients were identified with a mean age of 42 years (range: 1-67). 61% of patients were female. All patients presented with progressive facial weakness, ranging from House-Brackmann (HB) grade II to HB VI. Conductive hearing loss (CHL) or sensorineural hearing loss (SNHL) was present in 39% of patients. 29% of patients with tumors extending into the fundus of the IAC had SNHL. Patients with SNHL had tumors measuring in maximal dimension from 2.5mm to 20mm, with no correlation between size and severity of SNHL. No tumor eroded the cochlea. 57% of patients with unilateral SNHL had no evidence of IAC tumor growth. **Conclusions:** Facial nerve tumors are associated unilateral CHL and SNHL. The mechanism of SNHL is less likely cochlear nerve compression as distal segment FN tumors can also manifest SNHL. These data have implications for understanding potential molecular markers predictive of, or secretory factors resulting in, hearing loss for facial and



vestibular schwannomas.

**10:31 Persistent Oxidative Stress in Vestibular Schwannomas that Grow after Stereotactic Radiation Therapy**

Zachary N. Robinett, MD, Iowa City, IA; Girish Bathla, MD, Iowa City, IA; James Jason Clark, MS, Iowa City, IA; Bryan Allen, MD, Iowa City, IA; Marlan R. Hansen, MD, Iowa City, IA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) recognize the controversy that exists in the management of vestibular schwannomas; and 2) understand that tyrosine nitrosylation, a marker of oxidative cellular stress and a known effect of radiation, persists in vestibular schwannomas resected for regrowth up to 7 years after radiation therapy.

**Objectives:** Stereotactic radiation therapy is used to treat vestibular schwannomas (VSs) primarily and to treat tumor remnants following microsurgery. Little data are available regarding the effects of radiation on VS cells. Recent data indicate oxidative stress plays a role in the response of VS cells to radiation in vitro. Tyrosine nitrosylation was recently found to be a marker of oxidative stress following radiation in malignant tumors. It is not known how long these changes persist, and if such modifications occur in benign neoplasms such as VSs that may be more resistant to radiation damage. We immunostained sections from previously radiated VSs with an antibody that recognizes nitrosylated tyrosine residues to assess the extent of radiation induced oxidative stress. **Study Design:** Histological and immunohistochemical analysis. **Methods:** Four vestibular schwannomas, which recurred after microsurgical excision, were treated with stereotactic radiation therapy. Ultimately each tumor required salvage re-resection for regrowth. Histologic sections of each tumor before and after radiation were immunolabeled with a monoclonal antibody specific to nitrotyrosine and compared. **Results:** Tumors enlarged in volume by 3.16-8.62 mL over 3-7 years following radiation. Pre-radiation sections demonstrated little to no nitrotyrosine immunostaining. There was a significant increase in nitrotyrosine immunostaining in the post-radiation sections of each of the VSs compared to pre-radiation tumor sections. **Conclusions:** VSs exhibited oxidative stress up to seven years after radiotherapy. In spite of these radiation effects, the VSs exhibited ongoing growth. VSs may, therefore, be relatively radioresistant and may possess mechanisms for cell survival and proliferation despite radiation induced oxidative stress.

**10:38 - 10:45 Discussant:** Robert M. Owens, MD, Dallas, TX

**10:45 Change in Loneliness after Intervention with a Cochlear Implant or Hearing Aid**

Kevin J. Contrera, MPH, Baltimore, MD; Yoon K. Sung, MHS, Baltimore, MD; Joshua F. Betz, MS, Baltimore, MD; Lingsheng L. Li, MHS, Baltimore, MD; Caitlin R. Blake, MSPH, Baltimore, MD; Frank R. Lin, MD MPH, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the impact of hearing aids and cochlear implants on patient loneliness, social engagement, and mental health.

**Objectives:** To investigate the impact of hearing aid and cochlear implant use on loneliness in adults. **Study Design:** Prospective observational cohort study. **Methods:** 113 adults aged > 50 years with post-lingual hearing loss receiving routine clinical care at a tertiary academic medical center were evaluated with the UCLA Loneliness Scale before and 6 and 12 months after intervention with hearing aids or cochlear implants. Change in score was assessed using linear mixed effect models adjusted for age, gender, education, and history of hypertension, diabetes, and smoking. **Results:** A significant improvement in loneliness score was observed in cochlear implant users from baseline to 6 months (-3.79 [95% confidence interval (CI): -5.73, -1.85],  $P < .001$ ) and baseline to 12 months (-3.26 [95% CI: -5.66, -0.87],  $P = .007$ ). We did not observe a significant improvement in loneliness score in hearing aid users from baseline to 6 months (-0.83 [95% CI: -2.68, 1.02],  $P = .381$ ) or baseline to 12 months (-0.34 [95% CI: -2.77, -2.10],  $P = .007$ ). The most substantial increases were observed in individuals with the lowest baseline scores. **Conclusions:** Treatment of hearing loss with cochlear implants results in a significant reduction in loneliness symptoms. This improvement was not observed with hearing aids. We observed differential effects of treatment depending on the level of baseline loneliness score with the greatest improvements observed in those with the lowest scores.

**10:52 Do Cognitive Measures Explain Outcome Variability for Adults with Cochlear Implants?**

Aaron C. Moberly, MD, Columbus, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss cognitive abilities that may play a role in speech recognition for patients with cochlear implants.

**Objectives:** Unexplained variability in speech recognition outcomes among postlingually deafened adults with cochlear implants (CIs) is an enormous clinical and research barrier to progress. This variability is only partially explained by patient factors (e.g., duration of deafness) and auditory sensitivity (e.g., spectral and temporal resolution). This study sought to examine whether nonauditory, nonverbal cognitive skills could explain speech recognition variability exhibited by adult

CI users. In addition, this study examined whether the experience of hearing loss was associated with declines in these cognitive skills. **Study Design:** Thirty postlingually deafened adults with CIs and thirty age matched normal hearing (NH) controls were enrolled. **Methods:** Participants were assessed for recognition of words in sentences in quiet and in noise, along with several measures of nonauditory cognitive function from the Leiter 3 International Performance Scale. These tasks assessed fluid intelligence (problem solving), memory, attention, and inhibition abilities. **Results:** Nonauditory, nonverbal cognitive scores were similar between CI and NH groups. Interestingly, for CI users, scores of attention and inhibition abilities predicted recognition of sentences in quiet and in noise; however, similar effects were not seen for NH listeners. **Conclusions:** Some nonauditory, nonverbal cognitive skills appear to play roles in speech recognition, but these roles appear to be different for CI and NH listeners. Measures of cognition can predict variability in speech recognition outcomes for adult CI users, suggesting potential novel targets for intervention.

## 10:59 **The Influence of Subway Station Design on Noise Exposure**

Ravi R. Shah, BS, New York, NY; Jonathan J. Suen, MS, New York, NY; Ilana P. Cellum, AuD, New York, NY; Jaclyn B. Spitzer, PhD, New York, NY; Anil K. Lalwani, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare factors that affect sound levels in subway stations and discuss methods to reduce commuter noise exposure.

**Objectives:** To determine whether subway station design affects noise levels on the station platform. **Study Design:** Observational. **Methods:** Continuous A-weighted sound levels were recorded in 20 subway stations in a major metropolitan transit system. Trains entered on a straight track in 10 of these stations and a curved track in the remaining 10. Six samples were taken in each station, for a total of 120 samples. Equivalent continuous noise levels (Leq) were compared between the straight and curved stations. A subanalysis compared Leq at various locations on the boarding platform (inbound end, mid-platform, and outbound end) during train entry and exit. **Results:** Curved stations trended louder than straight stations, although the difference did not reach statistical significance (curve, 83.4 dB(A); straight, 82.6 dB(A);  $p=0.054$ ). Noise levels were loudest at the inbound end of the platform during train entry (inbound, 89.7 dB(A); mid, 85.5 dB(A); outbound, 78.7 dB(A);  $p<0.001$ ), and loudest at the outbound end during train exit (inbound, 79.7 dB(A); mid, 85.3 dB(A); outbound, 89.1 dB(A);  $p<0.001$ ). **Conclusions:** Curved stations demonstrated a clear trend of higher sound levels compared to straight stations. A larger sample, octave band frequency analysis, and stratification of stations by degree of curvature may yield significant results and illustrate a relationship between increasing curvature and sound level. Designing future stations with straight tracks and sound barriers between entering trains and the boarding platform can help reduce commuter noise exposure.

## 11:06 **Medial Canal Fibrosis: An Institutional Review and Meta-Analysis of Short and Long Term Outcomes**

Robert G. Keller, MD, Charleston, SC; Adrian A. Ong, MD, Charleston, SC (Presenter); Shaun A. Nguyen, MD MA, Charleston, SC; Brendan P. O'Connell, MD, Nashville, TN; Paul R. Lambert, MD, Charleston, SC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the expected short and long term clinical and audiometric outcomes after surgery for post-inflammatory medial canal fibrosis and to better counsel patients during the perioperative period.

**Objectives:** Few studies report outcomes of surgical management of post-inflammatory medial canal fibrosis (PIMCF). The objectives of the current study were to compare short and long term outcomes after surgical repair of PIMCF at our institution, and systematically aggregate published outcomes data for meta-analysis. **Study Design:** Retrospective chart review, meta-analysis. **Methods:** Patients undergoing canaloplasty +/- meatoplasty with split thickness skin graft canal reconstruction for PIMCF were identified. Short term (<2 years) and long term (>2 years) postoperative clinical and audiometric outcomes were evaluated for the case series and aggregated for the meta-analysis. **Results:** At our institution, 16 patients (21 ears) were identified. Compared to the preoperative ABG ( $40.0\pm 13.0$ dB), mean postoperative short term ABG ( $8.1\pm 7.4$ dB,  $p<0.001$ ) and long term ABG ( $15.3\pm 11.3$ dB,  $p=0.012$ ) were significantly improved, although this improvement diminished over time. While short term restenosis rate was low (0%), among long term followup patients, 64% (9/14) experienced some degree of recurrent canal narrowing, including one case of complete restenosis (5%). Similar to findings in our cohort, meta-analysis demonstrated postoperative improvement in short and long term ABG from baseline (-19.2dB, 95% CI, -28.0 to -10.5,  $p<0.001$  and -15.9dB; 95% CI, -25.8 to -6.1;  $p<0.001$ , respectively), with long term deterioration in hearing (mean ABG 4.4dB,  $p=0.023$ ). Long term complete restenosis rate (12%) was worse than short term (7%), although this did not achieve significance ( $p=0.28$ ). **Conclusions:** PIMCF is a rare condition that can successfully be treated with surgery to restore patency of the external auditory canal. Patients experience improved hearing early on, however, are at significant risk of restenosis and recurrence of their conductive hearing loss with time.

11:13 - 11:20 **Discussant:** Lawrence R. Lustig, MD FACS, New York, NY

**11:20 - 11:55 Panel: Hearing Loss in Elderly Patients: Case Presentations**

**Moderator:** Harold C. Pillsbury, MD FACS, Chapel Hill, NC

**Panelists:** Oliver F. Adunka, MD, Columbus, OH  
Colin L.W. Driscoll, MD, Rochester, MN  
Howard W. Francis, MD, Baltimore, MD  
David S. Haynes, MD, Nashville, TN  
Cliff A. Megerian, MD FACS, Cleveland, OH

**12:00 Adjourn**

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

Friday



# SATURDAY, MAY 21, 2016

7:00 Business Meeting (TRIO Fellows only)

8:00 Welcome by President  
Fred D. Owens, MD, Dallas, TX

8:00 - 5:00 SCIENTIFIC SESSION

8:00 - 9:25 - HEAD AND NECK  
GRAND E/F

8:00 - 8:35 Panel: High Risk HPV Associated Oropharyngeal Cancer  
Moderator: Mark C. Weissler, MD FACS, Chapel Hill, NC  
Panelists: Robert L. Ferris, MD PhD FACS, Pittsburgh, PA  
Eric M. Genden, MD FACS, New York, NY  
Cherie-Ann Nathan, MD FACS, Shreveport, LA  
Erich M. Sturgis, MD FACS, Houston, TX

Moderators: M. Boyd Gillespie, MD MSc FACS, Charleston, SC  
Mark K. Wax, MD FACS, Portland, OR

8:35 The Selective Neck Dissection: p16 Positive Oropharyngeal Squamous Cell Carcinoma  
Joseph Zenga, MD, St. Louis, MO; Evan M. Graboyes, MD, St. Louis, MO; Parul Sinha, MD, St. Louis, MO; Ryan S. Jackson, MD, St. Louis, MO; Eric J. Moore, MD, Rochester, MN; Bruce H. Haughey, MBChB MS, St. Louis, MO

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the technique and outcomes of selective neck dissection with resection of additional structures as indicated for patients with p16 positive squamous cell carcinoma who present with clinical neck disease.

**Objectives:** To examine outcomes of selective neck dissection (SND) with additional resection as indicated in patients with p16 positive oropharyngeal squamous cell carcinoma (OPSCC) who present with clinical neck disease. **Study Design:** Multi-institutional retrospective review. **Methods:** Two institutional databases with previously untreated p16 positive OPSCC patients, yielding those with clinical neck disease who underwent SND +/- adjuvant therapy. **Results:** 324 patients were identified with a median followup of 49 months (range 2-199 months). 176 (54%) presented with cN2b-N3 disease. All patients underwent transoral resection of the primary tumor and SND, including levels II-IV, +/- levels I or V, with resection of additional tissue (modified SND) as indicated by extent of disease: the spinal accessory nerve (7%), the internal jugular vein (13%), and the sternocleidomastoid muscle (8%). Extracapsular spread presented in 71%. 270 (83%) underwent adjuvant radiation, with the addition of chemotherapy in 148 (46%). There were 13 (4%) regional recurrences and 19 (6%) distant recurrences. On univariate analysis, absence of radiation was associated with regional recurrence (p=0.001). Five year Kaplan-Meier estimates for overall survival and disease specific survival were 88% (95%CI 84-92%) and 93% (95%CI 89-96%). **Conclusions:** In p16 positive OPSCC presenting with clinical neck disease, a SND with or without additional tissue resection and adjuvant therapy where indicated provides excellent long term regional control. Omission of radiotherapy may increase the risk of regional recurrence. It appears unnecessary to routinely perform a comprehensive neck dissection.

8:42 Incidence of Contralateral-Bilateral Nodes in the HPV Era  
Andrew G. Tritter, MD, Shreveport, LA; Ashley M. Twyman, BS, Shreveport, LA; Ginger L. Degraevelle, BS, Shreveport, LA; Amol Takalkar, MD, Shreveport, LA; Gloria Caldito, PhD, Shreveport, LA; Cherie-Ann O. Nathan, MD, Shreveport, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss incidence of contralateral/bilateral nodes in HPV+ squamous cell carcinoma of the oropharynx, as well as the associated implications for treatment.

**Objectives:** HPV positive oropharyngeal SCC (OPSCC) has a more favorable prognosis when compared

to HPV negative disease, regardless of the presence of nodal metastases. However, the importance of treating the contralateral neck based on HPV status has not been well studied. Given the historical poor prognostic implications of cervical nodal metastases, this study sought to elucidate the relationship between HPV status and contralateral or bilateral (CB) nodal metastasis in patients with OPSCC. **Study Design:** Retrospective cohort analysis. **Methods:** Data was collected on patients with OPSCC from 2001-2014. Nodal status was determined by PET imaging or surgical pathology when available. Survival rates and associations between HPV status and other categorical factors, such as race, gender, tobacco use, and primary tumor site/size were assessed. **Results:** Of 178 total patients with OPSCC, forty-six (26.0%) had CB metastasis. There was no significant difference in incidence of CB metastasis between HPV positive and negative patients (24.6% vs. 29.1%,  $p=0.53$ ). Tonsil primaries had significantly lower incidence of CB nodes compared to BOT or other oropharyngeal site (20.9% vs. 34.3%,  $p=0.048$ ). On multivariate regression, tumor size was the only factor associated with CB metastases (T4 vs. T1-3 OR = 5.15, 95% CI = 2.4 - 11.2). Five year survival among patients with and without CB metastasis was 57.3% and 67.9%, respectively ( $p=0.12$ ). **Conclusions:** We show no significant difference in incidence of CB metastasis between HPV positive and negative patients. T4 stage and BOT primary location, however, were associated with contralateral disease. Hence, bilateral necks should be treated in these cases, regardless of HPV status.

## 8:49 Evaluating Trends in the Reconstruction of Total Glossectomy Defects: A 20 Year Review

John W. Frederick, MD, Los Angeles, CA; Edward C. Kuan, MD, Los Angeles, CA; Karam W. Badran, MD, Los Angeles, CA; Elliot Abemayor, MD PhD, Los Angeles, CA; Keith E. Blackwell, MD, Los Angeles, CA; Maie A. St. John, MD PhD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the reconstruction options and expected outcomes for total glossectomy defects.

**Objectives:** In this study, we evaluate trends in total glossectomy reconstruction. To this end, patient demographic and clinicopathologic characteristics, reconstruction technique, surgical complications, survival, and functional outcomes will be reported. **Study Design:** Retrospective chart review of all patients who underwent total glossectomy as a singular procedure or as part of a composite resection between January 1, 1995 and January 1, 2015. **Methods:** All patients undergoing total glossectomy from January 1, 1995 to January 1, 2015 were included in the analysis. Patients were then separated into four groups of five year spans based on date of surgery. The groups were designated as A (prior to 2000), B (2001-2005), C (2006-2010), and D (after 2010). **Results:** A total of 48 patients were identified to have undergone total glossectomy for oncologic resection. The majority of the patients were male (60%) with a mean age of 56 (range, 29-92). Groups A, B, C, and D had 11, 14, 9, and 14 patients, respectively. All reconstruction techniques involved free tissue transfer. The most common flap type used was rectus abdominis, accounting for 40% of all reconstructions. Fibula and anterolateral thigh flaps were used in 25% and 23%, with radial forearm and subscapular system flaps being used in only 8 and 4% of reconstructions. Free flap survival was found to be 100% with no flap related complications. Multivariate analysis between all treatment groups revealed a significant change in flap choice over time ( $P < 0.001$ ) as well as change in time to decannulation ( $P < 0.05$ ). Free flap selection did not correlate to overall survival, functional outcome, or length of hospital stay ( $P > 0.5$ ). **Conclusions:** Total glossectomy defects can be successfully reconstructed with a variety of free flap options.

8:56 - 9:03 Discussant: M. Boyd Gillespie, MD MSc FACS, Charles, SC

## 9:03 Supraclavicular Artery Island Flap for Pharyngeal Reconstruction: Retrospective Case Series and Literature Review

Adam C. Satteson, MD, Winston-Salem, NC; Matt L. Rohlfing, BS, Winston-Salem, NC; Josh D. Waltonen, MD, Winston-Salem, NC; Christopher A. Sullivan, MD, Winston-Salem, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the versatility, outcomes and complications of pharyngeal reconstruction using the supraclavicular artery island flap.

**Objectives:** To evaluate a single institution's experience with the supraclavicular artery island flap (SCAIF) for pharyngeal reconstruction. **Study Design:** Retrospective case series and literature review. **Methods:** Patients who underwent surgery for laryngeal/hypopharyngeal malignancies were identified. Those who underwent SCAIF reconstruction were reviewed. Demographics, comorbidities, tumor site/stage, prior treatment, resection defect, reconstruction type, surgical technique, swallowing outcomes and complications were reviewed. PubMed search of relevant SCAIF literature was performed. **Results:** Thirteen patients underwent resection with SCAIF reconstruction categorized as follows: 1. Total laryngectomy with primary closure and SCAIF pharyngeal interposition graft (PIG) to support the suture line (4). 2. Total laryngectomy including anterior neck skin with primary closure and SCAIF reconstruction of skin defect (2). 3. Total laryngectomy with partial pharyngectomy and SCAIF patch graft (5). 4. Total laryngopharyngectomy with cervical esophagectomy and tubed SCAIF (2). Average defect size was 7x10cm, (range 5-8x6-14cm). Flap survival was 100%. There was one case of distal flap necrosis. There were no donor site complications. Spontaneous fistulas occurred in 6/13 patients (46%). Two fistulas required definitive closure with a second (pectoralis major) flap. All patients resumed a regular diet after recovery. **Conclusions:** Pharyngeal reconstruction with the SCAIF is characterized by simple harvest of

a thin, pliable flap that provides reliable closure of moderate to large pharyngeal defects with an acceptable rate of fistula formation. Use of a de-epithelialized flap to support pharyngeal closure is a unique application of this flap with low donor site morbidity. Tubed SCAIFs can be considered for defects up to 8 cm in craniocaudal dimension.

**9:10                    Reirradiation for Head and Neck Cancer: Safety, Complications and Survival**

Ariel B. Grobman, MD, Miami, FL; Mikhailo Szczupak, MD, Miami, FL; Michael T. Scott, MD, Miami, FL; Chetan S. Nayak, MD, Miami, FL; Zoukaa B. Sargi, MD MPH, Miami, FL; Michael Samuels, MD, Miami, FL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the effects of head and neck reirradiation on patient survival, demonstrate the incidence of severe radiation related toxicity in this patient cohort and to improve pretreatment counseling.

**Objectives:** Understand outcomes after reirradiation to improve pretreatment counseling of patients with recurrent head and neck cancer. Determine the overall survival (OS) and progression free survival (PFS) after reirradiation. Determine the incidence of severe complications associated with reirradiation. **Study Design:** Retrospective and prospective chart review database. **Methods:** Patients who received two courses of radiation to the head and neck at our institution from year 2000 until the time of submission were included. Data was analyzed to determine complications as well as OS and PFS with Kaplan Meier curves. Toxicities were graded using the Common Terminology Criteria for Adverse Events (CTCAE) version 4.0. Severe complications were defined as grade 3-5 toxicities. **Results:** A total of 54 patients was included. Thirty-one patients had progression of disease and 35 patients died. The median interval between reirradiation and death was 8.3 months. Eighteen patients had no evidence of disease at last followup. Median PFS was 8.2 months with median time to progression 4.4 months. One and two year PFS were 41.7% and 28.5% respectively. Median OS was 16.6 months. One and two year OS were 58.2% and 40.2% respectively. Severe toxicities after reirradiation included wound complications (43%), tracheostomy (21%) and vascular complications (9%) Three deaths from carotid blowout were attributed to effects of reirradiation. **Conclusions:** Patients undergoing reirradiation for head and neck cancer demonstrate high risk of disease progression or recurrence. However, reirradiation offers a modest chance of disease eradication despite its toxicities. The incidence of severe toxicities is high enough to warrant appropriate pre-treatment counseling with patients.

**9:17                    Risk Factors for Hospital Readmission after Neck Dissection: Analysis of the 2011 National Surgical Quality Improvement Program**

Rijul S. Kshirsagar, BS, Irvine, CA; Zachariah K. Chandy, BA, Irvine, CA; Hossein Mahboubi, MD MPH, Irvine, CA; Vini Balakrishnan, MS, Irvine, CA; Sunil P. Verma, MD, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare risk factors associated with unplanned readmission rates following neck dissection.

**Objectives:** Hospital readmission rates are an indicator of the quality of surgical care. The aim of this study was to determine the 30 day unplanned readmission rate following neck dissection and identify associated risk factors. **Study Design:** Retrospective analysis was performed using the 2011 American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) dataset. **Methods:** All patients who underwent neck dissection in 2011 were identified from the ACS-NSQIP database. Univariate analysis and multivariate logistic regression were used to determine independent risk factors associated with unplanned readmission. **Results:** Data from 2304 patients who underwent neck dissection were analyzed. The overall rate of unplanned readmission was 4.5% or 103 patients. Univariate analysis showed significant association ( $p < 0.05$ ) between readmission and increased age, diabetes, current smoking status, dyspnea, decline in functional status, history of COPD, history of CHF, hypertension, dialysis, disseminated cancer, weight loss  $> 10\%$ , history of bleeding disorder, and increased total work relative value unit (RVU). Multivariate logistic regression demonstrated independent risk factors for readmission including dyspnea (odds ratio [OR] = 2.31; 95% confidence interval [CI]: 1.27-4.21;  $p = 0.006$ ) and hypertension (OR = 2.11; 95% CI: 1.31-3.39;  $p = 0.002$ ). **Conclusions:** This study estimates the readmission rate following neck dissection to be 4.5%. Dyspnea and hypertension were determined to be significant risk factors for readmission. This finding may help identify individuals at higher risk of readmission who might benefit from closer postoperative observation following neck dissection.

**9:24 - 9:31            Discussant:** Mark K. Wax, MD FACS, Portland, OR

**9:31 - 9:55            Break/View Posters - Riverside Center**

**9:55 - 10:25        Ogura Lecture**  
**The Changing Fabric of Health Care**  
 Jonas T. Johnson, MD FACS, Pittsburgh, PA

10:25 - 12:00 - RHINOLOGY  
GRAND E/F

**10:25 - 11:00 Panel: Managing Patients with Maximal Sinus Complaints and Minimal Sinus Disease on CT**

**Moderator:** Adam M. Zanation, MD, Chapel Hill, NC  
**Panelists:** Sandra Y. Lin MD, Baltimore, MD  
Ralph B. Metson, MD FACS, Boston, MA  
Brent A. Senior, MD FACS, Chapel Hill, NC

**Moderators: Subinoy Das, MD FACS, Columbus, OH  
Brent A. Senior, MD FACS, Chapel Hill, NC**

**11:00 General Antibiotic Exposure Is Associated with an Increased Risk of Developing Chronic Rhinosinusitis without Nasal Polyps: A Case Control Study**

Alice Z. Maxfield, MD, Boston, MA; Hakan Korkmaz, MD, Ordu, Turkey; Luciano L. Gregorio, MD, Boston, MA; Nicolas Y. Busaba, MD, Boston, MA; Stacey T. Gray, MD, Boston, MA; Benjamin S. Bleier, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the impact of antibiotic exposure on patients with CRSsNP and the significant risk factor it poses in the development of CRS.

**Objectives:** Antibiotic use and chronic rhinosinusitis (CRS) have been independently associated microbiome diversity depletion and opportunistic infections. This study was undertaken to investigate whether antibiotic use may be an unrecognized risk factor for developing CRS. **Study Design:** Case control study of 1,162 patients referred to a tertiary sinus center for a range of sinonasal disorders. **Methods:** Patients diagnosed with CRS according to established consensus criteria (n=410) were assigned to the case group (273 without nasal polyps[CRSsNP] and 137 with nasal polyps[CRSwNP]). Patients with all other diagnoses (n=752) were assigned to the control group. CRS disease severity was determined using a validated quality of life (QOL) instrument. The class, diagnosis, and timing of previous non-sinusitis related antibiotic exposures were recorded. Results were validated using a randomized administrative data review of 452 (38.9%) of patient charts. The odds ratio of developing CRS following antibiotic exposure as well as the impact of antibiotic use on the subsequent QOL was calculated. **Results:** Antibiotic use significantly increased the odds of developing CRSsNP (odds ratio[OR]: 2.21, 95% confidence interval[CI], 1.66-2.93, p<0.0001) as compared to non-users. Antibiotic exposure was significantly associated with worse CRS QOL scores (p = 0.0009) over at least the subsequent 2 years. These findings were confirmed by the administrative data review. **Conclusions:** Use of antibiotics more than doubles the odds of developing chronic rhinosinusitis without nasal polyps and is associated with a worse QOL for at least 2 years following exposure. These findings expose an unrecognized and concerning consequence of general antibiotic use.

**11:07 Can Public Tap Water Be Rendered Safe for Nasal Saline Irrigations?**

Allison G. Ordemann, MD, Jackson, MS; James K. Stanford II, BS, Flowood, MS; John M. Reed, MD, Jackson, MS; Donna C. Sullivan, PhD, Jackson, MS

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the three current FDA recommended methods of sterilely preparing a sinonasal irrigant and compare them to the suggested alternative of use of ultraviolet light.

**Objectives:** To compare sterile water to three methods of sterilization (carbon filtration, boiling, and UV light) for preparation of nasal saline irrigants free of bacterial and amebic contaminants. **Study Design:** Bench top translational research, cost comparison. **Methods:** Sterile water was compared to common sterilization methods. Sterile water was contaminated with known concentrations of staphylococcus aureus, pseudomonas aeruginosa, Moraxella catarrhalis, Acinetobacter baumannii, klebsiella pneumonia, legionella pneumophila, and Naegleria fowleri. Test samples were subjected to boiling, carbon filtration or ultraviolet light (UV) and then cultivated on appropriate media. Controls included samples of sterile water (negative control) and untreated test samples (positive control). **Results:** Carbon filtration reduced but did not eliminate the number of organisms present in test samples. Boiling test samples for 5 minutes and UV light treatment resulted in sterilization of all organisms. Negative (sham contaminated) samples produced no growth while positive (untreated) samples grew numerous organisms as expected. A cost comparison between bottled water and UV water sterilization (with SteriPEN® Ultra) became equal in less than two years of consistent use. **Conclusions:** Carbon filtration reduces contamination but does not sterilize water and is thus unsafe for preparation of nasal saline irrigant. Boiling and UV treatment resulted in sterilization and are equivalent to purchased sterile water. Ultraviolet treatment was found to be safe, convenient, and a cost effective alternative to purchased sterile water.



**11:14 Olfactory Outcomes after Endoscopic Sinus Surgery in Patients with Eosinophilic and Non-Eosinophilic Chronic Rhinosinusitis**

Camilo Reyes, MD, Augusta, GA; Daniel Carroll, MD, Augusta, GA; Madison Pumphrey, BS, Augusta, GA; Thomas Holmes, BS, Augusta, GA; Stilianos E. Kountakis, MD PhD, Augusta, GA

**Educational Objective:** At the conclusion of this presentation participants should be able to understand the difference in olfactory outcomes following surgery in patients with eosinophilic and non-eosinophilic chronic rhinosinusitis.

**Objectives:** Compare olfactory outcomes in patients with eosinophilic (eCRS) and non-eosinophilic (neCRS) with regard to subjective symptom scoring. **Study Design:** Prospective study. **Methods:** A patient's database compiled at a tertiary referral institution in an academic rhinology practice was reviewed. Olfactory compromise from the Sinonasal Outcome Test (SNOT-20) was compared from eCRS and neCRS patients before and after surgery. Patients on a visual analog scale from 0-5 rated olfactory compromise before and after surgery (5 indicates severe compromise). Average followup was 18 months. **Results:** Fifty-one eCRS patients and 29 neCRS patients were identified that met inclusion criteria. Preoperative average olfactory compromise was worse in eCRS patients compared to neCRS patients (3.38 vs 1.96 respectively,  $p=0.0001$ ). Both groups improved postoperatively to 1.71 for eCRS patients (49%,  $p=0.0001$ ) and 1.14 for neCRS patients (41%,  $p=0.04$ ). When postop average olfactory dysfunction was compared between the two groups, the difference was not statistically significant ( $p=0.08$ ). **Conclusions:** Patients with eCRS have higher preoperative olfactory compromise than neCRS patients. Both groups have significant improvement postoperatively; however, eCRS patients experience a higher recovery in olfactory function after surgery. Compared to the literature, our eCRS patients had a higher degree of improvement in olfactory dysfunction than previously published studies.

**11:21 - 11:28 Discussant:** Brent A. Senior, MD FACS, Chapel Hill, NC

**11:28 Oncological Outcomes of Endoscopic Endonasal Surgery for Olfactory Neuroblastoma**

Carl H. Snyderman, MD MBA, Pittsburgh, PA; Eric W. Wang, MD, Pittsburgh, PA (Presenter); Paul A. Gardner, MD, Pittsburgh, PA; Juan C. Fernandez-Miranda, MD, Pittsburgh, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand the oncologic principles of endoscopic endonasal surgery for olfactory neuroblastoma; 2) develop a treatment plan for the treatment of olfactory neuroblastoma; and 3) describe the surgical technique of endoscopic endonasal surgery for olfactory neuroblastoma.

**Objectives:** The role of endoscopic endonasal surgery for the treatment of olfactory neuroblastoma has not been completely established. The literature is limited by small sample sizes, selection bias, and limited followup. We report our experience with endoscopic endonasal surgery for olfactory neuroblastoma and the oncologic outcomes in a series of 74 consecutive patients with five year followup. **Study Design:** Retrospective case series. **Methods:** A retrospective review of all patients with olfactory neuroblastoma treated at our institution from 1994 to 2015 was performed. Demographic, staging, treatment, pathologic, and outcomes data were collected. **Results:** Seventy-four patients with an average age of 51 and a male:female ratio of 46:28 were included in this study. All patients underwent primary surgical resection. Eighty percent of surgeries were completely endoscopic; 20% were open or combined. Adjuvant radiation therapy was provided to 50% of patients. Negative surgical margins were achieved in 88% of patients. With an average followup of 58 months, 87% of patients are disease free or dead of other causes. There was no significant difference in survival based upon the surgical approach. **Conclusions:** Endoscopic endonasal surgery appears to be as effective as open techniques for the treatment of olfactory neuroblastoma. Adherence to oncologic principles must be preserved regardless of surgical approach. Continued followup is needed to determine the incidence of late recurrences.

**11:35 Impact of Resident Involvement in Outpatient Otolaryngology Procedures: An Analysis of 17,647 Cases**

Andrew B. Baker, BS, Charleston, SC; Adrian A. Ong, MD, Charleston, SC; Brendan P. O'Connell, MD, Nashville, TN; Alexander D. Sokohl, MD, Charleston, SC; William B. Clinkscales, BS, 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 impact of resident participation in outpatient otolaryngologic surgeries on both patient safety and length of operation.

**Objectives:** To examine the impact of resident physician participation on postoperative outcomes in outpatient otolaryngologic surgery. **Study Design:** Retrospective cohort. **Methods:** The ACS-NSQIP database was queried for outpatient otolaryngologic procedures performed on adult patients. Cases were analyzed with the following cohorts: attending with resident or attending without resident. Outcomes included complications, readmission, reoperation, and operative time. **Results:** A total of 17,647 cases were analyzed, with 13,123 patients in the attending without resident cohort and 4,524 patients in the attending with resident cohort. The majority of patients were female (58.7%) and white (88.0%). The average age was 44 (range 16-89) years and average BMI was  $29.0 \pm 7.3$  kg/m<sup>2</sup>. Total RVU was higher in the attending with

# Saturday

resident group  $14.6 \pm 12.0$  compared with  $10.2 \pm 8.3$  in the attending without resident group ( $p < 0.01$ ). Univariate analysis revealed that resident participation increased complication rate (2.0% vs. 1.4%,  $p < 0.01$ ) and operative time ( $108 \pm 98$  minutes vs.  $60 \pm 55$  minutes,  $p < 0.01$ ). There were no differences in readmissions ( $p = 0.35$ ), reoperations ( $p > 0.05$ ) or death rates ( $p = 0.32$ ) between groups. Multivariate regression analysis, however, revealed that resident participation did not increase the rate of any complication and that operative time was the only significantly impacted variable ( $p < 0.01$ ).

**Conclusions:** Resident surgical training remains a vital component of the current healthcare system. Previous research has shown that despite increased operative time, resident participation does not significantly impact complication rates for inpatient procedures. This study confirms these findings in the outpatient setting, thus reassuring both the surgeon and patients that resident participation does not impact procedural safety.

## 11:42 **A Model to Demonstrate the Importance of L-Strut Thickness in Nasal Septal Strength**

Yuan F. Liu, MD, Loma Linda, CA; Kelton E. Messinger, BS, Loma Linda, CA; Jared C. Inman, MD, Loma Linda, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand how nasal septal L-strut thickness and width contribute to the strength of the nasal septum, and to assess how wide of an L-strut to preserve based on its inherent or altered thickness (i.e. cartilage grafting).

**Objectives:** To create a physical model for the cartilaginous nasal septum, and to mathematically model how L-strut thickness and width contribute to nasal septal strength. **Study Design:** Physical and mathematical modeling. **Methods:** Using 0.10 and 0.15 mm paper bonded by spray adhesive, 270 L-shaped nasal septal models were constructed with thicknesses from 0.5 to 4 mm and limb widths from 5 to 20 mm. A force gauge was used to find the yield strength of L-strut models by compression until permanent deformation occurs. Best fit curves were applied to yield strength versus L-strut thickness or width. A 3D surface map was generated to simultaneously model all variables. The tensile strength of paper was measured. **Results:** Yield strength varied with L-strut thickness exponentially (mean correlation coefficient  $R^2 = 0.9312$ ) for given widths, while it varied only linearly (mean  $R^2 = 0.8218$ ) or logarithmically (mean  $R^2 = 0.8502$ ) with L-strut width for given thicknesses. A 3D surface model of yield strength with L-strut thickness and width as variables was created using a 2D Gaussian function ( $R^2 = 0.9348$ ). A table of yield strengths was generated from the 3D model to allow determination of desired yield strength with different permutations of L-strut thickness and width. The tensile strength of paper was 28.5 MPa, compared to 12.4 MPa for septal cartilage in the literature. **Conclusions:** Nasal septal L-strut thickness contributes significantly more to nasal septal strength than L-strut width. L-strut strength with various combinations of thickness and width can be estimated using the model generated in this study.

11:49 - 11:56 **Discussant:** Subinoy Das, MD FACS, Columbus, OH

12:00 - 1:00 **Lunch break**

1:00 - 2:55 - PEDIATRICS, LARYNGOLOGY & SLEEP  
GRAND E/F

## 1:00 - 1:30 **Panel: Who's the Boss of Airway in Surgery - Otolaryngology or Anesthesiology?**

**Moderator:** C. Gaelyn Garrett, MD, MMHC, Nashville, TN

**Panelists:** Mark S. Courey, MD, New York, NY  
Hassan H. Ramadan, MD FACS, Morgantown, WV  
Timothy L. Smith, MD MPH FACS, Portland, OR

**Moderator: Kristina W. Rosbe, MD FACS, San Francisco, CA**

## 1:30 **Open Resection of Long Segment Laryngotracheal Resection in High Risk Patients**

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

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) identify laryngotracheal reconstruction patients who are at high risk for complications; and 2) identify some pre and postoperative interventions that may reduce the incidence of complications in this population.

**Objectives:** Subglottic and tracheal stenosis is one of the most difficult conditions treated by the otolaryngologist. Recurrences are common after endoscopic management and multiple procedures are required. Open resection is the definitive treatment for this condition. However, some patients are considered high risk candidates for open airway surgery and outcomes in this group have not been presented. In this study, we identify a series of high risk patients who underwent open laryngotracheal surgery and detail their postoperative course and outcomes. **Study Design:** Retrospective chart review. **Methods:** A retrospective review of all patients that underwent airway resection and anastomosis for long segment laryn-

gotracheal stenosis performed and high risk patients were identified. Postoperative complications and ultimate airway outcomes were noted. **Results:** Nine patients fitting high risk category were identified. Comorbidities poorly controlled diabetes mellitus (N=4), uncontrolled hypertension (N=4), end stage renal disease requiring hemodialysis (N=3), poorly controlled asthma and COPD (N=3), and history of radiation therapy (N=1). In this case series all high risk laryngotracheal reconstruction patients suffered postoperative complications of varying degree. The most common complications include postoperative infection, formation of granulation tissue at the anastomotic site and postoperative hematoma. Those patients with the best outcomes were those whose blood pressure and glucose remained well controlled, patients who received postoperative steroids as well as those who underwent regular dialysis when indicated. **Conclusions:** Medical comorbidities do not have to be a contraindication to laryngotracheal reconstruction. However, this experience emphasizes the importance of preoperative medical optimization and comprehensive postoperative care.

**1:37 National Incidence of Vocal Fold Paralysis following Intubation: Characteristics Associated with Diagnosis**

Sophie G. Shay, MD, Los Angeles, CA; Rachel Mandelbaum, BS, Los Angeles, CA; Joshua Quint, MPH, Los Angeles, CA; Abie H. Mendelsohn, MD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss racial and socioeconomic factors affecting diagnosis of intubation related vocal fold paralysis. Participants should be able to demonstrate the incidence and healthcare burden of vocal paralysis following intubation.

**Objectives:** Vocal fold paralysis (VFP) is an uncommon complication of intubation that often presents subtly. However, VFP can also result in significant morbidity, warranting further workup and intervention. The current study sought to determine the national incidence and associated predictors of VFP following intubation. **Study Design:** Secondary analysis of a national healthcare database. **Methods:** All adults (age > 18.0 years) intubated between calendar years 2001-2011 were extracted from the Nationwide Inpatient Sample. Diagnosis of VFP was defined as unilateral or bilateral, paralysis or paresis. Demographic data and admission characteristics were extracted. **Results:** There were 737,316 patients intubated, amongst which 19,369 patients (2.63%) were diagnosed with VFP. Patients with intubation related VFP were hospitalized 7.6 extra days ( $p < 0.001$ ), and accrued an additional \$57,018 in hospital charges ( $p < 0.001$ ). Black patients were less likely diagnosed with VFP than white patients (odds ratio [95% confidence interval], 0.87 [0.79-0.96],  $p = 0.0067$ ). Patients from the highest income quartile were more likely diagnosed with VFP than the three lower income quartiles (1.31 [1.19-1.45],  $p < 0.001$ ). Privately insured patients were more likely diagnosed with VFP than those with Medicaid (0.70 [0.63-0.79],  $p < 0.001$ ), Medicare (0.72 [0.67-0.77],  $p < 0.001$ ), or without healthcare coverage (0.50 [0.42-0.60],  $p < 0.001$ ). **Conclusions:** VFP following intubation results in significantly greater healthcare costs and resources. White and higher socioeconomic status (SES) patients are most likely to be diagnosed with intubation related VFP. Lower SES and black patients are less likely to be diagnosed with VFP following intubation, suggesting potentially unrecognized VFP and delayed management. Further study is required to evaluate this concern.

**1:44 Treatment of Chronic Cough: Single Institution Experience Utilizing Behavioral Therapy**

Resha S. Soni, MD, Philadelphia, PA; Barbara Ebersole, CCC-SLP, Philadelphia, PA; Kathleen Moran, CCC-SLP, Philadelphia, PA; Nausheen Jamal, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss diagnosing chronic cough and treatment strategies for addressing chronic cough as well as explain the role of behavioral modification in the treatment algorithm of chronic cough.

**Objectives:** Chronic cough, treated by multiple medical disciplines using various strategies, remains a challenging condition. Recent studies have investigated the role of behavior modification. We describe our experience with behavioral techniques employed for patients presenting with chronic cough at a tertiary care setting to determine if such therapy facilitates resolution in otherwise recalcitrant patients. **Study Design:** A retrospective observational study of patients treated for chronic cough over a two year period. **Methods:** A chart review was conducted to identify patients treated for a primary complaint of chronic cough. We assessed the number of patients who underwent evaluation with a speech pathologist to address their cough and the rate of cough improvement. This was compared with patients who did not undergo behavioral therapy. **Results:** 43 patients were treated for chronic cough within the study period. Patients were excluded if they had inadequate followup or underwent surgical intervention for another disease process relating to their cough. 30 patients were initially treated with reflux and/or sinonasal disease management. 47% experienced improvement of their symptoms over an average of 7.5 months. 11 patients who initially failed medical management underwent behavior modification therapy with a speech pathologist. Of this cohort, 73% experienced complete or near complete resolution of symptoms over an average of 6.4 months. **Conclusions:** There appears to be a role for behavior modification in patients diagnosed with chronic cough who have not improved after a trial of other medical therapies. This therapy may be under-utilized in practice and could potentially lead to resolution of otherwise recalcitrant cough symptoms.



**1:51 Comparison of Pharyngeal pH Probe Results to the Reflux Finding Score in Laryngopharyngeal Reflux Disease**

Matthew G. Yantis, MD, Galveston, TX; Naren N. Venkatesan, MD, Fort Worth, TX; Michael P. Underbrink, MD MBA, Galveston, TX; Ted Mau, MD, PhD, Dallas, TX; Ronda E. Alexander, MD, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the implications of using the reflux finding score given the poor interrater reliability of this value among multiple laryngologists.

**Objectives:** Laryngopharyngeal reflux disease (LPRD) is commonly diagnosed with laryngoscopic findings. The reflux finding score (RFS) is a previously validated grading system for LPRD. The pharyngeal pH probe can objectively identify pharyngeal reflux. This study sought to determine the correlation of RFS scores with pH probe results and assess reproducibility of the RFS score. **Study Design:** A prospective cohort analysis of 52 subjects, including controls, with LPRD symptoms was gathered. **Methods:** Videostroboscopy and pH probe analysis were performed and recorded. Three fellowship trained laryngologists (#1, #2, or #3), blinded to pH probe status, reviewed and scored the videostroboscopies. **Results:** In 52 subjects, 31 were pH probe positive and 21 were negative. With pH negative, the mean RFS score was 8.1 (laryngologist #1), 4.3 (#2), and 7.3 (#3). With pH positive, the mean was 8.1 (#1), 4.4 (#2), and 7.6 (#3), respectively. Interrater reliability revealed significant correlation for three findings: subglottic edema ( $\kappa=0.50$ ), thick endolaryngeal mucus (0.61), and posterior commissure hypertrophy (0.33). Vocal fold edema and diffuse laryngeal edema showed no agreement. The RFS was reweighted to emphasize the three categories with the highest agreement, yet still showed no significant differences: mean RFS scores of probe (-) subjects were 4.2 (#1), 3.1(#2), and 4.3 (#3); mean of probe (+) scores were 4.5 (#1), 3.5 (#2), and 4.4 (#3). **Conclusions:** Given no significant difference in RFS scores between pH probe positive or negative cohorts, even with weighting scores based on interrater reliability, we found no predictive value or reliability for the RFS scoring system.

**1:58 Analysis of Risk Factors Associated with Unilateral Hearing Loss in Children Who Initially Passed Newborn Hearing Screening**

Eric N. Appelbaum, MD, Richmond, VA; Derek A. Chapman, PhD, Richmond, VA; Kelley M. Dodson, MD, Richmond, VA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate knowledge of risk factors associated with unilateral hearing loss in children who initially pass newborn hearing screening.

**Objectives:** To analyze Joint Committee on Infant Hearing (JCIH) risk factors in children with confirmed unilateral hearing loss (UHL) who initially passed newborn hearing screening. **Study Design:** Retrospective review. **Methods:** Retrospective record review of 20,949 children who passed newborn hearing screening but had one or more JCIH risk factors prompting subsequent followup through the universal newborn hearing screening (UNHS) program from 2010-2012. **Results:** Over the 2 year study period, 14,634 (4.8% of total births) children passed UNHS but had the presence of one or more JCIH risk factor. Ultimately, we identified 96 babies from this group with confirmed hearing loss (0.7%), with 41 babies (0.2%) showing unilateral hearing loss. The most common risk factors associated with the development of confirmed UHL after passing the initial screen were neonatal indicators, craniofacial anomalies, family history, and stigmata of syndrome associated with hearing loss. **Conclusions:** Infants who passed UNHS but had one or more JCIH risk factor accounted for more than a quarter of all infants requiring followup after UNHS. Neonatal indicators and craniofacial anomalies were the categories most often found in children with confirmed unilateral hearing loss who initially passed their newborn hearing screen. While neonatal indicators were also the most common associated risk factor in all hearing loss, craniofacial abnormalities are relatively more common in children with UHL who initially passed newborn hearing screening. Further studies assessing the etiology underlying the hearing loss and risk factor associations are warranted.

**2:05 - 2:11 Discussant:** Joel H. Blumin, MD FACS, Milwaukee, WI

**2:11 Differences in Interregional Brain Connectivity in Children with Unilateral Hearing Loss Using Resting State Functional Connectivity MRI**

Matthew E. Jung, MD, St. Louis, MO; Miranda Colletta, BS, St. Louis, MO; Banan Ead, MA, St. Louis, MO; Rebecca Coalson, BS, St. Louis, MO; Bradley L. Schlagger, MD PhD, St. Louis, MO; Judith E. Lieu, MD, St. Louis, MO

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the basic concept of rs-fcMRI and identify functional differences in the intrinsic brain networks of children with unilateral hearing loss.

**Objectives:** To identify functional differences in the intrinsic brain networks of children with unilateral hearing loss (UHL) using resting state functional connectivity MRI (rs-fcMRI). **Study Design:** Prospective observational study. **Methods:**

Children between the ages of 7 to 17 (n=20) with severe to profound hearing loss in one ear, and their normal hearing (NH) siblings (n=13) were imaged using rs-fcMRI. Low frequency BOLD signals (<0.1 Hz) were extracted from 41 regions of interest centered around established brain networks such as the default mode, cingulo-opercular, and frontoparietal networks, as well as regions for language, phonological and visemic processing. Region-wise correlations and conjunction analyses were then conducted to determine differences in functional connectivity between the UHL and NH groups.

**Results:** When compared to the NH group, children with UHL showed enhanced connectivity between the cingulo-opercular network (task set maintenance) with primary motor, frontoparietal, and auditory processing regions. Frontoparietal networks (adaptive task control) also showed enhanced connectivity to visual processing and salience regions, but decreased correlations within its own network as well. The default mode network showed increased connectivity with the frontoparietal network, a relationship that is usually anti-correlated. **Conclusions:** Children with UHL demonstrate multiple differences in cognitive and executive function networks when compared to NH controls that may be associated with attention and behavioral deficits. This may explain the increased need for individualized education programs among children with UHL.

## 2:18 Validity of the Epworth Sleepiness Scale

Lauren B. Bonzelaar, MD, Chicago, IL; Anna M. Salapatras, MS, Chicago, IL; Michael Friedman, MD, Chicago, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand that the validity of the Epworth Sleepiness Scale is improved when a consensus of scoring is reached between the patient and a family member or close friend.

**Objectives:** We hypothesize that patients are in denial about their daytime sleepiness levels and that the accuracy of the Epworth Sleepiness Scale (ESS) can be improved by having a close friend or family member, who is aware of the patient's daytime sleepiness, also fill out the ESS questionnaire. **Study Design:** Retrospective chart review. **Methods:** A chart review was conducted comparing the ESS score obtained from the patient with the ESS score obtained from a friend. These questionnaires were completed by patients suspected of having obstructive sleep apnea, as part of standard practice upon consultation for sleep apnea treatment in an otolaryngology clinic. **Results:** 100 consecutive patients who could identify a friend were included in this study. The Wilcoxon U test was used to see if a difference exists in ESS score between the patient and their friend. The mean score was higher when graded by the friend (12.54.0) than by the patient themselves (8.5 4.1). In 61% of cases, the patient underestimated their score ( $p=0.044$ ) compared to the score given by the friend. The mean absolute difference in score was approximately 3. **Conclusions:** The difference in mean ESS score obtained from the patient compared to the friend implies that this diagnostic form should be filled out by the patient in the presence of a friend. In this way, a consensus by the patient and the friend may provide a more accurate score.

## 2:25 A Cost Effectiveness Analysis of Nasal Surgery to Increase CPAP Adherence in Sleep Apnea Patients with Nasal Obstruction

Judith S. Kempfle, MD, Boston, MA; Nicholas Y. Busaba, MD, Boston, MA; John M. Dobrowski, MD, Boston, MA; Michael B. Westover, MD PhD, Boston, MA; Matt T. Bianchi, MD PhD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the basics of decision analysis and cost effectiveness tree models in the setting of patients with obstructive sleep apnea.

**Objectives:** Obstructive sleep apnea (OSA) is characterized by sleep associated upper airway obstruction with oxygen desaturations and increased cardiovascular morbidity and mortality. Continuous positive airway pressure (CPAP) therapy is a highly effective treatment for OSA, however, CPAP adherence remains a challenge for many patients. Increased resistance within the nasal cavity due to septum deviation and turbinate hypertrophy may contribute to higher CPAP pressures and decreased CPAP compliance. This study set out to determine whether nasal surgery could provide a cost effective treatment to increase CPAP adherence in OSA patients. **Study Design:** Cost effectiveness decision tree model. **Methods:** We constructed a decision tree model to determine conditions under which nasal surgery to improve CPAP adherence would be cost effective over standard of care (no surgery), in OSA patients with septum deviation/turbinate hypertrophy, using standard willingness to pay assumptions. Our model includes variables for cost of untreated OSA, surgical cost and complications, and improved adherence postoperatively, quality of life, and time horizon. **Results:** Nasal surgery was cost effective in our model under plausible assumptions of cost of untreated OSA and probability of adherence improvement over a chronic (10-20 year) time horizon for septoplasty. Reduced cost of turbinate reduction makes turbinate surgery cost effective earlier. **Conclusions:** Across a range of plausible values in a clinically relevant decision model, nasal surgery is a cost effective strategy to improve CPAP adherence in OSA patients with nasal pathology.

# Saturday

- 2:32      The Use of Drug Induced Sleep Endoscopy in Predicting Success following Transoral Robotic Surgery +-Multilevel Procedures for Obstructive Sleep Apnea**  
Taha S. Meraj, BS, Ann Arbor, MI; Tiffany A. Glazer, MD, Ann Arbor, MI; Rebecca S. Harvey, MD, Ann Arbor, MI; Matt E. Spector, MD, Ann Arbor, MI; Paul T. Hoff, MD, Ann Arbor, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the methods used to score drug induced sleep endoscopy and understand its limitations in predicting success following transoral robotic surgery for obstructive sleep apnea.

**Objectives:** The aim of this study was to determine if drug induced sleep endoscopy (DISE) was predictive of success following transoral robotic surgery (TORS) +- multilevel procedures for sleep apnea. **Study Design:** Retrospective chart review of patients who underwent TORS surgery for sleep apnea by a single surgeon. **Methods:** Pre- and post-polysomnograms were analyzed to assess improvement, success, and cure. Improvement was defined as any decrease in AHI, success as an AHI < 20 with a decrease >50%, and cure as an AHI < 5. DISE videos were scored by committee consensus using the NOHL and VOTE classification systems. VOTE scores were analyzed using the presence or absence of vibration and as percent obstruction. **Results:** 101 patients were available for analysis. 87% of patient had an improvement in their AHI. 51% met criteria for success, while 17% were cured. The degree of collapse at individual NOHL and VOTE subsites as well as total additive scores did not predict improvement, success, or cure. Patients with no oropharyngeal lateral collapse in the VOTE classification system were more likely to improve following surgery (p=0.001); however, this effect did not hold for success or cure. **Conclusions:** In obstructive sleep apnea patients, there is a 51% success rate and a 17% cure rate. DISE as scored by the NOHL and VOTE system did not readily identify patients that would most benefit from surgery. Patients with lateral oropharyngeal collapse may be poorer candidates. Prospective studies and larger sample sizes are required to further evaluate the use of DISE in predicting success following TORS.

- 2:39      Does Mask Type Impact Positive Airway Pressure (PAP) Adherence in Patients with Sinonasal Symptoms?**  
Amy E. Schell, MD, Pittsburgh, PA; Ryan J. Soose, MD, Pittsburgh, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss appropriate initial mask interface choices for patients with sinonasal symptoms undergoing positive airway pressure titration.

**Objectives:** To determine if patients with chronic sinonasal problems who are initiating PAP therapy demonstrate improved adherence with an oronasal mask compared to nasal interfaces. **Study Design:** Retrospective medical record review. **Methods:** 328 patients underwent a laboratory based PAP titration study between January 2012 and May 2015. Followup PAP adherence data was available for 218 patients. Multivariable analysis tested the hypothesis that patients with nasal symptoms are more likely to adhere to PAP therapy with oronasal interfaces when compared to nasal or nasal pillows interfaces. Analysis was adjusted for demographics, disease severity, and type of PAP therapy. **Results:** At a median followup of 95 days, PAP adherence in patients with nasal symptoms was highest with the nasal pillows interface followed by the nasal mask. Patients using nasal pillows were over 5 times more likely to meet minimum adherence criteria compared to patients using with oronasal interfaces. (OR = 5.20; 95% CI 1.61-16.80; p = 0.006). The odds of adherence were over 3 times greater with the nasal mask than oronasal mask (OR = 3.67; 95% CI 1.20-11.26; p = 0.02). **Conclusions:** PAP adherence is substantially higher with nasal pillows or a nasal mask even in the presence of sinonasal symptoms. Sleep apnea patients with symptoms of chronic sinonasal disease may not be more likely to require oronasal mask interface and should be offered a nasal interface initially.

- 2:46 - 2:53      Discussant:** Steven M. Houser, MD FACS, Cleveland, OH

- 2:53 - 3:20      Break with Exhibitors - Riverside Center**

3:20 - 5:00 - GENERAL  
GRAND E/F

- 3:20 - 3:50      Panel: Contemporary Management of Adult Recurrent Respiratory Papillomatosis**  
**Moderator:** Robert A. Buckmire, MD, Chapel Hill, NC  
**Panelists:** Glendon M. Gardner, MD, Detroit, MI  
Sid Khosla, MD, Cincinnati, OH  
Ted Mau, MD PhD, Dallas, TX

**Moderators: Edward J. Damrose, MD FACS, Stanford, CA  
Sid Khosla, MD, Cincinnati, OH**

**3:50**

**The Burden of Angioedema on United States Emergency Departments: 2006-2011**

Aaron M. Smith, MD, Memphis, TN; Meredith A. Ray, PhD, Memphis, TN; Nikhita S. Jain, BS, Memphis, TN; Hongmei M. Zhang, PhD, Memphis, TN; Merry E. Sebelik, MD, Memphis, TN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the epidemiology of angioedema as it presents to United States emergency rooms and discuss the varied managements of this condition.

**Objectives:** Regardless of cause, angioedema (AE) can quickly progress to swelling of the supraglottic mucosa, risking airway obstruction and resultant hypoxia. In order to promote standardization in the treatment of AE, it is necessary to understand the current epidemiology and practice patterns. Therefore, this study was undertaken to measure the magnitude of AE emergency department visits with an evaluation of demographics, management, frequency of airway interventions, and mortality. **Study Design:** Retrospective review of national database. **Methods:** From the National Emergency Department Sample, we identified all patients presenting from 2006-2010 with a primary diagnosis of AE, characterized by the ICD-9-CM code 995.1. These discharges were weighted and stratified by comorbidities, age, treatments and region. We obtained data from the US census, similarly stratified for incidence calculation. Chi square and student t-test were employed for data comparisons. **Results:** Total discharges increased from 87,481(29.3/100000 people) to 111,116(35.8/100,000 people). More females were afflicted (57%). Patients presented more commonly in summer months (June, July, August) and in the south (44%). The majority of patients were discharged from the ED (83%). Hypertension was comorbid in 36% of discharges and 12% of cases attributed to antihypertensive reaction. Affected patients required intubation infrequently (6%) with low overall mortality (0.08%). **Conclusions:** The AE burden on United States EDs has increased over the past several years. The reasons for this increase are unclear with further investigation needed to delineate causation for such a life threatening reaction. A seasonal variation appears to exist favoring the summer months. Management of AE differs between emergency departments, however intubation rates and mortality are low.

**3:57**

**Peritonsillar Abscess Economic Analysis**

Erin H. Peeden, MS, Jackson, MS; Scott P. Stringer, MD, Jackson, MS; Eden J. Yelverton, BS, Jackson, MS

**Educational Objective:** At the conclusion of this presentation, participants should be able to make an informed decision regarding whether to use imaging prior to a needle aspiration in the treatment of peritonsillar abscess.

**Objectives:** To evaluate the cost effectiveness of needle aspiration (NA), computed tomography (CT), and ultrasound (US) for diagnosing peritonsillar abscess (PTA). **Study Design:** Cost effectiveness analysis. **Methods:** Decision trees were constructed for CT, US, and NA options. Effectiveness was defined as the number of NA s required to obtain PTA resolution. Effectiveness measures were obtained from a literature search. Costs were defined as Medicare allowable reimbursements in 2015 U.S. dollars. The economic perspective was from the payer. Discounting was not applied due to the short time course. Univariate sensitivity analyses were performed. **Results:** NA was the most cost effective method for diagnosis in all scenarios. In the base case, the incremental cost effectiveness ratios for CT and US compared to NA were \$1,037/NA prevented and \$289/NA prevented. US dominated CT as more NA's were required at a greater cost in the CT model. US was more cost effective than CT in all scenarios. Univariate sensitivity analysis revealed that the results were not sensitive to any changes within reasonable ranges. **Conclusions:** Imaging, particularly CT, is frequently obtained by emergency medicine physicians for PTA diagnosis. Imaging modalities are not cost effective compared to NA alone. However, these modalities could reduce the need for NA in the diagnosis of PTA. US is more cost effective than CT but may be less well tolerated. In a resource constrained healthcare environment, the cost of employing imaging for PTA diagnosis should be considered along with patient and physician preference.

**4:04**

**Cost Effectiveness Analysis of Transfacial Gland Preserving Removal of Parotid Sialoliths**

Adrian A. Ong, MD, Charleston, SC; William W. Carroll, MD, Charleston, SC; Shaun A. Nguyen, MD MA, Charleston, SC; M. Boyd Gillespie, MD MSc, Charleston, SC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the cost effectiveness of the transfacial gland preserving removal of parotid stones compared to traditional parotidectomy.

**Objectives:** Examine outcomes of transfacial gland preserving removal of difficult parotid stones and compare the cost and operative time to traditional parotidectomy. **Study Design:** Cost effectiveness analysis and retrospective chart review. **Methods:** Patients who underwent transfacial removal of symptomatic parotid sialoliths at a tertiary medical center from June 2010 to July 2015 were evaluated. Outcomes included operative technique, stone size, stone location, complications, and symptom relief. In addition, patients who underwent traditional parotidectomy for difficult parotid stones were identified. The charges and times for both the transfacial technique and parotidectomy were reviewed and



compared. **Results:** Forty-four patients underwent transfacial operation for symptomatic parotid sialolithiasis. Mean stone size was  $8.4 \pm 4.0$  mm. Stones were most often located in the main duct and hilum (58%) with fewer intraglandular stones (42%). Of those with followup, thirty-three (92%) patients reported at least partial resolution of symptoms. Transfacial technique was significantly cheaper (U.S. \$) than parotidectomy (mean difference -8064.09; 95% confidence interval [95% CI] -2655.40 to -13472.78;  $p=0.033$ ). Anesthesia cost (mean difference -2997.85; 95% CI, -246.89 to -5748.81;  $p=0.035$ ) and operating room cost (mean difference -4793.91; 95% CI, -629.72 to 8958.09;  $p=0.028$ ) were also cheaper for the transfacial technique. Finally, mean procedure time for transfacial removal of parotid stones was shorter than for parotidectomy ( $120.2 \pm 49.9$  vs.  $178.4 \pm 41.3$  minutes, respectively;  $p=0.002$ ). **Conclusions:** Transfacial, gland preserving removal of difficult parotid stones is a well tolerated and effective alternative to parotidectomy. Moreover, it is faster and cheaper than parotidectomy, maximizing both surgeon time and hospital resources.

#### 4:11 **Sialendoscopy Assisted Surgery for Non-Sialolith Etiologies and the Chronic Obstructive Sialadenitis Symptoms Survey: A Prospective Study**

Elise. A. Delagnes, MA BA, San Francisco, CA; Annick Aubin-Pouliot, MD, San Francisco, CA; Jolie L. Chang, MD, San Francisco, CA; William R. Ryan, MD, San Francisco, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain and discuss how the chronic obstructive sialadenitis symptoms (COSS) survey can be used to assess symptoms of obstructive sialadenitis for non-sialolith etiologies before and after sialendoscopy assisted salivary duct surgery (SASDS) and understand the degree to which SASDS can impact non-sialolith etiologies of chronic sialadenitis.

**Objectives:** To prospectively assess symptoms of obstructive sialadenitis for non-sialolith etiologies before and after sialendoscopy assisted salivary duct surgery (SASDS) using the chronic obstructive sialadenitis symptoms (COSS) survey. **Study Design:** Prospective cohort study. **Methods:** Patients with chronic obstructive sialadenitis without sialoliths who underwent SASDS completed the COSS survey preoperatively and three months postoperatively. The COSS survey addresses 20 symptoms with a collective 0-100 score. **Results:** Fourteen consecutive patients undergoing SASDS for non-sialolith sialadenitis, including 30 glands: 19 parotid (63%) and 11 submandibular glands (37%), completed both surveys. Symptom improvement was seen in 73% (22/30) of glands: 71% (15/21) of radioiodine induced, 100% (6/6) of idiopathic, and 33% (1/3) of inflammatory glands. Overall, non-sialolith glands showed a significant decrease in mean COSS score from 41.0 (standard error of the mean (SEM) 3.1) pre-SASDS to 27.5 (SEM 3.3) post-SASDS ( $p<0.001$ ). Among the 20 COSS variable symptoms measured, 19 (95%) improved, 13 with statistical significance. Radioiodine induced and idiopathic glands both had significant mean improvements of 12.4-points ( $p < 0.05$ ) and 24.8-points ( $p < 0.005$ ), respectively. Among all etiologies, 17 glands (56%) were found to have stenotic ducts that were also treated either with dilation (12/17) or an open sialodochoplasty (5/17). Ducts that underwent dilation showed a significant 22.7-point (SEM 5.7) decrease in COSS score ( $p<0.001$ ). **Conclusions:** Obstructive sialadenitis related symptoms significantly declined three months after SASDS, collectively as well as in 13 independent symptoms, for radioiodine induced and idiopathic sialadenitis in general, and in glands with stenotic ducts that underwent dilation.

4:18 - 4:25 **Discussant:** Sid Khosla, MD, Cincinnati, OH

#### 4:25 **Weaning of Proton Pump Inhibitors in Patients with Laryngopharyngeal Reflux Disease**

June R.J. Lin, MD, Pittsburgh, PA; Shaum S. Sridharan, MD, Washington, DC; Libby J. Smith, DO, Pittsburgh, PA; VyVy N. Young, MD, Pittsburgh, PA; Clark A. Rosen, MD, Pittsburgh, PA

**Educational Objective:** At the conclusion of this presentation, the participants should learn about the proton pump inhibitor (PPI) weaning protocol and should be able to consider eligible patients for PPI weaning.

**Objectives:** To evaluate the feasibility of a proton pump inhibitor (PPI) weaning protocol in a cohort of patients following successful empiric treatment for laryngopharyngeal reflux disease (LPRD). **Study Design:** A retrospective review was performed on patients who had a positive response to empiric treatment for LPRD and were weaned from PPI using a standardized weaning protocol. Symptom recurrence rate following PPI wean, symptom specific standardized evaluations (e.g. Reflux Symptom Index) and present PPI use were determined. All numeric data were analyzed using the student's unpaired t-test. **Methods:** A retrospective review was performed on patients who had a positive response to empiric treatment for LPRD and were weaned from PPI using a standardized weaning protocol. Symptom recurrence rate following PPI wean, symptom specific standardized evaluations (e.g. Reflux Symptom Index) and present PPI use were determined. All numeric data were analyzed using the student's unpaired t-test. **Results:** Thirty-seven patients were instructed to wean from PPI from July 2013-September 2015. Fifteen patients (41%) had symptom recurrence post-wean and twelve (32%) needed to go back on a PPI. Twenty-two patients (59%) remained symptom free post-wean. The duration of LPRD treatment for each group was  $26.3 \pm 44.3$  months and  $8.3 \pm 10.2$  months ( $p = 0.07$ ). Duration of followup was  $5.0 \pm 5.1$  months and there was no significant difference in followup time between the groups ( $p = 0.13$ ). Pre-wean and post-wean RSI scores in the symptom recurrence group were  $18.6 \pm 7.5$  and  $10.4 \pm 4.5$  ( $p=0.008$ ). Pre-wean and post-wean RSI scores in the symptom free group were  $18.2 \pm 10.4$  and  $7.5 \pm 8.0$  ( $p<0.001$ ). There was no significant difference in post-wean RSI between the groups ( $p = 0.31$ ). The symptom recurrence group had a significantly higher BMI compared to the symptom

free group (34.4±8.5 vs. 26.1±3.6,  $p = 0.0002$ ). **Conclusions:** More than half of patients who are on PPIs for LPRD can be weaned successfully. High BMI is predictive of failure to wean.

#### 4:32 Mastoid and Middle Ear Effusion in the Intensive Care Unit Patient

Phillip A. Huyett, MD, Pittsburgh, PA; Yael Raz, MD, Pittsburgh, PA; Barry E. Hirsch, MD, Pittsburgh, PA; Andrew A. McCall, MD, Pittsburgh, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the incidence of and risk factors associated with the development of radiographic mastoid and middle ear effusions (ME/MEE) in ICU patients.

**Objectives:** To determine the incidence of and risk factors associated with the development of radiographic mastoid and middle ear effusions (ME/MEE) in ICU patients. **Study Design:** Retrospective chart review. **Methods:** A retrospective study of serial head imaging (CT or MRI) from April 2013 through April 2014 of 300 neurologic ICU patients at a university medical center was performed. Images were reviewed for absent, partial, or complete opacification of the mastoid air cells and middle ear space. Exclusion criteria included temporal bone or facial fractures, history of mastoid surgery, prior sinus or skull base surgery, history of sinonasal malignancy, and ICU admission less than 3 days. **Results:** At the time of admission, 3.7% of patients (11/300) had radiographic evidence of ME/MEE. 10.3% of patients (31/300) subsequently developed ME/MEE during their ICU stay. ME/MEE was found to be most prevalent in patients with a prolonged length of ICU stay. Variables statistically significantly associated with worsening ME/MEE included endotracheal tube (ETT) and/or nasogastric tube (NGT) placement, younger patient age, use of antibiotics, and the development of radiographic sinus opacification. Every patient with worsening ME/MEE had an ETT, an NGT, or both during their ICU stay. **Conclusions:** ME/MEE is a potential source for hearing impairment that may contribute to delirium, compromised communication or perceived depressed consciousness in ICU patients. ME/MEE is strongly associated with ETT/NGT placement and prolonged length of stay in ICU patients. Thus, the presence of ME/MEE should be especially considered in patients who are emerging from prolonged ICU stays that required ETT and/or NGT placement.

#### 4:39 Otolaryngology Consult Pattern Trends at an Academic Quaternary Care Center

Kevin J. Choi, MD MS, Durham, NC; Russel R. Kahmke, MD, Birmingham, AL; Matthew G. Crowson, MD, Durham, NC; Liana Puscas, MD, Durham, NC; Richard L. Scher, MD, Durham, NC; Seth M. Cohen, MD MPH, Durham, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the trends in inpatient and emergency room consultation patterns within otolaryngology - head & neck surgery.

**Objectives:** The use of electronic health records has automated the consultation process. Other surgical specialties, such as urology and orthopedic surgery, have reported their consultation patterns but this is unknown for otolaryngology. This study aims to assess trends in emergency department (ED) and inpatient consultations within otolaryngology at a quaternary care center. **Study Design:** Retrospective review. **Methods:** Consultation requests received from January to December 2014 were reviewed. Patient demographics, reason for consultation, diagnosis, bedside procedure, operative intervention, and admission variables were collected. Consults with incomplete documentations were excluded. **Results:** 1491 consultations for adult (73.2%) and pediatric (26.8%) patients were completed. 51.4% of consults originated from inpatient teams versus 48.6% from the ED. Time of year did not influence the volume of consult requests received. 67.7% of all consults had a bedside procedure performed and 16.2% required operative intervention. Comparing inpatient to ED consultations, airway evaluation (47.3% vs. 19.72%), epistaxis management (10.2% vs. 4.55%), and rhinologic evaluation (10.1% vs. 2.5%) occurred more frequently from inpatient teams. Management of head and neck infections (21.1% vs. 4.1%), facial fractures and lacerations (32.1% vs. 2.0%), and postoperative complications (10.1% vs. 0.3%) were more frequent in the ED. 30.0% of ED consultations required hospitalization. **Conclusions:** The consultation volume to the otolaryngology service is significant. The types of consults received are unique to specific clinical settings. Considering the infrequent need for operative intervention, a cost analysis may assist in determining when routine consults may be deferred to an outpatient setting in appropriately selected clinical scenarios.

#### 4:46 Institutional Rankings for Scholarly Productivity in Academic Otolaryngology Using the H-Index

Brandon A. Shepherd, BSc, Memphis, TN; Daniel D. Sharbel, BSc, Memphis, TN; Aaron M. Smith, MD, Memphis, TN; George R. Tamula, BSc, Memphis, TN; Jerome W. Thompson, MD MBA, Memphis, TN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the regional, subspecialty, and interdepartmental differences in research productivity.

**Objectives:** Scholarly productivity in otolaryngology has been described using statistical and mathematical methods, otherwise known as bibliometrics. The authors calculate publication productivity measures for academic otolaryngology departments within the United States. **Study Design:** A quantitative citation analysis of academic otolaryngology literature. **Methods:** A database of 1604 academic otolaryngologists from 99 programs was collected. H-indices were gath-

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ered using SCOPUS. Interdepartmental ranks were then calculated for the total h-index, mean h-index, and size of each program. Regional and subspecialty rankings were identified using total h-indices of each department with respect to US Census Bureau regions. Calculations were carried out in Microsoft Excel. **Results:** The average program mean h-index was 10.6 (SEM 4.1), and the average program total h-index was 184.6 (SEM 143.3) The top 5 programs by total h-index were Johns Hopkins (748), Massachusetts Eye and Ear Infirmary/Harvard Medical School (651), the University of Pittsburgh (642), the University of Pennsylvania (639), and the University of Michigan (499). The top regional programs were the University of Washington (400), the University of Michigan (499), Massachusetts Eye and Ear Infirmary/Harvard Medical School (651), and Johns Hopkins (748) for the west, midwest, northeast, and south, respectively. Subspecialty specific tabulations showed head and neck and otology had the highest overall h-indices. **Conclusions:** This study represents further investigation of previous bibliometric evaluations of academic otolaryngology. The most productive programs are clustered in the northeast. These results can be viewed as a benchmark for further studies of this type.

**4:53 - 5:00**      **Discussant:** Edward J. Damrose, MD FACS, Stanford, CA

**5:00**                **Introduction of Incoming President**  
Charles W. Beatty, MD FACS, Rochester, MN



**H1. Outcomes of Concurrent Septal Perforation Repair and Endoscopic Sinus Surgery**

Rachel B. Cain, MD, Phoenix, AZ; Alpen B. Patel, MD, Phoenix, AZ (Presenter);  
Stephen F. Bansberg, MD, Phoenix, AZ; Andy M. Courson, MD, Phoenix, AZ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss considerations, technique, and outcome of simultaneous septal perforation repair and endoscopic sinus surgery for patients with symptomatic septal perforation and chronic rhinosinusitis.

**Objectives:** Repair of septal perforation performed concurrently with endoscopic sinus surgery (ESS) for chronic rhinosinusitis has not been evaluated. Surgical outcomes of patients undergoing simultaneous ESS and septal perforation repair are presented. **Study Design:** Retrospective review. **Methods:** Adult patients who underwent ESS combined with septal perforation repair from January 1997 to October 2015 were identified. Medical records were reviewed for demographics, clinical findings, perforation size, operative technique, histopathology, complications and outcomes. Septal perforation repair was performed using a combination of bipediced advancement or rotational mucosal flaps allowing a tension free closure. An interposition graft was placed and the repair protected by thin silastic sheeting in all cases. **Results:** Thirty-eight patients underwent concurrent ESS and septal perforation repair. Maxillary antrostomy and anterior ethmoidectomy were the most common procedures performed. Revision ESS accounted for 57.9% of procedures. Average perforation size was 15.4 (range 3-45) mm length by 10.7 (range 3-25) mm height. In the first 7 years of the study, 3 of 8 surgeries resulted in re-perforation, while no patient had re-perforation in the last 11 years. Overall, successful septal perforation closure was achieved in 35 of 38 patients (92.1%). **Conclusions:** Septal perforation repair is a delicate operation with a wide range of historical success rates. Concurrent ESS, with additional nasal instrumentation/manipulation both intra- and postoperatively, may seem contraindicated. However, this study demonstrates that septal perforation repair and ESS can be performed simultaneously with high probability of success. In our series, this held true for even large perforations measuring greater than 2 cm.

**H2. Ecthyma Gangrenosum of the Sinonasal Tract Mimicking Acute Invasive Fungal Rhinosinusitis**

Eric Todd Carniol, MD MBA, Newark, NJ; Amy Bansal, MD, Newark, NJ; Alejandro Vazquez, MD, Newark, NJ; Senja Tomovic, MD, Hackensack, NJ; Brian E. Benson, MD, Hackensack, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the presentation of sinonasal pseudomonal infections.

**Objectives:** Ecthyma gangrenosum is an uncommon cutaneous necrotizing infection classically associated with pseudomonas aeruginosa bacteremia. Only one case of sinonasal ecthyma gangrenosum has been reported to date. Here, we present two additional cases of sinonasal ecthyma gangrenosum with unique, previously unreported features. **Study Design:** Case series. **Methods:** Retrospective review of clinical cases. **Results:** Patient 1. A 35 year old female on tacrolimus and prednisone 3 months following peripheral blood stem cell transplant for acute lymphoblastic leukemia was evaluated for acute onset fever, left sided facial pain and swelling, without visual changes or facial dysesthesia. Nasal endoscopy revealed an eschar within the middle meatus. Biopsy showed no fungal elements. Due to concern for acute invasive fungal rhinosinusitis, the patient underwent endoscopic and open sinonasal debridement of the necrotic tissue. Histopathologic analysis showed no fungal elements. Pseudomonas aeruginosa was isolated. The patient improved following debridement and therapy with intravenous tobramycin and cefepime. Patient 2. A 20 year old male on tacrolimus after bone marrow transplant for chronic myelocytic leukemia presented with headache, facial swelling, and altered mental status. The patient had asymmetric facial swelling, with dark mucoid nasal discharge. The patient was taken to the operating room for concern for invasive fungal rhinosinusitis. Operative findings included extensive pallor and eschar in the uncinat process, maxillary sinus, and nasal septum. Repeat debridement was necessary. Tissue culture demonstrated pseudomonas aeruginosa. The patient showed significant improvement following ceftazidime therapy initiation. **Conclusions:** A diagnosis of sinonasal ecthyma gangrenosum should be considered in an immunocompromised patient with an acute necrotizing rhinosinusitis in whom biopsies fail to show fungal elements.

**H3. Ocular Sarcoidosis Masquerading as Acute Frontal Sinusitis**

Joshua B. Greene, MD, Detroit, MI; Robert H. Deeb, MD, Detroit, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize that ocular sarcoidosis is rare and may mimic traditional sinonasal diseases.

# Posters

**Objectives:** 1) Describe an unusual presentation of ocular sarcoidosis which was initially mistaken for classic acute frontal sinusitis; and 2) recognize that ocular sarcoidosis is rare and may mimic traditional sinonasal diseases. **Study Design:** Retrospective case review. **Methods:** Case report and review of the literature. A PubMed search using terms sarcoid, ocular, sinusitis, and proptosis was performed. **Results:** A 65 year old female presented with 2 weeks of nonpainful, right eye proptosis with right forehead pressure. A CT scan was performed which showed right frontal sinus opacification as well as orbital proptosis. The patient was treated with antibiotics and steroids for the presumed diagnosis of orbital cellulitis secondary to frontal sinus infection. After initial improvement of symptoms, her proptosis returned with additional eyelid swelling within several days of completing the course of medications. Followup CT scan showed improved aeration of frontal sinus, but she continued to suffer from intermittent proptosis which only improved with intermittent steroids. Transcutaneous orbitotomy with incisional biopsy of preaponeurotic fat revealed noncaseating granuloma, consistent with sarcoidosis. **Conclusions:** Extrapulmonary involvement by sarcoidosis is observed in ~30-40% of patients however ocular sarcoidosis presents as the initial manifestation in only 1.5-12.4% of patients. The presentation is often confounded by sinonasal symptoms, which may delay the diagnosis. Sarcoidosis should be considered in all patients who present with ocular and sinus symptoms.

#### H4. A Systematic Review of Sinonasal Oncocytomas and Oncocytic Carcinomas: Diagnosis, Management, and Technical Considerations

Zerina Hodzic, BS, Pittsburgh, PA; Nicholas R. Rowan, MD, Pittsburgh, PA; Ryota Kashiwazaki, MD, Pittsburgh, PA; Thomas J. Willson, MD, Pittsburgh, PA; Eric W. Wang, MD, Pittsburgh, PA; Stella Lee, MD, Pittsburgh, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to properly diagnosis and manage oncocytomas of the sinonasal cavity and be able to describe the locally aggressive nature of sinonasal oncocytomas and oncocytic carcinomas. Participants should be able to understand how to treat and implement an endonasal endoscopic approach when appropriate and conduct postoperative surveillance to confer the best outcome for the patient in these rare tumors.

**Objectives:** Properly diagnosis and manage oncocytomas of the sinonasal cavity and be able to describe the locally aggressive nature of sinonasal oncocytomas and oncocytic carcinomas. Participants should be able to understand how to treat and implement an endonasal endoscopic approach when appropriate and conduct postoperative surveillance to confer the best outcome for the patient in these rare tumors. **Study Design:** Case report and systematic literature review. **Methods:** A systematic literature review of manuscripts with sinonasal oncocytoma/oncocytic carcinoma as the primary diagnosis was performed using PubMed and Ovid databases. Data obtained include patient demographics, presentation, radiographic and histologic findings, management, and recurrence rates. **Results:** 20 cases were identified. The most common symptoms were epistaxis (n=12) and nasal obstruction (n=11); however, nasal obstruction was more associated with oncocytic carcinoma (p = .02). Involvement of the nasal cavity was most common (n=17), followed by the paranasal sinuses (n=13) and nasolacrimal apparatus (n=4). Recurrence occurred in 55% of cases with no significant relationship between recurrence and age at diagnosis (p = 0.23), sex (p= 0.65), location of tumor (p = 0.14), or histologic findings (p = 0.27). The authors present a 73 year old woman with a 5 month history of worsening epistaxis and biopsy proven oncocytoma. Complete surgical resection of the tumor using combined endonasal endoscopic and anterior orbitotomy approach is described. **Conclusions:** Oncocytomas and oncocytic carcinomas are rare tumors of the sinonasal cavity with a high rate of local recurrence. Involvement of the nasolacrimal apparatus occurred in 14% of reported cases in addition to our case, for which a combined orbitotomy and endonasal endoscopic approach for complete surgical excision can achieve a favorable outcome.

#### H5. Orbital Silastic Implant as a Cause for Chronic Rhinosinusitis

Raymond H. Kessler, BS, New Orleans, LA; Michael J. Marino, MD, New Orleans, LA; Mary A. Fazekas-May, MD, New Orleans, LA

**Educational Objective:** In this case report we demonstrate migration of an orbital silastic implant as a nidus for chronic maxillary sinusitis. This has been infrequently reported for silastic implants, and we compare to alternative implant materials for which this complication has not been reported.

**Objectives:** Silastic implants have been widely used for repairing orbital floor fractures. Previous reports have demonstrated the migration of these implants as the nidus for the late complication of chronic or recurrent acute rhinosinusitis. This has typically been thought to be a rare complication. We report a case of silastic implant migration as a cause of chronic maxillary sinusitis and a literature review of alternative orbital implant materials as a similar etiology for these complications. **Study Design:** Case report. **Methods:** The literature was reviewed for cases of orbital silastic implant migration as a cause of sinusitis. Review was also performed for alternative materials (autologous grafts, porous plastics, and titanium), as a cause of similar complications. **Results:** A 60 year old male presented with a four month history of nasal symptoms and a remote history of right orbital floor fracture repaired with a silastic implant 7 years ago. Computed tomography scan demonstrated migration of the implant into the right maxillary sinus with obstruction of the maxillary

ostia. Endoscopic, transnasal removal of the implant was performed as well as maxillary antrostomy. Six similar cases have been reported, with a mean presentation of 16 years after fracture repair. Migration of autologous bone grafts, porous plastics (MEDPOR), or titanium implants, as a cause for sinusitis, has not been reported. **Conclusions:** Migration of silastic implants, as a cause of rhinosinusitis, is a relatively rare and late complication of orbital floor fracture repair. Nevertheless this has been reported in the literature on multiple occasions, while similar complications with alternative materials have not been described.

#### H6. Sensitivity and Specificity of Cetuximab-IRDye800 to Identify Regional Metastatic Disease in Patients with Head and Neck Cancer

Lindsay S. Moore, MD, Birmingham, AL; Jason M. Warram, PhD, Birmingham, AL; Thomas K. Chung, MD, Birmingham, AL; Esther de Boer, BSc, Birmingham, AL; William R. Carroll, MD, Birmingham, AL; Eben L. Rosenthal, MD, Stanford, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the results of a recent clinical trial assessing the ability of a closed field fluorescence imaging device to detect regional metastatic cancer in the lymph nodes of patients with squamous cell carcinoma of the head and neck.

**Objectives:** This study assessed the specificity of cetuximab-IRDye800 to fluorescently identify regional metastatic disease in patients with head and neck cancer. **Study Design:** Consenting patients (n=12) scheduled for curative resection were enrolled in a phase 1 clinical trial to evaluate the safety and specificity of cetuximab-IRDye800 (NCT01987375). Neck dissections were performed according to the standard of care. **Methods:** When indicated, surgical resection of lymph nodes accompanied resection of the primary tumor 3-7 days following intravenous infusion of cetuximab-IRDye800 (Li-cor Biosciences). All harvested lymph nodes were imaged with a closed field, NIR imaging device (Pearl Impulse, Li-cor Biosciences) during gross processing of the fresh specimen. Blinded assessments of the fluorescence data were compared to the gold standard of histopathology to calculate sensitivity, specificity, negative predictive value (NPV), and positive predictive value (PPV). **Results:** Twelve patients received either 2.5mg/m<sup>2</sup> (microdose) (n=3), 25mg/m<sup>2</sup> (n=6), or 62.5mg/m<sup>2</sup> (n=3) of cetuximab-IRDye800 following a 10mg or 100mg pre-treatment dose. A total of 454 nodes were examined using fluorescence and histopathology. Thirty out of thirty-one pathology proven positive nodes were correctly identified using fluorescence assessment, yielding a sensitivity of 96.8%. Of the 423 pathology proven negative nodes, 383 were correctly assessed using fluorescence imaging, yielding a specificity of 90.5%. The NPV was determined to be 99.7%, and the PPV was 42.8%. **Conclusions:** Closed field (NIR) fluorescence imaging of patients given systemic cetuximab-IRDye800 was shown to assess lymph node disease with a high sensitivity and specificity, suggesting a role for this technology for real time assessment of regional disease.

#### H7. Sublabial Approach to Intranasal Fungus Ball following Young's Procedure for Hereditary Hemorrhagic Telangiectasia

Neil S. Patel, MD, Rochester, MN; John F. Pallanch, MD, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize fungus ball as a potential complication of Young's procedure and employ the sublabial approach for intranasal surgery to avoid reversal of nasal closure.

**Objectives:** Young's procedure, or closure of the nares, is an effective procedure for patients with treatment refractory epistaxis secondary to hereditary hemorrhagic telangiectasia (HHT). Complications following this procedure are rare but may include persistent epistaxis, the development or worsening of obstructive sleep apnea, and patient intolerance of the lack of a nasal airway. Herein we present a patient who developed a symptomatic intranasal fungus ball one year after nasal closure, and demonstrate the use of the sublabial approach for diagnosis and treatment without reopening the nares. **Study Design:** Retrospective review. **Methods:** Case report and review of the literature. **Results:** A 44 year old female with HHT developed persistent foul smelling postnasal drainage, nausea, and retching one year after bilateral nasal closure (Young's procedure). Maxillofacial CT revealed heterogenous material in the nasal cavity. Due to worsening symptoms, the patient underwent a sublabial approach to the nasal cavity for examination and debridement, which revealed amorphous brown material occupying the nasal cavities bilaterally and extending into the choanae. Pathologic and microbiologic analysis revealed hyphae with cultures positive for aspergillus fumigatus and klebsiella pneumoniae, likely representing bacterial colonization or superinfection. One month postoperatively the patient noted no malodor, decreased nasal fullness, and a marked reduction in nausea and retching. **Conclusions:** This represents the first documented case of fungus ball complicating nasal closure (Young's procedure) for HHT. Entering the nasal cavity at the level of the piriform aperture using the sublabial approach is a safe, effective method for endoscopic nasal or sinus surgery after nasal closure that does not require reversal of the procedure.

# Posters

## H8. Primary Ameloblastoma of the Maxillary Sinus: Case Report and Literature Review

Zao Yang, MD, Shreveport, LA; Lori A. Lemonnier, MD, Shreveport, LA; Cherie-Ann O. Nathan, MD FACS, Shreveport, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe possible locations of primary extraosseous ameloblastoma and cite characteristics of the few cases arising from nasal cavity and paranasal sinuses that have been reported in the literature.

**Objectives:** Ameloblastoma is a locally aggressive, benign tumor of odontogenic epithelial differentiation. Extraosseous ameloblastoma has been well reported, though primary sinonasal ameloblastoma is exceedingly rare. We present the case of ameloblastoma arising from the maxillary sinus. **Study Design:** Case report. **Methods:** Literature review using PubMed to identify previously reported cases of ameloblastoma arising from the nasal cavity or paranasal sinuses. **Results:** A 55 year old presented to an outside otolaryngologist with right nasal obstruction, bilateral maxillary facial pain and pressure, and headaches that failed medical management. Preoperative CT scan showed soft tissue opacification within the right maxillary sinus with no bony lesions or mottled appearance of the maxilla. Surgical pathology specimens from endoscopic sinus surgery revealed ameloblastoma within the right maxillary sinus, at which point the patient was referred to our institution for additional care. Additional imaging showed persistence of the mass within the right maxillary sinus, again with no bony involvement, and the patient was taken to the OR for revision endoscopic surgical excision. A review of the literature yielded fewer than 50 cases of primary ameloblastoma arising from the nasal cavity or paranasal sinuses. **Conclusions:** Ameloblastoma is a rare, benign neoplasm that can infrequently arise from extraosseous locations including the nasal cavity and paranasal sinuses, with fewer than 50 cases of sinonasal primary reported to date.

## CLINICAL FUNDAMENTALS/GENERAL/PEDIATRIC OTOLARYNGOLOGY

## H9. Validity of the Hum Test, a Simple and Reliable Alternative to the Weber Test

Omar H. Ahmed, MD, New York, NY; Ryan L. Ruiz, MD, New York, NY; Catherine M. Flynn, AuD, New York, NY; William H. Shapiro, AuD, New York, NY; Susan B. Waltzman, PhD, New York, NY; Erich P. Voigt, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to administer the hum test in their clinical practice. This is a simple yet powerful tool to detect and categorize acute, unilateral hearing change in the normal hearing patient. The participant will also learn how the hum test was validated.

**Objectives:** To validate the hum test, a clinical exam currently used by many otolaryngologists, proposed to work similarly in mechanism to the Weber test. Validation of this exam would allow the clinician to remotely determine (i.e. over the phone) whether a sudden change in hearing status in a normal hearing patient may be sensorineural or conductive in origin, thus directing urgency of consultation. **Study Design:** Cross-sectional study. **Methods:** Normal hearing subjects ages 18-35 were recruited. Normal hearing was verified by audiometric screening. Subjects underwent three clinical tests across two conditions: with an earplug in one ear and without an ear plug (ear plugs simulated a 25-40 dB hearing attenuation). The three tests utilized were: 1) hum test - conducted by asking subjects to hum in a high and low frequency and then to indicate if the hum lateralized; 2) Weber test utilizing a 512Hz tuning fork; and 3) pure tone audiometry. **Results:** To date, 10 patients have completed the study (50-100 subjects in total are anticipated). The hum test has demonstrated 100% sensitivity and specificity in conductive detecting hearing loss captured by pure tone audiometry. **Conclusions:** Data from this ongoing study suggest that the hum test is a reliable and accurate clinical exam to detect acute, unilateral conductive hearing loss in the normal hearing patient. The high specificity and sensitivity of the test should alert the clinician to the possibility of a sensorineural hearing loss if lateralization to the noncompliant ear occurs. This is the first study to validate the hum test utilizing normal hearing subjects.

## H10. Neck Mass Evaluation in the Military Recruit

Marco A. Ayala, MD, Kansas City, KS; Kevin J. Sykes, PhD MPH, Kansas City, KS; Myron W. Yencha, MD, North Chicago, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the differences in types of pathology seen during the evaluation of a neck mass in the military recruit population.

**Objectives:** 1) To evaluate the types of neck masses seen in the military recruit population; and 2) to determine the incidence of medical conditions disqualifying recruits from military training during the evaluation of a neck mass. **Study Design:** Retrospective cohort study of all patients evaluated for a neck mass by a combined Navy and Veteran Affairs otolaryngology clinic from January 1, 2011-September 1, 2014. Military recruits were identified and compared to Veteran Affairs members, active duty (non-recruit) members, and active duty family dependents. **Methods:** One hundred and fifty patients were evaluated during the study period. Electronic medical records were reviewed for all patients. Data collection included demographic information, comorbidities, pathology, and imaging results. **Results:** Of the 150 patients



evaluated, 46 (31%) were recruits of which 10 (22%) were disqualified from military training. Reactive lymphadenopathy was the most common diagnosis seen in 18 (39%) recruits followed by neck abscess/infection (20%), congenital neck mass (15%), other benign lesions (19%), and malignancy in 3 (7%) of recruits. In the 52 Veteran Affairs patients and 24 active duty (non-recruit) members, the incidence of malignancy during a neck mass workup was 25% and 17% respectively. **Conclusions:** The majority of neck mass evaluations in military recruits represent reactive lymphadenopathy with a significant decrease in the incidence of malignancy compared to the veteran population. However, malignancy was observed in 7% of recruits evaluated in the otolaryngology clinic for a neck mass. These findings confirm the need for careful evaluation of all patients presenting with a neck mass.

## H11. Three Dimensional Printing in Microtia Repair: Facilitating Teaching and Achieving Symmetry

Morgan R. Bliss, MD, Stanford, CA; Mai Thy Truong, MD, Palo Alto, CA; Kay W. Chang, MD, Palo Alto, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe clinical outcomes of microtia repair with the intraoperative use of 3D printed models.

**Objectives:** The use of three dimensional (3D) printing is becoming more common in otolaryngology and is a promising tool for microtia repair. The primary objective of this study is to describe clinical outcomes of microtia repair with the intraoperative use of sterile 3D printed models. **Study Design:** This was an observational case series with retrospective chart review of patients with microtia who underwent 2 stage Firmin technique microtia repair with and without the assistance of custom 3D printed models. **Methods:** Models were created from mirror images of the normal ear from CT scans of the temporal bone, and further customized into each segment of the reconstructed ear utilizing CAD software (Materilize, Synthes). The primary endpoint was symmetry between the two ears. Additional endpoints included projection of ears and operative time. **Results:** Ten patients were included in the series over a two year period. Symmetry of the ears improved with time and experience when 3D printed models were used. We determined that the models needed to be scaled down to 90% of the desired dimensions in order to account for increase in size once the soft tissue envelope was draped over the cartilage framework. Unanticipated outcomes were improved ability to teach residents and fellows with 3D printed models. **Conclusions:** With the adoption of a 3D printed model assisted technique for microtia repair, the surgeon has improved ability to harvest and carve cartilage of exactly the necessary dimensions in order to achieve symmetry. It may also allow new fellows and surgeons to learn the technique more easily and more efficiently.

## H12. Endocannabinoid Signaling System Modulators and Cannabis Use in the Otolaryngology Patient

Lucas M. Bryant, MD, Philadelphia, PA; Patrick T. Tassone, MD, Philadelphia, PA; Serin I. Seckin, BS, Philadelphia, PA; David M. Cognetti, MD, Philadelphia, PA; Joseph M. Curry, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the otolaryngic manifestations of cannabis use, be able to compare some of the risks and benefits of cannabis and pharmaceutical cannabinoid use, discuss the basic physiology of the endocannabinoid signaling system, and understand the differences between current state and federal regulations for the medical use and research of cannabis and endocannabinoid signaling system modulators.

**Objectives:** 1) Describe the otolaryngic manifestations of cannabis use and compare the risks and benefits of cannabis and pharmaceutical cannabinoid use; 2) describe the physiology and biomolecular mechanisms of the endocannabinoid signaling system (ECS); and 3) define current state and federal regulations for the medical use and research of cannabis and endocannabinoid signaling system modulators. **Study Design:** Current review of literature. **Methods:** This manuscript is a review of the current literature relevant to the stated objectives. Several sources for used, including PubMed and Google Scholar. **Results:** Cannabis (marijuana) use is increasing. It is the most widely used illicit substance in the world, including the United States. There is increasing interest in its therapeutic potential due to changing societal perceptions, new data, and changes in regulatory legislation. There are currently two synthetic cannabinoid drugs that are FDA approved. Because they are indicated for use in the alleviation of several chemoradiation related adverse effects, they may be used or asked about by otolaryngology patients. Research has demonstrated potential benefit for use in many other non-FDA approved pathologies including pain, inflammation, and malignancy. All of these may directly affect pathologies seen and treated by the otolaryngologist. Some disease processes of interest to the otolaryngologist include wound healing, allergy, and cancer. There is data demonstrating antineoplastic activity in oral, thyroid, and skin cancers. **Conclusions:** Effectors of the endocannabinoid signaling system may play both a causal and therapeutic role in several disorders seen in otolaryngology patients. The use of cannabis and cannabinoids is not without risk. There is a need for further research to better understand both the adverse and therapeutic effects of cannabis use. With increasing rates of consumption, it is helpful for the otolaryngologist to be aware of both the adverse manifestations of use, and the potential therapeutic benefits.

# Posters

## H13. Rates of Post-Tonsillectomy Hemorrhage at a Tertiary Care Center

Kent L. Burton, MD, Shreveport, LA; Stephanie E. Hanke, BS, Shreveport, LA; Anil A. Gungor, MD, Shreveport, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand a surgical technique for tonsillectomy that potentially reduces the rate of post-tonsillectomy hemorrhage.

**Objectives:** To describe a surgical technique that reduces the rate of post-tonsillectomy hemorrhage. **Study Design:** A single center retrospective chart review from 2011 through 2015 for patients undergoing tonsillectomy with or without adenoidectomy at a tertiary medical center. **Methods:** Patient data collected included medical record number, age, sex, race, significant comorbidities, indication for tonsillectomy, BMI, lab values, date of surgery, postoperative complications, whether the patient experienced a primary or secondary hemorrhage and which treatment was used. **Results:** There were 374 patients (197 males, 177 females) included in the study. Mean age was 6.3 years. 372 patients underwent tonsillectomy with adenoidectomy, 2 underwent tonsillectomy alone. All patients underwent a bilateral tonsillar excision with the needle tip bovie with preservation of the inferior pole. The anterior and posterior pillars were sutured together caudally in all patients. The primary and secondary hemorrhage rates using our technique were 0.3% and 0.8% respectively. Overall post-tonsillectomy hemorrhage rate for our technique was 1.1%. **Conclusions:** The use of a needle tip bovie, preservation of the inferior pole, and suturing together the anterior and posterior pillars caudally can reduce the rate of post-tonsillectomy hemorrhage in pediatric patients.

## H14. Palpation Thyroiditis: Fact or Fiction

Charles Ronald Cannon, MD, Flowood, MS

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the entity of palpation thyroiditis, its pathogenesis and clinical implications.

**Objectives:** Present a case of palpation thyroiditis, the pathologic findings of multifocal thyroid granulomatous lesions in conjunction with a separate thyroid pathology and review the literature for other descriptions of this entity. **Study Design:** Case report. **Methods:** Review of pathologic findings in the current case and literature review of palpation thyroiditis. This entity is thought to arise in cases of vigorous palpation of the thyroid gland or in cases of thyroidectomy or parathyroidectomy. **Results:** This entity is thought to arise in patients who have undergone vigorous palpation of the thyroid gland or after thyroidectomy or parathyroidectomy. It rarely causes thyroid dysfunction although there has been a reported case of atrial fibrillation seen in a patient with palpation thyroiditis. This entity is usually noted on pathologic review of a thyroidectomy specimen or at autopsy. **Conclusions:** Palpation thyroiditis is an unusual clinical entity with limited clinical implications.

## H15. Blunt Trauma Leading to Arterial Rupture and Facial Compartment Syndrome

Eric T. Carniol, MD MBA, Newark, NJ; Candice Yip, MD, Newark, NJ; Emily Marchiano, BA, Newark, NJ; Sanjeev Kaul, MD, Hackensack, NJ; Brian E. Benson, MD, Hackensack, NJ; Senja Tomovic, MD, Hackensack, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss compartment syndrome and its relevance to otolaryngology and discuss the management of expanding facial hematoma.

**Objectives:** Compartment syndrome is defined as a condition in which increased pressure within a limited space compromises the circulation and function of the tissues within that space. No previous cases of facial compartment syndrome have been reported. Here, we present a case of facial compartment syndrome secondary to a rapidly expanding hematoma. **Study Design:** Case report. **Methods:** Retrospective review of a clinical case. **Results:** An 80 year old female presented to the trauma department following a face first fall with rapidly expanding right facial swelling. Patient was noted to have significant ecchymosis and edema along the right nasolabial fold and right cheek. CT angiography demonstrated a right facial hematoma with active extravasation, with presumed rupture of the angular artery. Over a several hour period, ecchymosis increased with a vesicular eruption on the face and intraorally in the buccal mucosa. The right face also became tense. Under local anesthesia, the patient underwent facial artery ligation. The right face remained tense, so an incision was made into the nasolabial fold. Following this, the right face became soft. Gauze was placed as a wick for drainage. The vesicles resolved within hours and no further surgical intervention was necessary. Approximately four weeks later, the patient was seen in the office with near complete resolution of the hematoma and facial ecchymosis and symmetric facial movements. **Conclusions:** The face, even with its communicating fascial planes, is still susceptible to acute compartment syndrome. Prompt diagnosis and treatment is important for preservation of neuromuscular function as well as prevention of skin loss and scarring.

**H16. The Pediatric Otolaryngology Patient Handoff in an EMR Based System**

John M. Carter, MD, Chicago, IL; Jessica Vanbeek-King, MD, Chicago, IL; Alex Schneider, MD, Chicago, IL; James Schroeder, MD, Chicago, IL; Dana M. Thompson, MD, Chicago, IL

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand what items our pediatric otolaryngology team felt was essential to convey within our team and to other teams during handoff times. Also, what communication items and issues we examined when transitioning to an EMR based handoff system at a tertiary care pediatric hospital.

**Objectives:** To identify opportunities to improve the quality and safety of a pediatric otolaryngology patient handoff process using an EMR based handoff system. **Study Design:** Prospective anonymous survey. **Methods:** Residents, fellows and attendings involved in our current patient handoff system completed an anonymous survey. **Results:** 23 respondents (n=23); 77% response rate. 4/23 (17.4%) of respondents believed that essential patient information was lost during handoff times. 7/23 (30.43%) believed that transferring to an EMR handoff system would improve the quality of information that is relayed on patient handoffs, 5/23 (21.7%) believed that it would better safeguard protected patient health information, and 10/23 (43.5%) believed that this transition would help other services/personnel better understand the patient management. The 2 most common responses to what would improve our handoff process were increasing the amount of attending to attending handoffs (43.5%) and increasing patient related information on handoff sheets (43.5%). When respondents evaluated 25 individual items to be present on the handoff sheet, the most frequently identified essential items were patient diagnosis (100%), to do list (100%), room number (100%), emergency airway plan (95.7%), type of surgery performed (95.7%), ENT related past medical history (95.7%), primary otolaryngologist caring for the patient (87%), antibiotics (87%), primary service managing the patient (82.6%), and drain output (82.6%). **Conclusions:** One-third of those surveyed indicated that there could be improvements in the quality of information relayed by transitioning to an EMR based handoff system. Almost half indicated that this system could help other services to better understand the management of the patient. We were able to identify at least ten items that were essential to our EMR based handoff system design.

**H17. Epistaxis: Risk Stratification for Directing Patient Centered Management**

Karen Y. Choi, MD, Bronx, NY; Aaron D. Burkenroad, MS, Bronx, NY; Marc J. Gibber, MD, Bronx, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the implications of managing patients who present with supratherapeutic INR levels with respect to increased risk of recurrent epistaxis.

**Objectives:** Epistaxis accounts for 0.46% of all emergency department visits in the United States. Little literature exists correlating INR levels to increased risk of epistaxis. The objective of this study is to analyze the correlation of INR levels of patients presenting with epistaxis, and to determine if a specific INR level places patients at increased risk of epistaxis. **Study Design:** Retrospective chart review. **Methods:** All patients >18 years old who presented to ED for epistaxis were included. INR level and medical comorbidities, including use of anticoagulants were recorded. Patients were risk stratified into the following: single episode mild, single episode moderate, recurrent mild, and recurrent moderate. Mild was defined as not requiring intervention and moderate was defined as requiring intervention. **Results:** Moderate category had statistically significant higher INR levels (mean INR = 2.163) than patients in mild category (mean INR = 1.273, p<0.05). Patients with recurrent moderate epistaxis had statistically significant higher INR levels (mean INR = 2.412) than patients with single mild episodes (mean INR of 1.110, p<0.05). Use of warfarin anticoagulation was more likely in the recurrent group than in the single episode group (45.9% vs 26.8%, p<0.01). However, use of warfarin or other anticoagulants was not significantly correlated with severity of epistaxis. **Conclusions:** There is a significantly positive correlation between INR level >2.1 and severity of epistaxis requiring intervention, while use of warfarin is associated with increased risk of epistaxis recurrence. Our study emphasizes the importance of measuring INR in evaluating patient risk of developing severe and recurrent epistaxis episodes.

**H18. Surgeon Performed Intubation Using an Anterior Commissure Scope and Bougie: A Retrospective Case Series**

Benjamin A. Collins, MD, Oklahoma City, OK; Michael R. Clampitt, BS, Tulsa, OK; Nilesh R. Vasan, MD, Oklahoma City, OK

**Educational Objective:** At the end of this presentation the participants should be able to compare the strategies and expected outcomes for urgent airway management. Through the use of diagrams and video, participants will be able to recognize the ideal population to undergo surgeon performed direct laryngoscopic awake intubation.

**Objectives:** This study examines the outcomes of surgeon performed intubations using a rigid laryngoscope and bougie in adults who have difficult airways to determine factors that may contribute to the success of this procedure. **Study Design:** Retrospective case series. **Methods:** This study identifies all adult subjects who underwent surgeon performed intubations at a tertiary care center over a 10 year period. A search of electronic medical records was performed to



# Posters

identify operative reports coded as CPT 31500- intubation by surgeon. The outcomes and complications of patients who underwent surgeon performed direct laryngoscopic intubation are analyzed. **Results:** 49 intubations were reviewed. Successful direct laryngoscopic intubation by the otolaryngologist surgeon occurred in 47 of the cases. The majority had a head and neck cancer involving the airway or trismus related to prior treatment for head and neck cancer. Over half of the subjects had one or more failed intubation attempts prior to surgeon performed direct laryngoscopy. Only one patient required an urgent tracheostomy due to failed intubation. **Conclusions:** In properly selected adults with unfavorable anatomy or pathologic obstruction who need an urgent, secure airway, surgeon performed direct laryngoscopic intubation using a bougie should be considered as a reliable and safe procedure that may preclude the need for an urgent awake tracheostomy.

## H19. Effect of Surgeon Cost Awareness on Utilization of Supplies in Thyroidectomies

Eugenie Du, MD, Bronx, NY; Marc J. Gibber, MD, Bronx, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand potential factors that may impede a surgeon's ability to effectively change or decrease supply utilization costs in an academic setting.

**Objectives:** We sought to determine whether providing surgeons with information on cost of supplies utilized in their operating procedures at regular intervals has any impact on their utilization pattern of these supplies. **Study Design:** Prospective controlled trial. **Methods:** The average operating supply costs of 10 faculty surgeons who perform partial and total thyroidectomies at our tertiary academic medical center was gathered for all cases performed in 2014. This information, along with supply cost and a breakdown of supplies used was provided to 5 surgeons monthly between January 1, 2015 and June 30, 2015. Subsequent operating supply costs were recorded for all surgeons and compared between the two groups. **Results:** The average supply cost for thyroidectomies was \$1205 (\$741-\$1920) during 2014 and \$1154 (\$664-\$1898) during the 6 month study period. There was no difference in the change in supply costs between the group that received detailed supply costs and monthly utilization and cost reports and the group that did not ( $p=0.8392$ ). All surgeons in the study group acknowledged receiving the cost and utilization report. **Conclusions:** Presenting surgeons with cost and utilization data as feedback did not result in any decrease in the supply cost of their thyroidectomies. Many factors play into the usage pattern of operating room supplies and simply improving surgeon cost awareness may be insufficient to effect change in this complex setting.

## H20. A Survey of Successful Otolaryngology Reapplicants

Zachary Farhood, MD, Charleston, SC; Adrian A. Ong, MD, Charleston, SC; Kevin Y. Zhan, MD, Charleston, SC; Shaun A. Nguyen, MD MA, Charleston, SC; Ted A. Meyer, MD PhD, Charleston, SC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to use this information to advise unmatched applicants who wish to continue pursuing a residency in otolaryngology.

**Objectives:** Matching into otolaryngology has become increasingly difficult, with more qualified applicants than available positions. Over the past 5 years, 287 United States seniors did not match, and 42 postgraduate year (PGY) 1 positions were filled by U.S. graduate reapplicants (representing 3% of the resident pool). The purpose of this study was to describe the characteristics of successful reapplicants. **Study Design:** Electronic survey. **Methods:** Otolaryngology program directors were asked to forward a survey to residents in their programs who had successfully matched following reapplication. The survey queried demographics, academic performance, research experience, action taken following an unsuccessful match, and reapplication data. **Results:** Responses from 22 residents were analyzed. Mean step 1 and 2 scores were  $241\pm 17$  and  $249\pm 15$ , respectively. Eleven reapplicants completed a preliminary surgery internship, with 4 matching into a PGY1 position and 5 into a PGY2. Eleven reapplicants completed a research year with 7 matching into a PGY1 position. The remaining 6 matched after a second year that differed from the first year. There was a significant difference in interviews offered ( $p=0.003$ ) and attended ( $p<0.001$ ) between researchers and prelims. However, some who completed a preliminary year had significantly fewer interviews because they accepted a PGY2 position before the match. Regression showed that on reapplication, change in number of research projects predicts change in proportion of interviews offered ( $p=0.016$ ) and attended ( $p=0.009$ ). **Conclusions:** Although difficult, reapplying and matching to otolaryngology is possible. Either a preliminary surgery or research year can be justified for qualified applicants who wish to reapply. Persistence pays off.

## H21. Safety and Utility of Direct Laryngoscopy and Bronchoscopy in Hospitalized Croup

Daniel P. Fox, MD, Houston, TX; Julina Ongkawuwan, MD, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the safety and yield of direct laryngoscopy and bronchoscopy in hospitalized croup patients who are not responding to standard medical therapy.

**Objectives:** 1) To determine if inpatient direct laryngoscopy and bronchoscopy (DLB) in acute croup is safe; 2) to describe

the operative findings on inpatient DLB; and 3) to correlate preoperative physiologic signs with operative findings. **Study Design:** Retrospective chart review. **Methods:** Five hundred twenty-one charts were reviewed with admitting diagnoses of acute tracheitis, acute laryngotracheitis, and croup between January 2003 and January 2011. Eighteen patients underwent inpatient DLB. Mean preoperative vital signs were recorded and correlated to operative findings. Comorbidities, complications within 72 hours of operation, level of care, and culture data were analyzed. **Results:** For the 18 DLBs performed mean age was 1.29 years. GERD (27.8%) and prior intubation (22.2%) were the most common comorbidities. Eleven (61%) had concurrent airway pathology. Seven (39%) required operative intervention and two (11%) required additional medical intervention. Preoperative mean temperature and change in mean temperature were elevated in tracheitis patients ( $P=.016$ ). Preoperative change in respiratory rate was elevated when other airway pathology was present ( $P=.047$ ). Only patients in the ICU preoperatively were intubated in the operating room, and only one postoperative escalation in level of care occurred. **Conclusions:** Performing inpatient DLB in hospitalized croup is reasonably safe and has a sufficient yield of identifying tracheitis or other airway pathology in select populations. Elevated preoperative mean temperatures are correlated with tracheitis, whereas elevated respiratory rates are correlated with additional unexpected airway pathology. Recurrent croup, history of GERD or prior intubation, and preoperative admission to the ICU increase the yield of DLB.

## H22. Formation and Assessment of a Novel Surgical Video Atlas in Otolaryngology

Wayne D. Hsueh, MD, Bronx, NY; Sandip Tarpada, BS, Bronx, NY; Marc J. Gibber, MD, Bronx, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the efficacy of a surgical video atlas with that of a traditional textbook atlas in teaching anatomy.

**Objectives:** Within surgical specialties, interactive web based media have previously been used to educate medical students and residents. In our study, we develop and assess the efficacy of a novel surgical video atlas in teaching surgically relevant head and neck anatomy to medical students. **Study Design:** Randomized controlled trial. **Methods:** A total thyroidectomy was recorded intraoperatively and subsequently edited with narration to develop a video atlas. Medical students were recruited and randomly assigned to one of two interventions. One group was given access to the video atlas while the other was supplied with a traditional textbook atlas. Both groups underwent pre- and post-tests to evaluate anatomical knowledge. All students completed a satisfaction questionnaire at the end of the study. **Results:** A total of 30 students completed the study with 15 students in each group. In the video atlas arm, mean pre- and post-test scores were 57.2% and 84.5% respectively. In the traditional textbook arm, the mean pre- and post-test scores were 55.3% and 76.5% respectively. Students with the video atlas had a mean post-test score 8.0 percentage points higher than those without ( $p=0.035$ ). Overall students were significantly more satisfied with the surgical video atlas than with the standard traditional textbook. **Conclusions:** A surgical video atlas was shown to more effectively teach head and neck anatomy to medical students compared to standard textbook atlases. We look forward to further investigation of interactive web based teaching materials to assess long term retention and its applicability to other procedures within otolaryngology.

## H23. Resident and Student Education in Otolaryngology: A 10 Year Update on e-Learning

Wayne D. Hsueh, MD, Bronx, NY; Sandip Tarpada, BS, Bronx, NY; Marc J. Gibber, MD, Bronx, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss e-learning and its future in the education of otolaryngology.

**Objectives:** E-learning, in its most rudimentary form, is the use of internet based resources for teaching and learning purposes. In surgical specialties, this definition encompasses the use of virtual patient cases, digital modeling, online tutorials, as well as standardized video and imaging. As new technological frontiers rapidly emerge within otolaryngology, e-learning may be an effective alternative to traditional teaching. Here we present a systematic review of the literature assessing the efficacy of e-learning for otolaryngologic education and a discussion of the relevance of these programs for both medical students and residents within the field. **Study Design:** Systematic review. **Methods:** A systematic search of PubMed, Embase, Web of Science, and the Cochrane Library was conducted according to the guidelines defined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. **Results:** Thirteen studies met inclusion criteria. These studies measured a range of outcomes from basic science anatomical knowledge to clinically relevant endpoints such as diagnostic accuracy and surgical technique. Twelve of the thirteen studies reported greater satisfaction and/or significantly gained knowledge using the e-learning intervention compared to standard techniques. **Conclusions:** E-learning proves to be a powerful alternative to standard teaching techniques within otolaryngologic education for both residents and medical students. Future work should focus on validating specific e-learning programs and accessing long term knowledge retention using e-learning platforms.

## H24. Indications and Usage Patterns of Flexible Fiberoptic Laryngoscopy in the Emergency Room Setting

Qasim Husain, MD, New York, NY; Kenny F. Lin, MD, New York, NY; Rahmatullah W. Rahmati, MD, New York, NY

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

# Posters

mon indications and usage patterns of flexible fiberoptic laryngoscopy in the emergency room and understand how this intervention may guide management.

**Objectives:** To evaluate the usage of flexible fiberoptic laryngoscopy (FFL) in the emergency room (ER) setting and delineate the indications for its use and potential benefits. **Study Design:** Retrospective analysis. **Methods:** Six months of consultations to otolaryngology-head and neck surgery service at a tertiary care center were examined. The inclusion criteria for the study were adult consultations from the emergency room involving an upper airway evaluation with flexible fiberoptic laryngoscopy. Those consultations that were included in the study provided the reason for consult, laryngoscopy findings, whether repeat examination was required versus intubation, and finally patient disposition. **Results:** During 6 consecutive months there were 111 adult consultations generated from the emergency department that involved the use of FFL for upper airway evaluation. The most common chief complaint or indication requiring flexible FFL in the ED was angioedema, followed by foreign body sensation, and allergic reaction. Out of a total of 111 evaluations there were positive findings elicited in 31 cases (27.9%). When positive findings were elicited, repeat scope exams occurred 45% of the time, whereas 13% of cases were intubated based on findings. Patients were admitted for further monitoring in 52% of cases, compared to 6 hours of ED observation in 48% of cases. **Conclusions:** Flexible fiberoptic laryngoscopy is a frequently used tool in the emergency room to evaluate patients with respiratory distress, foreign bodies, dysphagia, and odynophagia. Positive findings on laryngoscopy can often dictate the next step in management, as well as determine the safest disposition for the patient.

## H25. The Use of Standardized Letters of Recommendation for Otolaryngology Head and Neck Surgery Residency and the Impact of Gender

Evelyne Kalyoussef, MD, Newark, NJ; Christina H. Fang, MD, Bronx, NY (Presenter); Remy P. Friedman, BS, Newark, NJ; Johann Hasbun, BS, Mt. Laurel, NJ; Helen Han, BS, Edison, NJ; Jean Anderson Eloy, MD, Newark, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss gender based differences in narrative letters of recommendation (NLORs) and standardized letters of recommendation (SLORs) submitted to an otolaryngology-head and neck surgery residency program.

**Objectives:** To evaluate gender based differences in narrative letters of recommendation (NLORs) and standardized letters of recommendation (SLORs) submitted for applicants to an otolaryngology-head and neck surgery (OHNS) residency program. **Study Design:** Retrospective review. **Methods:** Nine hundred fifty-eight letters of recommendation (LORs) submitted to one OHNS program in 2013-2014 were analyzed. **Results:** NLORs (n=590) and SLORs (n=368) were reviewed. Male writers composed over 85% of LORs. Compared with male writers, female writers of NLORs were more likely to compose a letter of minimal assurance (p <0.025). Female writers of SLORs were more likely than males to rank applicants higher in communication skills (p <0.035) and match potential (p <0.045). Analysis of NLORs by applicant gender revealed that female applicants were more likely than male applicants to be described as team players (p <0.025) and less likely to receive a letter of minimal assurance (p < 0.001). Compared with SLORs, NLORs written for male applicants were more likely to reference their leadership potential (p <0.001). Female applicants were less likely to be described as bright (p <0.001) and more likely to have their appearance mentioned (p <0.03) in NLORs when compared to SLORs. **Conclusions:** Although SLORs were officially adopted in 2012 in otolaryngology, they are still not widely used. NLORs allow authors more descriptive opportunity than SLORs. Greater awareness of historical biases has likely contributed to more equitable letter writing, though impactful gender biases remain when reviewing applicants.

## H26. Patient Technology Utilization in Otolaryngology: A Demographic Study

Richard Kao, MD, Winston-Salem, NC; Mitchell L. Worley, MD, Charleston, SC; Jordan L. Wallin, MD, Winston-Salem, NC; Jonathan T. Maslan, MD, Winston-Salem, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe healthcare related technology use in otolaryngology clinic patients and to compare those differences across the subspecialties within otolaryngology.

**Objectives:** 1) To determine the extent of internet usage and preferred modalities for patients to understand and engage in their otolaryngologic care; 2) to determine patients' perspectives on the use of electronic health records (eHR) in their care; and 3) to describe patients' smart phone usage and its potential application in clinic settings. **Study Design:** Cross-sectional study. **Methods:** This prospective study was conducted from July 2014 to January 2015 in outpatient adult and pediatric otolaryngology clinics of all subspecialties at a tertiary care hospital. The questionnaire queried subjects on demographics, mobile phone ownership, internet utilization in their healthcare, and perspectives on eHR. Outcomes' frequencies were calculated and comparisons by demographics and subspecialties were performed. Fisher's Exact Test was used to analyze strength of statistical correlations. **Results:** A total of 194 subjects (86 male) participated in the study. In general, subjects who are female, younger than age 65, live in suburban settings, have higher incomes, and have higher levels of education had statistically greater healthcare related technology use (P<.05). No variables were correlated with assuming increased risks involving eHR use. While ownership of cell phones was ubiquitous (92-



98%), smart phone ownership had a statistically significant positive correlation with income ( $P=.014$ ). In general, pediatric subjects' family members had higher technology usage versus other subspecialties; conversely, otology subjects demonstrated lower utilization ( $P<.05$ ). **Conclusions:** Internet and mobile devices are becoming increasingly common in health-care utilization and engagement with otolaryngology patients. Understanding patients' demographics and perspectives is necessary to optimize patient care by disseminating information as efficiently as possible in their preferred modalities.

## H27. Readability of Patient Educational Materials in Otolaryngology

Catherine M. Kelso Geller, MD, Detroit, MI; Frank S. Chen, MD PhD, Detroit, MI; Nathan Gonik, MD MHA, Detroit, MI; Bianca Siegel, MD, Detroit, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to assess the educational materials they provide to patients and determine whether these materials effectively cater to patients' reading abilities.

**Objectives:** According to the United States Department of Health and Human Services (USDHHS), 15-62% of patients used the Internet as a source of health information in 2003; this number has likely grown with increasing reliance on computers in our society. Studies consistently show that the average American adult reads at a 6th-8th grade reading level; this should be considered when patient materials are developed. The American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS) provides a wealth of health literature intended to educate and inform patients. This study evaluates the readability of patient educational materials provided by the AAO-HNS. **Study Design:** Comparative descriptive educational study. **Methods:** Otolaryngology patient educational materials on the patient health information section of the AAO-HNS website in all subspecialties, English only, were assessed for readability using the Flesch Reading Ease Scale (FRES) and Flesch-Kincaid Grade Level (FKGL). **Results:** The AAO-HNS website provides 114 unique pages of patient educational materials. These materials have an average FRES 47.9 (SD 10.8) and average FKGL 10.7 (SD 1.93). Overall 79% fell at a 9th grade level or higher while only 21% of the materials provided were in the desired range of a 6th-8th grade reading level. A one way ANOVA found no difference between different subspecialties for FRES or FKGL ( $p>0.05$ ). **Conclusions:** The majority of patient materials supplied by the AAO-HNS is written above reading levels recommended by the USDHHS. Improving readability to meet USDHHS recommendations would enhance patient comprehension and may increase patient use of these resources.

## H28. Incidence and Demographics in Tympanoplasty Surgery: Contemporary Epidemiologic Analysis

Elliott D. Kozin, MD, Boston, MA; Rosh K.V. Sethi, MD MPH, Boston, MA; Aaron K. Remenschneider, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand surgical incidence of tympanoplasty and the associated preoperative ICD-9 diagnosis. Together, these data will be helpful for understanding resource utilization, disparities in care, and surgical exposure for trainees.

**Objectives:** Tympanoplasty is a common procedure for otolaryngologists, however, data regarding surgical prevalence, distribution of preoperative diagnoses, and patient demographics are sparse. We provide a contemporary epidemiologic evaluation of tympanoplasty surgery in California, the most populous US state. **Study Design:** Retrospective analysis of healthcare cost and utilization project s state ambulatory surgery and services database for California for 2010-2011, as well as from the United States Census Bureau from 2009 through 2011. **Methods:** American Academy of Otolaryngology tympanoplasty codes were used (CPT 69620, 69820, 69840, 69631-5). Descriptive analysis was performed. **Results:** From 2010-2011, a total of 6,870 tympanoplasty procedures was performed, reflecting a statewide incidence of 9.15 procedures per 100,000 residents per year. Patients undergoing tympanoplasty are on average 37.0 years old (SD 22.2) and pediatric cases (age<18) represent 35.4%. Approximately half of patients undergo tympanoplasty for a perforated tympanic membrane (46.7%), but otitis media (16.6%), and conductive hearing loss (7.58%) are also frequent surgical diagnoses. The majority of procedures are performed without ossiculoplasty or mastoidectomy (64.4%) and as a single procedure (53%). 16.7% of tympanoplasties were performed with greater than two additional procedures. Patients were equally distributed among income levels; however, most had private insurance (61.5%) or Medicare (13.9%). Patients undergoing tympanoplasty were (56.7%) white, (14.6%) Asian and (21.6%) other race. Few black or African American patients underwent tympanoplasty (2.3%). **Conclusions:** In the era of the Affordable Care Act and value based care, understanding the epidemiology of tympanoplasty surgery has important implications for provider and payor resource allocation, disparities in care, and surgical exposure for trainees.

## H29. A Case of Intraductal Retention of a Fractured Laser Fiber Tip during Parotid Sialendoscopic Lithotripsy

Raymond W. Kung, MD, Iowa City, IA; Henry T. Hoffman, MD, Iowa City, IA; Chad R. Tracy, MD, Iowa City, IA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the potential for laser fiber fracture during sialolithotripsy.

# Posters

**Objectives:** To identify the occurrence and management of intraductal retention of a fractured fiber tip during intracorporeal parotid laser assisted lithotripsy employing sialendoscopy. **Study Design:** Retrospective chart review. **Methods:** Case report. **Results:** A 66 year old male with a 5mm right parotid sialolith proximal to the hilum underwent complex sialodochoplasty with a 200 micron single use holmium laser fiber to fragment the stone and facilitate its extraction. Midway into the case, a 4mm piece of the laser fiber tip was found to have fractured within the parotid duct. Ductal dilation was required to permit placement of a 1.6 mm O.D. sialoendoscope with a sufficiently large working channel for the use of microforceps to remove the foreign body. **Conclusions:** Fragmentation of laser fiber tips has been identified as a more common occurrence in urologic procedures but can be readily addressed through retrieval of the fragmented fiber in the larger renal collecting system. However, the relatively narrow salivary duct system may not accommodate larger instrumentation and retrieval would generally be considered more difficult. The report of this complication warrants attention both to help in preoperative patient counseling and in directing consideration for application of non-laser based alternatives for sialolith fragmentation.

### H30. Introducing a Novel Referral Algorithm for Nasal Bone Fractures to Improve Patient Care and Utilization of Healthcare Resources

Alexander E. Lanigan, MD, Fort Sam Houston, TX; Sarah N. Bowe, MD, San Antonio, TX;  
Adrienne M. Laury, MD, San Antonio, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate that immediate otolaryngology consultation for isolated nasal bone fractures results in a low yield of immediate operative intervention, diminishes work hour productivity, and unnecessarily increases healthcare utilization. We performed a literature review to identify best practices of nasal bone fracture management and propose a novel consultation algorithm for use by referring providers to optimize patient care and healthcare resources.

**Objectives:** To analyze current referral patterns to the otolaryngology department for isolated nasal bone fractures and propose a novel tool for referring providers to optimize patient care and healthcare resources. **Study Design:** Retrospective chart review and experimental model. **Methods:** A literature search was performed to create a referral tool based on best practice management of nasal bone fractures. The electronic medical record at our level I trauma center was queried via CPT codes identifying isolated nasal bone fractures from August 2014-2015. Charts were reviewed for demographics, injury description, radiographic findings, and operative interventions (i.e. closed reduction, septal hematoma drainage). The total number of actual consultations and intervention rate was assessed and compared to the same data processed through the experimental referral algorithm. **Results:** Review of records revealed that immediate otolaryngology consultation was made for isolated nasal bone fractures in 50 patients. Ten interventions were performed yielding an intervention rate of 20%. Upon reanalysis utilizing the proposed algorithm, only 8 immediate consultations would have been indicated and, of those, all would have undergone immediate operative intervention, yielding an experimental intervention rate of 100%. Chi-squared test revealed a significant difference in intervention rate between groups ( $p < 0.0001$ ). The odds ratio for operative intervention when utilizing the algorithm was 91 ( $p < 0.001$ ). **Conclusions:** The current referral pattern for immediate otolaryngology consultation in nasal bone fractures reveals a low rate of operative intervention. Implementing a novel algorithm for referring providers to optimize rates of intervention is effective in improving patient outcomes while also reducing excess healthcare expenditures.

### H31. Characterizing the Utilities and Limitations of Repurposing an Open Field Optical Imaging Device for Fluorescence Guided Surgery in Patients with Head and Neck Cancer

Lindsay S. Moore, MD, Birmingham, AL; Jason M. Warram, PhD, Birmingham, AL; Thomas K. Chung, MD, Birmingham, AL; Esther De Boer, BSc, Birmingham, AL; William R. Carroll, MD, Birmingham, AL; Eben L. Rosenthal, MD, Stanford, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the utilities and limitations of repurposing an FDA approved intraoperative open field near infrared fluorescence imaging device intended for fluorescence angiography for fluorescence guided surgery. Understand how this can expedite the approval process for intraoperative fluorescence imaging devices and streamline clinical translation of this technique.

**Objectives:** In order to expedite the translation of fluorescence guided surgery, we assessed the utility of repurposing an FDA approved fluorescence imaging device (LUNA, Novadaq) to identify disease in patients with head and neck cancer. **Study Design:** Consenting patients ( $n=15$ ) scheduled for curative resection were enrolled in a phase 1 clinical trial to evaluate the safety and specificity of cetuximab IRDye800 (NCT01987375). **Methods:** Fluorescence imaging of the primary tumor was performed daily in the preoperative clinic, as well as prior to, during, and immediately following surgical resection. The post-resection wound bed and resected margins were also imaged. Fluorescence was quantified using integrated instrument software, and the tumor to background ratio (TBR) was determined by dividing the fluorescence of the tumor by that of normal tissue. **Results:** In the preoperative clinic, the repurposed device was utilized to guide preoperative mapping of tumor borders, optimize the day of surgery based on peak contrast (TBR), and identify occult lesions. Intraoperatively, the device demonstrated robust potential to guide surgical resections, as the peak TBR  $> 2.1$  (2.2-14.1) for all patients. Post-resection wound bed fluorescence was significantly less than the pre-resection tumor fluorescence

( $P < 0.001$ ). The repurposed device also successfully identified positive margins using fluorescence when compared with histopathology. Imaging in the oral cavity was determined to be a potential limitation due to the inherent design of the device. **Conclusions:** This study examines the potential of repurposing optical imaging devices for fluorescence guided surgery, which can streamline the clinical translation of this technology.

### H32. Resident Success Factors for Competency Gain and American Board of Otolaryngology In-Service Examination Scores

Eun Mi Park, EdD, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) explain a study conceptual framework drawn from behavioral theories that suggest to study how resident personal attributes and burnout reactions in the residency learning environment may relate to the behavioral outcomes of resident learning and competency attainment; 2) identify significant predictors for each of two learning outcomes evaluated by a residency program and by the American Board of Otolaryngology; 3) compare the commonality versus differences of the significant predictors for the resident learning outcomes assessed institutionally and nationally; and 4) discuss the scientific and practical implications for resident education.

**Objectives:** Identify significant predictors of resident learning outcomes, focused on overall competency attained over a year in a residency program and the otolaryngology training/in-service examination (OTE) score. **Study Design:** A longitudinal cohort study. **Methods:** Residents in a tertiary teaching hospital voluntarily self-assessed two questionnaires in fall 2013, Learner Autonomy Profile-Short Form (LAP-SF) and Maslach Burnout Inventory-Human Services (MBI-HS). We monitored two learning outcomes in 2014-2015: 1) resident competency scores that the institution faculty have observed using a validation reported form for objective structured assessments; and 2) resident OTE scores. Correlations and regression models were mainly analyzed. **Results:** Assessed responses showed internal consistency reliabilities (LAP-SF, MBI-HS, faculty scores Cronbach's alpha 0.98, 0.83, and  $> 0.71$  respectively). There were no demographic differences on competency gain ( $N=14$ ). Three significant predictors of the overall competency gain were personal accomplishment burnout ( $B = -1.1, p < .01$ ), learning initiative ( $B = -0.1, p < .01$ ), and persistence ( $B = 0.2, p < .01$ ), which adjusted R square showed 66% variance of the global competency outcome. Specifically, the three factor model accounted for 83% variance of critical thinking attainment or for 48% variance of knowledge gain. Two domain scores in critical thinking ( $r = 0.7, p = .01$ ) and knowledge ( $r = 0.6, p = .04$ ) were correlated with OTE score. Further, not single status ( $B = -2.9, p = .02$ ) and high level of resolving conflict skill ( $B = 0.5, p = .02$ ) predicted high OTE score, which accounted for 65% variance of the outcome. **Conclusions:** Gaining competency in critical thinking may be most beneficial in resident achievement scores assessed both institutionally and nationally. In contrast, resident competency learning and national evaluation seem welcome different strategies as adult learners.

### H33. Xeomin (IncobotulinumtoxinA) Injection for Temporomandibular Joint Disorder--A Double Blinded Randomized Controlled Study

Amit A. Patel, MD, New York, NY; Michael Z. Lerner, MD, New York, NY; Andrew Blitzer, MD DDS, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to consider Xeomin as a possible treatment for temporomandibular joint disorder.

**Objectives:** Temporomandibular joint disorder (TMJD) involves dysfunction of the temporomandibular joint and associated muscles of mastication causing pain with chewing, limitation of jaw movement, and chronic orofacial pain. While the exact pathophysiology of TMJD is not completely understood, it is thought that hyperfunction of the muscles of mastication place undue stress on the temporomandibular joint, which leads to degeneration of the joint and associated symptoms. We hypothesize that chemo denervation of the muscles of mastication with Xeomin will decrease the stress on the temporomandibular joint and thus improve pain associated with TMJD. **Study Design:** Double blinded randomized controlled study. **Methods:** 20 patients were randomized to either 170 units of Xeomin or saline injection of the masseters and pterygoid muscles. Patient reported pain scale (0-10) was recorded at 4 week intervals following injection for 16 weeks. At 4 weeks patients who received saline injection were rolled over to Xeomin injection and vice versa. Student's t-test was used to analyze for differences between the groups. **Results:** Data was available for 18 patients. At 4 weeks post injection, the Xeomin and saline groups showed an average pain score reduction of  $4.1 \pm 2.1$  and  $2.4 \pm 1.4$  respectively ( $p = 0.06$ ). At 8 weeks after injection with Xeomin, an average reduction in pain score of  $3.2 \pm 2.3$  was noted. **Conclusions:** Patients injected with Xeomin showed a trend toward improved pain scores when compared with placebo injection. After all patients had received Xeomin injection, an overall reduction in average pain score was noted. Although further study and analysis is needed, Xeomin can be considered as an adjunct treatment for TMJD.



# Posters

## H34. Otolaryngology Residency Training during Military Humanitarian Operations

Colleen F. Perez, MD, San Diego, CA; Ryan L. Sload, MD, San Diego, CA; Michelle G. Arnold, MD, San Diego, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the importance and value of resident involvement in military humanitarian missions, including the ability to fulfill ACGME goals and objectives in the nontraditional training environment of a hospital ship.

**Objectives:** The objectives of this study are to 1) identify how resident participation in military humanitarian missions aboard a hospital ship can serve to provide exposure to the core facets of otolaryngology; and (2) describe how cognitive, noncognitive and technical goals can be attained during a medical mission rotation. **Study Design:** Retrospective review of resident training and preparation prior to embarking on a humanitarian mission, operative and scholarly involvement during the mission, and final review of value and adherence to ACGME goals and objectives upon completion of the humanitarian experience. **Methods:** Residents planning to participate in the humanitarian mission were selected based upon previous performance, academic standing and overall maturity. Each was required to complete training pertaining to humanitarian operations prior to participating in the mission. Goals and objectives for the rotation were provided in written format, and a faculty mentor was assigned to provide direct guidance and evaluation. Residents evaluated the rotation and value to otolaryngology training. **Results:** ACGME goals were met for otolaryngology training. Residents participated in direct patient care; including patient assessment, operative cases, postoperative care and cooperation with host nation physicians. Residents participated in continuing medical education activities by giving specialty lectures as well as developing scholarly activity relevant to otolaryngology training. **Conclusions:** Invaluable training exists in the participation by residents in humanitarian missions. All rules, policies, and regulations of resident training still apply during military medical mission rotations. Otolaryngology residency goals and objectives can be met in accordance with ACGME regulations while providing a unique learning environment.

## H35. Epistaxis Severity Score in Pediatric Patients with Hereditary Hemorrhagic Telangiectasia

Matthew G. Petersen, BS, Salt Lake City, UT; Cristian D. Gonzalez, BS, Salt Lake City, UT; Jamie C. McDonald, MS, Salt Lake City, UT; David A. Stevenson, MD, Salt Lake City, UT; Kevin F. Wilson, MD, Salt Lake City, UT

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the previously undefined roles of epistaxis and epistaxis severity scores in pediatric patients with diagnosed hereditary hemorrhagic telangiectasia. Participants will also be able to identify genotype-phenotype correlations among this population.

**Objectives:** Our objective is to assess one measure of epistaxis, the epistaxis severity score (ESS) and its role in pediatric HHT patients. We will also describe how these scores correlate with genotype. **Study Design:** Retrospective cohort study. **Methods:** Inclusion criteria included patients age 0 to 18 evaluated at a tertiary multidisciplinary HHT clinic from January 2010 to 2015. For each patient, a molecular diagnosis, ESS data, and Curacao score were collected. ESS was administered in clinic using a 3 month recall survey completed by guardians. Statistical analyses were conducted for groups of patients according to identified HHT mutation: ACVRL1, ENG, SMAD4 and those with no identified mutation. **Results:** 91 subjects; 63 had HHT confirmed by molecular genetic testing, 27 were suspicious for HHT, but did not meet Curacao criteria for clinical diagnosis, 1 met clinical diagnostic criteria but genetic testing was negative. Average ESS among patients with identified mutations was 1.61 with a maximum score of 4.22 on a 10 point scale. Mean age of epistaxis onset was 4.4 years in this group. Patients less than 10 years of age had lower ESS compared to adolescent ( $\geq 10$  years) patients ( $P=0.038$ ). Adolescents with ENG mutations have higher ESS (2.46) than those with ACVRL1 (1.52) mutations ( $P=0.041$ ). Of the 91 subjects, three sought interventions to control epistaxis while anemia was noted in only one. **Conclusions:** Epistaxis may present early in HHT, severity appears to increase with age. Generally, epistaxis associated with HHT presents mildly in pediatric patients and can be easily missed in the community setting.

## H36. Rapidly Progressive Necrotizing Deep Neck Space Infection Presenting as a Peritonsillar Abscess versus Head and Neck Cancer

Lara K. Reichert, MD MPH, Galveston, TX; Matthew G. Yantis, MD, Galveston, TX; Dayton L. Young, MD, Galveston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to appreciate the diagnosis and treatment of cervical necrotizing fasciitis.

**Objectives:** This case report describes an unusual presentation of a necrotizing deep neck space infection with associated literature review to aid otolaryngologists in patient care. **Study Design:** Case report with review of literature. **Methods:** The patient's clinical records were reviewed and summarized. Relevant literature was reviewed. **Results:** A 56 year old female presented with 3 days of odynophagia, dysphagia, and progressive facial swelling. She was transferred to our institution for specialty care and management of a peritonsillar abscess. Upon initial examination, she was found to have

extensive soft tissue swelling of the upper airway extending from the soft palate to the glottis. The patient had an extensive tobacco and alcohol abuse history with a family history of thyroid cancer. Imaging was concerning for a necrotizing superinfection of head and neck malignancy. The patient required operative incision and drainage of a multiloculated collection extending from the parotid gland to the thyroid gland with medial extension into the lateral pharyngeal wall necessitating nasogastric tube placement. Watery, brawny edema and necrotic tissue were encountered within the abscess tract. Preliminary cultures reported *Gemella morbillorum* infection with finalized reports declaring streptococcus viridians infection. The patient improved after operative intervention with intravenous antibiotics. **Conclusions:** The majority of cases of cervical necrotizing fasciitis and descending necrotizing mediastinitis are odontogenic in origin. Appropriate management involves a multidisciplinary approach, airway monitoring, surgical drainage, and intravenous antibiotics. Due to the difficulty in diagnosis and rapid progression of disease, clinicians must remain suspicious of more extensive infectious processes when patients have atypical or complex presentations.

### H37. iPhone Based Otoscopy

Ronald Sayhouni, BS, Irvine, CA; Omid Moshtaghi, BS, Irvine, CA; Yaser Ghavami, MD, Irvine, CA; Hossein Mahboubi, MD, Irvine, CA; Melissa Huang, BS, Irvine, CA; Hamid R. Djalilian, MD, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the advantages of CellScope and its feasibility and ease of use.

**Objectives:** The CellScope® is a novel tool that digitally improves optical clarity and fidelity of the tympanic membrane, providing residents and medical students with an enhanced view of normal anatomy and pathology. This project seeks to determine the utility of CellScope, an iPhone enabled otoscope, for clinical use. We compared the ease of use, fidelity, reproducibility and utility of this device compared to a standard otoscope. **Study Design:** For one month, a smart phone based otoscope (CellScope) was used by clinicians at our outpatient otolaryngology clinic. **Methods:** Pre and post surveys assessed the utility of this device compared to otoscopes both as its practical and educational value. Answers from the surveys were scored from 1 to 5, (5: most favorable rating). The pre survey questions assess the efficacy, usefulness, and value of the otoscope. The post survey assessed the same parameters for the phone based otoscope. **Results:** Data collection is still in progress, but preliminary results have shown that both students and residents favor the use of CellScope. Survey results demonstrated a 22.4% increase in comfort level for CellScope compared to a standard otoscope (4.36 vs. 3.24 on a 5 point scale). Additionally, there was an 88.6% increase in user preference for CellScope compared to a standard otoscope. **Conclusions:** The ease of use for this device makes it easier for clinicians to document and visualize the tympanic membrane. Attending physicians will be able to teach the pathology easier for both student and patient. In addition, smart phone enabled otoscopes may allow for telemedical diagnosis in the future.

### H38. Return of the Great Imitator: An Unusual Cause of Unilateral Tonsil Mass

Isaac E. Schwartz, MD, San Diego, CA; Anil N. Shah, MD, San Diego, CA; Niels H. Olson, MD, San Diego, CA; Alexander E. Stewart, MD, San Diego, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to thoroughly discuss the differential diagnosis for atypical tonsillar infections, compare chronic to acute tonsillar infections in an immunocompromised patient.

**Objectives:** 1) To present a case of secondary syphilis presenting as unilateral tonsillar mass with neck mass; and 2) to discuss the differential diagnosis of unilateral tonsillar mass in an immunocompromised patient. **Study Design:** Case report. **Methods:** Case report. **Results:** A 27 year old man with recently diagnosed HIV presented with right 4+ tonsillar swelling, right cervical lymphadenopathy, and pain that was refractory to multiple antibiotics. In order to obtain tissue for diagnosis, tonsillectomy was performed, which was complicated by multiple severe postoperative hemorrhages. Due to skin findings at a return visit, further testing was performed yielding a diagnosis of secondary syphilis. Syphilis tonsillitis was confirmed by retroactive pathologic examination of the surgical specimen which showed spirochetes. **Conclusions:** Secondary syphilis is an extremely rarely described cause of tonsillitis or tonsil mass. We present a case of secondary syphilis presenting as extreme tonsillar swelling in an HIV positive patient. This report is intended to highlight the importance of syphilis - a disease that has nearly doubled in incidence in recent years - as an etiology of head and neck disease. It is also an opportunity to review the infectious and neoplastic causes of atypical head and neck masses.

### H39. Poor Online Patient Ratings of Otolaryngologists in the United States: What Are Patients Saying?

Grace M. Scott, MSc, London, ON Canada; Connor S. Sommerfeld, BSc, Winnipeg, MB Canada; Lily H.P. Nguyen, MD MSc FRCSC, Montreal, QC Canada; Alexandra E. Quimby, BSc, Ottawa, ON Canada; Kristina H. Pulkki, MD, Ottawa, ON Canada; Kevin Fung, MD FRCSC, London, ON Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss patient concerns in the context of ACGME competencies.

# Posters

**Objectives:** Online patient forums have become a platform for patient education and advocacy in many areas of medicine. The anonymity provided by such forums may encourage honest, candid responses. Our study aims to explore themes that arise from negatively perceived care interactions with American otolaryngologists as recorded by patient online reviews. **Study Design:** Qualitative thematic analysis. **Methods:** Through an iterative, multistep process, a qualitative thematic analysis was conducted on negative reviews (defined as ratings of two or less out of five) of all American otolaryngologists found on a popular online physician rating website (RateMDs). The 5 most recent negative comments for each physician were included in this study. **Results:** A search of the RateMDs website revealed 1385 separate negative comments. The predominant themes that emerged aligned closely with the Accreditation Council for Graduate Medical Education (ACGME) competencies, in particular with professionalism and interprofessional skills and communication. **Conclusions:** Analysis of negative reviews of American otolaryngologists by patients reveals a number of areas where improvements could be made to quality of care. Patients value evidence based medicine delivered by compassionate and respectful physicians. In isolating and aligning predominant themes with the ACGME framework, we may be able to integrate teaching into the post-graduate training and continuing professional development to avoid such negatively perceived interactions in the future.

## H40. Caregiver Reported Outcomes of Pediatric Adenotonsillectomy by Device

Justin C. Sowder, MD, Salt Lake City, UT; Craig Gale, MS, Salt Lake City, UT; Kristy Veale, RN, Salt Lake City, UT; Katie Liljestrand, RN, Salt Lake City, UT; Mark Ott, MD, Salt Lake City, UT; Jeremy D. Meier, MD, Salt Lake City, UT

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the difference between patient reported outcomes (pain scores, days to resumption of normal diet and activity), duration of pain medication usage, and complication rates between various devices utilized for adenotonsillectomy.

**Objectives:** To 1) compare parent reported outcomes after adenotonsillectomy (T&A) in children between devices; and 2) determine if complication rate is influenced by the device used. **Study Design:** Cross-sectional survey with chart review. **Methods:** Primary caregivers of children 1-18 years old who underwent outpatient T&A in a multi-hospital network were contacted via phone 14-21 days post-surgery. Data collected included parent reported pain score at postoperative days (POD) 2, 3, 7, and 14; days until normal diet/activity resumed, duration of narcotic use, and ED visits for postoperative complications. Results were compared by device used. **Results:** 1,444 children met criteria and 672 surveys (46.5%) were completed. Electrocautery tonsillectomy with electrocautery or curettage adenoidectomy (EC) was performed in 335 (49.9%), coblation T&A (CO) in 295 (43.9%), and other in 42 patients (6.2%). Mean pain scores at POD #2/3/7/14 for EC: 6.1/6.1/3.8/0.6; while for CO: 6.1/6.4/4.8/0.8. Significant differences were seen at POD #7 ( $P < 0.05$ ). Normal activity resumed in 8.3 days for EC and 9.2 days in CO ( $P = 0.002$ ). Duration until normal diet resumed (8.4 vs. 8.9 days) or narcotics use (6.6 vs. 6.7 days) was not different. EC patients used any pain medications fewer than CO patients (8.6 vs 9.5 days,  $P < 0.001$ ). Complications requiring ED visit occurred in 7.8% of EC patients and 11.9% of CO patients ( $P = 0.08$ ). Postoperative hemorrhage occurred in 1.5% with EC and 5.4% with CO ( $P < 0.001$ ). **Conclusions:** Parent reported pain scores were not significantly different between electrocautery and coblation T&A except at POD #7. Electrocautery T&A had fewer days to resume normal activity and less postoperative hemorrhage.

## H41. When Danger Calls: Facial Trauma Resulting from Cellular Phone Usage

Peter F. Svider, MD, Detroit, MI; Michael Blasco, MD, Detroit, MI; Adam J. Folbe, MD, Detroit, MI; Syed Naweed Raza, MD, Detroit, MI; Michael A. Carron, MD, Detroit, MI; Mahdi A. Shkoukani, MD, Detroit, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the potential for facial trauma associated with cellular telephone use, particularly as a result of distraction when using these devices while driving or participating in other activities.

**Objectives:** An increased availability of applications on modern cellular phones may potentially distract individuals, rendering users vulnerable to severe injury. We aimed to estimate the incidence of facial trauma sustained from cellphones and further delineate injury patterns, as this information may potentially assist patient evaluation and counseling. **Study Design:** Analysis of a nationwide database. **Methods:** The Consumer Product Safety Commission's nationwide electronic injury surveillance system was evaluated for ED visits resulting from cellphone related injuries. Patient entries were evaluated for demographics, mechanism of injury, and clinical injury characteristics. **Results:** From 2010-2014, there were 205 entries extrapolating to an estimated 7,448 ED visits for cellphone induced facial trauma, with incidence increasing. Median patient age was 23 years (13-37 IQR), 50.7% were female and the most common diagnoses were laceration (55.1%), contusion/abrasion (33.2%), and fracture (6.8%). Common factors included being struck by the device (46.8%), being distracted (31.7%), usage causing a MVA (16.1%), bicycle accident (5.4%), texting (15.6%), intentional assault (3.4%), and alcohol (2.9%). Adults were more likely to be distracted by usage with resultant injury. Patients involved in MVAs were more likely to sustain fractures. Texting while driving and bicycling were significant factors. **Conclusions:** Direct injury and distraction from usage of cellphones has resulted in thousands of facial injuries, many preventable, in recent years. Distraction while driving, particularly from texting, has become a significant issue, resulting in particularly



severe injuries. These sobering numbers may be used to educate patients, particularly young adults, about potentially devastating consequences. Furthermore, device manufacturers may need to do more to minimize distractibility.

## H42. Otolaryngology Graduate Medical Education and the Institute of Medicine Report--Is There a Need for Non-Physician Educators?

Trisha L. Thompson, MD, Shreveport, LA; Timothy S. Lian, MD MBA FACS, Shreveport, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the limitations of ENT residency program directors and understand how non-physician medical educators could be valuable faculty members of ENT residency programs.

**Objectives:** The Institute of Medicine (IOM) released a report in July 2014 detailing the state of graduate medical education (GME) in the United States. This report called for GME programs to provide proof that the Medicare funding that supports resident physician training is producing physicians that are prepared to work in, to help lead, and to continually improve the healthcare system. With increasing curriculum based requirements, the ability of residency program directors to effectively maintain clinical requirements and fulfill the educational criteria is being compromised. Medical and surgical programs across the country have expressed positive growth in fulfilling educational requirements with the addition of non-physician educators. It is hypothesized that there is a tremendous lack of non-physician educators within otolaryngology programs across the country. **Study Design:** Descriptive report with literature review. **Methods:** All ACGME accredited otolaryngology residency program websites were researched. Available faculty profiles were reviewed for evidence of formal education training, including Masters of Education (M.Ed.) degree or fellowship in medical education. A literature review was performed. **Results:** The websites of 107 ACGME accredited otolaryngology residency programs were reviewed. Of the 101 programs included, 5 (4.95%) were identified as having physician or non-physician faculty members with advanced education degrees. **Conclusions:** Despite changing curricula and increasing educational demands, there is an enormous lack of educational support within the structured educational activities in otolaryngology programs. General surgery programs have embraced non-physician educators as vital members of the educational team. With the newest recommendations from the IOM, this may identify a void in otolaryngology residency programs.

## H43. EIF1AX: A Novel Gene in Thyroid Cancer Tumorigenesis

Michael C. Topf, MD, Philadelphia, PA; Zi-xuan Wang, PhD, Philadelphia, PA; Edmund A. Pribitkin, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize EIF1AX as a novel cancer gene in thyroid carcinoma tumorigenesis.

**Objectives:** To review a case of follicular thyroid carcinoma in a patient found to have an EIF1AX mutation on next generation sequencing and discuss the role of EIF1AX mutations in thyroid cancer tumorigenesis. **Study Design:** Case report and literature review. **Methods:** Retrospective chart review and literature review. **Results:** A 71 year old woman presented with an enlarging right thyroid mass, which was follicular neoplasm on cytology. The tumor was examined with next generation sequencing and found to be positive for a c.338-1G>T mutation in the EIF1AX gene. The patient underwent right thyroid lobectomy with final pathology showing follicular carcinoma, oncocyctic Hürthle cell type with capsular and vascular invasion. The patient returned one month later for completion thyroidectomy with the left thyroid lobe found to be negative for malignancy. The EIF1AX gene encodes an essential translation initiation factor that mediates protein synthesis. Mutations in EIF1AX have been reported in patients with papillary thyroid carcinoma, follicular thyroid carcinoma, and anaplastic thyroid carcinoma, though it is unclear how mutations in the gene promote cancer. **Conclusions:** EIF1AX is a novel gene in thyroid cancer tumorigenesis. Further research needs to be conducted to determine the exact mechanism by which mutations in EIF1AX promote thyroid carcinoma.

## H44. Otolaryngology Trainees Lack Billing/Coding Knowledge, Underbill at Significant Potential Cost

Jennifer A. Villwock, MD, Syracuse, NY; Lisa M. Craner, BA, Syracuse, NY; Eric K. Fung, MD, Syracuse, NY

**Educational Objective:** At the conclusion of this presentation, the participants will be familiar with billing and coding patterns and knowledge in residents and potential areas for improvement.

**Objectives:** Otolaryngology training focuses on acquisition of surgical and clinical skill. Formal education on practice management, including billing and coding knowledge is often lacking. In order to effectively remedy this, knowledge gaps must first be assessed. We sought to characterize billing and coding knowledge in residents as well as estimate the amount of inappropriately gained or lost revenue due to current coding patterns. **Study Design:** Cohort study of otolaryngology residents. **Methods:** Web based anonymous survey of otolaryngology residents. **Results:** 28 residents responded. Overall, coding of clinical scenarios was highly variable. There was no statistically significant difference between junior and senior residents. On average, residents underbilled 9 clinical scenarios for a mean loss of \$526+/-233. If these billing trends

# Posters

continued over the course of a year, this would translate into a potential inappropriate loss of \$194,327 over the course of a year in clinical practice. Interns and fellows fared even worse, with an average loss of \$779 and \$676 or \$287,797 and \$249,744. Overall, formal training is lacking with 89% of surveyed residents receiving between 0-2 hours. Duration of training did not impact performance. Participants experienced the most difficulty in coding that involved modifiers, duration of office visit, or complexity of management determinations. **Conclusions:** Billing and coding knowledge is variable among residents and formal education is lacking. Trainees at all levels are consistently underbilling with potential impacts for the financial viability of their future practices. Targeted and effective education programs and tools for residents are needed.

#### H45. Xenograft and Allograft Disclosure Practices among Otolaryngologists

Jennifer A. Villwock, MD, Syracuse, NY; Erynne A. Faucett, MD, Tucson, AZ; Haidy Marzouk, MD, Syracuse, NY

**Educational Objective:** At the conclusion of this presentation, participants will be familiar with commonly used biologic graft materials as well as current disclosure practices as part of informed consent among otolaryngologists.

**Objectives:** Allograft and xenograft materials are commonly used in otolaryngology. The use of these materials should be disclosed during the informed consent process as patient religious and ethical observances may preclude their use. We sought to determine the knowledge base of otolaryngologists' biologic graft materials as well as their disclosure practices when using these materials. **Study Design:** Cross-sectional study of attending otolaryngologists. **Methods:** Internet based anonymous survey. **Results:** A convenience sample of attending otolaryngologists yielded 22 respondents. Over half (54%) knowingly routinely use biologic graft materials. Religious and ethical/dietary practices that may impact graft material preferences are routinely collected in only 22% and 9% of practices, respectively. Knowledge based questions regarding biologic grafts were correctly answered 56% of the time. For example, 42% correctly identified Gelfoam as a porcine derivative; 28.6% FloSeal as a bovine derivative. Disclosure of xeno or allograft use is most common with AlloDerm (31%). Gelfoam, FloSeal and the species of origin of these materials is not routinely disclosed (0%). Physician demographics had no impact on disclosure practices. **Conclusions:** Xenograft and allograft materials are commonly used. Assessment of factors impacting patient preference for use of these materials is not routine. Knowledge deficiencies and disclosure practices have implications for patient care. The informed consent process should include dialogue about biologic grafts to avoid potential religious and ethical issues, possible litigation, and respect patient autonomy.

#### H46. Evaluating Adherence to the American Academy of Otolaryngology-Head and Neck Surgery Choosing Wisely Guidelines

Cynthia S. Wang, BS, Durham, NC; Walter T. Lee, MD, Durham, NC; Nikita Chapurin, BA, Durham, NC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare adherence rates to the choosing wisely guidelines at an academic tertiary care center.

**Objectives:** The purpose of this study is to gauge awareness of and adherence to the American Academy of Otolaryngology-Head and Neck Surgery choosing wisely guidelines at an academic tertiary care center to better understand the strengths and deficits in knowledge about otolaryngology related practices across all specialties. **Study Design:** Retrospective chart review. **Methods:** Retrospective chart review was performed on patients seen from 2011 to 2015 who had received one of the following 1) computed tomography (CT) for sudden hearing loss; 2) oral antibiotics for uncomplicated acute tympanostomy tube otorrhea; 3) oral antibiotics for uncomplicated acute external otitis; 4) radiographic imaging for uncomplicated acute rhinosinusitis; or 5) CT/magnetic resonance imaging (MRI) for initial evaluation of hoarseness. Interventions and treatments were recorded to evaluate adherence to the choosing wisely guidelines. **Results:** This study included 83 patients who received oral antibiotics for tympanostomy tube otorrhea, 268 patients treated with oral antibiotics for acute otitis externa, 116 patients with head CTs for sinusitis, and 102 patients with CTs/MRIs for hoarseness. No patients were found to have received head CTs for initial evaluation of sudden hearing loss. After careful chart review, subjects that received treatments that were noncompliant with the guidelines included: 1 patient (1%) with tympanostomy otorrhea, 3 patients (1%) with acute otitis externa, 13 patients (11%) with sinusitis, and 1 patient with dysphonia (0.25%). **Conclusions:** The majority of physicians at this academic tertiary care center were adherent to the choosing wisely guidelines, with noncompliance most prevalent in the treatment of acute rhinosinusitis.

#### H47. Use of Propranolol in Treatment of an Infantile Hemangioma Complicating Cleft Lip Repair

Joshua W. Wood, MD, Memphis, TN; Phillip D. Rosen, MD, Birmingham, AL; Vijaya M. Joshi, MD, Memphis, TN; Jennifer D. McLevy, MD, Memphis, TN; Jerome W. Thompson, MD, Memphis, TN; RoseMary S. Stocks, MD, Memphis, TN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the use of propranolol to treat infantile hemangiomas that were complicating surgical repair of cleft lip.



**Objectives:** Infantile hemangiomas and cleft lips are relatively common lesions, however rarely present concurrently. The only three case reports in English literature discuss simultaneous surgical excision of the hemangioma and repair of the cleft. We present the first case report utilizing propranolol to treat a facial hemangioma distorting a unilateral cleft lip and nose, followed by the delayed surgical repair of the cleft lip. **Study Design:** Retrospective case review. **Methods:** The medical record of a single case report was reviewed, including clinical presentation, imaging performed, treatment received, and ultimate surgical repair of congenital abnormalities. **Results:** A 6 month old female presented with right cleft lip and infantile hemangioma of the left maxilla. The immediate repair of the cleft defect was delayed as the hemangioma was causing significant distortion of the ala and the nasal tip. The child was started with oral propranolol according to protocol at our institution. Two months later, the hemangioma had decreased in size and it was deemed safe to proceed with the repair of the patient's cleft lip. The patient's cleft was repaired using the Millard advancement rotational flap technique and concurrent cleft rhinoplasty. She was continued on propranolol for full involution of her hemangioma. **Conclusions:** This case illustrates the decision making process to delay the surgical repair of a unilateral complete cleft lip until the partial involution of a facial hemangioma being treated with propranolol. Propranolol can be safely employed to facilitate proper correction of cleft lips and other craniofacial abnormalities that are compromised by hemangiomas.

#### H48. Cost Implication Analysis for the use of PET/CT in Treatment Monitoring in Head and Neck Cancer

Kevin Y. Wu, BS, Boston, MA; Scharukh M. Jalisi, MD MA FACS, Boston, MA; Samuel J. Rubin, BA, Boston, MA; Anand K. Devaiah, MD FACS, Boston, MA; Minh T. Truong, MD, Boston, MA; Salman T. Hussain, BS, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the risks and benefits of the use of PET/CT in post-treatment monitoring of head and neck cancers and discuss the creation of standard imaging guidelines.

**Objectives:** Evaluate the cost effectiveness of positron emission tomography/computed tomography (PET/CT) in post-treatment monitoring for stage III and IV head and neck cancer. **Study Design:** Single center retrospective cohort study. **Methods:** 33 patients from an urban medical center fit the inclusion criteria for the study. Patients were monitored for true positive or false positive PET/CT scans and the number of resulting biopsies, fine needle aspirations (FNA), computed tomography (CT), and magnetic resonance images (MRI). The price analysis between the false positive and true positive groups was conducted from the perspective of Medicare reimbursement rates. A two sample t-test was used to analyze measurable data and the chi square test and Fisher Exact test were performed on categorical data. **Results:** The false positive group with stage III cancer (n=3) had a total reimbursed cost of \$10,400.41 in comparison to the true positive group with stage III cancer (n=4), which had a total reimbursed cost of \$5,502.37, demonstrating an increase of 89% in cost (p=0.141). The false positive group with stage IV cancer (n=10) had a total reimbursed cost of \$10,704.59 in comparison to the true positive group with stage IV cancer (n=16), which had a total reimbursed cost of \$6,878.37, demonstrating an increase of 56% in cost with a statistically significant difference between the two groups (p=0.040). **Conclusions:** In an era of accountable care organizations and global payment systems, we have demonstrated the possible financial impact of false-positive PET/CT scans in post-treatment monitoring of head and neck cancer.

#### H49. Decreasing Intraoperative Costs by Optimizing Instrument Use

Elizabeth A. Zambricki, MD MBA, Stanford, CA; Jennifer Y. Lee, MD, Stanford, CA; Edward J. Damrose, MD, Stanford, CA

**Educational Objective:** Empower budding and established otolaryngologists to evaluate opportunities for decreased intraoperative waste while maintaining patient care standards.

**Objectives:** Given the soaring costs of healthcare, many medical specialties within our academic medical center aim to decrease operating costs while optimizing efficiency and patient care. Within the operating room, there are significant differences in direct variable costs based on unique surgeon preferences. Surgical case card preferences vary substantially from surgeon to surgeon with little or no oversight. Indeed, most surgeons may not be aware of the significant variability that exists for disposable items used during surgery. Our objective is to understand and reduce the cost variability of disposable items between surgeons for common otolaryngology cases. **Study Design:** Observational study involving statistical comparative analysis of disposable items used to 10 most common otolaryngology cases at one tertiary care institute. **Methods:** Using the Supply Chain Variation Software, developed at our institution, the top 100 otolaryngology cases were analyzed across different surgeons. Patterns of use were identified and categorized. Unused and wasted items were identified. Costly items were identified and discussed with the surgeon of record. **Results:** Preliminary results show significant variation of disposable use items across similar surgeries without a known clinical advantage. Additionally, many items were identified as wasted or unused despite being present on a surgeon's case card. **Conclusions:** Within the surgical specialties, there is a growing body of literature assessing operating room expenses and the impact on patient care, physician satisfaction, and overall hospital expenditures. Decreasing intraoperative costs by reducing unused instruments and surgeon variability has potential for significant annual cost savings.

# Posters

## FACIAL PLASTIC & RECONSTRUCTIVE

### **H50. Postoperative Analgesia Strategies for Mandibular Fracture Patients: A Survey of Facial Trauma Surgeons**

Elizabeth M. Floyd, MD, Brooklyn, NY; Gabriel Karkenny, BA, Brooklyn, NY; Shantel Jiggetts, BA, Brooklyn, NY; Jeremy Weedon, PhD, Brooklyn, NY; Sydney C. Butts, MD, Brooklyn, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the factors that could influence the choice of analgesic agents when treating patients with mandibular fractures and discuss benefits and risks associated with these agents in this group of patients.

**Objectives:** Analgesia after mandibular fracture repair represents a balance between optimizing pain control and pain free function while controlling side effects such as respiratory depression, bleeding and nausea. Current evidence demonstrates that postoperative pain management for mandibular fractures is largely under studied. **Study Design:** Members of the trauma committees of the American Academy of Facial Plastic and Reconstructive Surgery and the American Academy of Otolaryngology-Head and Neck Surgery were invited to complete a brief electronic survey. Questions regarding preferred analgesic agent, perceived analgesic side effects and factors influencing analgesic choice were included. **Methods:** Survey responses were collected anonymously via SurveyMonkey.com from July-September 2015. Results were analyzed with one and two way frequency tables. **Results:** The response rate was 45% (24/53 surgeons). Average fracture repairs performed annually were 14.9 (range 0-40). 18/24 respondents (75%) prescribe opioid combinations (e.g., acetaminophen+oxycodone) as first line, while 1/24 (4%) prescribe nonsteroidal anti-inflammatory drugs (NSAIDs). 16/24 (66.7%) surgeons never prescribe NSAIDs, with risk of surgical site bleeding cited most commonly. Half of the respondents modify the analgesic regimen for patients with a history of substance abuse, including use of NSAIDs or decreasing the amount of opioids, but no respondents change the dose of opioids for patients in maxillomandibular fixation (MMF). **Conclusions:** Superior efficacy and risk of bleeding were cited as reasons to prescribe opioids over NSAIDs, but there is little evidence indicating superiority of one agent for mandibular fracture patients. Nausea and vomiting are known side effects of opioids, but all respondents continued opioids for patients in MMF. Pain regimens for patients with substance abuse history are challenging to develop.

### **H51. Pharmacologic Leeching with Bivalirudin for Treatment of Venous Congestion of Head and Neck Reconstructive Flaps**

Aisha Harun, MD, Baltimore, MD; Rachel M. Krueger, PharmD, Baltimore, MD; Andrew Lee, MD, Baltimore, MD; Kofi Boahene, MD MS, Baltimore, MD; Patrick J. Byrne, MD, Baltimore, MD; Jeremy Richmon, MD, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the use of bivalirudin for venous as an alternative adjuvant therapy for venous congestion of reconstructive flaps.

**Objectives:** To review the safety and efficacy of local bivalirudin injection for treatment of venous congestion of head and neck reconstructive flaps. **Study Design:** Retrospective chart review. **Methods:** Patients who underwent bivalirudin treatment for venous congestion of head and neck reconstructive flaps in the department of otolaryngology from September 1, 2012 to September 1, 2015 were reviewed. Individuals were treated with variable number of intradermal injections directly into the flap followed by a small skin incision to allow extended passive bleeding. The main outcome measure was improvement of flap congestion. **Results:** Ten patients underwent treatment with bivalirudin. Bivalirudin injections were utilized as adjuvant therapy in 6 patients (5 patients received bivalirudin after operative removal of an arterial or venous clot, and 1 individual was treated with one day of standard leech therapy prior to injections). Eight individuals developed initial improvement of their venous congestion, whereas 2 individuals underwent alternate therapy for venous congestion immediately following injection and therefore the efficacy could not be assessed. Of these 8 flaps, 3 developed partial necrosis and 1 developed complete necrosis requiring additional reconstruction. Bivalirudin treatment was complicated by the need for blood transfusions in 2 individuals. **Conclusions:** Bivalirudin is a safe and feasible adjuvant therapy for treatment of flap congestion. It may be an alternative to traditional leech therapy, as bivalirudin negates the need for antibiotic prophylaxis, eliminates the psychological aversion associated with leech therapy in the head and neck, and avoids the potential for leech migration, and therefore warrants further investigation.

### **H52. Dental Occlusion Ties: A Rapid, Safe, and Noninvasive Maxillomandibular Fixation Technology**

Alan W. Johnson, MD MS, Grand Forks, ND

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand how to harness the apical embrasure between teeth to secure noninvasive maxillomandibular fixation (MMF); 2) describe the development process of a new technology from initial design sketch, through engineering design, prototyping, cadaver testing, and ultimately to feasibility clinical trial validation; and 3) contrast dental occlusion ties from Erich arch bars and screw based and "hybrid" MMF techniques.

**Objectives:** Maxillomandibular fixation (MMF) establishes dental occlusion to treat mandible and maxilla fractures. For decades, Erich arch bars have been the standard to establish MMF. While reliable, the approach risks sharps injury, consumes operating room time, and inflicts gingival trauma. Newer technologies including screw based techniques and hybrid techniques have improved MMF by reducing sharps injuries and operating room time, but risk injury to tooth roots, nerves, and gingiva. A need remains for an efficient, safe, and noninvasive MMF solution. **Study Design:** Prospective, non-blinded, human feasibility clinical trial. **Methods:** An iterative prototyping process was used to invent dental occlusion ties. Development included 3D printing, cadaver prototype testing, human apical embrasure dimensioning, and ultimately nonsignificant risk human clinical trial testing. In the IRB approved feasibility clinical trial, the devices were applied to mandible and maxilla fracture candidates with fractures amenable to intraoperative MMF with open reduction/internal fixation. The ties were removed prior to extubation. Pre-teens, comminuted fracture patients, and patients requiring postoperative MMF were excluded. **Results:** Fully optimized and manufactured prototypes secured MMF successfully in management of unilateral and bilateral mandible fractures as well as displaced maxilla fractures. All patients reported correction of fracture related malocclusion. Application times were consistently 12-15 minutes for a single surgeon to achieve MMF. Patients incurred negligible gingival trauma from the technology as the ties require no screw or wire penetration for application. **Conclusions:** Dental occlusion ties offer a noninvasive solution featuring operating room time efficiency, minimized sharps risk, and less bony and soft tissue trauma than current commercialized solutions.

### H53. Mandibular Defect Reconstitution: Caprine Model of Bone Regeneration

Jan L. Kasperbauer, MD, Rochester, MN; Jeffrey R. Janus, MD, Rochester, MN; Michael J. Yaszemski, MD PhD, Rochester, MN; Heidi D. Lehrke, DO, Rochester, MN; Sivakumar Chinnadurai, MD, Nashville, TN; David J. Schembri Wismayer, MD, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the caprine model of mandibular defect bone regeneration and explain the impact of bone morphogenic protein in mandibular bone reconstitution.

**Objectives:** 1) Develop a large animal model of a contaminated mandibular defect which facilitates evaluation of tissue regenerative techniques; 2) evaluate bone regeneration in a mandibular defect filled with a resorbable scaffold; and 3) document the impact of bone morphogenic protein (BMP2) on bone regeneration. **Study Design:** Prospective animal study comparing mandibular defects stabilized with: metal plates alone, metal plates with a resorbable scaffold, and metal plates with a resorbable scaffold coated with BMP2. **Methods:** A 3 cm contaminated mandibular defect was generated via an external incision and stabilized with two mandibular reconstruction plates. A scaffold was placed in 6 goats. In 6 goats the scaffold was coated with BMP2. In six goats the defect was left blank with the periosteum intact, as a control group. After 12 weeks the mandibles were plasticized, sectioned and evaluated histologically to assess for bone regeneration. Initially, we examined 6 specimens (2 from each group) to establish a standardized analytic approach. **Results:** The mandibular specimens revealed only focal (average of 5.8% of the scaffold pores) and early bone formation in the scaffold only group. In the scaffold + BMP2 group, there was more (average of 51.4% of the pores) bone formation. In the periosteum only group, the ratio of the bone thickness of the defect to that of the normal bone ranged from 0.16 to 0.78. **Conclusions:** This caprine model serves as an excellent method to assess reconstructive options for mandibular deficits. Caprine mandibular periosteum generated significant bone. BMP2 augments bone generation in the synthetic scaffold.

### H54. In the Rough: Facial Trauma Resulting from Golfing

Christopher T. Rose, MD, Detroit, MI; Peter F. Svider, MD, Detroit, MI; Vibhav Sekhsaria, MD, Detroit, MI; David S. Cohen, MD, Detroit, MI; Vivek S. Patel, MD, Detroit, MI; Michael A. Carron, MD, Detroit, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand facial injuries are a major component of golf related safety concerns.

**Objectives:** Novel technologies and enhanced equipment have resulted in golf carts that travel faster and clubs able to drive balls further. Along with golf's increasing popularity these changes also bring up important safety considerations. Our objectives included utilizing a national database to characterize the incidence of facial trauma sustained from golfing and further delineate injury patterns. **Study Design:** Retrospective review of national database. **Methods:** The Consumer Product Safety Commission's Nationwide Electronic Injury Surveillance System was evaluated for ED visits resulting from golf related injuries. Patient entries were evaluated for demographics, mechanism of injury, and clinical injury characteristics. **Results:** From 2010-2014, there were 751 entries amounting to an estimated 27,101 ED visits for golf related injuries. Median patient age was 9 years, 67.9% were male, and the most common diagnoses were laceration (70.4%), contusion/abrasion (20.0%), and fracture (7.3%). The most common fracture locations were the nose, orbit, and mandible. Most common devices involved in injuries were golf clubs (65.7%), golf balls (14.8%), and carts (9.3%). Children and teenagers were involved in a significant proportion of injuries. **Conclusions:** Facial trauma sustained while golfing results in thousands of emergency department visits every year. Although some injuries are inevitable, equipment related injuries may potentially be prevented with safer teaching regarding appropriate usage. As the majority of injuries reported were



# Posters

among minors, safety regulations may need to be reconsidered regarding children and adolescents participating in golf.

## H55. Subcutaneous Nasal Angioleiomyoma: Case of a Rare Tumor and Review of the Literature

Robert A. Saadi, BS, Hershey, PA; Benjamin S. Oberman, MD, Hershey, PA; Henry S. Crist, MD, Hershey, PA; Jessyka G. Lighthall, MD, Hershey, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the disease and understand the treatment. The review will elucidate current literature regarding nasal angioleiomyoma and we will present a case and successful surgical treatment.

**Objectives:** 1) Present a case of a rare nasal lesion; 2) demonstrate the implications of the unique location and surgical management; and 3) review current literature regarding nasal angioleiomyoma and patient specific treatment. **Study Design:** Case report and review of literature. **Methods:** Case Report. Year: 2015. Disease studied: angioleiomyoma. Subject studied: 46 year old woman. Setting: academic medical center. Intervention: angioleiomyoma removed from nasal subcutaneous tissue via open rhinoplasty approach. All specimens were sent to pathology for review. Outcome measurements: histology revealed thick walled vessels merging with smooth muscle. Results confirmed diagnosis of disease. **Results:** Postoperative exam revealed no recurrence and good cosmetic result. **Conclusions:** Angioleiomyomas are rare, benign tumors arising in the deep dermis and subcutaneous tissue. They are derived from smooth muscle often in association with the media of vessel walls. An estimated 10% of these tumors arise in the head and neck. Intranasal angioleiomyomas are even more unusual, comprising only 1% of all benign tumors of the nasal cavity and less than 1% of all angioleiomyomas. The reported patient had a mass 2 cm in diameter resulting in nasal deformity, obstruction, and unremitting pain, especially when exposed to cold. The mass was excised via open septorhinoplasty approach. Her left lower lateral cartilage was intact but her left upper lateral cartilage was thinned and depressed, failing to provide structural support. An auricular cartilage graft was used for reconstruction of her nasal sidewall. Evidence of much improved support and patency of the nasal airway was visualized at the end of the procedure.

## H56. The Use of Perioperative Antibiotics for Free Tissue Transfer in Head and Neck Surgery

Stefanie S. Saunders, MD, Boston, MA; Stephen Reese, MS-4, Boston, MA; Jimmy Lam, MS-4, Boston, MA; Waleed H. Ezzat, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) demonstrate an understanding that there is no established standard of care for the duration of use of perioperative antibiotics in the setting of free tissue transfer; 2) demonstrate a 7 day course of prophylactic antibiotics does not appear to increase the number of antibiotic associated infections when compared to all surgical patients.

**Objectives:** Free tissue transfer is commonly practiced for reconstruction of head and neck defects. In the postoperative setting, antibiotics are frequently used given the length of exposure to oral flora. There is a paucity of literature on the optimal duration of antibiotic prophylaxis. Our objective was to report our outcomes after a 7 day perioperative antibiotic use in free tissue transfer. **Study Design:** Retrospective chart review at an academic tertiary care hospital. **Methods:** Subjects who underwent head and neck free tissue transfer between September 1, 2011 and March 31, 2014 were included in the study. We collected data to determine outcomes of our protocol using a 7 day course of postoperative antibiotics. **Results:** Eighty-one subjects were identified and seventy-six subjects met the inclusion criteria. The rate of postoperative antibiotic associated infections and surgical site infections (SSI) was similar between patients undergoing free tissue transfer when compared with all surgical patients at our institution during the given time frame. There were no significant differences in postoperative and medical complications between these groups. **Conclusions:** Our current protocol for antibiotic prophylaxis in free tissue transfer is a 7 day postoperative course. While there is no conclusive evidence regarding the optimal duration for antibiotic prophylaxis, our data suggest that a 7 day course does not predispose the patient to increased risks of antibiotic associated complications.

## H57. Trigeminal Trophic Syndrome following Radiosurgery: Case Report and Literature Review

Isaac E. Schwartz, MD, San Diego, CA; Curtis W. Gaball, MD, San Diego, CA

**Educational Objective:** At the conclusion of this presentation, participants should be able to 1) describe the complications of radiosurgery that are pertinent to the otolaryngologist and their patient; and 2) discuss the etiology, pathophysiology, clinical presentation, and treatment options for trigeminal trophic syndrome.

**Objectives:** Present a case of self-induced traumatic facial ulcers following radiosurgical ablation of the trigeminal nerve, and review the literature regarding trigeminal trophic syndrome and complications of radiosurgery. **Study Design:** Case report and literature review. **Methods:** Case report. Trigeminal trophic syndrome (TTS) is an infrequently described disease process characterized by self-induced traumatic facial ulcerations following denervating insult to the trigeminal nerve. We present a case report of a patient who developed this syndrome after radiosurgery for trigeminal neuralgia (TN) and review the literature regarding this syndrome and complications from radiosurgery for trigeminal neuralgia. **Results:**

A patient developed facial numbness and ulcerations on her nasal sill, upper lip, and temple, 6 months after undergoing gamma knife radiosurgery for trigeminal neuralgia. After extensive workup ruling out and treating infectious and neoplastic diseases, the patient was diagnosed with trigeminal trophic syndrome. **Conclusions:** Facial numbness is the most common complication of SRS for TN, and TTS is a described complication of trigeminal nerve surgery. We present an uncommon manifestation of a common treatment complication. TTS lesions can become quite erosive and they represent a diagnostic challenge. The otolaryngologist is well served to be familiar with this rare disease and its underlying cause, as well as the complications of radiosurgical management of TN.

## H58. Composite 3D Printed Calcium Phosphate Scaffolds with Polycaprolactone Incorporation for Craniofacial Reconstruction

Joseph B. Vella, MD PhD, Rochester, NY; Ryan P. Trombetta, BS, Rochester, NY; Hani A. Awad, PhD, Rochester, NY; Danielle S.W. Benoit, PhD, Rochester, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand 1) 3D powder printing process; 2) mechanical shortcomings of powder printed osteogenic scaffolds; and 3) how biocompatible polymers can strengthen and toughen ceramic bone scaffolds.

**Objectives:** Although 3D printing of calcium phosphate osteogenic scaffolds powder printing yields porosity, biocompatibility, and precise defect contouring required for craniofacial reconstruction, brittle failure must be mitigated for clinical translation. Previously our group has shown accelerated allograft remodeling utilizing a tissue engineered periosteum of hydrogel impregnated mesenchymal stem cells in a murine femoral osteotomy model. In this study, we seek to extend this tissue engineering strategy to 3D printed scaffolds, using a biphasic precursor mixture of  $\pm$ -tricalcium phosphate and hydroxyapatite. In pursuit of clinical translation, we sought to improve the mechanical properties of the scaffolds using sintering as well as formation of a polycaprolactone (PCL) scaffold composites. **Study Design:** Basic science. **Methods:** Addition of PCL to biphasic scaffolds was achieved by co-deposition during printing or via immersion in dissolved PCL. Flexural strength, modulus, and fracture toughness was measured using 3 point bending geometry. Sintering was performed in an open tube furnace. Surface morphology and porosity was characterized using scanning electron microscopy and microcomputed tomography. **Results:** While sintering improved flexural strength little improvement in fracture toughness was observed. With incorporation PCL significant increases in flexural strength and fracture toughness was observed. Minimal alteration porosity or pore size distribution was observed following heat treatment, however obliteration of surface porosity which is deleterious to osteogenic remodeling was observed in the PCL composite using the immersion method. However, porosity was conserved with PCL co-deposition. **Conclusions:** While 3D powder printing promises osteogenic capacity and conformation to precise defect geometry, brittle scaffold properties mitigates clinical application. Deposition of ceramic biopolymer composite significantly increases the strength and toughness without compromising the porosity.

## H59. Clavicular Bone Graft Harvest with Supraclavicular Artery Island Flap for Reconstruction of Composite Head and Neck Defect

Denna A. Zebda, BS, Houston, TX; Syed Naqvi, MD, Houston, TX; Kevin J. Caceres, MD, Houston, TX; Ron J. Karni, MD, Houston, TX; Daniel J. Freet, MD, Houston, TX; Tang Ho, MD, Houston, TX

**Educational Objective:** At the conclusion of this presentation, participants should be able to discuss and compare different techniques and reconstructive options available for composite head and neck defect.

**Objectives:** To present a novel application of pedicled supraclavicular artery island flap (SCAIF) with attached clavicular bone graft for head and neck reconstruction. **Study Design:** Case report and literature review. **Methods:** A 65 year old male underwent midline partial glossectomy, floor of mouth resection, and marginal mandibulectomy for squamous cell carcinoma. A novel approach using a SCAIF with a partial thickness clavicular bone graft was utilized to reconstruct the floor of mouth soft tissue defect and the segmental mandibulectomy defect. The bone graft was taken as a free graft instead of planned pedicled osteocutaneous flap due to the distance between mandibular symphysis and supraclavicular artery pedicle. The soft tissue defect, including the free clavicular bone graft, was covered with soft tissue component of the SCAIF. **Results:** Reconstruction of floor of mouth defect and marginal mandibulectomy using a free clavicular bone graft and SCAIF, obviating the need for additional bone graft donor site and morbidities associated with graft harvest. **Conclusions:** This is the first reported case to use a free clavicular bone graft and SCAIF for composite head and neck reconstruction. The advantages include ease of harvest compared to free flap, avoidance of second donor site morbidity, and provides good color match. Depending on the location of the mandibulectomy defect, the flap may be harvested as a pedicled flap with bone graft attached, but additional investigations are necessary.



# Posters

## HEAD & NECK

**H60. Detection of CD46 in Tumor Tissue and Saliva from Head and Neck Squamous Cell Carcinoma Patients**  
Sherwin Abdoli, BS, Los Angeles, CA; Uttam K. Sinha, MD, Los Angeles, CA; Agnieszka Kobiela, MS PhD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the potential role of membrane bound complement restriction proteins (mCRPs) CD46, CD55, and CD59 in the detection of head and neck squamous cell carcinoma.

**Objectives:** Membrane bound complement restriction proteins (mCRPs) CD46, CD55, and CD59 enable cells to be spared from complement dependent cytotoxicity. mCRPs are expressed in normal tissue but are also often overexpressed in tumor cells allowing them to evade immune surveillance. In this study, we use immunofluorescence to observe CD46 expression in normal mucosa and head and neck squamous cell carcinoma (HNSCC) tumor tissue and use enzyme linked immuno assay (ELISA) to measure the concentration of CD46 in saliva. The goal of this study is to identify CD46 in early tumor stages and saliva to allow for early detection of HNSCC. **Study Design:** Basic science investigation. **Methods:** We performed immunofluorescent microscopy of tumor tissue and normal mucosa of HNSCC patients (n=14) stained with antibodies against E-cadherin, DAPI, and CD46. Saliva was collected from a subset of the patients (n=6) and healthy controls (n=6). The concentration of CD46 in the saliva samples was measured using ELISA. **Results:** 11 of the 14 tumor samples and none of the normal mucosa stained positive for CD46. The six control subjects and the two CD46 negative HNSCC patients had undetectable levels of CD46 in saliva. Of the four CD46 positive HNSCC patients, two had detectable levels of CD46 in their saliva at 562.11 pg/ml and 133.94 pg/ml respectively. **Conclusions:** The majority of HNSCC tumors stain positive for CD46 at early tumor stages. CD46 is detectable in saliva providing a possible mechanism for early screening of HNSCC.

**H61. A Case of Idiopathic Fibrosis Involving Head and Neck Musculature**  
Suhyla Alam, MD, Richmond, VA; Stephanie E. Ambrose, MD, Richmond, VA; Niklaus V. Eriksen, MD, Richmond, VA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe a case of idiopathic fibrosis of head and neck musculature, not characteristic of any identifiable neuromuscular or connective tissue disorder.

**Objectives:** Describe a case of idiopathic fibrosis of head and neck musculature, not characteristic of any identifiable neuromuscular or connective tissue disorder. **Study Design:** Case report. **Methods:** Chart review, PubMed literature review. **Results:** A 24 year old Moroccan female presented with right pharyngeal and submental swelling, requiring awake fiberoptic intubation. She was treated with IV antibiotics and steroids with subsequent extubation. She returned 4 months later with progressive dysphagia, dyspnea and neck pain. Her workup showed no evidence of abscess or acute infection, but a CT demonstrated nonspecific thickening of hypopharyngeal soft tissues. She was taken to the operating room for direct laryngoscopy with biopsy. She required emergent tracheostomy due to the inability to access the airway due to severe oral and pharyngeal fibrosis. A biopsy from the tonsillar pillar demonstrated benign fibroconnective and lymphoid tissue. Lab and tissue testing for disease processes including lymphoma, polymyositis and CREST were negative. Additionally, four extremity electromyography was normal. MRI revealed enhancement of the hypopharyngeal soft tissues and paraspinal musculature consistent with inflammatory changes. Repeat biopsy of pharynx and strap musculature demonstrated extensive fibrosis and atrophy. She was started on mycophenolate mofetil 7 months after her initial presentation which has resulted in mild improvement of her symptoms. **Conclusions:** We present the case of progressive idiopathic pharyngeal and neck fibrosis with a negative rheumatologic workup. She is currently being treated with mycophenolate mofetil, with some improvement in her symptoms, including improved ability to move neck and eat. She has been successfully decannulated. The pathogenesis of her disease remains unknown.

**H62. Intrathyroidal Lymphoepithelial Cyst: A Diagnostic Challenge**  
Stephanie E. Ambrose, MD, Richmond, VA; Suhyla Alam, MD, Richmond, VA; Evan R. Reiter, MD, Richmond, VA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss intrathyroidal lymphoepithelial cysts and recognize that they can pose a diagnostic challenge.

**Objectives:** Describe a rare lesion of the thyroid gland which can pose a diagnostic challenge on both fine needle aspiration (FNA) and frozen section, complicating surgical decision making. **Study Design:** Case report. **Methods:** Chart review and PubMed literature review. **Results:** A 68 year old female presented with a 2 month history of a rapidly progressive, painful left paratracheal mass. Neck CT showed a large left thyroid mass causing tracheal deviation without definite invasion. The patient had a history of right hemithyroidectomy in 1987 for reportedly benign disease. She had

subsequently become hypothyroid and was currently on replacement therapy. An ultrasound guided FNA of the mass was obtained, which was suspicious for a high grade thyroid malignancy, favoring anaplastic carcinoma. The patient underwent completion thyroidectomy and left central neck dissection. Operative findings revealed extensive periglandular inflammation without frank invasion of the airway. An intraoperative frozen taken from the left superior pole rendered a diagnosis of lymphoid tissue versus small cell type malignancy. Final pathology revealed an intrathyroidal lymphoepithelial like lesion with reactive squamous differentiation and necrosis, arising within severe chronic lymphocytic (Hashimoto's) thyroiditis. **Conclusions:** Intrathyroidal branchial cleft-like lymphoepithelial cysts are rare lesions of the thyroid, thought to arise from solid cell nest remnants of the ultimobranchial bodies during embryogenesis. There are 30 reported cases in the literature, some reported in association with lymphocytic thyroiditis. Due to the rarity of this lesion, as well as cellular features and high incidence of inflammatory changes, preoperative diagnosis by FNA and ultrasonography is difficult, and findings may mimic malignant thyroid neoplasms.

#### H63. The Impact of Patient Delay upon Stage at Presentation in Head and Neck Cancer

Ashwin Ananth, MD MBA, New Orleans, LA; Charles A. Riley, MD, New Orleans, LA; Jason F. Ohlstein, BS, New Orleans, LA; Thomas S. Edwards, BS, New Orleans, LA; Stephen T. Green, BS, New Orleans, LA; Paul L. Friedlander, MD, New Orleans, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the meaning of patient delay and discuss the relevance of patient delay to head and neck cancer stage at presentation.

**Objectives:** Poor outcomes for head and neck cancer have been associated with presentation with advanced stage disease. Patient delay (time interval between symptom onset and healthcare system entry) is felt to be contributory; however, the data is inconclusive. Understanding the impact of patient delay is necessary to design effective early detection strategies. We hypothesize that patient delay is associated with advanced stage at presentation and is pervasive across racial and demographic groups. **Study Design:** Retrospective chart review. **Methods:** 100 consecutive patients treated for squamous cell carcinoma of the head and neck between 2011 and 2014 were reviewed. Patient delay was determined and was correlated with stage at presentation along with age, gender, and race. **Results:** Ninety-three patients met inclusion criteria. The average age was 63 years, 79.5% were male, and 14% of patients were African American (AA). Seventy patients (75%) presented with advanced disease. Advanced disease stage at presentation was significantly associated with race: 13 of 13 AA patients presented with advanced disease versus 57 of 75 of their non-AA counterparts ( $p = 0.0003$ ). The mean patient delay was 117 days. Patient delay was not significantly associated with advanced disease stage ( $p = 0.30$ ). Patient delay was comparable for African American and non-AA, 114 days vs. 118 days ( $p = 0.95$ ), and along age ( $p = 0.30$ ) and gender ( $p = 0.56$ ). **Conclusions:** Increased patient delay was not associated with advanced stage at presentation, and this effect was pervasive among race, gender, and age. Strategies for early detection relying on decreasing patient delay may have minimal impact.

#### H64. Head and Neck Presentation of Nodular Lymphocyte Predominant Hodgkin Lymphoma in a Patient with Preceding Progressive Transformation of Germinal Centers

Christopher E. Bailey, MD, Morgantown, WV; Benjamin L. Addicks, MD, Morgantown, WV; Olukemi Esan, MD, Morgantown, WV; Brian M. Kellermeyer, MD, Morgantown, WV

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate understanding of progressive transformation of germinal centers and its relationship with nodular lymphocyte predominant Hodgkin lymphoma.

**Objectives:** 1) Present a rare case of head and neck nodular lymphocyte predominant Hodgkin lymphoma (NLPH) in a patient with history of progressive transformation of germinal centers (PTGC); and 2) review literature of head and neck PTGC and NLPH. **Study Design:** Discuss case report and review current literature on PTGC and NLPH of head and neck. **Methods:** Retrospective chart review was performed including review of CT imaging and pathology. A PubMed literature review was performed using PTGC, progressive transformation of germinal centers, and nodular lymphocyte predominant Hodgkin lymphoma as keywords. **Results:** Our patient is a 39 year old female with a history of right parotid and neck progressive transformation of germinal centers (PTGC) without lymphoma. She presented to us four years postoperatively with recurrence of right parotid and neck lymphadenopathy, fatigue, and weight loss. Excisional biopsy of a level II cervical lymph node was performed. Pathology results were consistent with NLPHL. Literature review revealed rare reports of this condition including one series showing 2/206 NLPHL patients having preceding PTGC. **Conclusions:** Nodular lymphocyte predominant Hodgkin lymphoma is an uncommon variant of Hodgkin lymphoma. PTGC can develop prior to, concurrent with, or after diagnosis of NLPHL. We present a rare patient with NLPHL of right parotid and neck with history of PTGC of same location excised four years prior. Knowledge of her previous diagnosis of PTGC raised our concern for lymphoma, influenced our surgical management, and spared the patient additional surgery with risk of facial nerve injury inherent in reoperative parotidectomy.

# Posters

## H65. Voice and Swallowing Dysfunction in Neurofibromatosis 2

Simon R. Best, MD, Baltimore, MD; Julie Ahn, BS, Baltimore, MD; Vaninder Dhillon, MD, Baltimore, MD; Lee Akst, MD, Baltimore, MD; Alexander Hillel, MD, Baltimore, MD; Jaishri Blakeley, MD, Baltimore, MD

**Educational Objective:** The present study aims to determine the rates and effects of vagal injury on voice and swallowing function in patients with neurofibromatosis 2 (NF2).

**Objectives:** NF2 is a neuro-oncologic condition that presents with bilateral vestibular schwannomas (VS) of the cerebellopontine angle (CPA) and potentially schwannomas/neurofibromas of other cranial nerves. Vagal injury can occur from direct involvement or as the result of surgical excision of CPA tumors. We assessed the prevalence of voice and swallowing impairments in this high risk population. **Study Design:** Prospective clinical study. **Methods:** NF2 patients followed by a tertiary NF center were mailed Voice Handicap Index and the Sydney Swallow Questionnaire surveys. Stroboscopic, voice, and swallowing evaluations were performed prospectively on NF2 patients who elected to participate in screening exams. **Results:** There were high rates of self-assessed and objective voice and swallowing handicaps in this population. 13/36 (36%) patients [VHI mean scores: abnormal - 66, normal - 7] patients have a self-assessed voice handicap and 20/35 (57%) patients have a self-assessed swallow handicap [SSQ mean scores: abnormal - 547, normal - 61]. Vocal cord paralysis/paresis was observed in 15/18 (83.3%) patients examined with 20/36 (55.6%) of possible vocal cords affected. A strong correlation was found between vocal cord motion impairment and surgical intervention ipsilateral to the impairment ( $p=0.0022$ ). 12/17 (71%) had abnormal GRBAS scores rated by blinded observers. Reflecting high vagal injury, there was reduced velopharyngeal closure in 5/13 (39%), piriform sinus pooling in 9/18 (50%), and abnormal swallowing functioning on FEES in 38% of patients. **Conclusions:** Speech and swallowing impairments are highly prevalent in NF2 patients and are most commonly related to surgical interventions in the CPA region.

## H66. PET Positive Warthin's Tumor and False Positive FNA with Known Tongue Cancer and Bilateral Cervical Node Metastasis

Ryan C. Borek, MD, Philadelphia, PA; Adam C. Kaufman, MD, Philadelphia, PA; Laurie A. Loevner, MD, Philadelphia, PA; Michael D. Feldman, MD, Philadelphia, PA; Bert W. O'Malley, MD, Philadelphia, PA; Christopher H. Rassekh, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the diagnostic dilemma and further workup of a PET positive parotid mass in a patient with known head and neck cancer.

**Objectives:** Warthin's tumors have high affinity for FDG mimicking malignancy. This can result in a false positive diagnosis of parotid or neck cancer, which can be particularly confusing in smokers with known squamous cell carcinoma of the upper aerodigestive tract. Further workup including fine needle aspiration and/or technetium-99 scintigraphy is reliable for clarifying the diagnosis. We present a case of an exceptional patient with carcinoma of the tongue and bilateral cervical metastasis who also had a positive FNA in a contralateral parotid mass. **Study Design:** Case report. **Methods:** A 62 year old male smoker presented with a p16+ ventral tongue carcinoma and clinically positive ipsilateral cervical metastases. Contralateral nodal metastasis and parotid mass were identified on PET/CT scan. FNA of the parotid was interpreted as carcinoma. **Results:** The patient underwent a hemiglossectomy and neck dissection. The parotid mass appeared to be oval shaped and well encapsulated. A local excision of the mass was performed and frozen section pathology confirmed Warthin's tumor. **Conclusions:** Warthin's tumors with PET/CT positivity can present a diagnostic dilemma in patients with known head/neck malignancy. This unusual case of additional false positive FNA was potentially even more confusing but was managed conservatively. A false positive needle biopsy was suspected and parotidectomy was avoided in this setting. Understanding this presentation can minimize morbidity of a benign disease and not delay treatment of a malignant condition.

## H67. Ex vivo Simulation as a Training Tool in Transoral Robotic Surgery

Andres M. Bur, MD, Philadelphia, PA; Ernest D. Gomez, MD MTR, Philadelphia, PA; Jason G. Newman, MD, Philadelphia, PA; Gregory S. Weinstein, MD, Philadelphia, PA; Christopher H. Rassekh, MD, Philadelphia, PA; Katherine J. Kuchenbecker, PhD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the advantages of ex vivo simulation for training in transoral robotic surgery.

**Objectives:** To evaluate the training capacities of an ex vivo simulator for transoral robotic posterior hemiglossectomy. **Study Design:** Prospective observational study. **Methods:** We describe the design and fabrication of a transoral robotic surgery (TORS) simulator using porcine tongue in a modified airway mannequin. Twenty-nine surgeons performed transoral robotic posterior hemiglossectomy on the simulator; the 20 resident subjects completed 6 trials each, and the 5 fellows and 4 attendings completed 2 trials each. Surgical video was recorded for each trial and was blindly rated using



the Global Evaluative Assessment of Robotic Skill (GEARS), a validated instrument for assessing robotic surgical skill. **Results:** Attendings were faster ( $p = 0.04$ ) and demonstrated greater technical skill than fellows or residents ( $p < 0.001$ ). Resident completion time decreased with each subsequent trial, becoming significantly faster by the 5th trial (410 s to 319 s,  $p = 0.02$ ). A similar trend was seen in GEARS scores, which increased with each trial and were significantly higher by the 4th trial (15.7 to 19.4,  $p = 0.008$ ). Overall, subjects rated the realism and training value of the TORS simulator highly (mean 4.4 and 4.7 out of 5, respectively). **Conclusions:** The finding that experienced surgeons outperform novices supports the validity of the simulator as a training tool for TORS. Residents significantly improved in speed and technical skill over the course of 6 trials but did not match the performance levels of attendings. These results support the value of ex vivo simulation for training in transoral robotic surgery.

#### H68. Predictors of Unplanned Reoperation after Neck Dissection

Zachariah K. Chandy, BA, Irvine, CA; Rijul S. Kshirsagar, BS, Irvine, CA; Hossein Mahboubi, MD MPH, Irvine, CA; Vini Balakrishnan, MS, Irvine, CA; Sunil P. Verma, MD, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss risk factors associated with reoperation following neck dissection.

**Objectives:** Unplanned reoperations are a significant adverse event following surgery. The goal of this study was to determine the thirty day unplanned reoperation rate following neck dissection and establish associated risk factors using a nationally representative sample. **Study Design:** Retrospective cohort study. **Methods:** Patients who underwent neck dissection were identified from the American College of Surgeons National Surgical Quality Improvement 2011 database. Univariate analysis and multivariate logistic regression were used to evaluate factors associated with reoperation. **Results:** Of the 2304 identified patients who underwent neck dissection, 4.1% had an unplanned reoperation. Univariate analysis showed significant association ( $p < 0.05$ ) between reoperation and increased age, diabetes, current smoker, dyspnea, decline in functional status, history of COPD, history of CHF, hypertension, disseminated cancer, weight loss  $> 10\%$ , history of bleeding disorder and increased total work RVU. Disseminated cancer (OR = 2.89;  $p < 0.001$ ), wound class of II (OR = 2.38;  $p = 0.001$ ), current smoking status (OR = 1.71;  $p = 0.037$ ), increased work relative value unit (OR = 1.05;  $p = 0.006$ ), and increased age (odds ratio [OR] = 1.02;  $p = 0.032$ ) were revealed to be independent risk factors for reoperation using multivariate logistic regression. **Conclusions:** The total rate of unplanned reoperation after neck dissection was 4.1%. Disseminated cancer, wound classification of II, current smoking status, increased work RVU, and increased age were determined to be risk factors for unplanned reoperation. These findings may serve to improve identification of patients at high risk of reoperation after neck dissection.

#### H69. Rosai-Dorfman Disease Presenting as Progressively Enlarging Lymphadenopathy in an Elderly Woman

David Sining Chen, MD, Baltimore, MD; Wojciech K. Mydlarz, MD, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) demonstrate the typical presentation of Rosai-Dorfman disease; 2) explain the pathophysiology of Rosai-Dorfman disease; and 3) discuss the management options of Rosai-Dorfman disease.

**Objectives:** Discuss the pathologic and radiographic findings of Rosai-Dorfman disease and review treatment options cited in the literature. **Study Design:** Case report and retrospective review of the English literature. **Methods:** Retrospective review of English scientific literature about Rosai-Dorfman disease. **Results:** Rosai-Dorfman disease (RDD) is a rare disorder of histiocyte proliferation of unknown etiology. It typically affects children and young adults and presents as painless bilateral lymphadenopathy of the head and neck. The course of the disease is variable, ranging from spontaneous remission to progressive disease requiring treatment with surgery, steroids, chemotherapy and/or other therapeutic modalities. Here, we present a unique case of a 69 year old woman with RDD progressing over the course of one year with parotid involvement. We discuss the pathologic and radiographic findings of the case in the context of typical findings for RDD and review treatment options cited in the literature. **Conclusions:** In the diagnosis of RDD, tissue diagnosis is critical to rule out any lymphoproliferative process, lymphoma, or malignancy. Imaging is useful to evaluate burden of disease and the affected anatomic areas of the body. Children and young adults are most commonly affected but this disease may also affect elderly adults as discussed in this case report. Treatment of Rosai-Dorfman disease is variable and dependent on patient symptoms and the anatomic areas affected.

#### H70. Chicken Thigh Microvascular Training Model Improves Resident Surgical Skills

Francis X. Creighton, MD, Boston, MA; Neerav Goyal, MD, Hershey, PA; Kevin S. Emerick, MD, Boston, MA; Daniel G. Deschler, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the benefits and improvements offered by using a chicken thigh microvascular training model for resident and fellow education.

**Objectives:** To determine if use of a previously validated chicken wing model for microvascular anastomosis training

# Posters

improves resident microsurgical skills. **Study Design:** Validation study. **Methods:** Thirteen resident trainees were given a tutorial session on basic microvascular anastomosis techniques and were then allowed to practice performing several microvascular anastomoses with a previously validated chicken thigh model. These anastomoses were video recorded. The time it took trainees to throw a single stitch during their first anastomosis was recorded and compared to the time it took to throw a single stitch during their last anastomosis. Comparison of first and last stitch time was completed using Student T test. All participants were surveyed regarding their experience with the simulator. **Results:** There was a statistically significant decrease between times for trainee s first stitch compared to their last stitch, 235sec vs. 120sec ( $p = .0000072$ ), with an average 48.7% (1min 55 sec) decrease in time. Junior (PGY2/3) and senior (PGY4/5) residents had similar decreases in time, 49.1% and 48.21% respectively. There was a nonsignificant trend of senior residents performing faster first throws than junior residents, 206 sec vs. 260 sec. 100% of residents felt they improved during the session and 92% of residents agreed or strongly agreed their final stitch was better than their last stitch. All residents agreed or strongly agreed the simulation was realistic, was effective in teaching the procedure, and would prove useful when performing a real procedure. **Conclusions:** The chicken thigh model for microvascular anastomosis demonstrated objective improvements in resident microvascular surgical skills.

## H71. A Rare Case of an Intravagal Parathyroid Adenoma in the Post-Styloid Parapharyngeal Space Deepa Danan, MD MBA, Charlottesville, VA; David C. Shonka Jr., MD, Charlottesville, VA

**Educational Objective:** At the conclusion of this procedure, participants should be able to demonstrate understanding of unusual presentations of ectopic parathyroid adenomas and discuss ways to locate them.

**Objectives:** Describe a case of an intravagal parathyroid adenoma including the presentation, diagnosis, radiologic and histologic findings. **Study Design:** Case presentation. **Methods:** A 35 year old male with a history of papillary thyroid carcinoma status post total thyroidectomy and central neck dissection presented with symptomatic primary hyperparathyroidism. Thyroid ultrasound (US), 4D computed tomography (CT) of the neck, and single photon emission CT (SPECT) did not reveal an adenoma. **Results:** The patient was consented for parathyroid exploration. Intraoperative internal jugular venous (IJV) sampling was performed bilaterally under US guidance. Intraoperative parathyroid hormone (ioPTH) was 736 on the right and 71 on the left. Right central neck exploration through the prior thyroidectomy incision was performed, however an adenoma was not identified. ioPTH sampling was performed along the right IJV, which revealed a peak superiorly at the level of the carotid bifurcation. As this area could not be safely explored through the prior thyroidectomy incision, the case was terminated. A repeat 4D CT revealed an enhancing lesion in the right parapharyngeal space at the skull base, in between and posterior to the IJV and internal carotid artery. Surgical exploration of this area revealed a firm mass within the right vagus nerve. The mass splayed the nerve and was completely encompassed by nerve fibers. Microdissection of the mass out of the nerve allowed preservation of the nerve fibers. Pathological analysis of the mass revealed hypercellular parathyroid encased in normal appearing nerve tissue. There was an appropriate drop in ioPTH and vocal fold function was normal postoperatively. **Conclusions:** Intra-neural parathyroid adenomas are exceedingly rare entities. The radiologic and histologic findings of an intravagal parathyroid adenoma in the post-styloid parapharyngeal space are described.

## H72. Pharyngo-Vertebral Fistula: A Rare Complication of Pharyngeal Irradiation Tyler Deblieux, MD, Richmond, VA; Jonathan N. Young, MD, Richmond, VA; Shiyu Song, MD, Richmond, VA; Evan R. Reiter, MD, Richmond, VA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe an unusual case of pharyngo-vertebral fistula occurring as a delayed complication of head and neck irradiation.

**Objectives:** Identify a rare case of pharyngo-vertebral fistula occurring as a sequelae of pharyngeal radiotherapy. **Study Design:** Case report. **Methods:** Chart review, literature review. **Results:** A 63 year old man presented with T3N1M0 squamous cell carcinoma of the hypopharynx, involving the posterior pharyngeal wall at the esophageal introitus. He was treated with chemoradiation, requiring tracheostomy and gastrostomy tube support. Six months after treatment he presented with pneumonia and increasing neck pain. Workup included neck CT and esophagram which demonstrated a fistulous tract to C3-C4 vertebral bodies. Operative endoscopy showed a well demarcated fistulous tract with bone exposure. There was friable tissue more inferiorly at the esophageal introitus, biopsy of which revealed recurrence. He underwent total laryngopharyngectomy with excision of the pharyngo-vertebral fistula, debridement of necrotic bone and reconstruction with tubed anterolateral thigh free flap. **Conclusions:** We describe a case of pharyngo-vertebral fistula complicating hypopharyngeal chemoradiation therapy. This is the first reported case describing these features and highlights the diagnostic and treatment challenges for this entity.



## H73. Lateral Approach to Superior Thyroid Pedicle - A Safer Alternative in Large Goiters

Jagdish K. Dhingra, MB BS FRCS, Norwood, MA; Merry Sebelik, MD FACS, Memphis, TN;  
Jeremiah C. Tracy, MD, Worcester, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand indications and learn steps of "lateral approach" thyroidectomy.

**Objectives:** Endemic goiter remains a serious public health problem and the vast majority of people affected live in underdeveloped countries where access to surgery can be very limited. It is therefore common to see enormous goiters with significant superior as well as retrosternal extension. Superior extension results in distortion of the superior pole vessels, increasing the risk of major vessel injury. **Study Design:** Our team has been performing surgery on endemic goiter patients in remote parts of Rwanda since 2009. Over a period of 6 years a total of 131 cases of goiter surgery have been performed on patients with grade 3 goiters. **Methods:** For patients with large superior pole involvement and superior extension, we modified our surgical technique to a lateral approach to safely resect enormous goiters with superior pole involvement. In this technique the dissection begins by exposure of carotid sheath superior to the superior pole of the thyroid. We describe indications and surgical steps of this technique. **Results:** We have thus far successfully applied lateral approach in 12/63 patients operated over the last 3 years. In the first 4 patients, a conventional approach was converted to a lateral approach. We subsequently have chosen this technique in all large goiters with significant superior pole involvement. In our experience this approach results in reduced surgical time, better exposure and decreased morbidity. **Conclusions:** We recommend that lateral approach be considered for enormous goiters as well as tumors involving the superior pole.

## H74. Race as a Risk Factor for Provider Delays in a Public Healthcare Setting

Thomas S. Edwards, BS, New Orleans, LA; Jason F. Ohlstein, MS, New Orleans, LA; Charles A. Riley, MD, New Orleans, LA; Paul L. Friedlander, MD FACS, New Orleans, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the provider delays experienced by head and neck cancer patients of different races in a public healthcare setting.

**Objectives:** Although African American race is recognized as a poor prognostic factor for head and neck cancer (HNC), little is known about the mechanism. In this study, the effect of race on provider delays for patients in a public healthcare setting was investigated. **Study Design:** A retrospective review of 100 consecutive patients with squamous cell carcinoma of the head and neck between 2012 and 2014 in a public healthcare setting was completed. Racial and demographic characteristics, as well as provider delay (time from presentation to the healthcare system to treatment recommendation), were obtained. **Methods:** Subgroup analysis was used to calculate the relative risk (RR) of provider delay at 14, 21, and 28 day time points. **Results:** African Americans were determined to have a greater risk of provider delay at the 14 day ( $p < 0.05$ ; RR 1.29; 95% CI 1.09-1.5) and 21 day time points ( $p < 0.005$ ; RR 1.43; 95% CI 1.11-1.84) than non-African American patients. However, there was no statistically significant greater risk seen at 28 days ( $p$  of 0.688; RR 1.13; 95% CI 0.75-1.6). **Conclusions:** African American patients are at an increased risk of experiencing provider delays at 14 and 21 day time points when compared to non-African American patients. This risk disappears at 28 days, suggesting provider delay may not be a significant contributing factor for worse outcomes for African Americans in HNC. This suggests that other biologic or non-biologic factors may be the culprit.

## H75. Trends and the Utilization of Transoral Robotic Surgery (TORS) with Neck Dissection for the Treatment of Head and Neck Cancer in New York State (2008-2012)

Catherine H. Frenkel, MD, Stony Brook, NY; Ghassan J. Samara, MD, Stony Brook, NY; Elliot Regenbogen, MD, Stony Brook, NY; Jie Yang, PhD, Stony Brook, NY; Mengru Zhang, BS, Stony Brook, NY; Dana A. Telem, MD, Stony Brook, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the trends of transoral robotic surgery and compare frequency of concurrent versus staged neck dissection in a single state during a critical time period of technique adoption.

**Objectives:** Timing of neck dissection (ND) in relation to transoral robotic surgery (TORS) is controversial. This study identifies local practice patterns during early adoption of this technique. **Study Design:** We used the Statewide Planning and Research Cooperative System (SPARCS) data to identify patients who underwent TORS and ND and compared this to statewide oral cavity and pharynx cancer incidence from the Centers for Disease Control and Prevention. **Methods:** No TORS records were identified through 2007. Patients age  $\geq 18$  from January 2008 through December 2012 were included ( $n=194$ ). Patients underwent concurrent or staged procedure. ND was performed within 6 months of primary resection. Patient, insurer and institution demographics were extracted. Temporal trends were analyzed with Poisson regression models for counts.  $P$ -value  $< 0.05$  was significant. **Results:** Total and concurrent TORS procedures increased from 2008 ( $n=7$  and 6) to 2012 ( $n=171$  and 73). TORS utilization increased greater than cancer incidence (11.5 to 12.1 per

# Posters

100,000 persons/year),  $p < 0.0001$ . Percent increase in concurrent procedures peaked at 146% from 2009-10. No staged procedures were performed until 2010. Staged procedures increased at a greater rate than concurrent procedures from 2010-12 ( $n=8$  to 26) but it did not reach statistical significance ( $RR=1.70$  vs  $1.51$ ,  $p$ -value= $0.2282$ ). ND followed by TORS was least commonly practiced ( $n=1$  to 5). No insurance payer type or patient demographic was greater represented in concurrent versus staged populations. **Conclusions:** Concurrent procedures are most commonly practiced in New York. However, staged procedures are an evolving trend. Access to concurrent versus staged procedure does not depend on patient demographics, including insurer status.

## H76. Squamous Cell Carcinoma of the Oral Tongue: Age Specific Presentation and Prognosis in the United States

Valerie A. Fritsch, MD, Charleston, SC; Eric J. Lentsch, MD, Charleston, SC

**Educational Objective:** At the conclusion of this presentation, the participants should be knowledgeable of age related differences in the clinical presentation and prognosis of oral tongue cancer.

**Objectives:** Determine if there are age related differences regarding presentation, survival, and prognostic indicators in patients with oral tongue squamous cell carcinoma (OTSCC). **Study Design:** Population based cohort. **Methods:** OTSCC cases diagnosed 2000-2008 were extracted from the SEER database. Patients were categorized into age groups by decade, and clinicopathologic and treatment data were compared. Survival was assessed using Kaplan-Meier analysis, as well as multivariable regression. **Results:** A total of 5,980 cases were included. There was an inverse relationship between age at diagnosis and stage. Patients  $<30$  years old were most likely to be diagnosed stage III/IV, vs. patients 60-79 years old were most likely to be diagnosed at stage I/II ( $p=0.01$ ). Further analysis by T/N/M stage revealed no age related differences regarding T-stage; however, greater N-stage was associated with younger age ( $p < 0.001$ ). Thirty-six percent of those  $<30$  years old presented with at least N1 disease vs.  $<19\%$  in the elderly age groups ( $p < 0.001$ ). The proportion of N-positive patients decreased gradually with each interval increase in age decade. Younger patients were also significantly more likely to have high grade tumors and receive multimodality treatment. Older patients were more likely to receive primary radiation ( $2\%$   $<30$  years old vs.  $14\%$   $\geq 80$  years old). There was no association between age at diagnosis and 5 year DSS on multivariable analysis (controlled for patient demographics, histologic tumor grade, and stage). **Conclusions:** Age is not an independent prognostic factor in OTSCC. However, younger patients with OTSCC have a greater risk of advanced stage presentation and high grade pathology. Stage differences may be attributed to a higher rate of lymphatic metastasis among young patients.

## H77. Takotsubo Cardiomyopathy following Head and Neck Oncologic Surgery: Two Case Reports and Review of the Literature

Deniz N. Gerecci, MD, Portland, OR; Christopher B. Sullivan, BS, Portland, OR; Daniel R. Clayburgh, MD PhD, Portland, OR

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the pathophysiology, clinical diagnosis, and treatment of Takotsubo cardiomyopathy. Participants should also be aware that this can occur in the head and neck cancer population.

**Objectives:** Takotsubo cardiomyopathy is a rare clinical entity characterized by acute cardiac failure in the absence of coronary artery disease that typically occurs in times of stress. It has not previously been described in the otolaryngology literature. The objective of this report is to describe the presentation and management of two patients who developed this complication following head and neck oncologic surgery. **Study Design:** Chart review of medical records. **Methods:** The medical charts of two patients diagnosed with Takotsubo cardiomyopathy following surgical management of head and neck cancer were reviewed. Age, diagnosis, medical comorbidities, surgical procedure, and postoperative course were reviewed in detail. The findings are described and compared to the known literature on Takotsubo cardiomyopathy. **Results:** A 64 year old female with advanced supraglottic squamous cell carcinoma (SCC) and no previous cardiac history underwent total laryngectomy. She developed acute heart failure on postoperative day (POD) #6 requiring ICU transfer, cardiac catheterization, and medical management. A 63 year old male with SCC of the floor of mouth with no previous cardiac history underwent excision of his cancer with microvascular reconstruction. He developed acute cardiogenic shock on POD#1 requiring pressor support, intra-aortic balloon pump, and prolonged ICU stay. Both patients were diagnosed with Takotsubo cardiomyopathy and fully recovered. **Conclusions:** Takotsubo cardiomyopathy is a form of acute cardiac failure characterized by profound, reversible left ventricular contraction abnormalities in the absence of significant coronary artery disease. While rare, it may be provoked by acute stress, such as major head and neck surgery.

**H78. Quality Indicators of Oropharyngeal Cancer Care in the Elderly**

Christine G. Gourin, MD, Baltimore, MD; Robert H. Herbert, BS, Baltimore, MD; Carole Fakhry, MD, Baltimore, MD; Harry Quon, MD, Baltimore, MD; Kevin D. Frick, PhD, Baltimore, MD; David W. Eisele, MD, Baltimore, MD

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the association between evidence based quality indicators of oropharyngeal cancer care, survival, and costs.

**Objectives:** To examine associations between quality of care, survival, and costs in elderly patients treated for oropharyngeal squamous cell cancer (SCCA). **Study Design:** Retrospective analysis of Surveillance, Epidemiology, and End Results (SEER) Medicare data. **Methods:** We evaluated 666 patients diagnosed with oropharyngeal SCCA from 2004-2007 using multivariate regression and survival analysis. Using quality indicators derived from guidelines for recommended care, summary measures of quality were calculated for diagnosis, initial treatment, surveillance, treatment for recurrence, end of life care, and performance, and an overall summary measure of quality. **Results:** High quality care was associated with significant differences in survival for initial treatment (HR=0.55 [0.41-0.73]), surveillance (HR=0.32 [0.22-0.48]), treatment of recurrence (HR=2.37 [1.56-3.60]), performance measures (HR=0.50 [0.36-0.69]), and the overall summary measure of quality (HR=0.53 [0.39-0.71]). High quality salvage surgery was associated with improved survival (HR=0.16 [0.04-0.54]) while high quality chemotherapy given for recurrence was associated with worse survival (HR=5.70 [1.92-16.94]). High quality care was associated with significantly lower mean incremental costs for treatment of recurrence and end of life care and higher costs for diagnosis and surveillance. **Conclusions:** High quality oropharynx cancer care in elderly patients was associated with improved survival; however, high quality care for treatment of recurrence was associated with poorer survival, primarily due to poorer survival in patients treated with chemotherapy. These data suggest a need to reexamine the application of oropharyngeal cancer treatment guidelines in the elderly, and to develop sensitive and valid quality indicators of head and neck cancer care in this population.

**H79. 7 Day Clindamycin Prophylaxis Regimen in Patients Undergoing Head and Neck Cancer Microvascular Reconstruction Increases Risk of C. Diff Diarrhea: Fiction or Fact?**

Joshua B. Greene, MD, Detroit, MI; Michael P. Veve, PharmD, Detroit, MI; Susan L. Davis, PharmD, Detroit, MI; Tamer F. Ghanem, MD PhD, Detroit, MI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the low risk of C. diff infection in patients who receive prophylactic clindamycin following free flap surgery.

**Objectives:** Prophylactic antibiotics are commonly prescribed for patients who require a free flap for head and neck cancer reconstruction in the perioperative period. While there are no consensus guidelines for antibiotic recommendations in this setting, clindamycin is commonly selected based on its broad spectrum, including coverage against methicillin resistant staphylococcus aureus. Clindamycin use is also historically associated with clostridium difficile associated diarrhea, with reports of occurrence in up to ~20% of patients. The purpose of this study was to assess the prevalence of clostridium difficile (C. diff) infection in head and neck cancer patients undergoing microvascular reconstruction receiving a 7 day course of clindamycin, vancomycin, and cefepime. **Study Design:** Cross-sectional. **Methods:** This was a cross-sectional study conducted at a tertiary academic center from 2012 to 2015 including patients treated with a free tissue transfer flap for reconstruction following an ablative procedure for head and neck cancer. All patients received prophylactic intravenous clindamycin 600mg every 8 hours, cefepime 1 gm every 8 hours, and vancomycin 1 gm every 12 hours for 7 days postoperatively. Patients with signs of C. diff infection such as intractable diarrhea, abdominal pain, or fever had a stool sample sent for microbiology analysis. Incidence of inquiry for C. diff infection with stool sample was evaluated in addition to those with a positive result. This data was subsequently compared to the general hospital rate. **Results:** A total of 126 cases were reviewed. A total of 15 patients (14.2%) met criteria to have a stool sample sent investigating for C. diff infection and a total of 18 C. diff tests were sent. There was one positive C. diff test result among the 15 patients (1%). During this same inclusion period for the hospital, the positive return for samples sent was almost 6 times greater. **Conclusions:** Clindamycin use was rarely associated with C. diff infection among head and neck cancer patients undergoing microvascular reconstruction and was lower among data cited in the literature and among positive tests at our institution.

**H80. Role of NOTCH Family Receptors in Head and Neck Squamous Cell Carcinoma (HNSCC)**

Theresa W. Guo, MD, Baltimore, MD; Daria A. Gaykalova, PhD, Baltimore, MD; Joseph A. Califano, MD, San Diego, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the potential role of NOTCH family of receptors in head and neck cancer.

**Objectives:** Head and neck squamous cell carcinoma (HNSCC) is the fifth most common cancer worldwide, with approximately 60,000 new diagnoses in the United States annually. In recent genomic analyses, NOTCH1 mutations were identified in 10-15% of HNSCC tumors, and evidence of activation of the NOTCH pathway has also been shown. **Study**



# Posters

**Design:** Based on these findings, we sought to study the role of other NOTCH family member receptors in these cancers, and therefore we performed genomic analysis and functional studies to elucidate their potential role in the carcinogenesis of HNSCC. **Methods:** Gene expression analysis was performed using TCGA RNA seq data. Tumors with any mutations in NOTCH family receptors were excluded. For functional in vitro assays, siRNA were obtained for NOTCH1, NOTCH2, and NOTCH3. Transient knockdown was achieved through transfection using lipofectamine delivery. Cell growth was assessed over 72 hours following transfection using alamarBlue reagent. Invasion assays were performed over 24-48 hours using matrigel reagent in multiple cell lines. **Results:** We interrogated the TCGA RNA seq data for gene expression analysis and found that after excluding tumors with NOTCH mutations, expression of NOTCH1 and NOTCH3 were both significantly associated with NOTCH pathway activation and high HEY expression. Functional in vitro assays showed that silencing of multiple NOTCH family receptors inhibited of cell proliferation and invasion in functional in vitro assays, in both HPV positive and HPV negative HNSCC cell lines. **Conclusions:** These results point to the potential role of NOTCH inhibitors, some of which are in phase I clinical trials, as a targeted therapy for HNSCC.

## H81. Vagal Paraganglioma Associated with Cough on Palpation

Richard C. Heyes, MBChB, London, Middlesex UK; Nizar H. Taki, MD, Boston, MA; David S. Bick, MD, Boston, MA; Miriam A. O'Leary, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be familiar with the typical clinical presentation of vagal paraganglioma, be aware vagal paraganglioma can be associated with cough, and understand the management options available.

**Objectives:** To describe a unique case of vagal paraganglioma presenting as a neck mass associated with a severe cough which could be triggered by palpation of the mass. **Study Design:** Case report and Medline literature review. **Methods:** Medical records for the patient were extensively reviewed. Imaging, gross pathology and histopathology of the resected specimen are presented. A Medline search for key words vagal paraganglioma and glomus vagale was performed, and abstracts were reviewed for cough as a symptom. **Results:** A 70 year old female presented to clinic with a 4 week history of neck mass. The only associated symptom was a sporadic dry cough triggered by touching the swelling. Bouts of coughing were often of such severity that she would vomit. On examination a 2 cm right level two neck mass deep to sternocleidomastoid was palpable which was discrete, mobile and nonpulsatile. Palpation of the mass immediately triggered coughing. MRI of the neck displayed a 2.5 cm mass within the carotid sheath which intensely enhanced following contrast administration. Surgical excision of the mass was performed which showed a 3 cm tumor associated with a vagal nerve segment and ganglion. **Conclusions:** To our knowledge this is the first description of a vagal paraganglioma presenting as a neck mass associated with a severe cough, furthermore this uniquely could be triggered by palpation of the mass. We present this case to aid physicians should they encounter a neck mass associated with cough. Vagal paraganglioma, although rare, should be part of the differential in such a presentation.

## H82. An Unusual Parotid Mass: Glioblastoma Multiforme and Gliosarcoma

Mamie N. Higgins, MD, Albany, NY; Steven Parnes, MD, Albany, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate a differential diagnosis of parotid mass. Additionally participants should be able to discuss glioblastoma multiforme in comparison to gliosarcoma and each tumor's ability to metastasize and present in the head and neck.

**Objectives:** To describe a unique presentation of a parotid mass and further our understanding of glioblastoma multiforme (GBM) versus gliosarcoma metastases in the head and neck. **Study Design:** Case report. **Methods:** Retrospective case report of a patient with a history of glioma type II and recurrent GBM (type IV) referred to otolaryngology clinic for parotid mass. Includes a literature review of GBM and gliosarcoma with regards to the head and neck. **Results:** Patient was noted to have a parotid mass ipsilateral to his known GBM tumor. Two other cervical nodes as well as scalp lesions were noted. Patient underwent excisional biopsy of these scalp lesions and parotid mass at the time of his third resection of brain mass. Pathology demonstrated change in pathology with glioblastoma multiforme with sarcomatous features. Review of GBM pathophysiology includes its rare ability to metastasize in comparison to the more aggressive gliosarcoma - a GBM variant. **Conclusions:** Glioblastoma multiforme (type IV) rarely spreads extracranially with few case reports of mass presentation within the head and neck. Gliosarcoma, a variant of GBM, has an increased tendency to spread extracranially with a higher incidence of systemic metastases. Parotid mass can be a rare presentation of glioblastoma/gliosarcoma which represents a progression in pathology. This change in aggressive behavior needs to be considered in parotid mass workup with subsequent referral to our neurosurgery and neurologic-oncology colleagues for appropriate care.

## H83. Multicentric Warthin Tumor Masquerading as Carcinoma of Unknown Primary

John P. Hines, MD, Phoenix, AZ; Melissa L. Stanton, MD, Phoenix, AZ; Idris T. Ocal, MD, Phoenix, AZ; Thomas H. Nagel, MD, Phoenix, AZ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize multicentric Warthin tumor as a potential diagnostic conundrum.

**Objectives:** To present a case of Warthin tumor involving extraparotid lymph nodes and harboring squamous metaplasia in order to highlight a potential pitfall in the search for presumed carcinoma of unknown primary. **Study Design:** Case report and review of the literature. **Methods:** The clinical course, radiologic imaging, and histopathology of a single patient were reviewed. A literature review was conducted (PubMed, 1950 to October 2015) for Warthin tumor involving cervical lymph nodes and harboring squamous metaplasia. **Results:** We report the case of a 75 year old gentleman with a left sided neck mass and an ipsilateral parotid mass. The patient underwent an ultrasound that identified 2 suspicious lymph nodes in level IIA/IIB. Ultrasound guided fine needle aspirations of the parotid mass and the largest cervical lymph node were consistent with Warthin tumor and cystic squamous cell carcinoma, respectively. After proceeding with direct laryngoscopy, transoral CO2 laser assisted bilateral palatine tonsillectomy with left lingual tonsillectomy, and left selective neck dissection for carcinoma of unknown primary, pathology was negative for malignancy. He then underwent left superficial parotidectomy. Pathology demonstrated Warthin tumor in the parotid and in a left periparotid lymph node with focal areas of squamous metaplasia. **Conclusions:** Warthin tumors can be multicentric in nature and case reports have described involvement of extraparotid lymph nodes. These tumors can also contain squamous metaplasia, often being misdiagnosed as a neoplastic process on fine needle aspirates. This case illustrates the diagnostic conundrum in which Warthin tumors can involve cervical lymph nodes, harbor squamous metaplasia, and masquerade as carcinoma of unknown primary.

#### H84. Geriatric Head and Neck Oncologic Surgery Outcomes Based on Volume of Procedures at Medical Centers in the United States

Scharukh M. Jalisi, MD MA FACS, Boston, MA; Samuel J. Rubin, BA, Boston, MA (Presenter); Kevin Y. Wu, BS, Boston, MA; Afroze N. Shaikh, BS, Boston, MA; Waleed H. Ezzat, MD FACS, Boston, MA; Andrew R. Salama, MD DDS, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the difference in demographics, cost, and outcomes for head and neck oncologic surgery in the geriatric population based on hospital case volume.

**Objectives:** To evaluate the impact of case volume on outcomes in geriatric patients after head and neck oncologic surgery. **Study Design:** Cross-sectional ecologic study. **Methods:** The University Health Systems Consortium (UHC) database was analyzed for discharge data on patients over the age of 65 who underwent surgery for head and neck cancer (excluding thyroid and skin cancer) between quarter 4 of 2009 and quarter 4 of 2012. Analysis of variance (ANOVA) and chi square tests were applied to evaluate significant associations between hospital surgical volume and the complication rate, percent of patients with comorbidities, length of stay (LOS), LOS index, ICU stay, and cost. **Results:** Of 22,357 surgical cases, 4,544 met our inclusion criteria. All payer refined diagnosis related group defined minor, moderate, major and extreme severity of illness were significantly associated with hospital volume ( $P=0.0034$ ,  $P=0.0065$ ,  $P<0.0001$ ,  $P=0.0006$ , respectively). There was a shorter LOS and lower number of ICU admissions in high volume versus low volume hospitals ( $p=0.0144$ ,  $p=0.0048$ , respectively). Furthermore, there was a significant association between the percent of patients with comorbidities and surgical complications based on hospital volume ( $p=0.0112$ ,  $p=0.0002$ , respectively). Looking at factors related to cost, there was a significant association between the LOS (days), number of patients with an ICU stay, 7 day readmission rates, and hospital volume ( $p=0.0144$ ,  $p=0.0048$  and  $p=0.0257$ , respectively). However, there was no significant association between cost (\$) and hospital volume ( $p=0.0680$ ). **Conclusions:** Academic medical centers with a higher cumulative case volume demonstrate many benefits to the overall head and neck surgical oncologic care in the geriatric population.

#### H85. WITHDRAWN -- HPV Seropositivity in People with Oral and Vaginal HPV Infection

Suraj Kedarisetty, BS, La Jolla, CA; Ryan K. Orosco, MD, San Diego, CA; Philip A. Weissbrod, MD, San Diego, CA; Charles S. Coffey, MD, San Diego, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the associations between HPV seroprevalence and HPV infection.

**Objectives:** To evaluate associations between HPV seropositivity and HPV infection. **Study Design:** The National Health and Nutrition Examination Survey (NHANES) cross-sectional survey of U.S. population for years 2009-2010. **Methods:** Four HPV subtypes (6, 11, 16, and 18) were measured in 3,718 in subjects aged 18 to 69 years. Only females (50.1%) received the HPV vaccination questionnaire and were assessed for vaginal HPV infection. Oral and vaginal infection was assessed by DNA PCR. Seropositivity was determined by HPV antibody detection. Concordant infection was defined as infection of matching type in multiple sites. **Results:** Twenty-nine percent of subjects were seropositive for HPV infection. Of 3,489 subjects with adequate oral and serum data, 1.6% had an oral HPV infection; 31.1% of whom were also seropositive for the same HPV type. In the female subgroup, 8.5% were vaccinated; 83.9% of whom also demonstrated seropositivity. Additionally, 13.8% females had vaginal HPV infection; 44.7% of whom were also seropositive for the same HPV type. The portion of seropositive subjects with vaginal infection was higher than seropositive subjects with oral infection ( $p<0.005$ ). Concordant oral and vaginal infection was present in 6 people, 3 of whom also demonstrated seropositivity. **Conclusions:** This is the largest population based HPV prevalence study comparing infection at multiple sites to serum



# Posters

positivity. In this cohort, subjects with vaginal infection had statistically significant higher seroprevalence of HPV than those with oral infection. The implications have yet to be studied.

**H86. Effects of Anesthesia on Intraoperative Parathyroid Hormone Assay in Thyroid and Parathyroid Surgery**  
David S.H. Kim, MD, Las Vegas, NV; Annabel E. Barber, MD, Las Vegas, NV; Robert C. Wang, MD, Las Vegas, NV

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain how anesthesia can affect intraoperative parathyroid hormone level in head and neck endocrine surgery.

**Objectives:** The objectives of this study were to investigate the effects of anesthesia on intraoperative parathyroid hormone (IOPTH) in total thyroidectomy and parathyroidectomy and to understand the implication of the relationship in using IOPTH as a surgical outcome measure. **Study Design:** This was a prospective cohort study. **Methods:** Forty-two and twenty-three patients undergoing total thyroidectomy and parathyroidectomy, respectively, at a tertiary academic center between November 2014 and September 2015 were enrolled. PTH was measured at least at three time points: pre-anesthesia, pre-incision (following anesthesia induction but before skin incision) and post-excision (within 20 minutes of complete excision of a gland). **Results:** IOPTH increased globally following anesthesia induction and endotracheal intubation. In the total thyroidectomy group, the mean pre-anesthesia and pre-incision PTH were  $55.8 \pm 14.5$  pg/ml and  $132 \pm 41.8$  pg/ml, respectively. The mean percentage increase from pre-anesthesia to pre-incision PTH was  $139 \pm 90.0\%$  (range: 37.1 - 494%). In the parathyroidectomy group, the mean pre-anesthesia and pre-incision PTH were  $168 \pm 148$  pg/ml and  $248 \pm 237$  pg/ml, respectively. The mean percentage increase from pre-anesthesia to pre-incision PTH was  $32.7 \pm 34.4\%$  (range: 1 - 129%). PTH increases were significantly blunted in the parathyroidectomy group with primary hyperparathyroidism ( $p < 0.05$ ). PTH normalized postoperatively in all patients in both groups. **Conclusions:** Anesthesia increases IOPTH and thus may affect its pharmacokinetics intraoperatively. Also, anesthesia may influence IOPTH differentially based on the underlying pathology. Both phenomena should be considered when using IOPTH as a therapeutic or predictive marker in head and neck endocrine surgery.

**H87. Functional Imaging Using Fluorescence Decay Rate Tuning (FIFDRT): An Imaging Technique to Differentiate Parathyroid Tissue from Surrounding Head and Neck Tissues**  
Irene A. Kim, MD, Los Angeles, CA; Bobby Tajudeen, MD, Los Angeles, CA; Zachary Taylor, PhD, Los Angeles, CA; Fernando Palma-Diaz, MD, Los Angeles, CA; Warren S. Grundfest, MD, Los Angeles, CA; Maie St. John, MD PhD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand how the FIFDRT system works and explain its ability to differentiate parathyroid tissue from surrounding head and neck tissues.

**Objectives:** Treatment for primary hyperparathyroidism is surgical. The variable locations of these lesions as well as their inconspicuous external features can create challenges during intraoperative localization. Currently, there exists no routine use of intraoperative localization techniques. A novel imaging modality, functional imaging using fluorescence decay rate tuning (FIFDRT), produces images based on the differences in fluorescence decay rates of various tissue types. The objective of this study was to demonstrate the utility of FIFDRT in reliably and accurately identifying parathyroid tissue and differentiating it from surrounding neck tissues. **Study Design:** Observational study. **Methods:** 40 patients with primary hyperparathyroidism underwent surgical exploration, and the specimens (parathyroid tissue, fat, thyroid, thymus) were analyzed. Fluorescence decay images were acquired using a wide field FIFDRT system. Samples subsequently underwent standard histological evaluation, and mean relative fluorescence decay signatures for the respective tissues were calculated. Differences in relative lifetimes of the tissues were performed using the Wilcoxon signed rank test. **Results:** Qualitative contrast between tissue types was clearly delineated in FIFDRT images. A statistically significant difference ( $p < 0.05$ ) between fat and outer parathyroid was revealed for 8 out of 11 bandpass filters and between fat and inner parathyroid for 11 out of 11 bandpass filters. Qualitative contrast between tissue types was more clearly delineated in FIFDRT images using shorter wavelength emission filters. **Conclusions:** This study demonstrates a new imaging modality capable of distinguishing parathyroid glands from adjacent neck tissue such as fat, lending itself to the possibility of developing a tool that may perform this reliably in vivo, guiding the surgeon to identify glands more effectively.

**H88. The Relationship between Thyroid Serum Markers and Positron Emission Tomography in Assessing Recurrent Papillary Thyroid Carcinoma**  
Ashley E. Kita, MD, Los Angeles, CA; Karam W. Badran, MD, Los Angeles, CA; Rachel Mandelbaum, BA, Los Angeles, CA; Edward C. Kuan, MD, Los Angeles, CA; Miguel F. Palma Diaz, MD, Los Angeles, CA; Maie A. St. John, MD PhD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss and assess the utility of serum markers and PET/CT in detecting papillary thyroid carcinoma recurrence.

**Objectives:** To assess the relationship between thyroid serum markers and positron emissions tomography-computed tomography (PET/CT) in patients with negative whole body scintigraphy and suspected papillary thyroid cancer (PTC) recurrence. **Study Design:** Retrospective chart review of all patients who underwent surgical management of papillary thyroid cancer at a tertiary medical center between November 2001 and December 2014. **Methods:** One hundred thirty-nine patients who underwent surgical management of primary PTC and had followup serum and PET/CT surveillance. A total of 315 surveillance PET/CTs were performed. Positive and negative results of locoregional recurrence and distant metastases were verified by pathology, imaging, and/or clinical followup. **Results:** 315 FDG-PET/CT scans were evaluated. The mean thyroglobulin (Tg), thyroglobulin antibody (anti-Tg), and thyroid stimulating hormone (TSH) levels for true positive PET/CT images were  $69.7 \pm 150.8$ ,  $125.3 \pm 526.4$ , and  $6.17 \pm 19.4$ . For true negative PET/CT scans, Tg, anti-Tg, and TSH levels were  $13.9 \pm 65.5$ ,  $9.49 \pm 16.4$ , and  $11.4 \pm 28.4$ . When Tg values were  $\geq 1$  U/mL, PET/CT sensitivity and specificity were 83.3% and 89.3% respectively (n=82 scans). Anti-Tg values of  $\geq 1$  U/mL resulted in PET/CT sensitivity and specificity of 78.9% and 88.6% (n=111 scans).  $TSH \leq 0.03$  U/ml produced sensitivity and specificity quotients of 81.1% and 94.4% (n=91 scans). PET/CT alone had a sensitivity of 82.6% and specificity of 85.1% (n= 235 scans). **Conclusions:** When paired with PET-CT, thyroid serum markers enable reliable detection of both locoregional and distant PTC recurrence. Positive PET-CT in the context of Tg  $\geq 1$  allowed for greater detection of recurrence, while negative PET-CT and Tg  $\geq 1$ , anti-Tg  $\geq 1$ , or TSH  $\leq 0.03$  correctly identified those individuals without recurrence more often than PET-CT alone.

### H89. Pseudoepiglottitis and Dysphagia following Total Laryngectomy

Christopher J. Lee, MD, Shreveport, LA; Judith A. Fornadley, MS CF SLP, New Orleans, LA; Gloria Caldito, PhD, Shreveport, LA; Cherie-Ann O. Nathan, MD, Shreveport, LA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize risk factors regarding dysphagia following laryngectomy with regard to closure technique, presence of pseudoepiglottitis, and primary vs. salvage laryngectomy.

**Objectives:** Pseudoepiglottitis (PE) is a common occurrence following total laryngectomy, named after its appearance on barium swallow. We wanted to determine if PE was associated with dysphagia in our laryngectomy patients. **Study Design:** IRB approved single institution retrospective review. **Methods:** An IRB approved single institution retrospective review of videoscope recordings and MBSS was performed on total laryngectomy patients between 2000-2014. Data from 51 laryngectomees were analyzed to determine factors significantly associated with dysphagia including PE. **Results:** PE was not significantly associated with dysphagia. Patients with and without PE had similar incidence for dysphagia (13/26, 50% vs. 12/25, 48%,  $p=0.89$ ). Using multivariate analysis, odds of dysphagia among patients with and without PE are similar ( $p=0.2$ ). PE occurred most commonly with vertical closure compared to horizontal or T closure (17/24, 70% vs. 2/6, 33% and 7/21, 33%,  $p=0.03$ ). Patients with vertical or horizontal closure had higher incidence of dysphagia than those with T closure (63.3% vs. 28.6%,  $p=0.014$ ). Salvage laryngectomy had a higher incidence of dysphagia compared to primary laryngectomy (72.2% vs. 36.4%,  $p=0.014$ ). Multivariate analysis revealed vertical or horizontal closure and salvage surgery are also independent factors for dysphagia. The adjusted odds ratio of dysphagia for vertical or horizontal closure versus T closure was 3.76 ( $p=0.04$ ) and adjusted odds ratio for primary versus salvage surgery was 3.95 ( $p=0.04$ ). **Conclusions:** Pseudoepiglottitis had no significant effect on dysphagia. Vertical or horizontal closure and salvage laryngectomy are independent significant predictors for dysphagia. T-shaped closure had the best outcome.

### H90. Effects of Tonsillectomy during Workup for Tonsil Cancer

Sean T. Massa, MD, St. Louis, MO; Ronald J. Walker, MD, St. Louis, MO

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the potential risks to performing a diagnostic tonsillectomy on a suspected tonsil cancer without the ability to confirm clearance of all disease.

**Objectives:** When tonsil cancer is suspected, performing a diagnostic tonsillectomy (DT) without the ability to extirpate all disease and confirm clear margins makes determining the best definitive treatment challenging and may increase morbidity and recurrence. This study's primary objective is to determine if DT prior to referral to our cancer center increases rates of recurrence or gastrostomy tube (G-tube) requirement. **Study Design:** Retrospective chart review. **Methods:** After IRB approval, charts of adult patients treated with radical tonsillectomy (CPT 42842) were reviewed. Patients with prior head and neck cancer, tonsillectomy for benign indications, prior treatment, or preexisting G-tubes were excluded. Patients were categorized based on whether pre-referral workup included DT. Student's t and chi-squared tests were used as appropriate ( $\alpha = 0.05$ ). **Results:** 33 patients were identified including 6 with pre-referral DT. Demographics, stage, surgical technique, and treatment modalities were similar. Rates of recurrence (0% vs 13.6%,  $p=0.35$ ) and G-tubes (33.3% vs 22.7%,  $p=0.55$ ) did not differ significantly between groups. After DT, 5 of patients had residual malignancy identified. More frequently positive intraoperative margins (100% vs 32%,  $p=0.06$ ) approached significance in the DT group. **Conclusions:** No difference in recurrence or complications was observed associated with DT. However, these patients are exposed to additional surgery prior to initiating definitive treatment without clear oncologic benefit. Additionally, revision surgery after DT is reasonable with 33% having residual disease. If unable to provide definitive cancer treatment, we recommend diagnosis by minimal tissue removal followed by prompt referral to a cancer treatment center.

# Posters

## H91. A Third/Fourth Branchial Anomaly Presenting as a Chronically Draining Neck Wound after Total Thyroidectomy: Diagnosis and Endoscopic Management

John P. Naughton, MD, Bronx, NY; Lee P. Smith, MD, New Hyde Park, NY; Douglas K. Frank, MD, New Hyde Park, NY

**Educational Objective:** At the conclusion of the presentation, participants should be able to recognize the clinical factors suspicious for branchial anomaly as a cause of chronically draining postoperative neck wound as well as available endoscopic treatment options.

**Objectives:** To identify the clinical scenario consistent with underlying branchial anomaly as the cause of chronic wound infection after total thyroidectomy and to alert the surgeon to this rare entity. **Study Design:** Case report from a large tertiary care academic medical center. **Methods:** A 50 year old female was referred to a tertiary head and neck surgery practice due to chronically draining neck wound persistent for 2 years after total thyroidectomy for papillary thyroid cancer. She had undergone numerous prior surgical interventions as well as stem cell therapy and hyperbaric oxygen treatment, all of which were unsuccessful in managing the chronically draining wound. The patient was referred for MRI with contrast and interventional radiology fistulogram which revealed a tract traversing from the skin surface overlying the anterior border of the right sternocleidomastoid muscle through the thyroid bed and to the right pyriform sinus. Direct laryngoscopy revealed a sinus tract in the right pyriform sinus consistent with a third/fourth branchial anomaly or pyriform sinus anomaly. This tract was cauterized with silver nitrate under endoscopic guidance. No further surgical intervention in the neck was undertaken. **Results:** This case demonstrates an underlying cause for chronically draining postoperative wound that although rare, surgeons should keep in mind in the face of a non-healing neck wound. **Conclusions:** Unrecognized third/fourth branchial anomalies can lead to chronically draining neck wounds following thyroidectomy. If the surgeon keeps this diagnostic possibility in mind, a difficult to manage wound infection may be able to be addressed with a safe, simple, endoscopic technique.

## H92. Determinants of Unplanned Readmission after Microvascular Reconstruction of the Head and Neck

Yash J. Patil, MD, Cincinnati, OH; Jonathan R. Mark, MD, Cincinnati, OH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain and discuss factors that may precipitate an unplanned readmission after head and neck microvascular reconstruction. Participants will understand the effects of comorbidities as well as a clinical care pathway of unplanned readmission. Participants will understand the costs associated with these admissions.

**Objectives:** To determine the 30 day unplanned readmission (30dUR) rate, as well as some potential risk factors for readmission, for head and neck cancer patients undergoing microvascular free flap surgery. **Study Design:** Retrospective, cohort study. **Methods:** 250 consecutive patients who underwent microvascular reconstruction of the head and neck were enrolled. A single microvascular surgeon completed each reconstruction. **Results:** The following variables: clinical care pathway, age, race, sex, education level, marital status, insurance type, comorbidities, TNM stage, previous surgeries at the surgical site of interest, length of index hospital stay, details of the perioperative course, primary caregiver after discharge, and details on the readmission will be studied. Multivariate analysis will be used to determine significant factors for prediction of readmission. **Conclusions:** The effect of clinical care pathway was well as clinical variables that may predict readmission will be presented.

## H93. Human Papillomavirus Positive Oral Cancers

Kelly J. Pettijohn, MD, Westwood, CA; Jacob L. Wester, MD, Los Angeles, CA; Maie A. St. John, MD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare previous literature regarding HPV positive oral cancers, though sparse, to the findings of this study. They should consider HPV testing in oral cavity cancers, given the finding that it is potentially not as rare as previously reported.

**Objectives:** Human papilloma virus (HPV) is associated with increased incidence and improved prognosis in oropharyngeal cancers. Patients are typically younger and never smokers. A disproportionate number of oral tongue cancers also arise in young non-smokers; however, the association between oral cavity squamous cell carcinoma (OCSCC) and HPV is reportedly rare (1-5%). Given a paucity of data, we sought to review cases of OCSCC from a single tertiary referral center in order to evaluate the rate of HPV positivity within this site. **Study Design:** Retrospective chart review. **Methods:** All cases of OCSCC diagnosed between 2008 and 2012 in which HPV/p16 testing was performed were included in the study. Demographic, pathologic, and outcome data were analyzed. **Results:** Forty-seven patients with OCSCC were identified for analysis, of which 8 were found to have p16 positive tumors (17.0%). The mean age at diagnosis of HPV-positive tumors was 62.5 years and 66.6 years for HPV-negative. No significant difference was noted in tobacco use, alcohol history, or overall survival. Adverse pathologic features such as perineural invasion tend to be higher in HPV-negative tumors (p=0.1). **Conclusions:** The rate of HPV-positive OCSCC may be higher than previously reported. These patients



tend to have similar profiles to patients with non-HPV related cancers with regard to age and smoking/alcohol status. Oral cancers should be tested for p16, and further investigation should be directed at the impact of HPV-positivity on further outcomes.

**H94. Posterior Cricothyroid Muscle Electrophysiologic Changes Measured with a Posterior Cricoid Electrode are Predictive of Vocal Cord Paralysis with Recurrent Laryngeal Nerve Compressive Injury in a Canine Model**

Sidharth V. Puram, MD PhD, Boston, MA; Harold Chow, MD, Boston, MA; Che-wei Wu, MD, Boston, MA; James T. Heaton, PhD, Boston, MA; Dipto Kamani, MD, Boston, MA; Gregory W. Randolph, MD FACS FACE, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare post-cricoid and endotracheal tube electromyographic intraoperative nerve monitoring and discuss how each can be used to guide intraoperative surgical decision making.

**Objectives:** Recurrent laryngeal nerve (RLN) injury is a devastating complication of thyroid/parathyroid surgery. Intraoperative neural monitoring (IONM) has been increasingly used to assess for injury. Although the posterior cricothyroid muscle (PCA) is one of the primary muscles innervated by the RLN, posterior cricoid electromyographic (EMG) monitoring of the injured RLN remains poorly characterized and post-cricoid EMG parameters of RLN stimulation after compressive injury are unknown. **Study Design:** Prospective nonrandomized. **Methods:** We utilized a canine model to identify IONM post-cricoid EMG correlates of postoperative vocal cord paralysis (VCP). Post-cricoid electrodes were placed and recordings were obtained before and after compressive RLN injury associated with VCP. **Results:** Post-cricoid electrode recordings revealed a mean amplitude of  $1288 \pm 509.2 \mu\text{V}$  and a mean latency of 8.20 ms with maximal vagal stimulation, and mean amplitude of  $1807 \pm 1065.4 \mu\text{V}$  and mean latency of 3.50 ms for maximal RLN stimulation. After injury, there was a 62.1% decrement in post-cricoid EMG amplitude with maximal stimulation of the vagus and an 80% decrement with the RLN. Threshold stimulation of the vagus increased by 23%, with a corresponding 42% decrease in amplitude at threshold stimulation. For the RLN, latency increased by 17.3% after injury and threshold stimulation increased by 60%. **Conclusions:** If RLN amplitude decreases by 80% with an absolute amplitude of  $<300 \mu\text{V}$  with a latency increase of  $>10\%$ , then RLN injury is associated with VCP, similar to values with ETT EMG before and after injury. Our results predict postoperative VCP based on post-cricoid EMG IONM and may guide surgical decision making.

**H95. SEER Medicare Trends in Laryngeal Cancer Treatment Modalities and Implications for Cost**

Ali Razfar, MD, Los Angeles, CA; Pratik B. Patel, MD, Los Angeles, CA (Presenter); Tristan Grogan, MS, Los Angeles, CA; Elliot Abemayor, MD PhD, Los Angeles, CA; Maie St. John, MD PhD, Los Angeles, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the various surgical and nonsurgical treatment options for laryngeal cancer and be able to compare the cost differences associated with such treatments.

**Objectives:** This study aims to characterize the changing utilization between surgical and nonsurgical treatment options for laryngeal cancer. Furthermore, it aims to compare the treatment costs of these various modalities using Medicare reimbursement patterns as a proxy for national health spending. **Study Design:** Retrospective cohort study. **Methods:** Surveillance, Epidemiology, and End Results (SEER) Medicare database was queried to identify laryngeal cancer cases and linked data regarding Medicare payments for associated services. We stratified data based on treatment type, cost of treatment, and patient factors, including age, sex, race, income quartile, disease stage, primary site. **Results:** We identified 5536 patients in the SEER Medicare database from 2000 to 2007 who were treated for squamous cell carcinoma of the glottic or supraglottic larynx, and therefore met inclusion criteria. Overall, 956 patients underwent surgery alone, 2952 patients underwent radiation alone, and 1628 patients underwent combined therapy. There was a significant increase in use of radiation alone from 2000 to 2007 and a decrease in combined therapy, as well as decrease in the use of total laryngectomy. By 2007, intensity modulated radiotherapy (IMRT) treatment was of significantly high cost to Medicare. **Conclusions:** We demonstrate a recent trend toward nonsurgical treatment for laryngeal cancer, including increasing usage of IMRT, with associated cost differences. In the changing landscape of American healthcare, cost will be a significant driving force in choosing treatment options. Therefore, prospective studies investigating the comparative efficacy of various treatment modalities will be needed to determine if increased cost correlates with patient outcomes.

# Posters

## H96. Ultrasound Guided Needle Biopsy of Major Salivary Gland Tumors: Fine Needle Aspiration with Selective Use of Core Needle Biopsy Based on Preliminary Cytopathology

Erica B. Romano, BS, Oklahoma City, OK; Jason M. Wagner, MD, Oklahoma City, OK; Anthony M. Alleman, MD, Oklahoma City, OK; Lichao Zhao, MD PhD, Oklahoma City, OK; Rachel D. Conrad, MD, Oklahoma City, OK; Greg A. Krempf, MD, Oklahoma City, OK

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the advantages and disadvantages of both fine needle aspiration cytology and core needle biopsy, identify how they can contribute to the clinical decision making process, and to discuss the potential impact of selectively performing core needle biopsy as determined by initial cytopathologic interpretation of the quality and quantity of a fine needle aspirate.

**Objectives:** The preferential use of fine needle aspiration cytology versus core needle biopsy for differentiating benign from malignant neoplasms of the major salivary glands is highly debated. This study aims to evaluate the utility of ultrasound guided fine needle aspiration with selective use of core needle biopsy based on immediate cytopathologic assessment and to determine the rate at which this approach produces results that are adequate for guiding clinical management. Additionally, it may prove more sensitive and specific than fine needle aspiration cytology alone and at least as sensitive and specific as core needle biopsy. **Study Design:** A retrospective review was completed for 135 needle biopsies of lesions involving parotid and submandibular glands. **Methods:** Ultrasounds of 141 needle biopsies were identified. Patient/lesion/needle biopsy characteristics, pathology diagnosis, imaging studies, and subsequent clinical course were documented. **Results:** The rate of adequately guiding clinical decision making was 125 out of 135 cases, or 92.6% (95% confidence interval, 86.8% 96.4%). There were 120 lesions conclusively identified as benign (84) or malignant (36). Using 41 needle biopsies with a result considered adequate for guiding management and histologically verified by surgical pathology, the calculated sensitivity was 100% (95% confidence interval, 79.6% 100%) and specificity was 92.3% (95% confidence interval, 75.9% 97.9%) for detection of malignancy. **Conclusions:** This approach was adequate for guiding management of patients with salivary gland neoplasms 92.6% of the time. It may potentially reduce patient exposure to risks associated with core needle biopsy without the tradeoff of lower sensitivity seen with fine needle aspiration cytology, and we recommend further evaluation of the sensitivity and specificity.

## H97. Intraoperative Resident Education Prolongs Operative Time and Influences Postoperative Outcomes in Thyroid Surgery

Kimberly L. Serbousek, DO, Omaha, NE; Craig R. Folsom, MD, Omaha, NE; Katherine R. Rieke, MPH MA, Omaha, NE; Harlan Sayles, MS, Omaha, NE; Aru Panwar, MD, Omaha, NE

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand the impact of resident participation on operative time for thyroid lobectomy/hemithyroidectomy; 2) discuss difference in postoperative outcomes based on resident participation in such operations; and 3) discuss implications of these findings on clinical work flow management, healthcare costs, and opportunities for practice improvement.

**Objectives:** To investigate the impact of resident participation on operative duration for patients undergoing thyroid lobectomy with or without isthmusectomy. **Study Design:** Retrospective review of national database. **Methods:** The National Surgical Quality Improvement Program dataset for years 2006 to 2012 was queried to identify 13,151 adult patients who underwent a thyroid lobectomy, with or without isthmusectomy. Patients were stratified into two groups based on resident participation during the surgical procedure. Preoperative variables and comorbid conditions were assessed to establish comparability between the two groups. The operative duration was compared between the two groups. Secondary outcome variables included postoperative complications, reoperation and readmission rates. T-tests, chi-squared tests, and Fisher's exact tests were performed to examine the differences based on resident presence. **Results:** When compared to operations performed by attending surgeons alone, resident participation with attending supervision prolonged the operative duration by nearly 11% (82.5 minutes versus 91.2 minutes,  $p < 0.0001$ ). Patients undergoing surgery by attending surgeon alone had a higher incidence of obesity, COPD, and hypertension at baseline. Although the length of hospitalization, intraoperative adverse events and reoperation rates remained comparable, there was a higher incidence of readmission and wound complications for patients that underwent surgery with resident participation. **Conclusions:** Resident participation in thyroid lobectomy, with or without isthmusectomy, contributes towards increased operative duration, incidence of postoperative wound complications and higher readmission rates. This information is important to identify areas for improvement to optimize educational programs, reduce cost of healthcare delivery, and maximize patient safety, while continuing to train a competent physician workforce for the future.



**H98. Evaluation of the American College of Surgeons Thyroid and Parathyroid Ultrasound Skills Oriented Course and Surgeon Performed Head and Neck Ultrasound Practice Patterns: Results of a Web Based Survey**

Giriraj K. Sharma, MD MS, Irvine, CA; Robert A. Sofferman, MD, Burlington, VT; William B. Armstrong, MD, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the benefits of surgeon performed head and neck ultrasonography (HNUS), understand the objectives and efficacy of the American College of Surgeons (ACS) head and neck ultrasound course, discuss current HNUS practice patterns among post-graduate surgeons who have attended the ACS ultrasound course and discuss limitations to incorporation of HNUS into a surgeon's practice. While a vast majority of surgeons-in-training learn HNUS, only a fraction of post-graduate surgeons ultimately incorporate HNUS into their ambulatory practice. This study serves to highlight the practical, financial and legal limitations faced by many otolaryngologists and will serve as a platform (in addition to the ACS ultrasound course) to educate surgeons on steps they can take to incorporate HNUS into their daily practice. This includes learning curve, cost, billing and, of recent relevance, American Institute of Ultrasound in Medicine credentialing.

**Objectives:** The American College of Surgeons (ACS) Thyroid and Parathyroid Ultrasound Skills Oriented Course (TPUSC) was designed to teach surgeons how to interpret and perform office based ultrasonography of the head and neck. The objective of this study was to survey attendees of the TPUSC to evaluate the usefulness of the course and surgeon performed head and neck ultrasound practice patterns, and to help identify potential roadblocks to incorporation of HNUS into a surgeon's practice. **Study Design:** Cross-sectional survey. **Methods:** A web based survey was sent to post-graduate surgeons who completed the TPUSC at the annual ACS Clinical Congress meeting or at an ACS sponsored exported venue between 2010 and 2014. Questions included surgeon specialty, practice type, HNUS practice patterns and familiarity with American Institute of Ultrasound in Medicine (AIUM) credentialing. **Results:** The response rate was 24% (210 of 861). On a scale from 1 (not useful) to 5 (extremely valuable), the mean rating for course usefulness was 4.2. One hundred and ninety-four (92%) surgeons reported that their educational goals were met by the course and 162 (77%) surgeons reported performing HNUS in their practice. Of 48 surgeons who were not performing HNUS, 24 (50%) attributed insufficient time in their clinic schedule and 21 (44%) attributed high equipment costs. Forty-five (21%) surgeons planned to pursue AIUM accreditation while 10 (5%) surgeons had reviewed the AIUM website. **Conclusions:** The TPUSC is a valuable educational experience for surgeons seeking to gain proficiency in HNUS. Surgeon familiarity with AIUM accreditation remains low, and further information on HNUS credentialing is warranted for future TPUSC curricula.

**H99. Rosai-Dorfman Disease: A Case of Massive Lymphadenopathy Leading to Dyspnea**

Valeria Silva Merea, MD, New York, NY; William I. Kuhel, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to include RDD in the differential diagnosis of patients presenting with cervical lymphadenopathy. Participants should also be able to discuss the histopathological and cytologic findings required for diagnosis.

**Objectives:** Sinus histiocytosis with massive lymphadenopathy, also known as Rosai-Dorfman disease (RDD), is a rare, non-neoplastic, histiocytic proliferative disorder, which commonly presents as asymptomatic lymph node enlargement. However, disease may also be extranodal, and depending on the site involved, severe symptoms may develop. We report a case of RDD presenting with massive mediastinal and cervical lymphadenopathy leading to dyspnea. **Study Design:** Case report. **Methods:** The clinical records of a patient with RDD were examined and the literature on RDD was reviewed. **Results:** A 65 year old woman presented to the ED with dyspnea in the setting of a neck mass. CT of the neck and chest revealed a 15 x 8 x 17cm, heterogeneous mass centered in the anterior mediastinum, encasing and displacing the large vessels and causing tracheal narrowing. The mass was metabolically active on PET/CT. Biopsy demonstrated RDD. Treatment with high dose steroids and radiation therapy did not result in cure, but significantly decreased her disease burden and provided symptomatic control. **Conclusions:** RDD is a rare idiopathic condition with clinically diverse manifestations that may mimic malignancy. Treatment is reserved for symptomatic patients, as spontaneous remission has been observed. Patients with RDD have been treated with surgery, radiation therapy, oral or intralesional steroids, interferon and targeted agents; the optimal treatment has yet to be determined. RDD should be included in the differential diagnosis of patients presenting with cervical lymphadenopathy.

**H100. Nuclear Imaging in Primary Hyperparathyroidism: A Comparison of Protocols**

Tara E. Song, MD, Oakland, CA; Maqdooda M. Merchant, MD, Oakland, CA; Deepak Gurushanthaiah, MD, Oakland, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the different types of nuclear imaging protocols used for preoperative localization of abnormal parathyroid glands in primary hyperparathyroidism and appreciate the differences in accuracy between the techniques.

# Posters

**Objectives:** Sestamibi imaging is commonly used in the evaluation of patients with primary hyperparathyroidism for pre-operative localization. Multiple protocols exist, with no standard protocol being used exclusively. The true gold standard for localization is surgical confirmation of the abnormal parathyroid gland. Our objective was to compare the accuracy of the 5 most commonly employed nuclear imaging protocols used as localization studies in primary hyperparathyroidism at our institution. **Study Design:** Retrospective chart review from January 1, 2010 to December 31, 2011. **Methods:** The five protocols were T99 sestamibi, T99 sestamibi with SPECT, T99 sestamibi with pertechnetate, T99 sestamibi with pertechnetate and SPECT, and T99 sestamibi with Iodine 123 (I-123). Imaging results were compared to the surgically confirmed location and were determined to be a match if the imaging detected an adenoma on the same side as the surgically confirmed location. Pairwise analysis and logistic models were used to compare the accuracy between imaging techniques. **Results:** 748 patients underwent parathyroid surgery for hyperparathyroidism. 544 patients met inclusion criteria. The match rate was highest for T99 sestamibi with I-123. Pairwise analyses showed a statistically significant difference between T99 sestamibi alone compared to T99 sestamibi with I-123 ( $p = 0.0290$ ). Patients scanned with T99 sestamibi with I-123 were almost 10 times more likely to have a match than with T99 sestamibi alone ( $OR=9.6$   $p=0.03$ ). **Conclusions:** In our study population, T99 sestamibi with I-123 appears to be superior with a higher accuracy in detecting the location of abnormal parathyroid glands.

## H101. Surgical Management of Recurrent Tracheocarotid Fistula following Endovascular Stent Placement

Jeffrey T. Steitz, MD, Louisville, KY; Zachary J. Cappello, MD, Louisville, KY; Ziad A. Katrib, MD, Louisville, KY; Paul A. Tennant, MD, Louisville, KY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss surgical interventions in the management of an acute bleed from a recurrent tracheocarotid fistula.

**Objectives:** To demonstrate the successful surgical management of a recurrent tracheocarotid fistula in the presence of an infected endovascular stent. **Study Design:** Case report. **Methods:** A single patient was studied in this case presentation. **Results:** We report the case of a 25 year old woman who developed a tracheocarotid fistula secondary to an infected endovascular stent placed in the right carotid artery after the patient experienced hemorrhage on her first tracheostomy change. The patient originally had the tracheostomy placed at an outside hospital in September 2014 due to prolonged intubation after a motor vehicle accident. The patient presented to the otolaryngology service with an acute tracheal hemorrhage. This necessitated a neck exploration, median sternotomy, right carotid stent removal with subclavian to carotid bypass, and sternocleidomastoid flap reconstruction. This article addresses the epidemiology and anatomy of a tracheocarotid fistula and discusses methods to treat such a complication. **Conclusions:** Tracheocarotid fistulae pose a complex problem with high morbidity and mortality. Recurrence of tracheocarotid fistulae after previous endovascular intervention is a difficult problem that requires multidisciplinary surgical intervention.

## H102. The Role of HPV in Oropharyngeal Cancer in Japan

Julia Toman, MD, New Haven, CT; Scott V. Larson, MD, Great Falls, MT; Manju L. Prasad, MD, New Haven, CT; Tohru Furusaka, MD, Tokyo, Japan; Hirohito Vmeno, MD, Kurume City, Japan; Clarence T. Sasaki, MD, New Haven, CT

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare etiology of head and neck cancer, specifically oropharyngeal cancer, in Japan compared to the US and western countries and discuss changing etiology of head and neck cancer.

**Objectives:** While HPV has emerged as a driving cause of head and neck cancer especially in the oropharynx in western countries, there has been limited investigation of the etiology of head and neck cancer in other world regions, especially Asia. The objective of this study was to investigate HPV rates of head and neck cancer in Japan. **Study Design:** Retrospective cohort study. **Methods:** Fifty-nine oropharyngeal specimens collected over the past 5 years from 2 university hospitals in Japan were examined for the presence of HPV via testing for p16 positivity. The rate of HPV positivity was then determined and the two groups (HPV+ and HPV-) were compared for differences in age, smoking history, gender, and mortality. **Results:** The rate of HPV positivity as determined by p16 positivity was 38%. The patients with HPV cancer tended to be younger. There was no significant difference in smoking status. A higher proportion of HPV+ cancers were in women. Patients with HPV+ cancers appeared to have better survival. **Conclusions:** The rate of HPV positivity found in this study is higher than that in previous studies in Asian populations, which may indicate changing etiology of head and neck cancer in this region. Similar to oropharyngeal cancer in the west, patients with HPV+ cancer tend to be younger and women were more likely to be HPV+ and HPV+ status appears to have improved survival. However, no difference was found in smoking status suggesting a continued strong influence of tobacco in the development of oropharyngeal cancer in this population.

## H103. Retropharyngeal Hematoma Associated with Rivaroxaban

Prem B. Tripathi, MD, Irvine, CA; David Shamouelian, MD, Irvine, CA; Jason Handwerker, MD, Irvine, CA; William B. Armstrong, MD, Irvine, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss a novel link between rivaroxaban and spontaneous retropharyngeal hematoma.

**Objectives:** The aim of this investigation is to establish a novel link between non-vitamin K antagonist oral anticoagulants and spontaneous retropharyngeal hematoma and to review strategies in management for this life threatening condition. **Study Design:** Case report and review of the literature. **Methods:** A 49 year old male on rivaroxaban for atrial fibrillation presented to the emergency department with sudden onset otalgia and hoarseness and was found to have a rapidly expanding retropharyngeal hematoma. He was noted to have a normal PT, aPTT and INR. He was nasotracheally intubated and taken for invasive angiography which revealed extravasation from branches of the right external carotid artery. These vessels were coil embolized, and he was subsequently transferred to our institution for continued management. **Results:** We elected to take the patient to the operating room to definitively secure the airway by tracheostomy in conjunction with transoral hematoma evacuation. The procedure was successful and the patient was decannulated and discharged on hospital day 10. **Conclusions:** We describe the first case of a spontaneous retropharyngeal hematoma in a patient on rivaroxaban. A review of the literature did not reveal consensus on management, however, tracheostomy with evacuation, intubation with observation, and observation alone have been utilized in previous cases with success. With the use of these agents on the rise, knowledge of management for this rare entity is paramount for optimizing patient outcomes.

## H104. Application of Transoral Robotic Surgery (TORS) in the Management of Oropharyngeal Venous Malformations

Scott H. Troob, MD, Portland, OR; Elizabeth K. Schimmel, MD, Portland, OR (Presenter); Gary M. Nesbit, MD, Portland, OR; Peter E. Andersen, MD, Portland, OR

**Educational Objective:** At the conclusion of this presentation, the participants should be able to appreciate the role for transoral robotic surgery in the treatment of upper airway venous malformations.

**Objectives:** Rapid growth of vascular malformations of the upper airway often necessitates surgical management. Whereas traditional open approaches were associated with significant morbidity, transoral robotic surgery allows for resection of such tumors in the oropharynx in a minimally invasive manner. **Study Design:** Case report. **Methods:** We present a case of an adult patient with new obstructive airway symptoms and a vascular mass of the base of tongue. Pre-operative imaging was characteristic of a venous malformation. Management included cooperation of a multidisciplinary team of both otolaryngology and interventional neuroradiology. The patient was taken to the operating room and was placed in suspension laryngoscopy. Under endoscopic view, the lesion was injected with the sclerosing agent sodium tetradecyl to minimize intraoperative bleeding, and placement of the sclerosing agent was confirmed with fluoroscopy. Complete excision was then performed via a transoral robotic approach. **Results:** Sclerosis and transoral robotic resection was completed in a single 90 minute procedure, which did not necessitate a tracheostomy for airway management. The patient resumed an oral diet and was discharged postoperative day one. Upon followup, he reported resolution of his dyspnea and dysphagia. He remains without evidence of recurrence at 6 months. **Conclusions:** In select cases, preoperative sclerosis and transoral robotic surgery can contribute to minimally invasive treatment of venous malformation of the upper airway. This represents an important role for transoral robotic surgery that significantly reduces the morbidity in treatment of a benign, but potentially life threatening lesion in the head and neck.

## H105. Feasibility of Transoral Robotic Surgery for Cervical Spine Tumors

Angela C. Tsai, MD, Boston, MA; Scharukh Jalisi, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the utility of transoral robotic surgery versus open approach to cervical spine tumors.

**Objectives:** To describe the safe and effective use of transoral robotic surgery in removing cervical spine tumors in select patients. **Study Design:** Case report. **Methods:** Giant cell tumor is a benign neoplasm that may occur in the spine and is especially rare in the cervical spine. We report a case of a 36 year old male who was found to have a posterior pharyngeal mass during an allergy evaluation. **Results:** MRI neck with contrast showed a 4.3 x 3.0 x 2.8 cm well circumscribed mass in the prevertebral space at the level of C2. This is the first reported case in which robotic surgery was used to successfully excise a cervical prevertebral giant cell tumor, as treatment usually requires radical resection to preserve critical structures. **Conclusions:** We demonstrate that transoral robotic surgery is a safe and effective method of treatment for select cervical prevertebral space masses, in particular giant cell tumors.

# Posters

## H106. Stem Cell Therapy in a Model of Dysphagia Secondary to Tongue Fibrosis

Andrew M. Vahabzadeh-Hagh, MD, Los Angeles, CA; Alexander N. Goel, BA, Los Angeles, CA; Gerald S. Berke, 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 subacute changes that take place following partial glossectomy in rodents - a new model for tongue injury and fibrosis aimed to mimic changes following oncologic partial glossectomy in humans. They should be able to explain the therapeutic effects and potential of human mesenchymal stem cell injections into scarred rat tongues. They will also be able to compare and contrast the benefits seen from different sources or phenotypes of human mesenchymal stem cells.

**Objectives:** To investigate human mesenchymal stem cells (MSC) as a novel injectable treatment for post-insult tongue fibrosis. We develop a rat model for tongue injury and fibrosis aimed to mimic the clinical scenario of tongue base cancer status post resection. We hypothesize that MSC engrafting will improve tongue mass while reducing inflammation and fibrosis. We further investigate optimal cell source and phenotype in this model. **Study Design:** Rat model. **Methods:** Human adipose derived mesenchymal stem cells (ASC) and bone marrow derived mesenchymal stem cells (BSC) were grown in culture. A subset of each cell type was induced toward myocyte differentiation in vitro. Cells were transfected with a near infrared fluorescent protein for detection in vivo. Thirty nude rats underwent unilateral partial glossectomy with a 4 mm biopsy punch. After 2 weeks for scar formation, 1-2 million MSCs were injected into the tongue scar. Five treatment groups were studied: multi-potent ASC, myocyte differentiated ASC, multi-potent BSC, myocyte differentiated BSC, and control injection of growth media. IVIS Lumina in vivo imager was used to noninvasively detect MSCs from 4 to 21 days post-injection. Postmortem gross and histological evaluation of the tongue occurred at 3 weeks. Immunohistochemistry for myosin and human cell markers further evaluated engrafted MSCs. **Results:** Dense fibrosis was achieved two weeks post injury. Human MSC injections were feasible and well tolerated in this model. Outcomes of 5 treatment groups will be compared. **Conclusions:** This study establishes the feasibility of a new model for rodent tongue fibrosis and demonstrates that injection of human MSCs may augment recovery, reduce inflammation, and promote myofibril regeneration.

## H107. Preoperative Albumin Does not Predict Short Term Outcomes in Patients Undergoing Head and Neck Free Flap Reconstruction

Andrew D. Walls, BS, Washington, DC; Andres M. Bur, MD, Philadelphia, PA; Jason Brant, MD, Philadelphia, PA; Kyle Hatten, MD, Philadelphia, PA; Jason Newman, MD, Philadelphia, PA; Steven Cannady, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the importance of preoperative albumin on outcomes of free tissue transfer. Furthermore, participants should be able to confidently discuss specific secondary outcomes that are associated with abnormal preoperative albumin levels.

**Objectives:** To evaluate the impact of preoperative albumin on short term outcomes of patients undergoing head and neck reconstructive procedures with free tissue transfer. **Study Design:** Cross-sectional database analysis. **Methods:** The American College of Surgeons National Surgical Quality Improvement Program was queried for all cases of free autologous tissue transfer via CPT code. These were further refined by specialty to include only those involving the head and neck. Each patient was allocated to normal albumin (3.5-5.0 g/dL) or abnormal albumin (<3.5 g/dL) subgroups based on preoperative laboratory tests and were then further stratified to identify baseline characteristics. Patient cohorts were then compared to discern an association between free flap failure and survival over a thirty day period. Secondary outcomes included wound complications and return to operating room. **Results:** A total of 232 subjects met inclusion criteria. The normal albumin and abnormal albumin subgroups were found to be statistically similar according to baseline characteristics (diabetes, heart failure, body mass index, dialysis, renal failure, previous chemoradiation, smoker status, alcohol, transfusions, steroid use, DVT, previous coagulopathy, PTT/PT/INR, BUN, creatinine and hematocrit). The relative risk of flap failure and odds ratio between the two groups were not significantly different [(RR = 0.605, 95% CI: 0.198-1.841), (OR = 1.05, 95% CI: 0.3393 to 3.2296)] and no association was identified between serum albumin and flap survival (chi square value = 0.794, P=0.373). Although not statistically significant, we identified a trend toward increased wound infection and return to operating room in the abnormal albumin group (chi square value = 2.24, p = 0.13 and chi square value = 2.40, p = 0.12). **Conclusions:** This analysis demonstrates that albumin may not be a significant predictor of short term free flap outcomes in head and neck reconstruction with free autologous tissue transfer. Further studies evaluating other elements of nutritional status, including pre-albumin, a marker of short term nutritional status, are needed to determine its prognostic value.

## H108. Mucormycosis of the Mandible

Candice B. Yip, MD, Newark, NJ; Eric T. Carniol, MD MBA, Newark, NJ; Tapan Patel, MD, Newark, NJ; Brian Benson, MD FACS, Hackensack, NJ; Senja Tomovic, MD, Hackensack, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate understanding of the disease and its need for aggressive treatment.



**Objectives:** Mucormycosis is a rare opportunistic infection caused by Mucorales fungi, mainly affecting immunocompromised patients with poorly controlled diabetes or hematological malignancies. Rhinocerebral mucormycosis is the most common form, whereas mandibular mucormycosis is rare with only a few cases previously reported in the oral surgery literature. We report a case of mucormycosis of the mandible and adjacent soft tissue. **Study Design:** Case report. **Methods:** Retrospective review of clinical case. **Results:** A 70 year old female with a history of breast cancer, chemotherapy, myelodysplastic syndrome, bone marrow transplant, and graft versus host disease presented with fever and acute left side jaw swelling and pain. CT demonstrated an abscess surrounding the left hemimandible and sublingual space, with a foci of air within the left hemimandible. The patient underwent submental incision and drainage without gross purulence. Three days later, the left mental and submental skin became acutely necrotic, and pathology and cultures demonstrated invasive mucormycosis. The patient underwent wide local excision of the submental soft tissue, near total mandibulectomy, and partial glossectomy. Intravenous and topical antifungal agents, intravenous antibiotics, and filgrastim were given. Multiple debridements were done including subtotal glossectomy and floor of mouth resection. Despite aggressive surgical and medical management, the disease continued to progress and two weeks later, the patient was given comfort care and expired. **Conclusions:** Although most commonly associated with sinonasal disease, mucormycosis can present in other regions of the head and neck including the mandible. Prompt diagnosis, aggressive surgical and medical treatments are important in managing these patients. However, this disease portends poor outcomes, as demonstrated in our patient.

## LARYNGOLOGY/BRONCHESOPHAGOLOGY/SLEEP MEDICINE

### H109. Effect of Multi-Level Radiofrequency Tissue Reduction on Occupational Impact in Patient with Mild or Moderate Obstructive Sleep Apnea

Malika Atmakuri, MD, Seattle, WA; B. Tucker Woodson, MD, Milwaukee, WI; David L. Steward, MD, Cincinnati, OH; Edward M. Weaver, MD MPH, Seattle, WA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the importance of treatment of obstructive sleep apnea and its potential to have on occupational impact.

**Objectives:** Obstructive sleep apnea (OSA) is known to adversely impact work productivity through several mechanisms, including decreased concentration and excessive daytime sleepiness. However the effect of treatment of OSA has not been examined in the work place. We aim to evaluate the occupational impact of OSA before and following treatment with multilevel radiofrequency tissue ablation (RF). **Study Design:** An eight week randomized placebo controlled trial testing RF and sham-placebo in patients with mild to moderate OSA, and a two year followup case series of those treated with RF. **Methods:** Patients completed the Symptoms of Nocturnal Obstruction and Related Events (SNORE-25) at baseline, eight weeks after treatment, and two years following treatment. The SNORE-25 is a validated survey for OSA and contains an occupational impact domain with a series of questions targeted at the workplace. Change in the occupational impact domain of SNORE-25 was tested with one tailed Student's t-test between RF and sham groups at eight weeks and with the one tailed paired t-test between baseline and followup at two years in the RF treated cohort. **Results:** Occupational impact improved in both RF (-0.1 +/- 0.7, N=24) and sham patients (-0.1 +/- 0.8, N=25) at eight weeks, with no statistically significant difference (p=0.56). RF patients followed long term had a significant improvement in occupational impact at two years (-0.3 +/- 0.9, 95% CI -0.7 0.0, p=0.03, N=25). **Conclusions:** Multilevel RF may improve occupational impact in the long term. Further study is warranted to formally evaluate the effect of surgical treatment on occupational impact and work productivity in OSA.

### H110. Correlation between Expertise and Wrist Motion in Simulated Otolaryngological Surgery

Edward J. Callahan, BSc, Seattle, WA; Randall A. Bly, MD, Seattle, WA; Nava Aghdasi, MEng, Seattle, WA; Kaalan E. Johnson, MD, Seattle, WA; Kristen S. Moe, MD, Seattle, WA; Maya G. Sardesai, MD, Seattle, WA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the variation in wrist motion parameters with expertise in simulated airway surgery.

**Objectives:** This study aimed to determine whether wrist motion correlates with expertise as measured by objective structured assessment of technical skills (OSAT) performance in simulated cricothyroidotomy on a previously validated task trainer. **Study Design:** Prospective cohort study. **Methods:** Voluntary novice and expert subjects viewed a standardized training video and then performed cricothyrotomy on a previously validated task trainer while smartphones with accelerometer applications were fixed to both wrists. The procedures were video recorded, and two blinded expert surgeons scored all videos using OSATs. Procedure time, ARA, TRA, and STAEs were recorded for both dominant and nondominant hands. T-tests were used to compare scores between novices and experts. **Results:** Thirty subjects demonstrated OSAT scores ranging between 7 and 29 from a maximum of 30. Significant differences were seen between novices and experts in procedure time (p<0.001). For both dominant and nondominant hands, significant differences were seen in TRA (p<0.001, p<0.001 respectively) and STAEs (p=0.022, p=0.016 respectively). No differences were seen in ARA for either hand. **Conclusions:** Despite the need for digital dexterity, wrist motion as measured by a low cost smartphone application correlates with novice and expert OSAT performance in simulated otolaryngological surgery and may



# Posters

thus provide complimentary performance feedback and evaluation.

## H111. Chondrosarcoma of the Epiglottis: A Case Report and Literature Review

Jonathan Choi, BS, Houston, TX; Andrew J. Victores, MD, Houston, TX; Julina Ongkasuwan, MD, Houston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the epidemiology, etiology, histopathology, symptoms, radiologic features, and treatment of laryngeal chondrosarcomas (LCS).

**Objectives:** To report the sixth known case of LCS localized in the epiglottis and to discuss the literature regarding the classification scheme, etiology, histopathology, presentation, and treatment of LCS. **Study Design:** Case report and comprehensive review of the literature. **Methods:** This study reviewed the medical records of a patient with LCS of the epiglottis treated at a tertiary academic medical center. The Medline database search contained the following key words: larynx AND chondrosarcoma and chondrosarcoma AND epiglottis. **Results:** A 71 year old male smoker presented with sore throat, dysphagia, and odynophagia for three months. Computed tomography scan revealed an inhomogeneously enhancing necrotic mass emanating from his right epiglottis and traveling along the aryepiglottic fold. The patient subsequently underwent direct laryngoscopy with biopsy and histopathological examination of the excised specimen confirmed low grade LCS of the epiglottis. Endoscopic en bloc laser resection was performed of the mass including the lateral portion of the epiglottis, pharyngoepiglottic fold, aryepiglottic fold, and arytenoid. The patient underwent pre and postoperative swallow therapy and was able to take all food by mouth at discharge. **Conclusions:** LCS is an exceedingly rare malignancy and least frequently reported in the epiglottis. As of this writing, only five additional cases have been reported in the literature. This case study reinforces the need for histopathological examination in forming the basis for ongoing management and followup observations. This is noteworthy since chondrosarcomas (CS) are often misdiagnosed as chondromas. Timely surgery remains the optimal, primary means of treatment notwithstanding the rarity of LCS.

## H112. Effects of Balloon Dilatation on the Adult Cricoid Ring: A Cadaveric Study

Micaela J. Dagucon, MD, San Antonio, TX; Stephen C. Maturo, MD, San Antonio, TX; Nelson S. Howard, MD, San Antonio, TX; Wen Lien, DDS, San Antonio, TX; Sarah Sauter, Washington, DC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the effects of balloon dilation on the cricoid ring and understand how microcomputed tomography scans may be used in ex vivo models.

**Objectives:** The purpose of this study was to determine the incidence of balloon dilation induced cricoid ring fractures in an adult larynx ex vivo model using microcomputed tomography scanning. **Study Design:** Cadaveric study. **Methods:** 14 fresh frozen human larynges were evaluated using microtomography before and after balloon dilation with an Acclarent tracheal balloon dilator or a Boston Scientific esophageal balloon dilator. Scans were compared to identify any cricoid fractures and results were analyzed by logistical regression analysis for variables of balloon type, average diameter of each larynx, gender, and age group. **Results:** Cricoid fracture incidence was 14%. All fractures were located at the anterior lamina. There were no statistically significant correlations between presence of cricoid fracture and age group (chi-squared =0.5379), balloon type (chi-squared =0.1266), or average diameter (chi-squared =0.5123). There was a statistically significant correlation between fracture and female gender (chi-squared =0.0404). Further analysis showed no correlation with balloon type. **Conclusions:** Micro CT is a useful method to evaluate ex vivo specimens for both bony and soft tissue changes. Adult cadaveric cricoid cartilage fracture after balloon dilation is low, with an incidence of 14% in this study. Fractures were only observed in female larynges. This study suggests that cricoid fracture is not the mechanism by which balloon dilatation changes airway diameter.

## H113. Non-Small Cell Lung Carcinoma Metastatic to the Subglottis

Lindsay A. Goodstein, MD, Philadelphia, PA; Joseph R. Spiegel, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize that lung cancers may metastasize to the larynx and have the appearance of a primary laryngeal tumor.

**Objectives:** Malignant airway obstruction from lung cancer is described in the thoracic and respiratory literature, but the role of the otolaryngologist in the care team is not reported. Endobronchial metastasis occurs in as many as one out of three advanced lung cancers and may present with hoarseness, stridor, or difficulty breathing. Here we present the case of a patient with stage IV squamous cell carcinoma of the lung who presented with hoarseness and difficulty breathing secondary to a subglottic metastasis. **Study Design:** Case report. **Methods:** The medical records of a patient treated for a subglottic mass at a tertiary care medical center were reviewed. **Results:** A 64 year old female, with a history of squamous cell carcinoma of her lung, diagnosed in 2011 and treated with left pneumonectomy, chemotherapy and radiation, presented with increasing hoarseness and difficulty breathing. Flexible stroboscopy identified a multi-lobulated, red mass in the subglottic larynx arising from the posterior and left lateral walls. It had the appearance of

a primary subglottic cancer. The mass was resected with a combination of direct laryngoscopy and rigid bronchoscopy. Final pathology revealed invasive squamous cell carcinoma, consistent with the primary lung cancer. **Conclusions:** Lung cancers, as well as other many other cancers, may have endobronchial metastases that obstruct the airway. While often treated by the thoracic surgeon or interventional pulmonologist, these masses may occur in the proximal airway as high as the larynx. The airway expertise of otolaryngologists makes them key team members in caring for select patients with end stage lung cancer.

## H114. Angiomyxoma of the Epiglottis: An Exceedingly Rare Otolaryngologic Finding Presented in a Single Institution Case Series

Daniel B. Noel, MD, Rochester, MN; Michael J. Hutz, MD, Chicago, IL; James R. White, MD, Rochester, MN; Dale C. Ekbohm, MD, Rochester, MN; Jorge Torres-Mora, MD, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand and discuss the histology, clinical presentation, frequency, and differential diagnosis of angiomyxoma within the head and neck.

**Objectives:** To publish the largest case series of angiomyxomas of the head and neck from a single institution and to describe the first reported case of an angiomyxoma occurring on the epiglottis. We also provide an updated review of the literature regarding these rare tumors. **Study Design:** Case report; case series; literature review. **Methods:** We report the case of a patient presenting with globus sensation caused by an angiomyxoma of the epiglottis. Included is a case series at our institution, established by examining the pathology database, as well as the BSI systems database for patients with a diagnosed angiomyxoma of the head or neck. We also performed a review of the available biomedical literature and summarized by site and frequency those tumors previously documented. **Results:** We discovered 6 patients in our database that had been histologically diagnosed with angiomyxomas of the head and neck, the largest single institution series to our knowledge. One tumor was located on the posterior neck, two on the lower lip, one on the upper eyelid, one on the nasal tip and the most recent located on the epiglottis. A review of the current literature regarding these tumors was also completed and, aside from those reported in our case series, 41 have been reported thus far in the head and neck. **Conclusions:** Angiomyxomas are unusual benign soft tissue neoplasms that are very rarely found in the head and neck. Complete surgical excision is the treatment of choice. Due to their likelihood of local recurrence, long term followup is encouraged.

## H115. Anatomically Directed Mandibular Osteotomy in Genial Advancement Surgery for Obstructive Sleep Apnea

Joshua S. Park, MD, Loma Linda, CA; Christopher Lee, BA, Loma Linda, CA; Jason M. Rogers, DDS, Loma Linda, CA; Ho-hyun Sun, MS, Pomona, CA; Jeffrey A. Elo, DDS MS, Pomona, CA; Jared C. Inman, MD, Loma Linda, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify the vital features of mandibular anatomy and discuss how they impact osteotomy design in mandibular advancement surgery for patients with obstructive sleep apnea.

**Objectives:** Mandible advancement can reduce the apnea-hypopnea index in select patients with obstructive sleep apnea (OSA). Precise measurements that enhance knowledge of mandibular anatomy were obtained, and subsequent design of the ideal anterior mandible osteotomy was deduced. **Study Design:** Cadaveric dissection and cone beam computed tomography (CBCT) analysis. **Methods:** Dissection of 32 fresh adult cadavers and analysis of 32 CBCT scans. Measurements were made using digital micrometers and high resolution 3D analysis. Statistical analysis was performed. **Results:** Cadaveric measurements were  $25.18 \pm 4.40$  mm from midline to the mental foramen and  $15.0 \pm 3.28$  mm from the apex of the canine root to the inferior border of the mandible (IBM). CBCT attained horizontal distances from midline to the root apex of the central incisor, lateral incisor, and canine were  $2.04 \pm 0.87$ ,  $6.19 \pm 1.58$ , and  $13.56 \pm 3.01$  mm, respectively. Vertical distances from the IBM were  $21.81 \pm 3.49$ ,  $20.48 \pm 3.10$ , and  $17.11 \pm 3.28$  mm, respectively. The superior aspect of the genial tubercle (GT) was  $14.94 \pm 2.75$  mm from the IBM. **Conclusions:** Detailed knowledge of mandible anatomy can increase accuracy of GT advancement and help avoid injury to the tooth roots and mental foramina. Ideal muscle advancement would include the genioglossus, geniohyoid, and digastric. Our results show it is possible to osteotomize more than 5 mm inferior to the central dentition, preventing neurovascular devitalization while optimizing GT capture superiorly. This study establishes guidelines for a safe, more muscle inclusive, and aesthetically pleasing osteotomy design for anterior mandible advancement surgery in patients with OSA.

## H116. Minimally Invasive Resection of Parapharyngeal Branchial Cyst with Retropharyngeal Extension: A Novel Approach Using Potassium Titanyl Phosphate (KTP) Laser

Tiffany Peng, MD, New York, NY; Babak Sadoughi, MD, New York, NY

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss possible novel utilization of KTP laser as a safe and effective alternative in the transoral resection of benign parapharyngeal masses.

# Posters

**Objectives:** Branchial anomalies can, on rare occasions, present in the parapharyngeal space, creating unique challenges in the operative management of this benign entity. We present the first report of a novel approach using potassium titanyl phosphate (KTP) laser to perform transoral resection of a large parapharyngeal branchial cyst extending into the retropharyngeal space. **Study Design:** Case report, literature review. **Methods:** A 30 year old man with no past medical history presents with 3 year history of throat mass causing discomfort upon waking. Physical exam was notable for a 4 to 5cm pedunculated cystic mass of the right posterolateral oropharynx. Flexible laryngoscopy demonstrated 40-50% obstruction of the pharyngeal airway by the mass. Computed tomography demonstrated a mass originating from the parapharyngeal space extending to the carotid sheath. The patient underwent transoral excision of pharyngeal mass with KTP laser, where careful dissection was performed to separate the mass from its boundaries of the pharyngeal constrictors, longus colli muscle, prevertebral muscles, and carotid sheath. There were no complications. Final pathology was consistent with a branchial lesion. **Results:** Masses in the parapharyngeal space require special considerations due to their close proximity to vital neurovascular structures. Transoral resection offers decreased morbidity and a cosmetically favorable outcome compared to transcervical resection. KTP laser is photoselective, offering excellent coagulation with limited penetration of nearby tissues. While appropriate patient selection is critical prior to consideration of this approach, KTP laser is a safe alternative for transoral resection of a benign parapharyngeal mass. **Conclusions:** Transoral resection with KTP laser is a safe and effective alternative in the resection of benign parapharyngeal masses.

## H117. Open, Direct Midline Glossectomy

Dustin A. Platter, BS, Alexandria, VA; Joseph D. Boone, BS, Washington, DC; Michael R. Abidin, MD, Alexandria, VA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the reliability, efficiency and safety of the open, direct midline glossectomy technique to that of the same procedure performed by TORS.

**Objectives:** To define a technique for an open, direct midline glossectomy and compare the reliability, efficiency, and safety of the procedure to the same procedure performed by TORS.(How-to and comparison). **Study Design:** First, describe in detail the technique of the manual surgery, then through peer reviewed articles, compare the above factors to the same factors with regards to the TORS procedure and sleep medicine overall. **Methods:** Using peer reviewed articles, discuss and compare the change in AHI and RDI of patients both pre and postoperatively who have had the defined midline glossectomy performed either manually or via TORS. Also, compared factors such as simplicity, duration, short and long term care requirement, cost efficiency and safety of the aforementioned surgeries on the same patients. **Results:** The defined open, direct midline glossectomy is cheaper, more time efficient, requires less assistance and safer in regards to the neurovascular bundle versus the same procedure performed by TORS. **Conclusions:** The open, direct midline glossectomy is a much simplified procedure for reducing the size of the tongue. As the surgeon can tailor each procedure directly while visualizing the amount of tissue the neurovascular bundles can more easily be avoided. No patients require intubation or more than a single overnight hospital stay. The procedure also costs a significantly lower amount than same procedure performed via TORS. The open, direct midline glossectomy represents a reliable, efficient, safe, cost effective, and easily learned method for reducing tongue size as part of multi-level surgery for obstructive sleep apnea.

## H118. The Few, the Proud: Spontaneous Pneumomediastinum Due to Vocal Trauma in a Marine Drill Instructor

Isaac E. Schwartz, MD, San Diego, CA; Ryan L. Sload, MD, San Diego, CA; Carol R. Roth-Abramson, PhD, San Diego, CA; Alexander E. Stewart, MD, San Diego, CA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the causes of spontaneous pneumomediastinum, and explain its pathophysiology. Also to describe the unique set of laryngologic complications for which professional vocal abusers are at risk.

**Objectives:** To present a case of spontaneous pneumomediastinum suffered by a US Marine during the performance of his duties as a drill instructor. To review the laryngologic occupational hazards of this unique population and to review the pathophysiology of spontaneous pneumothorax. **Study Design:** Case report. **Methods:** A healthy 29 year old Marine with a two day history of acute onset of vocal hoarseness and extensive pneumomediastinum that occurred during a training trip for Marine drill instructors. **Results:** After a period of inpatient observation, patient was discharged and followed by ENT and speech therapy, with resolution of subcutaneous emphysema and improvement of voice. **Conclusions:** US Marine drill instructors are an extremely specialized population with a unique laryngologic risk profile, due to routine, sustained vocal abuse. To the list of occupational hazards we may add spontaneous pneumomediastinum.

## H119. Strap Muscle Type I Thyroplasty Following Gore-Tex Implant Extrusion: A Case Report and Literature Review

Rishabh Sethia, BS, Columbus, OH; Winslo K. Idicula, MD, Aurora, CO; Brad W. DeSilva, MD, Columbus, OH

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

of using strap muscle for revision type I thyroplasty following implant extrusion.

**Objectives:** To discuss the presentation and management techniques of implant extrusion following type I thyroplasty and to illustrate the potential of strap muscle for augmentation following implant removal. **Study Design:** Case report and comprehensive literature review. **Methods:** We report a unique case of a patient with late Gore-Tex implant extrusion after type I thyroplasty treated with removal and autologous strap muscle graft for augmentation. **Results:** A 41 year old female nearly 3.5 years status post Gore-Tex type I thyroplasty for left vocal fold paralysis presented for evaluation of dysphonia. Upon flexible laryngoscopy, erythema, edema, and granulation tissue were identified at the left vocal fold and ventricle. The patient subsequently underwent removal of her implant. Intraoperatively, a free portion of sternothyroid muscle was dissected free and placed into the paraglottic space. One month following surgery, the patient reported an improvement in her Voice Handicap Index (VHI) score from 40 to 0. In addition, no major complications were observed and complete glottic closure was achieved. Nine months post-surgery, she continues to function well with a VHI score of 0. **Conclusions:** Implant extrusion is a rare complication of type I thyroplasty usually occurring in the first few months after surgery and more commonly presenting in females. Current management options consist of observation or augmentation with autologous fat or vocal fold injection following implant removal. This is the first report of successful strap muscle free graft revision thyroplasty following implant extrusion. The patient's excellent long term outcome highlights the potential of strap muscle augmentation as a feasible management option for implant extrusion.

#### H120. Use of Kenalog Injection to Alleviate Posterior Glottic Stenosis

Jared J. Tompkins, MD, Memphis, TN; Jennifer D. McLevy, MD, Memphis, TN; Jerome W. Thompson, MD MBA, Memphis, TN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the 4 grades of posterior glottic stenosis and consider the use of steroid injection on higher grade patients than previously performed.

**Objectives:** Posterior glottis stenosis (PGS) represents an interesting dilemma to the airway surgeon. Diagnosis of this rare condition can be difficult, often mimicking bilateral vocal fold paralysis. Management can also be challenging, with several potential therapeutic options. We aim to present a series of patients demonstrating steroid injection as a potentially viable therapeutic option in high grade posterior glottic stenosis in addition to the more traditional low grade indication. **Study Design:** Case series, retrospective review. **Methods:** After receiving IRB approval, pediatric otolaryngology patient records at a single institution were reviewed from 1/1/2013 to 7/1/2014. **Results:** Four patients were identified with PGS. Serendipitously, each of these 4 patients represented a distinct grade, I-IV, of PGS. Our case series presents these pediatric patients, all with confirmed PGS on operative direct laryngoscopy that were treated with Kenalog 40 mg/1mL injectable solution a variable number of times, based on therapeutic response. All 4 patients showed improvement or resolution of synechiae causing the PGS on subsequent laryngoscopy. **Conclusions:** Kenalog injection has previously been shown to be a viable first line therapeutic option for the treatment of low grade (type I-II) PGS. Based on our limited series, a trial of steroid injection may represent a standalone therapeutic option worth trial for higher grade (type III-IV) PGS prior to more aggressive surgical treatment such as cartilage grafting, which is the standard practice at this time.

#### H121. Analyzing the Reflux Symptom Index Using Pharyngeal pH Probe Findings

Matthew G. Yantis, MD, Galveston, TX; Naren N. Venkatesan, MD, Fort Worth, TX; Michael P. Underbrink, MD MBA, Galveston, TX

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand which symptoms in the reflux symptom index correlate most strongly with having a positive pharyngeal pH probe.

**Objectives:** The diagnosis of laryngopharyngeal reflux disease (LPRD) is commonly made based on a symptom specific survey, reflux symptom index (RSI), and findings on laryngoscopy. The pharyngeal pH probe, an objective measure, can be used to identify reflux specific to the pharynx. In our study, correlation between pH probe findings and individual symptoms of the RSI was assessed. **Study Design:** We performed a prospective cohort analysis of 52 subjects including asymptomatic controls and symptomatic patients. **Methods:** The subjects submitted RSI scores and an overnight pH probe study was conducted. Probe status (+ or -) was determined. **Results:** Of the 52 subjects that had a pH probe study performed, 31 (60%) were pH probe (+) and 21 were (-). There were four main symptoms identified on the RSI that, when severe, correlate most strongly with a (+) pH probe. These include coughing after eating and lying down (100% specificity), breathing difficulties (95%), troublesome or annoying cough (95%), and heartburn (100%), with  $p < 0.05$  for all four of these categories. **Conclusions:** Symptoms that are most predictive on the RSI for a (+) pH probe status include coughing after eating/lying down, a troublesome/annoying cough, heartburn, and breathing difficulties. If a subject does not have these symptoms strongly weighted in their RSI score, we recommend obtaining a pH probe before starting empiric therapy. However, if these symptoms are strongly represented, it is plausible to start empiric medical therapy.



# Posters

## OTOLOGY/NEUROTOLOGY

### H122. Abnormal Rhomboid Lip in Children with CND Submitted to ABI

Vittorio V. Colletti, Milano, Italy; Giacomo G. Colletti, MD, Milano, Italy; Marco M. Mandalà, MD, Siena, Italy; Liliana L. Colletti, PhD, Verona, Italy

**Educational Objective:** At the conclusion of this presentation, the participants should be able to identify and treat severe abnormalities of the rhomboid lip that make auditory brainstem implantation surgery in children with cochlear nerve deficiency a difficult and risky procedure.

**Objectives:** To investigate the prevalence and implications of severe abnormalities of the rhomboid lip (RL) that make auditory brainstem implantation (ABI) surgery in children with cochlear nerve deficiency (CND) a difficult and risky procedure. **Study Design:** Retrospective study. **Methods:** In a cohort of 78 consecutive children with CND implanted with ABIs surgical video recordings and a full sequence of snapshots of the area surrounding the foramen of Luschka (FL) undergoing surgery were available for the present study. The individual surgical videos of each child were reviewed and analytically examined by four independent individuals to define the types and frequency of abnormalities of the RL. **Results:** The membranous structure forming the RL varied greatly in size, thickness and transparency in children of the present cohort. In a large number (72%) of children the RL extended laterally over the lower cranial nerves, obstructing the view of the FL and necessitating section of the RL to access the lateral recess (LR) and implant the ABI on the cochlear nuclei. **Conclusions:** An abnormal large RL adhering to the IX and X and obstructing the FL is described for the first time in children with CND during ABI surgery. A surgical dissection of the arachnoid membranes from the foramen jugularis down to cranial nerves VII, IX and X and delicate detachment of the RL from these nerves is necessary to visualize the FL, access the LR and locate the ABI array on the cochlear nuclei.

### H123. Spatial Orientation of the Cochlea and Relationship with Mastoid Pneumatization

Anita S. Deshpande, MD, Atlanta, GA; Bruno P. Soares, MD, Atlanta, GA; N. Wendell Todd, MD MPH, Atlanta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) know rotation and tilt of the plane of the basal turn of the cochlea; 2) know the "watch stem position" of the round window; 3) know that cochlear orientation is unrelated to mastoid pneumatization; and 4) know that cochlear orientation and distance from incus and superior semicircular canal have bilateral symmetry.

**Objectives:** To describe the orientation of the basal turn of the cochlea in image normal temporal bones, the distances of the round window and cochlear aperture from the incus and the superior semicircular canal, their bilateral symmetry and relationship with mastoid pneumatization. **Study Design:** Postmortem study of cadaveric crania. **Methods:** From 41 cranial specimens, direct axial CT images were obtained for the five crania with the largest and the five with the smallest mastoids. Landmarks were defined in xyz space: cochlear aperture (CA), center of the island of the superior semicircular canal (SSCC), apex of posterior process of incus, the cochlear aperture (CA), and two cochlear basal turn points so that the plane of the cochlea could be described. **Results:** The median angle value (and range) between the cochlear and sagittal planes was 52° (47-61), right ear. The median distances between apex of incus and RW were 9.3 mm (8.2 to 10.4). The median distances between SSCC and RW were 8.9 mm (8.1-11.5); between SSCC and CA, 8.9 (8.4-10.1). Angle SSCC-CA-RW "watch stem position" ranged 20 degrees. Statistically significant bilateral symmetry was found for the relationships between plane of the cochlea and coronal plane and distances SSCC to RW and SCC to CA. No association of any studied distance or planar relationship was found with mastoid pneumatization. **Conclusions:** The variable orientation of the cochlea has no relationship with mastoid pneumatization. That bilateral symmetry was found of distances and angles suggest that the ontogeny underlying the relationship may be of genetic origin.

### H124. Facial Nerve Decompression in Bell's Palsy by Middle Cranial Fossa Approach--A Single Center Case Series

Julie Bao Anh Do, MDCM, Quebec, QC Canada; Gaétan Fradet, MD FRCSC, Quebec, QC Canada; Denis Pouliot, MD FRCSC, Quebec, QC Canada

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand the natural history of Bell's palsy; 2) describe the middle cranial fossa approach to facial nerve decompression; and 3) evaluate the benefits of a surgical decompression compared to a conservative management.

**Objectives:** Bell's palsy is a facial paralysis of unknown origin with variable outcomes. Surgical decompression of the facial nerve is considered as an option in cases of complete paralysis. Many approaches have been proposed but the middle cranial fossa approach has been shown to be the most convincing. This procedure is not yet widely recommended due to the lack of large studies. Based on a unique case, we aim here to document the benefits of the surgery. **Study Design:** This is a retrospective case study. **Methods:** Twenty-four patients with complete Bell's facial paralysis covering

a period of 15 years of practice were reviewed. The facial nerve decompressions were done in a tertiary care center. **Results:** Results showed that 88% of patients recovered to a House-Brackmann (HB) grade I, II and III. No statistically significant difference was noted between patients who were operated before and after 14 days on onset of the paralysis ( $p > 0.05$ ). No patients had major and permanent complications. Results also showed that women recovered better than men after the surgery (HB  $2.08 \pm 0.64$  &  $2.83 \pm 0.83$  ( $p < 0.05$ ), respectively). **Conclusions:** This study has the largest case series in a single institution. It shows that patients undergoing facial nerve decompression via the middle fossa approach have a good chance of recovery.

## H125. The Effects of Double Gloving on Microsurgery

Scott A. Hardison, MD, Richmond, VA; Grace Pyon, BS, Richmond, VA; Audrey Le, BS, Richmond, VA; Wen Wan, PhD, Richmond, VA; Daniel H. Coelho, MD, Richmond, VA

**Educational Objective:** At the conclusion of the presentation, participants should be able to determine whether double gloving (DG) adversely affects microsurgical skills.

**Objectives:** To determine whether DG would negatively impact participants' ability to perform a simulated microsurgical task. **Study Design:** Randomized, controlled, crossover experiment. **Methods:** A model of a stapedectomy was created. Medical and dental students without prior experience were randomized into two groups. For trial 1, both groups performed the task without gloves, acting as their own control arm. For trial 2, group 1 performed the task with a single pair of gloves (SG) and group 2 performed the test with DG. For trial 3, group 1 performed the task with DG and group 2 performed the test with SG. The total time taken to perform the task for each trial was recorded for each participant and the results subjected to a series of statistical analyses. **Results:** There were statistically significant differences in the average time taken to complete the task between the no glove arm of the study and both experimental groups ( $p=0.0075$ ) but no difference between the SG and DG groups ( $p=0.4919$ ). Additionally, no significant difference was found between the two experimental groups when comparing the rate at which they improved at performing the task ( $p=0.8692$ ). **Conclusions:** Our study suggests that DG does not negatively affect the ability to perform a microsurgical procedure, lending support to the practice of double gloving even in the setting of fine motor tasks.

## H126. Primary Temporal Bone Cancer: A Retrospective Case Review

Shayanne A. Lajud, MD, Atlanta, GA; Douglas E. Mattox, MD, Atlanta, GA; Esther Vivas, MD, Atlanta, GA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to describe the current diagnostic and therapeutic paradigm of primary temporal bone cancers and to discuss the limitations of existing literature.

**Objectives:** To describe our experience in the management of patients with primary temporal bone cancers and to evaluate their outcomes. **Study Design:** Retrospective case review. **Methods:** The study was conducted at a tertiary referral center. Adult patients with a diagnosis of primary temporal bone cancer from 2000 to 2015 were included in the study. The Modified University of Pittsburgh staging system was used to stratify patients by stage at the time of diagnosis and after final workup. Diagnostic, treatment and outcomes data were reviewed and compared with existing literature. The main outcomes measured include disease specific survival, recurrence free survival, overall survival, and quality of life. **Results:** In this study management was carried out using a multidisciplinary approach including surgical resection with or without parotidectomy, with or without neck dissection, reconstruction, neoadjuvant or adjuvant chemotherapy and/or radiotherapy, and palliative measures. Our data is consistent with existing literature. Our outcomes are comparable to other large tertiary referral institutions. **Conclusions:** Primary temporal bone cancers are rare and difficult to treat entities that remain poorly understood. Management includes surgical resection, complex reconstruction, and neoadjuvant and adjuvant therapies. The lack of large data sets makes it difficult to study and to establish standardized management algorithms and guidelines. Combined efforts are desperately needed to better understand and treat these devastating diseases.

## H127. Racial Differences in Vestibular Schwannoma

Alexander P. Marston, MD, Rochester, MN; Amy E. Glasgow, MHA, Rochester, MN; Elizabeth B. Habermann, PhD MPH, Rochester, MN; Alex D. Sweeney, MD, Houston, TX; Matthew L. Carlson, MD, Rochester, MN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss racial differences in presentation of vestibular schwannoma in the United States.

**Objectives:** Racial disparity in healthcare delivery remains understudied. The objective of the current study is to estimate the impact of race on disease presentation and treatment of vestibular schwannoma (VS) in the United States. **Study Design:** Analysis of a national population based tumor registry. **Methods:** Analysis of the Surveillance, Epidemiology, and End Results (SEER) database including all patients identified with a diagnosis of VS. Associations between race, dis-

# Posters

ease presentation and treatment strategy were analyzed in a univariate and multivariable model. **Results:** 9,782 patients with VS were identified among 822 million person-years. Of these, 7,400 (75.6%) claimed white, 807 (8.2%) Hispanic, 755 (7.7%) Asian, 397 (4.1%) black, and 423 (4.3%) were other. The median annual incidence was lowest among black (0.43/100,000 persons) and Hispanic populations (0.45/100,000 persons) and highest among whites (1.61/100,000 persons) ( $p < 0.001$ ). Overall, Hispanic patients were diagnosed at the youngest age, while white patients were diagnosed at the oldest age (mean of 50.0 vs. 56.0 years, respectively;  $p < 0.001$ ). Compared to white persons, black, Hispanic, and Asian populations were more likely to present with larger tumors ( $p < 0.001$ ). After controlling for tumor size, age and treatment center in a multivariable model there were no statistically significant differences in primary treatment modality between races. **Conclusions:** These data demonstrate that racial disparities among patients with VS exist within the United States. Further studies are required to determine whether differences in tumor size, age, and annual disease incidence between races are driven by disparities in healthcare access or potential differences in tumor biology.

## H128. The First Case of Recurrent Carcinoid Tumor of the External Auditory Canal

Hilary C. McCrary, MPH, Tucson, AZ; Erynne A. Faucett, MD, Tucson, AZ; F. Zahara Aly, MD, Tucson, AZ; Sarah L. Kratz, MD, Tucson, AZ; Abraham Jacob, MD, Tucson, AZ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand the histological spectrum of disease for neuroendocrine tumors of the temporal bone; 2) appreciate that carcinoid tumors can arise in the ear canal and discuss the defining features of this neoplasm; and 3) list potential treatment options for various neuroendocrine tumors of the temporal bone, including carcinoid.

**Objectives:** Neuroendocrine tumors (NETs) of the ear canal are exceedingly rare, typically called Merkel cell carcinoma when aggressive and carcinoid when indolent. When arising in the temporal bone, NETs usually originate in the middle ear/mastoid. We present the first case of a recurrent carcinoid tumor originating in the ear canal. **Study Design:** Case report. **Methods:** Examination of medical records; literature review. **Results:** A 38 year old woman presented to an outside ENT physician in 2007 with a pedicled mass originating from the superior aspect of the medial bony ear canal. Physical exam and CT scan found no bone erosion, and the patient underwent uneventful soft tissue excision. Histology demonstrated a well differentiated neuroendocrine carcinoma positive for chromogranin eventually diagnosed as carcinoid. In 2015, she returned with a recurrent mass now involving the anterior, superior, and posterior aspects of the medial ear canal. The tympanic membrane was invaded, and tumor had entered the middle ear. CT confirmed physical findings, and an MRI (brain, face, neck, chest, abdomen, and pelvis) found a possible nasopharyngeal (NP) lesion and an unrelated lung nodule. Incisional biopsy of the ear lesion revealed infiltrative neuroendocrine carcinoma with a low Ki-67 index, again diagnosed as carcinoid. NP biopsy was negative. The patient consented to lateral temporal bone resection; no adjuvant therapy is planned. **Conclusions:** We describe the first case of a recurrent low grade cutaneous neuroendocrine tumor (carcinoid) of the ear canal. Despite its low proliferative index, gross total resection of the tumor and surrounding bone is recommended to prevent recurrence.

## H129. Self-Renewing Zebrafish Lateral Line Hair Cells Do not Regain Full Function after Ototoxic Insult: Implications for Drug Discovery Efforts Aimed at Screening Small Molecules with Tissue Regenerative Capacity

Maki Niihori, PhD, Tucson, AZ; Ross H. Francis, BA BS, Tucson, AZ; Ryan A. Ringle, Tucson, AZ; Sobia F. Zehri, Tucson, AZ; Kelsey R. Coyle, Tucson, AZ; Abraham Jacob, MD, Tucson, AZ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to 1) understand the rationale behind using zebrafish for hearing loss research; 2) describe the link between lateral line hair cell loss and perturbed fish swimming behavior; 3) define rheotaxis; and 4) discuss how incomplete functional recovery of zebrafish swimming behavior after ototoxic hair cell damage can be used for developing a high throughput small molecule screening platform targeting hearing loss.

**Objectives:** Zebrafish are an ideal biological model system for translational research targeting hearing loss since they have hair cells along their lateral lines that are architecturally similar to human inner ear hair cells. These cells are used to sense flow and orient in water, for example during swimming behavior called rheotaxis. It is known that zebrafish lateral line hair cells can regenerate spontaneously after injury; however, it is not known whether anatomic recovery results in functional recovery of rheotaxis. The current study was performed to answer this question. **Study Design:** IACUC approved animal study. **Methods:** We have previously shown that increasing anatomic damage to zebrafish hair cells results in a dose dependent decline of rheotaxis index. Using a novel 32 lane swimming apparatus (constructed by our group) that allows high throughput infrared video image acquisition and automated computer driven computation of rheotaxis index in near real time, we damaged 5 day old zebrafish hair cells using cisplatin and then measured both anatomic recovery (using confocal microscopy) and changes to rheotaxis index 3 days post-injury. **Results:** 72 hours post-cisplatin exposure, morphological regeneration of lateral line hair cells was complete; however, rheotaxis accuracy recovered to only 75% of normal function. **Conclusions:** Damaged zebrafish lateral line hair cells regenerate within 3 days of injury but are not functionally normal. Coupling industry academia partnerships and our novel swimming behavior apparatus, this gap in functional recovery presents a unique opportunity to assay - in high throughput manner - small molecules

(pre-treatment, co-treatment with ototoxin, or post-treatment) that pharma believes may have regenerative potential in the hearing space.

## H130. Cost Effectiveness Analysis of Middle Ear Cholesteatoma Management: MRI Surveillance versus Planned Second Stage Procedures

Kathryn Young Noonan, MD, Lebanon, NH; Daniel H. Noonan, MD, Lebanon, NH; James E. Saunders, MD, Lebanon, NH

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the cost effectiveness for different management strategies for postoperative cholesteatoma patients.

**Objectives:** To compare the cost effectiveness of magnetic resonance imaging (MRI) surveillance in the assessment of postoperative cholesteatomas versus planned second stage procedures. **Study Design:** Cost effectiveness and Markov decision analysis. **Methods:** Cost effectiveness analysis was performed for three postoperative management strategies: surgical (second look procedure), imaging (diffusion weighted MRI), or hybrid (second look followed by MRI if residual disease). Average current hospital charges at a tertiary care center for were used for cost data. Effectiveness estimates and event probabilities used in the decision algorithm were based on published data. A Markov analysis was performed to further study the progression through treatment and effectiveness variations between the pathways. **Results:** Average per patient costs were less with the imaging approach (\$82,158) than the hybrid (\$91,619) or surgical (\$94,310) approach. The imaging surveillance pathway was only marginally less effective than the other approaches using both the surgeon perspective (cholesteatoma detection rate) and the patient perspective (quality of life measures based on published chronic ear survey data) making it a valid alternative to planned second staged procedures. Sensitivity analysis was performed to account for the potentially poorer hearing outcomes with a primary ossicular chain reconstruction (OCR) indicating that revision surgery for poor hearing results may be performed in a large portion of patients (59%) before there would be an economic disadvantage to primary OCR with imaging surveillance. A Markov analysis over the course of treatment also favored the imaging pathway over a staged surgical approach. **Conclusions:** MRI imaging surveillance with primary OCR is a cost effective surveillance pathway for the management of postoperative cholesteatoma patients.

## H131. Influence of Surgical Technique on Symptom Resolution in Superior Semicircular Canal Dehiscence: A Meta-Analysis

Adrian A. Ong, MD, Charleston, SC; Neil Simmons, BS, Charleston, SC; Shaun A. Nguyen, MD MA, Charleston, SC; Ted A. Meyer, MD PhD, Charleston, SC

**Educational Objective:** At the conclusion of this presentation, the participants should be able to explain the difference in symptom resolution after plugging or resurfacing in the treatment of superior semicircular canal dehiscence.

**Objectives:** To determine the effect of plugging or resurfacing on symptom resolution in the treatment of superior semicircular canal dehiscence (SSCD). **Study Design:** Meta-analysis of published data. **Methods:** Two authors independently searched the PubMed-NCBI and Scopus databases for articles describing surgical treatment of SSCD. Articles that reported surgical treatment of SSCD via plugging or resurfacing with a minimum of five patients were included. Literature reviews and articles including patients with SSCD not treated surgically or treated with the capping technique or had less than five patients were excluded. If multiple articles included the same patient cohort, the most recently published article was included. **Results:** A total of 12 articles with 178 patients treated with plugging (n=153) or resurfacing (n=25) met inclusion criteria. There was a statistically significant improvement in cVEMP ( $p < 0.00001$ ) and air bone gap ( $p = 0.05$ ) in those treated with plugging. Surgical plugging had a greater percentage of patients improve in a number of symptoms (noise induced vertigo, tinnitus, aural fullness, autophony, and Tullio) when compared to surgical resurfacing. Resurfacing seemed more successful in relieving symptoms of chronic disequilibrium, and to a lesser extent, pulsatile tinnitus and hearing loss. Comparison of symptom improvement between the two techniques did not reach statistical significance. **Conclusions:** Both techniques improve symptoms in patients with SSCD. Plugging had a tendency to more effectively resolve symptoms than resurfacing. Surgeon preference may bias the surgical approach taken in determining symptom improvement. In addition to subjective symptom resolution, objective tools should be developed to confirm surgical success.

## H132. Middle Ear Squamous Cell Carcinoma: A Population Based Analysis

Tapan D. Patel, MD, Newark, NJ; Eric T. Carniol, MD MBA, Newark, NJ; Soly Baredes, MD FACS, Newark, NJ; Jean Anderson Eloy, MD FACS, Newark, NJ; Yu-lan Mary Ying, MD, Newark, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to understand the demographic, clinicopathologic, treatment and survival characteristics of primary middle ear squamous cell carcinoma.

**Objectives:** Primary middle ear squamous cell carcinoma (ME-SCC) is a rare malignant neoplasm that is associated with dismal outcomes despite advances in technology. This study analyzes the demographic, clinicopathologic, treat-



# Posters

ment, and survival characteristics of this rare tumor. **Study Design:** Population based retrospective analysis. **Methods:** The Surveillance, Epidemiology, End Results (SEER) database was queried for ME-SCC cases from 1973 to 2011 (212 cases). Data analyzed included patient demographics and survival outcomes using Kaplan-Meier survival curves. **Results:** ME-SCC occurred most frequently in the sixth and seventh decades of life. Mean age at diagnosis was 66.7 ( $\pm 13.4$ ) years. There was a slight male predilection with a male to female ratio of 1.27:1. Average tumor size was 2.1 ( $\pm 1.3$ ) cm at presentation. Majority of the tumors presented as a low histologic grade tumors (79.5%). The majority of cases had regional metastasis to adjacent anatomical structures at the time of presentation (57.0%), and 22.8% of the patients had distant metastasis. The most common treatment modality was surgery with radiotherapy (44.6%), followed by surgery alone (28.5%). Overall survival analysis showed poor 5 year and 10 year disease specific survival (DSS) rates (37.8% and 32.5%, respectively). Localized disease portended more favorable 10 year DSS (68.5%) compared to regional disease (28.8%) and metastatic disease (21.2%,  $p = 0.0003$ ). Ten year DSS was better among those treated with surgery alone (58.7%) or surgery with adjuvant radiotherapy (29.4%) than those treated with radiotherapy alone (14.9%), approaching statistical significance ( $p = 0.0558$ ). **Conclusions:** This study represents the largest cohort of primary ME-SCC cases. It has a poor survival outcome with surgery alone being the treatment of choice that offers better survival, presumably due to less advanced disease.

### H133. Not Just Q-tips: A Nationwide Analysis of 950 Traumatic Tympanic Membrane Perforations

Kevin Shaigany, BS, Newark, NJ; Eric T. Carniol, MD MBA, Newark, NJ; Peter F. Svider, MD, Detroit, MI; Jean A. Eloy, MD, Newark, NJ; Yu-lan M. Ying, MD, Newark, NJ

**Educational Objective:** At the conclusion of this presentation, the participants should be able to recognize the most common mechanisms of traumatic injury to the tympanic membrane. Furthermore, participants should be able to identify the patient population at the highest risk for these types of injuries.

**Objectives:** Tympanic membrane perforations (TMP) are frequent events leading to evaluation in the emergency department (ED), primary care office, and otolaryngology office. Despite specific warning labels on cotton applicator packaging on the risk of ear injury with personal use, the use of these products to perform self-cerumenectomy is ubiquitous. The objective was to analyze the mechanism of injury of traumatic TMP for patients presenting to the ED. **Study Design:** Retrospective review. **Methods:** The National Electronic Injury Surveillance System was searched for ear related injuries with analysis of incidence, age, and gender, specific injury diagnoses, and mechanisms over the last five years. **Results:** From 2010 until 2014, there were 950 case entries recorded or 4,914 estimated ED visits for TMP. The majority of injuries occurred in patients  $\leq 18$  years old (63.4%), with children under six years of age the most at risk (34.8%). There was a male to female ratio of 1.49:1. Instrumentation including foreign bodies within the ear canal was noted in 60.6% of cases. Of these, Q-tips were specifically noted in 45.3%. While foreign bodies and instrumentation represented the majority of TMP in all age groups, head trauma from water and other strikes to the head was the major cause of TMP in the 13-18 and 19-36 age groups. **Conclusions:** Traumatic TMP represents a common cause of evaluation in the ED. Despite warnings on risks of injury to the eardrum with Q-tip usage, it is still a major cause of traumatic perforations. Other mechanisms also play an important role in the teenage and young adult population.

### H134. Contemporary Exercise Classes May Be Bad for Your (Hearing) Health

Sumi Sinha, BS, Boston, MA; Elliott D. Kozin, MD, Boston, MA; Matthew R. Naunheim, MD MBA, Boston, MA; Samuel R. Barber, MS, Boston, MA; Leanna W. Katz, MSOT, Boston, MA; Aaron K. Remenschneider, MD, Boston, MA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss the hazards to hearing health of exercise classes.

**Objectives:** Repeat exposure to loud noise at venues such as rock concerts and construction sites is a known risk factor for noise induced hearing loss (NIHL). While certain environments, such as industrial worksites, are closely monitored, sound levels in gym based exercise classes, such as spinning, may reach dangerous levels. We hypothesize that noise exposure during common exercise classes may be above Occupational Safety and Health Administration (OSHA) guidelines for participants and instructors. **Study Design:** Case series. **Methods:** Spinning classes ( $n=4$ ) were attended in three different locations. Sound level monitoring and dosimetry were measured via two iPhone applications calibrated with an external sound meter (accuracy  $\pm 2$ dB). Sound meters were placed adjacent to the participant. OSHA guidelines were used to assess noise exposure dosage. **Results:** Sound measurements were recorded throughout the 45 minute exercise classes. The maximum dB recorded during the classes ranged from 101.6 to 118.2. Based on OSHA guidelines, permissible daily noise exposure is continuous 90 dB for 8 hours constituting a 100% dose. Relative to this standard, the exposure dose over 45 minutes ranged from 27.2% - 94.3%. Over 8 hours the projected dose ranged 269% - 992%. **Conclusions:** Noise exposure in cycling classes well exceeded OSHA recommendations and may put participants and instructors at an unexpected risk for NIHL. Exercise class attendees may benefit from ear protection and classes may consider self-monitoring to maintain safe noise exposure. Further studies into the variability between exercise classes and environments that utilize loud music are warranted to increase awareness of the associated hearing risks.

### H135. Adverse Events following Vestibular Schwannoma Surgery: A Comparison of Surgical Approach Using the National Surgery Quality Improvement Program Database

Anthony M. Tolisano, MD, Honolulu, HI; Philip D. Littlefield, MD, Honolulu, HI

**Educational Objective:** At the conclusion of this presentation, the participants should be able to compare the postoperative complications of vestibular schwannoma removal by surgical approach.

**Objectives:** To compare the postoperative complications of vestibular schwannoma removal by surgical approach. **Study Design:** Retrospective cohort study. **Methods:** The 2008-2013 American College of Surgeons National Surgery Quality Improvement Program (NSQIP) database was used to identify vestibular schwannoma surgeries performed by otolaryngologists. Surgical approaches were categorized as transtemporal (TT), retrosigmoid (RS), or middle cranial fossa (MCF). Hearing preservation approaches (RS and MCF) were compared to non-hearing preservation approaches (TT). Demographic and intraoperative factors were analyzed to determine predictors of postoperative complications, including medical and surgical complications, return to the operating room, and death. **Results:** A total of 111 patients undergoing surgical removal of vestibular schwannoma were identified. Patients were predominantly female (56.8%) and older than 50 years (69.4%). The TT approach accounted for half of all cases (50.5%), while RS (36.0%) and MCF (13.5%) were less common. The risk of any postoperative complication was 17.1%. No patients died. There was no difference in the overall complication rate among surgical approaches ( $p=0.526$ ). Additionally, there was no difference in the overall ( $p=0.460$ ), surgical (1.000) or medical (0.367) complication rates, or rates of return to the operating room (0.1513) between hearing preservation and hearing sacrificing approaches. **Conclusions:** Complication rates following removal of vestibular schwannoma are no different when comparing TT, RS, or MCF approaches. This study is limited by the inability to evaluate procedure specific variables (e.g. facial nerve weakness and hearing preservation rates), but offers a unique survey of global 30 day complication rates reported to a large, multi-institutional, publically available database.

### H136. Rate of Tympanic Membrane Perforation after Intratympanic Steroid Injection

Michael C. Topf, MD, Philadelphia, PA; David W. Hsu, MD, Philadelphia, PA; Douglas R. Adams, BS, Philadelphia, PA; Stanley Pelosi, MD, Philadelphia, PA; Thomas O. Willcox, MD, Philadelphia, PA; Kyle W. Fisher, MD, Philadelphia, PA

**Educational Objective:** At the conclusion of this presentation, the participants should be able to inform patients on the rate of persistent tympanic membrane perforation following intratympanic steroid injection and which comorbid conditions are associated with prolonged time to perforation closure.

**Objectives:** To determine the rate of persistent tympanic membrane perforation after intratympanic steroid injection. To determine which comorbid conditions and risk factors are associated with prolonged time to perforation closure following intratympanic steroid injection. **Study Design:** Retrospective chart review. **Methods:** Clinical data were gathered for patients who had undergone intratympanic steroid injection to treat sudden sensorineural hearing loss or Meniere's disease. Primary outcomes analysis included the rate of persistent tympanic membrane perforation, defined as perforation 90 days following last injection, and time to perforation healing. Age, sex, number of injections, smoking status, diabetes mellitus, previous head and neck irradiation, and concurrent use of oral steroids, were analyzed as potential predictors of persistent tympanic membrane perforation. **Results:** 192 patients were included in this study. Three patients (1.6%) had persistent tympanic membrane perforations. All three patients with persistent tympanic membrane perforations received multiple injections. One patient underwent tympanoplasty for repair of the persistent tympanic membrane perforation. The median time to perforation healing was 18 days. When controlled for use of concurrent oral steroids, patients who received three or greater injections had a 33% increase in time to perforation healing. **Conclusions:** The rate of persistent tympanic membrane perforation following intratympanic steroid injection is low. Patients who receive multiple injections may be at increased risk for prolonged time for closure of tympanic membrane perforation.

### H137. Mirror Image Twins with Congenital Venous Malformations and Associated Vestibulocochlear Dysfunction

Joshua W. Wood, MD, Memphis, TN; Brandon A. Shepherd, BS, Memphis, TN; Charles B. MacDonald, MD, Memphis, TN

**Educational Objective:** At the conclusion of this presentation, the participants should be able to discuss vascular malformations of the jugular bulb and how they can manifest with vestibulocochlear dysfunction.

**Objectives:** To demonstrate the effects of a congenital venous malformation on hearing and balance through a case study of mirror twins. **Study Design:** Retrospective chart review. **Methods:** A retrospective chart review of twin sisters who presented to a tertiary children's hospital with hearing loss and vertigo was performed. Imaging and audiometry results were compared between patients. **Results:** Our first patient was an 11 year old female who presented with complaints of chronic hearing loss, dizziness and migraine headaches. On audiometry she was found to have unilateral mild sloping to severe mixed hearing loss on the left. Imaging with CT, MRA, MRV, and angiogram demonstrated aplasia of

# Posters

the right sigmoid sinus. The left sigmoid sinus and jugular bulb were greatly enlarged and had expansile erosion into the IAC, basal turn of the cochlea, inferior limb of the posterior canal, and the vestibular aqueduct. Her twin sister presented with complaints of chronic hearing loss and episodic vertigo. Audiometry showed unilateral mild sloping to severe mixed hearing loss on the right. A CT of the temporal bones demonstrated dysplasia of the cochlea bilaterally and an enlarged right jugular bulb that was dehiscent into the area of the vestibular aqueduct. **Conclusions:** Vascular malformations, such as high riding jugular bulb, have been described in the setting of vestibulocochlear dysfunction. However, these cases are unusual in that they are uncommon examples of vascular malformations and are found on contralateral sides in a set of identical twins. To further understand and demonstrate these malformations, we have created a temporal bone 3D model.

## H138. Medial Dislocation of Cochlear Implant Magnet following Trauma

Mary Lauren Worthen, MD, Louisville, KY; Arun K. Gadre, MD FACS, Louisville, KY

**Educational Objective:** At the conclusion of this presentation, the participants will have improved knowledge and understanding of the devastating complication of cochlear implant magnet migration after trauma. They will specifically be made aware of the possibility of medial migration of the magnet and potential for the magnet to be hidden beneath the implant. The participants will learn methods to repair the silicone magnet pocket and avoid the entire replacement of the cochlear implant.

**Objectives:** Cochlear implantation is one of the most common otologic procedures performed today. The complication of magnet migration has been described following magnetic resonance imaging, and rarely secondary to trauma. In previous reported cases, the magnet migrated anterior or laterally to the implant; medial migration has not been reported. We present a case of a five year old child who sustained minor trauma to the head resulting in medial magnet displacement which was obstructed from view by the implant. A review of the pertinent literature will be presented. **Study Design:** Case report. **Methods:** We present a case of a five year old child who developed magnet dislocation after minor trauma. Upon surgical exploration our magnet was discovered to be medially lodged between the skull and the receiver-stimulator package. **Results:** During revision surgery, the magnet was found to be lodged behind the cochlear implant and extracted. The silicone magnet holding cap was torn, and a novel method was used to repair the holding cap to avoid an entire implant replacement surgery. **Conclusions:** Cochlear implant magnet displacement is a rare but potential major complication that renders the individual with a nonfunctional implant. It is important for the surgeon to be aware of this complication and methods to repair the silicone magnet pocket to avoid the replacement of the cochlear implant. If the magnet is not found lateral to the receiver stimulator package it is important for the surgeon to look for it under the implant.





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1974 to 1980 . . . . . Richard R. Ruggles, MD

1980 to 1984 . . . . . William M. Tribble, MD  
1984 to 1988 . . . . . Frank N. Ritter, MD  
1989 to 1992 . . . . . Michael E. Johns, MD  
1993 to 1996 . . . . . Robert H. Miller, MD  
1997 to 2004 . . . . . Patrick E. Brookhouser, MD  
2005. . . . . Gerald B. Healy, MD  
2006 to 2011 . . . . . Patrick E. Brookhouser, MD  
2011 to 2013 . . . . . Gerald B. Healy, MD

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## Executive Vice Presidents

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2013 to 2016 . . . . . Myles L. Pensak, MD

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## Presidents

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\* 1896. . . . . Edward B. Dench, MD  
\* 1897. . . . . Frank Hyatt, MD  
\* 1898. . . . . William H. Daley, MD  
\* 1899. . . . . S.E. Solly, MD  
\* 1900. . . . . D. Brayden Kyle, MD  
\* 1901. . . . . Robert C. Myles, MD  
\* 1902. . . . . Charles W. Richardson, MD  
\* 1903. . . . . J.A. Stuckey, MD  
\* 1904. . . . . Norval H. Pierce, MD  
\* 1905. . . . . Frederick F. Cobb, MD  
\* 1906. . . . . James E. Logan, MD  
\* 1907. . . . . Wendel C. Phillips, MD  
\* 1908. . . . . Ewing W. Day, MD  
\* 1909. . . . . Christian R. Holmes, MD  
\* 1910. . . . . James F. McKenna, MD  
\* 1911. . . . . Chevalier Jackson, MD  
\* 1912. . . . . G. Hudson Jakuen, MD  
\* 1913. . . . . H. Holbrook Curtis, MD  
\* 1914. . . . . Joseph A. White, MD  
\* 1915. . . . . Robert Levy, MD  
\* 1916. . . . . S. MacCuen Smith, MD  
\* 1917. . . . . Thomas J. Harris, MD  
\* 1918. . . . . George L. Richards, MD  
\* 1919. . . . . Herbert S. Birkett, MD

\* 1920. . . . . Harris P. Mosher, MD  
\* 1921. . . . . Lee Wallace Dean, MD  
\* 1922. . . . . Lewis A. Coffin, MD  
\* 1923. . . . . Dunbar Roy, MD  
\* 1924. . . . . Hanau W. Loeb, MD  
\* 1925. . . . . William H. Haskin, MD  
\* 1926. . . . . John M. Ingersoll, MD  
\* 1927. . . . . Burt R. Shurly, MD  
\* 1928. . . . . John F. Barnhill, MD  
\* 1929. . . . . Hill Hastings, MD  
\* 1930. . . . . Ross Hall Skillern, MD  
\* 1931. . . . . Max A. Goldstein, MD  
\* 1932. . . . . Edmund Prince Fowler, MD  
\* 1933. . . . . Joseph C. Beck, MD  
\* 1934. . . . . J.W. Jervy, MD  
\* 1935. . . . . Perry G. Goldsmith, MD  
\* 1936. . . . . Thomas E. Carmody, MD  
\* 1937. . . . . George M. Coates, MD  
\* 1938. . . . . Samuel J. Kopetzky, MD  
\* 1939. . . . . Harold I. Lillie, MD  
\* 1940. . . . . Lee M. Hurd, MD  
\* 1941. . . . . J. Mackenzie Brown, MD  
\* 1942. . . . . James A. Babbitt, MD  
\* 1943. . . . . James G. Dwyer, MD

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## Presidents (cont'd)

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* 1944.	H. Marshall Taylor, MD	* 1981.	G. O'Neill Proud, MD
* 1945.	Albert C. Furstenberg, MD	* 1982.	John A. Kirchner, MD
* 1946.	Albert C. Furstenberg, MD	* 1983.	Robin Michelson, MD
* 1947.	Harry W. Lyman, MD	* 1984.	Carl N. Patterson, MD
* 1948.	Lyman G. Richards, MD	1985.	William H. Saunders, MD
* 1949.	John J. Shea, MD	* 1986.	Wesley H. Bradley, MD
* 1950.	Robert C. Martin, MD	* 1987.	Roger Boles, MD
* 1951.	Louis H. Clerf, MD	* 1988.	Harold G. Tabb, MD
* 1952.	C. Steward Nash, MD	* 1989.	Malcolm H. Stroud, MD
* 1953.	Francis E. LeJeune, MD	1990.	M. Stuart Strong, MD
* 1954.	Leroy A. Schall, MD	* 1991.	Paul H. Ward, MD
* 1955.	Kenneth M. Day, MD	* 1992.	A. Paul Keller, Jr., MD
* 1956.	Dean M. Lierle, MD	* 1993.	Frank N. Ritter, MD
* 1957.	Percy E. Ireland, MD	1994.	Richard R. Gacek, MD
* 1958.	Lawrence R. Boies, MD	* 1995.	Patrick J. Doyle, MD
* 1959.	Gordon D. Hoople, MD	* 1996.	William R. Hudson, MD
* 1960.	Theodore E. Walsh, MD	1997.	H. Bryan Neel, MD
* 1961.	Fletcher D. Woodward, MD	1998.	Stanley M. Blaugrund, MD
* 1962.	John R. Lindsay, MD	* 1999.	Mansfield F. W. Smith, MD
* 1963.	Howard P. House, MD	2000.	Charles W. Gross, MD
* 1964.	John E. Bordley, MD	2001.	Edward L. Applebaum, MD
* 1965.	George E. Shambaugh, Jr., MD	2002.	Gerald B. Healy, MD
* 1966.	Francis W. Davison, MD	2003.	Roger L. Crumley, MD
* 1967.	Shirley H. Baron, MD	* 2004.	Robert A. Jahrsdoerfer, MD
* 1968.	G. Slaughter Fitz-Hugh, MD	* 2005.	Patrick E. Brookhouser, MD
* 1969.	Jerome A. Hilger, MD	2006.	Stanley M. Shapshay, MD
* 1970.	Joseph L. Goldman, MD	2007.	David F. Wilson, MD
* 1971.	Victor Goodhill, MD	2008.	Harold C. Pillsbury, MD
* 1972.	Victor R. Alfaro, MD	2009.	Myles L. Pensak, MD
* 1973.	Walter P. Work, MD	2010.	Frank E. Lucente, MD
* 1974.	Raymond E. Jordan, MD	2011.	Gerald S. Berke, MD
* 1974.	Louis E. Silcox, MD	2012.	Robert H. Ossoff, DMD MD
* 1975.	David D. DeWeese, MD	2013.	Jesus E. Medina, MD
* 1976.	James A. Harrill, MD	2014.	Jonas T. Johnson, MD FACS
* 1977.	Joseph H. Ogura, MD	2015.	Derald E. Brackmann, MD
* 1978.	Daniel Miller, MD	2016.	Fred D. Owens, MD
* 1979.	Francis A. Sooy, MD		
* 1980.	Beverly W. Armstrong, MD		

\* deceased

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## Guests of Honor Since 1947

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1947.	J. McKenzie Brown, MD	1963.	Robert C. Martin, MD
1948.	Harold Walker, MD	1964.	C. Stewart Nash, MD
1949.	Claude C. Cody, Jr., MD	1965.	Georges Portmann, MD
1950.	Harris P. Mosher, MD	1966.	Gordon D. Hoople, MD
1951.	Duncan McPherson, MD	1967.	Albery C. Furstenberg, MD
1952.	D.C. Jarvis, MD	1968.	Francis E. LeJeune, MD
1953.	Charles A. Thigpan, MD	1969.	Lawrence R. Boies, MD
1954.	J. Parsons Schaeffer, MD	1970.	Victor Alfaro, MD
1955.	Edward P. Fowler, MD	1971.	Vern O. Knudsen, PhD
1956.	Harold L. Lillie, MD	1972.	Carlos Munoz-MacCormick, MD
1957.	Not Available	1973.	Dean Lierle, MD
1958.	Arnold S. Diehl, MD	1974.	Raymond Jordon, MD
1959.	Frederick T. Hill, MD	1975.	Frank Lathrop, MD
1960.	Terence Cawthorne, MD	1976.	John Bordley, MD
1961.	Milton J. Robb, MD	1977.	Max Soni, MD
1962.	Thomas C. Galloway, MD		W.E.N. Harrison, MD



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## Guest of Honor (cont'd)

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1978. . . . . Moses Lurie, MD  
1979. . . . . Shirley Baron, MD  
1980. . . . . Frank Lathrop, MD  
. . . . . Harry Rosen-Wasser, MD  
1981. . . . . Ben Senturia, MD  
1982. . . . . Harold Schuknecht, MD  
. . . . . Ugo Fisch, MD  
1983. . . . . Walter Work, MD  
. . . . . Roy B. Cohn, MD  
1984. . . . . Beverly Armstrong, MD  
1985. . . . . G.O. Proud, MD  
1986. . . . . Daniel Miller, MD  
1987. . . . . Paul Ebert, MD  
1988. . . . . Robert W. Brown, MD  
1989. . . . . Hallowell Davis, MD  
1990. . . . . George Reed, MD  
1991. . . . . Victor Goodhill, MD  
1992. . . . . Roger Boles, MD  
1993. . . . . C. Ryan Chandler, MD  
1994. . . . . John Conley, MD  
1995. . . . . Paul H. Ward, MD

1996. . . . . Bobby Ray Alford, MD  
1997. . . . . Robert Cantrell, MD  
1998. . . . . Patrick J. Doyle, MD  
1999. . . . . Richard L. Goode, MD  
2000. . . . . A. Paul Keller, MD  
2001. . . . . Charles W. Cummings, MD  
2002. . . . . Stanley M. Shapshay, MD  
2003. . . . . Brian F. McCabe, MD  
2004. . . . . Byron J. Bailey, MD  
2005. . . . . Robert H. Miller, MD MBA  
2006. . . . . Gerald B. Healy, MD  
2007. . . . . William F. House, MD  
2008. . . . . Patrick E. Brookhouser, MD  
2009. . . . . Harry R. van Loveren, MD  
2010. . . . . Gady Har-El, MD  
2011. . . . . Harold C. Pillsbury, MD  
2012. . . . . Paul A. Levine, MD  
2013. . . . . Robert H. Mathog, MD  
2014. . . . . Michael M.E. Johns, MD  
2015. . . . . Gerald S. Berke, MD FACS  
2016. . . . . William H. Owens

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## Joseph H. Ogura, MD Lecturers

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1986. . . . . Hugh F. Biller, MD  
1987. . . . . Paul H. Ward, MD  
1988. . . . . John Conley, MD  
1989. . . . . George A. Sisson, MD  
1990. . . . . Sir Donald F.N. Harrison  
1991. . . . . Robert W. Cantrell, MD  
1992. . . . . Michael E. Johns, MD  
1993. . . . . John A. Kirchner, MD  
1994. . . . . John Lewis, MD  
1995. . . . . Eugene Myers, MD  
1996. . . . . Charles W. Cummings, MD  
1997. . . . . Harold C. Pillsbury III, MD  
1998. . . . . Frank E. Lucente, MD  
1999. . . . . Haskins Kashima, MD  
2000. . . . . Christopher Perry, MD  
2001. . . . . Richard R. Gacek, MD

2002. . . . . David G. Nathan, MD  
2003. . . . . Arnold G. D. Maran, MD  
2004. . . . . Ernest A. Weymuller, Jr., MD  
2005. . . . . Gerald B. Healy, MD  
2006. . . . . Jonas T. Johnson, MD  
2007. . . . . Byron J. Bailey, MD  
2008. . . . . Paul A. Levine, MD  
2009. . . . . Robin T. Cotton, MD  
2010. . . . . Marvin P. Fried, MD  
2011. . . . . Lord Bernard Ribeiro Kt CBE FRCS FACS (Hon.)  
2012. . . . . James L. Netterville, MD  
2013. . . . . Randal S. Weber, MD  
2014. . . . . David E. Eibling, MD FACS  
2015. . . . . Uttam K. Sinha, MD FACS  
2016. . . . . Jonas T. Johnson, MD FACS

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## Fifty Year Club

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### 1948

Edgar A. Thacker, MD . . . . . Everett, WA

### 1949

Ernest R.V. Anderson, MD . . . . . Camarillo, CA  
F. Johnson Putney, MD . . . . . Charleston, SC  
Julio Quevedo, MD . . . . . Guatemala City

### 1950

Arthur L. Juers, MD . . . . . Ivins, UT

### 1951

Howard C. High, Jr., MD . . . . . Milwaukee, WI

### 1953

Bert A. De Bord, Jr., MD . . . . . Temple, TX

### 1955

G. Dekle Taylor, MD . . . . . Jacksonville, FL

## Fifty Year Club (cont'd)

### 1956

J.H. Thomas Rambo, MD . . . . . New York, NY

### 1957

William Skokan, MD . . . . . Fort Worth, TX

### 1958

Hershel H. Burston, MD. . . . . Studio City, CA  
James F. Gardner, MD. . . . . Pittsford, NY

### 1959

Seymour J. Brockman, MD . . . . Pacific Palisades, CA  
Peter A. Wallenborn Jr., MD . . . . . Huntsville, AL  
Warren E. Wiesinger, MD . . . . . Oakland, CA

### 1960

John T. Bickmore, MD . . . . . Bonita Springs, FL  
James M. Cole, MD . . . . . Danville, PA  
James M. Timmons, MD . . . . . Lexington, SC

### 1961

Richard A. Buckingham, MD . . . . . Wilmette, IL  
Richard T. Farrior, MD FACS . . . . . Tampa, FL  
Irwin Harris, MD FACS . . . . . Los Angeles, CA  
Fred H. Linthicum Jr., MD . . . . . Los Angeles, CA  
Ludwig A. Michael, MD FACS . . . . . Dallas, TX  
William F. Robbett, MD . . . . . Manhasset, NY  
Wallace Rubin, MD . . . . . Metairie, LA  
William H. Saunders, MD . . . . . Columbus, OH

### 1962

Irving M. Blatt, MD FACS. . . . . Schriever, LA  
Harry R. Morse, MD. . . . . West Lebanon, NH  
M. Stuart Strong, MD. . . . . Bedford, MA  
John H. Webb Jr., MD . . . . . Orlando, FL

### 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 F. Boyle, MD . . . . . Napa, CA  
William J. Follette, MD FACS . . . . . North Palm Beach, FL  
Arthur J. Kuhn, MD . . . . . Naples, FL  
Harry W. McCurdy, MD FACS . . . . . Bethesda, MD

**Please report discrepancies to the Triological  
Administrative Office**

## In Memoriam

The following deaths have been reported to the Administrative Office since the publication of the 2015 Annual Program.

		<b>Elected</b>	<b>Died</b>
Samuel R. Fisher, MD FACS . . . . .	Durham, NC . . . . .	1989 . . . . .	2015
Geza J. Jako, MD . . . . .	Melrose, MA . . . . .	1971 . . . . .	2015
Arnold Komisar, MD DDS MS FACS . . . . .	New York, NY . . . . .	1989 . . . . .	2015
Christopher J. Linstrom, MD FACS . . . . .	New York, NY . . . . .	2002 . . . . .	2016
Daniel McNamara Martinez, MD . . . . .	Centerville, MA . . . . .	1967 . . . . .	2015
William C. Morgan Jr., MD FACS . . . . .	Charleston, WV . . . . .	1965 . . . . .	2016
Anthony N. Scalco, MD . . . . .	Metairie, LA . . . . .	1979 . . . . .	2016
Myron J. Shapiro, MD FACS . . . . .	Morristown, NJ . . . . .	1975 . . . . .	2014
Edward F. Shaver Jr., MD . . . . .	Charlotte, NC . . . . .	1974 . . . . .	2014
Robert A. Sofferman, MD FACS . . . . .	Burlington, VT . . . . .	1994 . . . . .	2015

# Active Fellows

Mona M. Abaza, MD  
Elliot Abemayor, MD PhD FACS  
Oliver F. Adunka, MD  
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  
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  
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  
Brian W. Blakley, MD PhD FACS  
Joel H. Blumin, MD FACS  
Emily Frances Boss, MD  
Derald E. Brackmann, 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  
Karen H. Calhoun, MD FACS  
Bruce H. Campbell, MD FACS  
Paolo Campisi, MD  
C. Ron Cannon, MD FACS  
Ricardo L. Carrau, MD FACS  
Roy R. Casiano, MD FACS  
John D. Casler, MD FACS  
Paul F. Castellanos, MD  
Kenny H. Chan, MD FACS  
Sujana S. Chandrasekhar, MD  
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  
Lanny Garth Close, 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  
Robin T. Cotton, MD FACS  
Mark S. Courey, MD  
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  
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  
Joseph B. Farrior III  
Jose N. Fayad, MD  
Joseph G. Feghali, MD FACS  
Robert L. Ferris, MD PhD FACS  
Bruce L. Fetterman, MD FACS  
Douglas G. Finn, 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  
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  
Nira A. Goldstein, MD  
Carlos Gonzalez, MD FACS  
W. Jarrard Goodwin, 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  
Patrick J. Gullane, MD FACS  
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  
Steven D. Handler, MD MBE FACS  
Marlan R. Hansen, MD  
Gady Har-El, MD FACS  
Earl Herberto Harley, MD FACS  
Willard C. Harrill, MD FACS  
Jeffrey P. Harris, MD PhD FACS  
Christopher J. Hartnick, MD FACS  
George T. Hashisaki, MD FACS  
Bruce H. Haughey, MBChB FACS  
Richard E. Hayden, MD FACS  
David S. Haynes, MD  
Gerald B. Healy, MD FACS  
Yolanda D. Heman-Ackah, MD FACS  
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

# Active Fellows

Michael E. Hoffer, MD FACS  
Henry T. Hoffman, MD FACS  
Norman D. Hogikyan, MD FACS  
Eric H. Holbrook, MD  
David B. Hom, MD FACS  
Karl L. Horn, MD  
Steven M. Houser, MD FACS  
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  
John R. Jacobs, MD FACS  
Joseph B. Jacobs, MD  
Scharukh Jalisi, MD FACS  
Adrian L. James, MD  
Herman A. Jenkins, MD FACS  
Michael M. Johns III, MD  
Jonas T. Johnson, MD 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  
Margaret A. Kenna, MD FACS  
David W. Kennedy, MD FACS  
Thomas L. 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  
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  
Wesley W. O. Krueger, MD FACS  
Ronald B. Kuppersmith, 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  
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 FACS  
Kasey K. Li, MD FACS  
Judith E.C. Lieu, MD MSPH  
Ho-Sheng Lin, MD FACS  
Sandra Y. 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  
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  
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