

Message from the President, Robert H. Ossoff, DMD MD FACS



Welcome to San Diego! Thank you for attending our 115th 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, Gaelyn Garrett, MD and our Program Committee. Some of the highlights include a presentation on “Marketing in Our Specialty: The Need for Honesty, Integrity, and Reality” which will be given by my Guest of Honor, Paul Levine, MD, and Dr. James Netteville’s Joseph Ogura Lecture “Listening to Patients and Tumors: Lessons Learned from 25 Years of Treating Patients with Carotid Body and Other Paragangliomas”. A special guest panelist, David Hoyt, MD, Executive Director of the American College of Surgeons, will participate in our “Pay for Performance-Quality Matters” panel on Saturday morning. “Current Concepts in Otology: Expert Panel” will be presented on Friday morning. Also included in Friday’s sessions are two state of the art lectures. Jonas Johnson, MD will present “PET/CT in Head and Neck Oncology: 2012”, and Mark Courey, MD will discuss “Current Concepts on the Applications of Lasers in Laryngology: Science not Magic”. We are confident that you will find this meeting to 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.

Meeting Overview

Friday, April 20 - Elizabeth F-G-H	
7:00 - 7:50	Business Meeting (Fellows Only) New Fellow Induction Ceremonies and Reception
8:00 - 9:25	Welcome, Introduction of Honored Guests, Guest of Honor Presentation “Marketing in Our Specialty: The Need for Honesty, Integrity, and Reality”; President’s Address “Leadership, Legacy and Succession”; Ogura Lecture “Listening to Patients and Tumors: Lessons Learned from 25 Years of Treating Patients with Carotid Body and Other Paragangliomas”
9:25 - 9:55	Triological Society Award Winning Thesis Presentations (co-Mosher and Fowler Awards)
9:55 - 10:20	<i>Break with Exhibitors - View Posters</i>
10:20 - 12:00	Concurrent Session I - Elizabeth F-G-H Otology Papers “Current Concepts in Otology: Expert Panel”
10:15 - 12:00	Concurrent Session II - Elizabeth D-E Pediatrics, Head & Neck Papers State of the Art Lecture - “PET/CT in Head and Neck Oncology: 2012”
12:00 - 1:00	<i>Lunch with Exhibitors - View Posters</i>
1:00 - 2:50	Otology and Laryngology Papers State of the Art Lecture - “Current Concepts on the Applications of Lasers in Laryngology: Science Not Magic”
2:50 - 3:20	<i>Break with Exhibitors - View Posters</i>
3:25 - 5:00	Head & Neck, Facial Plastics, Sleep Medicine Papers
5:30 - 7:00	Meet the Authors Poster Reception

Meeting Overview continued

Saturday, April 21 - Elizabeth F-G-H	
7:00 - 7:50	Business Meeting (Fellows Only)
8:00 - 9:45	General Papers "Pay for Performance--Quality Matters" Panel
9:45 - 10:15	<i>Break with Exhibitors - View Posters</i>
10:15 - 12:00	General, Rhinology, Allergy Papers
12:00 - 1:00	<i>Lunch with Exhibitors/View Posters</i>

115th Annual Meeting Manchester Grand Hyatt San Diego, California April 20-21, 2012

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.

Educational Objectives for Program

After attending this meeting, participants will be able to:

- Describe the clinical indications for obtaining PET/CT scanning in evaluating recurrent head and neck cancer;
- Understand the appropriate applications for various lasers in laryngeal disease;
- Discuss the impact of future pay for performance reimbursement in otolaryngology;
- Understand the basis for treatment of various controversial otologic disorders;
- Review the latest basic science research in head and neck cancer.

Accreditation Statement

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education through the joint sponsorship 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 10.5 *AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.



AMERICAN COLLEGE OF SURGEONS

Inspiring Quality:

Highest Standards, Better Outcomes

Exhibits/Commercial Support

Exhibitors will include representatives of pharmaceutical companies, instrument companies (including laser and endoscopic equipment), diagnostic equipment companies, publishers, public service companies, and others. We encourage attendees to examine the exhibits for information that may assist in their pursuit of improved patient care. Exhibitor arrangements and commercial support are in compliance with the Accreditation Council for Continuing Medical Education (ACCME) revised Standards for Commercial Support.

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

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 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

Program Planning and Advisory Committee

President - Robert H. Ossoff, DMD MD FACS
Nashville, TN

Program Chair - C. Gaelyn Garrett, MD
Nashville, TN

Dinesh K. Chhetri, MD
Los Angeles, CA

H. Peter Doble II, MD FACS
Twin Falls, ID

Colin L.W. Driscoll, MD
Rochester, MN

Sigsbee Walter Duck, MD FACS
Rock Springs, WY

Roland D. Eavey, MD FACS
Nashville, TN

Christine G. Gourin, MD FACS
Baltimore, MD

David S. Haynes, MD
Nashville, TN

Andrew P. Lane, MD
Baltimore, MD

Cliff A. Megerian, MD FACS
Cleveland, OH

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Boston, MA

Mark S. Persky, MD FACS
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David W. Roberson, MD FACS
Boston, MA

William W. Shockley, MD FACS
Chapel Hill, NC

Mark C. Weissler, MD FACS
Chapel Hill, NC

Kathleen L. Yaremchuk, MD
Detroit, MI



**American College of Surgeons
CME JOINT SPONSORSHIP PROGRAM**

American College of Surgeons
Division of Education

**Disclosure Information
Triological Society 115th Annual Meeting
April 20-21, 2012
San Diego, California**

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 sponsorship 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/ CHAIRS / DISCUSSANTS	NOTHING TO DISCLOSE	DISCLOSURE (As it pertains to the content of the presentation)
Oliver F. Adunka, MD		Med-EI Corp. (clinical trial sponsor - speaker)
Anca M. Barbu, MD	X	
Michael J. Brenner, MD	X	
E. Hollin Calloway, BA BS	X	
Ryan A. Carver, BS	X	
Tendy Chiang, MD	X	
Sukgi S. Choi, MD*	X	
J. Jared Christophel, MD	X	
Justin C. Cohen, MD	X	
Mark S. Courey, MD	X	
Subinoy Das, MD		Medtronic, Inc.--Biomaterials Research Team (consultant fees - co-investigator of study)
Adam S. DeConde, MD	X	
Sigsbee W. Duck, MD FACS	X	
Roland D. Eavey, MD FACS	X	
Marvin P. Fried, MD FACS	X	
Ellen M. Friedman, MD FACS	X	
David R. Friedmann, MD	X	
Bruce J. Gantz, MD FACS		Advanced Bionics (honorarium - consultant); Cochlear Corporation (honorarium - consultant)
M. Boyd Gillespie, MD MSc		Gyrus Olympus (salary support - principal investigator)
Jose M. Godoy, MD	X	
Nira A. Goldstein, MD MPH	X	

FACULTY DISCLOSURE LIST

Christine G. Gourin, MD FACS	X	
Timothy M. Haffey, MD	X	
David S. Haynes, MD		Anspach Company (surgeon's advisory board); Cochlear Corp. (surgeon's advisory board); Advanced Bionics (surgeon's advisory board); Grace Medical (consultant)
Jordan B. Hochman, MD	X	
David B. Hoyt, MD	X	
Masaru Ishii, MD PhD	X	
David W. Jang, MD	X	
Jeffrey R. Janus, MD	X	
Jill S. Jeffe, MD	X	
Jonas T. Johnson, MD FACS	X	
Shin-ichi Kanemaru, MD PhD	X	
Robert C. Kern, MD FACS	X	
Bradley W. Kesser, MD*	X	
Stephen M. Kieran, FRCS	X	
Dennis H. Kraus, MD FACS	X	
Yosef P. Krespi, MD*		Valam Corp. (board of directors - speaker)
Robbi A. Kupfer, MD	X	
Robert F. Labadie, MD PhD		Cochlear Corporation (consultant); Medel Corporation (consultant); Ototronix Corporation (consultant)
Kulsoom Laeeq, MD	X	
Anil K. Lalwani, MD*	X	
Paul A. Levine, MD FACS	X	
Ryan J. Li, MD	X	
Judith E.C. Lieu, MD MSPH	X	
Ted Mau, MD PhD*	X	
Stanley W. McClurg, MD	X	
Beth N. McNulty, MD	X	
Jesus E. Medina, MD FACS	X	
Cliff A. Megerian, MD FACS	X	
Albert L. Merati, MD FACS	X	
Alan G. Micco, MD FACS	X	
Jennifer L. Nelson, MD	X	
James L. Netterville, MD FACS	X	
Michael N. Neuss, MD	X	
Quyen T. Nguyen, MD PhD		Avelas Biosciences (stock - scientific advisor)
Marlien E.F. Niesten, MD	X	
Reza S.A. Nouraei, MBBChir MRCS	X	
Robert H. Ossoff, DMD MD FACS	X	
Israel Pena Jr., BS	X	
Myles L. Pensak, MD FACS	X	
Mark S. Persky, MD FACS	X	
Tara D. Rachakonda, MD	X	
Dale H. Rice, MD FACS	X	
Wm. Russell Ries, MD FACS	X	
David W. Roberson, MD FACS	X	
Peter S. Roland, MD	X	
Robert T. Sataloff, MD DMA FACS		Plural Publications (book royalties); Medtronic-Xomed (instrument royalties); Jaypee Brothers Medical Publishers (book royalties)
Samuel H. Selesnick, MD FACS		Medtronic ENT (royalty agreement)
Yevgeniy R. Semenov, MA	X	
Andrew G. Shuman, MD	X	
Daniel A. Sleeve, MD	X	
Timothy L. Smith, MD MPH FACS	X	
Matthew K. Steehler, MD	X	

FACULTY DISCLOSURE LIST

Larissa Sweeny, MD	X	
Paul A. Tennant, MD	X	
David J. Terris, MD	X	
Dana M. Thompson, MD FACS		Shire (consultant for clinical research project)
Charles C.L. Tong, MS	X	
Neelima Tummala, MS	X	
Andrew J. Victores, BA	X	
Peter G. Volsky, MD	X	
D. Bradley Welling, MD PhD FACS	X	
Brandon Wickens, MD	X	
Kathleen L. Yaremchuk, MD	X	
Kathleen L. Yaremchuk, MD	X	
Yu-Lan Mary Ying, MD	X	
PLANNING COMMITTEE	NOTHING TO DISCLOSE	DISCLOSURE (All commercial relationships)
Dinesh K. Chhetri, MD	X	
H. Peter Doble II, MD FACS	X	
Colin L.W. Driscoll, MD		Advanced Bionics (consulting fee); Cochlear Corporation (consulting fee); MedEl Corporation (consulting fee)
Sigsbee Walter Duck, MD FACS	X	
Roland D. Eavey, MD FACS		Santa Barbara Medco (honorarium for ear dressing headband)
C. Gaelyn Garrett, MD	X	
Christine G. Gourin, MD FACS	X	
David S. Haynes, MD		Advanced Bionics (honorarium-advisory board); Anspach (honorarium-advisory board); Cochlear (honorarium-advisory board); Grace Medical (honorarium-consultant); Zeiss (honorarium-consultant)
Andrew P. Lane, MD	X	
Cliff A. Megerian, MD FACS		Anspach-Synthes (honorarium-surgeon's advisory board); Cochlear Corp. (honorarium-surgeon's advisory board); Grace Corp. (honorarium-surgeon's advisory board)
Jacob Pieter Noordzij, MD	X	
Robert H. Ossoff, DMD MD FACS	X	
Mark S. Persky, MD FACS	X	
David W. Roberson, MD FACS	X	
William W. Shockley, MD FACS	X	
Mark C. Weissler, MD FACS	X	
Kathleen L. Yaremchuk, MD	X	

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Guest of Honor**Paul A. Levine, MD FACS**

Paul A. Levine, MD was born in Brooklyn, New York on November 4, 1947. He received a Bachelor of Science degree in Biology from Rensselaer Polytechnic Institute in 1969 and received his MD in 1973 from Albany Medical College. He completed his internship in Surgery at Yale, followed by a residency in the Division of Otolaryngology that was completed in 1977. After a year fellowship at Stanford in Head and Neck, Maxillofacial, and Facial Plastic and Reconstructive Surgery, completed in 1978, Dr. Levine remained on the Stanford faculty as an assistant professor in the Division of Otolaryngology-Head and Neck Surgery as well as the associate chief for the Division at Santa Clara Valley Medical Center. In 1984, he joined the Department of Otolaryngology at UVA as an associate professor and vice chair, became a professor in 1987, and was named chairman of the department at UVA in 1997, a position he stills holds.

Dr. Levine has contributed over 140 publications to the specialty during his career, and has been very active in institutional and national committees, in and outside the specialty, throughout his career. He was an early proponent of plate fixation for mandible fractures, and as his career matured, he has become a well-known expert on sinonasal malignancies, especially esthesioneuroblastoma and sinonasal undifferentiated carcinoma, as well as craniofacial resections with expertise in sparing the eye. A nationally and internally recognized academic head and neck cancer surgeon, Dr. Levine has served as a member of all the major societies in the field and as a leader of many. He has served as the past president of the American Broncho-Esophagological Association, chairman of the Advanced Training Council of the American Head and Neck Society as well as its President. He has been a director of the American Board of Otolaryngology for the past 10 years and has served as its treasurer for the past four years. He served as Southern Section Vice President of the Triological Society, and currently serves as the Editor of Archives of Otolaryngology-Head and Neck Surgery as well as an editorial board member of JAMA.

Special Honored Guest**Harold C. Pillsbury III, MD FACS**

Harold C. Pillsbury, III, MD FACS, is the Chair of the UNC Department of Otolaryngology/Head and Neck Surgery, as well as the Thomas J. Dark Distinguished Professor of Otolaryngology/Head and Neck Surgery.

A native of Baltimore, Maryland, Dr. Pillsbury earned his B.A. and M.D. degrees from George Washington University in Washington, DC (1970 and 1972, respectively). He completed his residency training in Otolaryngology/Head and Neck Surgery at the University of North Carolina School of Medicine in 1976. Following six years at the Yale University School of Medicine, he joined the UNC faculty in 1982 as an Associate Professor. He served as Chief of the Division of Otolaryngology/Head and Neck Surgery from 1983 to 2001.

Dr. Pillsbury has completed an eighteen year term on the American Board of Otolaryngology where he served as Exam Chair and President. He is a past President of the American Academy of Otolaryngology-Head and Neck Surgery, The American Laryngological Association, The Society of University Otolaryngologists, and the Triological Society. He is also past CME coordinator and Vice-President of the Southern Section for the Triological Society. He is the President-Elect of the American Academy of Otolaryngic Allergy.

Dr. Pillsbury has written and/or contributed to over 270 publications and over 45 textbooks. He has also given over 326 presentations nationally and internationally. He has been the primary investigator or co-investigator on over 21 grants. His special field of interest is neurotology and, most especially, cochlear implantation.

Presidential Citation Awardee**James A. Duncavage, MD FACS**

After receiving his Bachelor of Science in civil engineering from the State University of New York at Buffalo, Dr. James Duncavage attended the Medical College of Wisconsin in Milwaukee, getting his medical degree in 1975. He stayed in Milwaukee to do his residency, became a staff physician at the Beloit (Wisconsin) Clinic, then joined the faculty at the Medical College of Wisconsin in 1981.

Dr. Duncavage moved to Nashville in 1986 as an associate professor and a founding member of the Department of Otolaryngology at Vanderbilt University Medical Center. Currently Dr. Duncavage is Professor and Vice Chairman in

the Department of Otolaryngology, now part of the Vanderbilt Bill Wilkerson Center for Otolaryngology and Communication Sciences. In 2002 he became the program director of a one-year fellowship in Rhinology; in 2004 he also became the medical director of the department's expanding nurse practitioner program.

His clinical interests are diagnosis and treatment of nasal and sinus disorders, the use of endoscopic sinus surgery for treatment of sinus disease, and innovative methods to deliver care for patients with sinus problems. Moreover, Dr. Duncavage is interested in management of airway disease and is a founding physician of the Asthma, Sinus, and Allergy Program which later became part of Vanderbilt University Medical Center.

In addition to being the guest editor of the sinus issue of *Current Opinion in Otolaryngology & Head and Neck Surgery* from 2001 through 2009, Dr. Duncavage is a co-director of the Sisson International Head and Neck Workshop. He has presided over many panels and courses that provide continuing medical education credits, has held offices in national professional societies, and has served on several of those organizations' committees.

Presidential Citation Awardee

C. Gaelyn Garrett, MD

Dr. C. Gaelyn Garrett is currently Medical Director of the Vanderbilt Voice Center and Professor in the Department of Otolaryngology at Vanderbilt Medical Center. She received her Bachelor degree in Chemistry (1984), Medical Degree (1988) and completed her Residency in Otolaryngology-Head and Neck Surgery (1994), all at the University of North Carolina in Chapel Hill. She completed a fellowship in Laryngology and Care of the Professional Voice at Vanderbilt under the mentorship of Dr. Robert Ossoff in 1995 and joined the full-time faculty there following her fellowship. Dr. Garrett has been extremely active in the Triological Society, having served as an At-large Council member from 2003-2005 and Secretary/Treasurer of the Southern Section from 2005-2010. She is currently Vice-President representing the Southern Section and is also the Program Chair for this year's annual meeting in San Diego. In addition to her involvement with the Triological Society, she has been on the Council of the American Laryngological Association since 2005 and is currently its Secretary.

Dr. Garrett is actively involved in the education and training of medical professionals regarding laryngeal disorders and has been an invited lecturer nationally and internationally. She is Co-Director of the Laryngology Fellowship Program at Vanderbilt, a program that counts over 20 alumni in academic programs across the country. She has completed a term as Senior Examiner for the American Board of Otolaryngology (ABO) and remains active in the educational endeavors through the ABO and the American Academy of Otolaryngology-Head and Neck Surgery. Her research interests include lasers in laryngology, vocal fold wound healing, laryngopharyngeal reflux and outcomes studies regarding the medical and surgical management of diseases of the larynx.

Presidential Citation Awardee

Stanley M. Shapshay, MD FACS

Dr. Shapshay has been a Professor in the Department of Otolaryngology at Albany Medical College since 2006 practicing the subspecialty of Laryngology. He has held the positions of Professor of Otolaryngology at Boston University School of Medicine, Tufts University School of Medicine and the Mount Sinai School of Medicine serving as Chairman, Department of Otolaryngology at Tufts University from 1994 to 2001. Dr. Shapshay did his Surgical Residency training at Tufts Medical Center and Otolaryngology residency at the Combined Boston University- Tufts University Otolaryngology Program. He is past president of the ABEA, ALA and the Triological Society and currently is the Chair of the COSM SLC. He is the recipient of several honors and awards which include the Fowler Award from the Triological Society, the ALA Award and the De Roaldes Award from the ALA and the Chevalier Jackson Award from the ABEA. Dr Shapshay has as well served as the Guest of Honor at the annual meetings of the ABEA, ALA and Triological Society. He has received the Teacher of the Year Award from the Otolaryngology residents from Boston University School of Medicine, Tufts Medical School and the Mount Sinai School of Medicine and from the students at Albany Medical College. He has published 192 scientific publications in peer reviewed journals and 35 books and book chapters. Currently Dr. Shapshay resides with his wife Ruth in the town of Richmond located in beautiful Berkshire county of Western Massachusetts.

Presidential Citation Awardee

David L. Zealear, PhD

David Zealear has been the Director of Research of the Department of Otolaryngology since its inception in 1986. He became a tenured professor in 1996, with a dual appointment in the Division of Speech and Hearing Sciences. In 1977, Dr. Zealear introduced the concept of functional electrical stimulation as a new method of treatment for laryngeal paralysis. In a pioneering study, he introduced the concept of feedback-controlled muscle stimulation, now routinely employed in rehabilitation medicine. In 1986 this approach met with renewed interest as a potentially useful treatment for patients with bilateral vocal fold paralysis, a life-threatening problem. In 1994, Dr. Zealear conducted the first trial of laryngeal pacing, a more physiological approach to treatment, in a patient using an external device, which prompted a biomedical company (Medtronic, Inc.) to initiate FDA trials with an implantable laryngeal pacemaker. Serving as principal investigator on the project, Dr. Zealear directed the first successful implant of a laryngeal pacemaker in the United States in 1996. A new generation pacemaker is currently under investigation (St. Jude Medical—Neuro Division).

Over the past 25 years, Dr. Zealear has received nearly \$9 million dollars in NIH and other funding for his research as Principal and Co-Investigator in the areas of neurophysiology, voice science, voice biology, and neuromuscular regeneration. He has received three United States Patent Awards (one pending), and one Japanese Patent Award, with commercial license and royalties on one patent.

In 2010, Vanderbilt established an annual award in Dr. Zealear's name to be awarded to a graduating medical student who has demonstrated excellence in research during Vanderbilt commencement.

David Zealear received his Ph.D. from the University of California-San Francisco in 1979 in the field of physiology and neuroscience. Subsequently, he pursued postdoctoral research and became an Assistant Professor at Northwestern University Medical School in Chicago, Illinois.

New Fellows to Be Inducted

Manohar Bance, MD	Halifax, NS
Emily Frances Boss, MD	Baltimore, MD
Alexander Guang-Yu Chiu, MD	Tucson, AZ
Ellen S. Deutsch, MD	Media, PA
Anand Devaiah, MD FACS	Boston, MA
Adrien Eshraghi, MD	Fort Lauderdale, FL
Glendon M. Gardner, MD	Detroit, MI
Nira A. Goldstein, MD	Brooklyn, NY
John Herman Greinwald Jr., MD	Cincinnati, OH
Joseph K. Han, MD	Norfolk, VA
Matthew M. Hanasono, MD FACS	Houston, TX
Bruce H. Haughey, MBChB FACS	Saint Louis, MO
Michael L. Hinni, MD FACS	Phoenix, AZ
Timothy E. Hullar, MD FACS	Saint Louis, MO
Scharukh Jalisi, MD FACS	Boston, MA
Michael M. Johns III, MD	Atlanta, GA
Sid Khosla, MD	Cincinnati, OH
Hung Jeffrey Kim, MD	Washington, DC
David I. Kutler, MD FACS	New York, NY
Judith E.C. Lieu, MD MSPH	St. Louis, MO
Robin Williams Lindsay, MD	Bethesda, MD
Thomas B. Logan, MD FACS	Henderson, KY
Daniel D. Lydiatt, MD FACS	Omaha, NE
Bruce H. Matt, MD FACS	Indianapolis, IN
Ted Mau, MD PhD	Dallas, TX
Brian J. McKinnon, MD	Augusta, GA
Jeffrey N. Myers, MD FACS	Houston, TX
Quyen T. Nguyen, MD PhD	San Diego, CA
Sanjay Rajendra Parikh, MD FACS	Seattle, WA
Albert H. Park, MD	Salt Lake City, UT
Miriam I. Saadia-Redleaf, MD	Chicago, IL
Ghassan J. Samara, MD FACS	Stony Brook, NY
Ahmed M.S. Soliman, MD	Philadelphia, PA
Joseph R. Spiegel, MD FACS	Philadelphia, PA
Robert J. Stachler, MD FACS	Detroit, MI
Ralph P. Tufano, MD FACS	Baltimore, MD
David L. Walner, MD FACS	Niles, IL
Mark K. Wax, MD FACS	Portland, OR
Eric P. Wilkinson, MD	Los Angeles, CA

Thesis Award Winners

Harris P. Mosher Award

Nira A. Goldstein, MD MPH, Brooklyn, NY

Validation of a Clinical Assessment Score for Pediatric Sleep Disordered Breathing

Harris P. Mosher Award

Judith E.C. Lieu, MD MSPH, St. Louis, MO

Longitudinal Study of Children with Unilateral Hearing Loss

Edmund Prince Fowler Award

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

Surgery with Molecular Navigation Using Fluorescently-Labeled Injectable Systemic Probes

Harris P. Mosher Award Citation

In recognition of the excellence of his/her Candidate's Thesis in Clinical Research, the Society confers upon _____ the Harris P. Mosher 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 Twelve.

Recipients

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

Harris P. Mosher 1867-1954

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.

*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.

Edmund Prince Fowler Award Citation

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 Twelve.

Recipients

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

Edmund Prince Fowler 1872-1966

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

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

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

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

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

TRIOLOGICAL SOCIETY 115TH ANNUAL MEETING PROGRAM APRIL 20-21, 2012 MANCHESTER GRAND HYATT SAN DIEGO, CALIFORNIA

FRIDAY, APRIL 20, 2012

Elizabeth F-G-H

- 7:00 - 7:50** **Business Meeting (Fellows Only)**
New Fellow Induction Ceremonies and Reception
- 8:00** **WELCOME/OPENING REMARKS BY PRESIDENT**
Robert H. Ossoff, DMD MD FACS*, Nashville, TN
- INTRODUCTION OF SPECIAL HONORED GUEST AND PRESIDENTIAL CITATIONS**
Special Honored Guest:
Harold C. Pillsbury, MD FACS*, Chapel Hill, NC
Presidential Citations:
James A. Duncavage, MD FACS, Nashville, TN
C. Gaelyn Garrett, MD*, Nashville, TN
Stanley M. Shapshay, MD FACS*, Albany, NY
David L. Zealear, PhD, Nashville, TN
- 8:20** **INTRODUCTION OF GUEST OF HONOR PRESENTATION**
Marketing in Our Specialty: The Need for Honesty, Integrity, and Reality
Paul A. Levine, MD FACS*, Charlottesville, VA
- 8:35** **PRESIDENT'S ADDRESS**
Leadership, Legacy and Succession
Robert H. Ossoff, DMD MD FACS*, Nashville, TN
- 8:50** **JOSEPH H. OGURA, MD LECTURER**
Listening to Patients and Tumors: Lessons Learned from 25 Years of Treating Patients with Carotid Body and Other Paragangliomas
James L. Netterville, MD FACS*, Nashville, TN
- 9:25** **CO-MOSHER AWARD FOR TRIOLOGICAL THESIS**
Validation of a Clinical Assessment Score for Pediatric Sleep Disordered Breathing
Nira A. Goldstein, MD MPH*, Brooklyn, NY

Educational Objective: At the conclusion of the presentation, the participants should be able to describe a clinical assessment score for pediatric sleep-disordered breathing and understand its usefulness.

Objectives: To validate a clinical assessment score for pediatric sleep-disordered breathing. **Study Design:** Prospective instrument validation. **Methods:** 100 children scheduled for overnight polysomnography were evaluated by a standardized history and physical examination and assigned a clinical assessment score. Parents completed the OSA-18, the PedsQL™ 4.0 and the Child Behavior Checklist. Children with positive polysomnography underwent adenotonsillectomy or adenoidectomy. The identical assessments were performed at a mean follow-up of 8 months. **Results:** Item reduction yielded a score of 15 items (CAS-15) that demonstrated the best internal consistency and predictive utility (Cronbach $\alpha = 0.80$). Intraclass correlation demonstrated good intra-rater [ICC=0.78 95% CI (0.58, 0.89)] and inter-rater agreement [ICC=0.65 95% CI (0.26, 0.84)]. All change scores were significantly improved after surgery. Effect sizes were large for the CAS-15 (2.6), OSA-18 (2.4), and apnea-hypopnea index (1.4) and moderate for the Child Behavior Checklist (0.7) and PedsQL™ 4.0 (-0.5). Moderate to strong correlation was found between the initial CAS-15 scores and the external measures (|r| between 0.32 and 0.65). Receiver operating characteristic curves were constructed to determine the optimal initial CAS-15 score for predicting positive polysomnography. The area under the curve was 0.77 95% CI (0.67, 0.87) and a score ≥ 32 yielded a sensitivity of 77.3% (95% CI 65.3, 86.7) and a specificity of 60.7% (95% CI 40.6, 78.5).

Conclusions: The CAS-15 proved useful in an office setting and correctly diagnosed 72% of referred children when compared to polysomnography. It correlated well with external measures and demonstrated a good response to clinical change.

* Denotes Fellow

Friday

9:33 **CO-MOSHER AWARD FOR TRIOLOGICAL THESIS**
Longitudinal Study of Children with Unilateral Hearing Loss
Judith E.C. Lieu, MD MSPH*, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the longitudinal changes in cognitive and language scores and educational performance in children with unilateral hearing loss.

Objective: Children with unilateral hearing loss (UHL) have been found to have lower language scores, and increased rate of speech therapy, grade failures, or needing Individualized Education Plans (IEPs). The objective of this study was to determine whether language skills and educational performance improved or worsened over time in a cohort of children with UHL. **Study Design:** Prospective longitudinal cohort study. **Methods:** Forty-six children with permanent UHL, ages 6 to 12 years, were studied using standardized cognitive, achievement, and language testing at yearly intervals for three years. Using standardized test scores allowed implicit comparison to norms established by national cross-sectional samples. Secondary outcomes included behavioral issues, IEPs, receipt of speech therapy, or teacher report of problems at school. Analysis utilized repeated measures ANOVA and multilevel random regression modeling. **Results:** Several cognitive and language mean standardized scores increased over time. Possible predictors of increase with time included higher baseline cognitive levels and receipt of interventions through an IEP. However, standardized achievement scores and indicators of school performance did not show concomitant improvements. Rates of IEPs remained > 50% throughout, and rates of speech therapy were consistently about 20%. **Conclusions:** Children with UHL demonstrated improvement in oral language and verbal IQ scores over time, but not improvements in school performance. Parents and teachers reported persistent behavioral problems and academic weaknesses or areas of concern in about 25%. The provision of IEPs for children with UHL, and acknowledging UHL as a hearing disability, may be an effective intervention to improve language skills over time.

9:41 **FOWLER AWARD FOR TRIOLOGICAL THESIS**
Surgery with Molecular Navigation Using Fluorescently-Labeled Injectable Systemic Probes
Quyen T. Nguyen, MD PhD*, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the use of fluorescently labeled molecularly targeted, systemically delivered, injectable probes for tissue identification during surgery.

Objectives: Develop fluorescently labeled molecularly targeted systemically delivered injectable probes for tumor and nerve identification during surgery. **Study Design:** Proof of concept experiments are performed in a prospective randomized placebo controlled fashion in rodent animal models. Sensitivity and specificity of individual probes were measured. Outcome including tumor-free survival for the tumor targeting probe and postoperative functional recovery for the nerve targeting probe were measured. **Methods:** Injectable probes to differentiate between tumor and adjacent normal tissue and between nerve and adjacent non-neural structures were delivered systemically using intravenous injection into mice. Following a brief washout period, animals were anesthetized and the areas of interest surgically exposed. White light reflectance and fluorescence images were performed using a custom modified surgical dissecting microscope. Following imaging, confirmation of tissue identity was performed using histology and immunohistochemistry. Sensitivity and specificity of individual probes were compared to control injectates. Visual differentiation comparing fluorescently labeled targets versus white light reflectance was measured and plotted as a scatterplot. Tumor free survival for the tumor targeting probe was measured and plotted as a Kaplan-Meier plot for two different cancer models. Nerve function was measured for facial nerve recovery and data analyzed with Student's t test. **Results:** We found that matrix metalloproteinases (MMP) based activatable cell penetrating peptides (ACPPs) was sensitive and specific for the differentiation between tumor and adjacent normal tissue. We found that nerve peptide 41 (NP41) was sensitive and specific for the differentiation between nerve and adjacent non-nerve tissue. **Conclusions:** The use of fluorescently labeled molecularly targeted systemically delivered injectable probes for tissue identification during surgery may aid in surgical efficiency and in improving functional outcome.

9:49 **Discussion/Q&A**

9:55 - 10:20 Break with Exhibitors - View Posters

10:20 - 12:00 SCIENTIFIC SESSIONS
CONCURRENT SESSION I - OTOTOLOGY
Elizabeth F-G-H

Moderators: Peter S. Roland, MD*, Dallas, TX
D. Bradley Welling, MD PhD FACS, Columbus, OH

10:20 Bilateral Sequential Adult Cochlear Implantation: Who Should Receive Priority in the Context of a Constrained Health Care System?

Jordan B. Hochman, MD, Winnipeg, MB Canada; Joseph M. Chen, MD, Toronto, ON Canada; Julian M. Nedzelski, MD*, Toronto, ON Canada; Vincent Y.W. Lin, MD, Toronto, ON Canada; Phillip C. Hebert, MD PhD, Toronto, ON Canada; Brian R. Forzley, MD, Penticton, BC Canada

Educational Objective: At the conclusion of this presentation, participants will understand the issues surrounding allocation of a limited resource and have gained exposure to social justice theories that inform such resource macro-decisions.

Objectives: Resource allocation decisions have become increasingly necessary as the cost of health care habitually increases. Bilateral (second side) adult cochlear implantation (CI) is an example of a novel technology with accruing evidence of benefit, yet expense has limited universal employ. Currently at our center, bilateral implantation is only provided under research protocol. In this paper, we discuss the need for a principled approach concerning distribution of a second device both during this period of investigation and if ultimately an insured service. Allocation strategies, while extensively addressed in some arenas, have yet to be developed for second side sequential adult CI. We advocate that physicians must assume an explicit role when both caring for individual patients as well as administering healthcare programs. We review social justice theories that inform resource allocation macro-decisions and include a defense of age based considerations. Our approach to patient selection for adult second side CI sequentially considers clinical criteria (directly addressed in the article), willingness to participate in rigorous research and a 65 year cut-off. Ultimately we employ random blinded selection for allocating bilateral CI among the remaining similarly situated individuals. This approach functions impartially and in a manner that is transparent for both patient and physician. **Study Design:** N/A. **Methods:** N/A. **Results:** N/A. **Conclusions:** N/A.

10:28 Childhood Obesity is a Significant Risk Factor for Sensorineural Hearing Loss

Anil K. Lalwani, MD*, New York, NY; Ying-hua Liu, MD PhD, New York, NY; Michael Weitzman, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the risk of hearing loss in children associated with obesity.

Objectives: Childhood obesity, defined as body mass index (BMI) >95%, is a significant health problem associated with a variety of disorders including diabetes, hypertension, heart disease, and endocrine disturbance that are also risk factors for hearing loss. We investigated the hypothesis that obese children are at increased risk of SNHL. **Study Design:** A complex, multistage, stratified geographic area design for collecting representative data from the noninstitutionalized US population. **Methods:** Cross-sectional data from the National Health and Nutrition Examination Survey (NHANES) (2005-2006) for 1533 adolescents ages 12-19 was examined. Obesity was defined as BMI>95% and all participants underwent audiometric testing. SNHL was defined as an average pure tone level >15 dB for 0.5, 1, 2 kHz (low frequency) and 3, 4, 6, 8 kHz (high frequency) in those with normal tympanometry and examination of the external ear. Bivariate and multivariate analyses were conducted. **Results:** Compared to normal weight participants (BMI 5-85%), obesity in adolescents was associated with elevated pure tone hearing thresholds and greater prevalence of unilateral low frequency SNHL (15.2% vs. 8.3%). In multivariate analyses, obesity was associated with a 1.73 fold increase in unilateral low frequency SNHL (95% CI: 1.04-2.86) after controlling for multiple hearing related covariates. **Conclusions:** We demonstrate, for the first time, that obesity in childhood is associated with higher hearing thresholds across all frequencies and an almost 2 fold increase in unilateral low frequency hearing loss. These results add to the growing literature on obesity related health disturbance and add to the urgency in instituting public health measures to reduce it.

10:36 Cochlear Implant Electrode Misplacement: Incidence, Evaluation, and Management

Yu-Lan Mary Ying, MD, Houston, TX; Robert A. Williamson, MD, Houston, TX; Jerry W. Lin, MD, Houston, TX; Jeffrey T. Vrabec, MD*, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should have increased awareness and knowledge in evaluating patients in whom cochlear implant electrode arrays are improperly positioned. Treatment strategies will be presented that will improve patient outcomes in these situations.

Objectives: To review the presentation and management of improper electrode placement and to help guide clinical decision making. **Study Design:** Retrospective case series. **Methods:** Pediatric and adult cochlear implant patients managed from January 2001 to present whose electrode arrays were not placed properly within the cochlea or extended beyond the cochlea into the internal audi-

Friday

tory canal or adjacent structures. **Results:** Four patients, all pediatric, were identified from over 450 cases (<1%) managed over the study duration. These cases were initially identified due to poor auditory skill development or absent behavioral responses following implantation, which prompted imaging. Two patients presented several years after surgery. Sites of improper placement included the internal carotid artery canal, eustachian tube, and the internal auditory canal (IAC). The two IAC placement cases involved a cochlear dysplasia and a normal cochlear anatomy. Intraoperative findings and management are reviewed. **Conclusions:** Electrode array malpositioning is a rare, but serious and correctable complication in cochlear implant surgery. A multidisciplinary approach, including prompt audiologic evaluation and imaging, is important, particularly when benefit from the implant is limited or absent. Management of electrode arrays in the IAC may be more challenging.

10:44 Cochlear Implantation Outcomes in Patients with Far Advanced Otosclerosis

Maroun T. Semaan, MD, Cleveland, OH; Neelima Tummala, MS, Cleveland, OH (Presenter); Neal C. Gehani, MD, Cleveland, OH; Gail S. Murray, PhD, Cleveland, OH; Souha A. Fares, PhD, Cleveland, OH; William H. Lippy, MD*, Warren, OH; Cliff A. Megerian, MD*, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate knowledge of the role of cochlear implantation in auditory rehabilitation of far advanced otosclerosis.

Objectives: To compare hearing outcomes in patients with far advanced otosclerosis (FAO) undergoing cochlear implantation to an age matched group of adult controls, postlingually deafened by other etiologies. **Study Design:** Retrospective chart review. **Methods:** 30 patients with FAO, who met the audiological criteria for cochlear implantation, were compared to 30 age matched controls, postlingually deafened by non-otosclerotic causes were included. Audiometric pre and postoperative speech reception thresholds (SRT), word, and sentence scores were analyzed. The presence of retrofenestral findings on computed tomography, or intraoperative cochlear ossification was noted. **Results:** In the FAO group, radiographic abnormalities were noted in 26.4% of patients. Intraoperative ossification requiring drill-out was seen in 29.4% of patients. None developed postoperative facial nerve stimulation. There was no difference between the FAO and control groups in the mean short term (ST=less than 12 months) and long term (LT=greater than 12 months) postoperative SRT, word, and sentence scores (P=0.77). The presence of radiographic abnormalities did not predict ST or LT hearing outcome (P=0.47 and 0.68, respectively). Intraoperative cochlear ossification was associated with worse ST postoperative SRT (P=0.008). However, no association was seen for the ST word and sentence scores (P=0.58 and 0.79, respectively) and for the LT hearing outcome (P=0.24). **Conclusions:** In patients with FAO, effective and safe hearing rehabilitation can be accomplished with cochlear implantation.

10:52 Hearing Preservation and Speech Perception Outcomes with Electric-Acoustic Stimulation after 12 Months of Listening Experience

Oliver F. Adunka, MD, Chapel Hill, NC; Margaret T. Dillon, AuD, Chapel Hill, NC; Marcia C. Adunka, AuD, Chapel Hill, NC; English R. King, AuD, Chapel Hill, NC; Harold C. Pillsbury, MD*, Chapel Hill, NC; Craig A. Buchman, MD*, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the benefits of a hearing preservation surgical approach on postoperative speech perception.

Objectives: Objective benefits of electric-acoustic stimulation (EAS) were evaluated in 17 subjects who completed the 12 month FDA clinical trial. Postoperative stability of residual low-to-mid frequency thresholds and improvements in speech perception in both quiet and noise conditions were measured over time. **Study Design:** Prospective study of subjects implanted with the FlexEAS electrode array that listened with the DUET speech processor. **Methods:** Subjects' speech perception performance in quiet and noise was tested in three listening conditions: hearing aid alone, cochlear implant alone, and combined (EAS). Testing was completed pre-operatively and at 3, 6 and 12 month postoperative intervals. Unaided thresholds were assessed at each test interval to evaluate hearing preservation over time. **Results:** Hearing preservation was achieved with cochleostomy and round window surgical approaches. Speech perception performance as measured with CNC words in quiet and CUNY sentences in noise showed a general trend to improve over time. There was a significant difference for speech perception results between the preoperative and 3 month test intervals. Postoperatively, the EAS listening condition was significantly better than either the cochlear implant alone or hearing aid alone listening conditions, with subjects scoring an average of 71% on CNC words and 73% on CUNY sentences at SNR+0. **Conclusions:** Preservation of low-to-mid frequency residual hearing offers patients improved speech perception in both quiet and noise over time.

11:00 Discussion/Q&A

11:05 PANEL: CURRENT CONCEPTS IN OTOTOLOGY: EXPERT PANEL

Moderator: David S. Haynes, MD*, Nashville, TN

Panelists: Bruce J. Gantz, MD FACS*, Iowa City, IA
Cliff A. Megerian, MD FACS*, Cleveland, OH
Myles L. Pensak, MD FACS*, Cincinnati, OH
Samuel H. Selesnick, MD FACS*, New York, NY

11:50

Discussion/Q&A

Noon - 1:00 Lunch with Exhibitors - View Posters

10:20 - 12:00 SCIENTIFIC SESSIONS
CONCURRENT SESSION II - PEDIATRICS, HEAD & NECK
Elizabeth D-E

PEDIATRICS

Moderators: Ellen M. Friedman, MD FACS*, Houston, TX
Dana M. Thompson, MD FACS*, Rochester, MN

- 10:15** **Anatomical Reconstructions of Pediatric Airways from Endoscopic Images: A Pilot Study of the Accuracy of Quantitative Endoscopy**
Eric Meisner, PhD, Baltimore, MD; Masaru Ishii, MD PhD, Baltimore, MD (Presenter); Gregory Hager, PhD, Baltimore, MD; Stacey Ishman, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss quantitative endoscopy and its role in the assessment and management of airway anomalies.

Objectives: To evaluate the accuracy of three dimensional airway reconstructions obtained using quantitative endoscopy (QE). QE is a novel technique that we developed to reconstruct precise three dimensional (3D) representations of airway geometries from endoscopic video streams. This method is based on machine vision methodologies and can be done as a post-processing step from standard videos obtained during routine bronchoscopy. We hypothesize that this method is precise and will generate airway geometries similar to those obtained by computed tomography (CT). **Study Design:** N/A. **Methods:** This study was IRB approved. We analyzed video sequences from pediatric patients receiving rigid bronchoscopy. We generated 3D scaled airway models of the subglottis, trachea, and carina using QE. These models were compared to 3D airway models generated from CT; we assumed the CT data represented a gold standard measure of airway size, and used a mixed linear model to estimate the average error in cross-sectional area and effective diameter for QE. **Results:** The average error in cross-sectional area (area sliced perpendicular to the long axis of the airway) was 6.71 mm² (variance 1.41 mm²). The average error in effective diameter (approximated as the square root of the area) was 0.4 mm (variance 0.008 mm). **Conclusions:** Our pilot study suggests that QE can be used to generate precise 3D reconstructions of airways. This technique is atraumatic, does not require ionizing radiation, and integrates easily into standard airway assessment protocols. We conjecture that this technology will be useful for staging airway disease and assessing surgical outcomes.

- 10:23** **Risk Factors for Desaturation after Tonsillectomy: Analysis of 4095 Consecutive Cases**
Stephen M. Kieran, FRCS, Boston, MA; Caroline Gorman, Boston, MA; Naomi Oyemwense, BA, Boston, MA; Alexann Kirby, MA MBA, Boston, MA; David W. Roberson, MD*, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to use an evidence based algorithm to predict those patients more likely to suffer oxygen desaturation post-tonsillectomy; thus permitting better decisions regarding overnight admission and intensive care admission.

Objectives: To identify clinical risk factors for oxygen desaturation in the first 24 hours post-tonsillectomy, thus permitting the identification of those patients who warrant inpatient monitoring. **Study Design:** A retrospective analysis of 4095 consecutive patients undergoing tonsillectomy over a two year period. Detailed clinical data were recorded for all patients who desaturated in the postoperative period (n=294) and randomly selected controls (n=368). **Methods:** Detailed clinical data were recorded for all patients who desaturated in the postoperative period (n=294) and randomly selected controls (n=368). **Results:** 294/4095 patients (7.2%) experienced desaturations (sustained <90%) in the postoperative period (mean nadir 78.74%). Risk factors for desaturation and their odds ratios, in order of predictive importance, were (a) Downs syndrome (OR=8.8, 95%CI 3.04-25.26), (b) age less than 2 years (OR=6.53, 95%CI 2.84-14.97), (c) cardiac comorbidities (OR=5.6, 95%CI 3.1-10.03), (d) age less than 3 years (OR=3.80, 95%CI 2.60-5.56), (e) neurological comorbidities (OR=3.4, 95%CI 2.13-5.3), (f) OSA (OR=3.2, 95%CI 2.0 - 5.1). (g) weight <20Kg (OR=2.93, 95%CI 2.13-4.04) (h) pulmonary comorbidities (OR=2.75, 95%CI 1.22-6.18), (i) airway abnormalities (OR=2.1, 95%CI 1.49-3.02). A policy that admits: all children <3 years, all <20Kg, all with an AHI of >10, all Downs syndrome, and all patients with either a cardiac or neurological comorbidity would have identified 85.4% of patients who subsequently desaturated. However, such a policy would require admission of 51.6% of the patients undergoing tonsillectomy. **Conclusions:** These findings generally support the clinical practice guidelines recently published by the American Academy of Otolaryngology. It may not be possible to identify an algorithm, which admits all children at risk of desaturation, whilst permitting the discharge of a reasonable percentage of patients.

Friday

10:31 Identification and Characterization of Novel B Cell Populations in Pediatric Tonsil Tissue
Daniel A. Sleve, MD, Kansas City, KS; Thomas M. Yankee, PharmD PhD, Kansas City, KS; Marcia A. Chan, PhD, Kansas City, MO; Kevin J. Sykes, MPH, Kansas City, KS; Vivekanand Singh, MD, Kansas City, MO; Julie L. Wei, MD*, Kansas City, KS

Educational Objective: At the conclusion of this presentation, the participants should be able to understand 1) the novel use of flow cytometry to characterize B cell populations found in pediatric tonsil tissue; 2) key populations of B cells identifiable in tonsil specimens of preschool children and differences in such populations based on histologic diagnosis; and 3) lack of correlation between histologic and clinical diagnosis of pediatric tonsil diseases (tonsil hypertrophy versus chronic tonsillitis).

Objectives: Over 500,000 tonsillectomies are performed annually in the US with sleep disordered breathing (SDB) as the most common surgical indication followed by recurrent tonsillitis (RT). Exact cause for idiopathic tonsillar hypertrophy (ITH) in preschool age children is unclear. Our previous pilot study demonstrated feasibility of using flow cytometry to characterized phenotypes of B cells, and we identified differences in B cell subsets between tonsils with histologic diagnosis of ITH versus RT. We report data from 27 children age 6 and younger. **Study Design:** Prospective, convenience sample, cohort study of tonsils from 27 children who underwent tonsillectomy for SDB and/or RT. **Methods:** Fifty-four tonsils (27 pairs) were collected. One tonsil underwent histologic evaluation. Mononuclear cells from the other tonsil were harvested over a Ficoll density gradient. These cells were stained with appropriate antibodies and analyzed using eight color flow cytometry for different cell markers. Data was analyzed with BD FACSDiva software. **Results:** Specimens from 13 males and 14 females were studied. Median age was 44.1 months. The clinical indication for tonsillectomy was SDB in 8 patients and RT in 19 patients. Histologic diagnosis of chronic tonsillitis or lymphoid hyperplasia was often not consistent with clinical history. Our previous data on 10 specimens showed a difference in number of CD27Naïve B cells and CD27+Memory B Cells. With an expanded data set, no difference in CD27+Naïve B cells ($p=0.339$) and CD27+MemoryB cells ($p=0.524$). **Conclusions:** Histological findings of tonsil specimen do not always correlate with clinical history or diagnosis. There is currently no identifiable B cell population that demonstrates overproliferation consistent with ITH.

10:39 Efficacy of Different Cleaning Solutions in Removing Biofilms from Tracheostomy Tubes
Ryan A. Carver, BS, Gainesville, FL; Carolyn P. Ojano-Dirain, PhD, Gainesville, FL; Patrick J. Antonelli, MD*, Gainesville, FL; Rodrigo C. Silva, MD, Gainesville, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to compare various methods of tracheostomy tube cleaning.

Objectives: Bacterial biofilms are prevalent on tracheostomy tubes (TTs). Biofilms have been linked to poor clinical outcomes and are not effectively cleared by standard cleaning with gauze and household detergents. We aimed to examine the effectiveness of different disinfection solutions to remove staphylococcus aureus (SA) and pseudomonas aeruginosa (PA) biofilms from TTs. **Study Design:** Prospective and controlled in vitro microbiological study. **Methods:** Coupons were made from polyvinyl chloride (PVC) TTs, exposed to human plasma, and incubated in growth media with either PA or SA for 7 days. Coupons were rinsed with saline and immersed in a cleaning solution (2% chlorhexidine, 0.3% sodium hypochlorite, 3% hydrogen peroxide, or Polident® denture cleanser) for 5 minutes. Biofilm was measured with bacterial counts and TT surface integrity was assessed with scanning electron microscopy. **Results:** All cleaning solutions reduced mean SA biofilm counts compared to untreated control ($p<0.0001$). Sodium hypochlorite and chlorhexidine were more effective than peroxide and Polident® (three vs. two log reduction in total bacterial counts, $p=0.01$). Chlorhexidine, sodium hypochlorite and hydrogen peroxide produced a three log reduction of PA biofilm counts ($p=0.0001$, 0.0001 , and 0.0002 respectively), while Polident® had no effect. SEM revealed preserved surface integrity after exposure to all solutions. **Conclusions:** Sodium hypochlorite and chlorhexidine solutions effectively remove SA and PA biofilms from PVC TTs. Immersion in these readily available solutions should be considered as a new standard for disinfection of reusable TT cannulae.

10:47 Discussion/Q&A

HEAD & NECK Elizabeth D-E

**Moderators: Christine G. Gourin, MD FACS*, Baltimore, MD
Mark S. Persky, MD FACS*, New York, NY**

10:55 The Prognostic Significance of Combined Effector and Regulatory Lymphocyte Status in Patients with HNSCC
Charles C.L. Tong, MS, New York, NY; Johnny Kao, MD, Brandon, FL; Amelia Clark, BS, New York, NY; Shu-hsia Chen, PhD, New York, NY; Julio Aguirre-Ghiso, PhD, New York, NY; Andrew G. Sikora, MD PhD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to appreciate the role of immune response in HNSCC.

Objectives: We hypothesized that a high level of CD8+ tumor infiltrating lymphocytes (TILs) and low level of regulatory T cells (Treg) is associated with a favorable outcome in HNSCC. **Study Design:** Retrospective. **Methods:** Patients were identified from a phase II trial of a cetuximab based chemoradiation regimen for locally advanced (III or IV) HNSCC. Immunohistochemistry for p16, CD3, CD8, and the Treg marker Foxp3 was performed on pre-treatment specimens. Immune response was assessed using a modification of a previously described three tiered variable. Infiltration of Foxp3+ lymphocytes was stratified into intratumoral (IT), invasive margin (M), and peritumoral (PT). Correlations of lymphocyte subpopulations with p16 status and survival were determined. **Results:** 22 of 45 patients (49%) had p16 positive tumors, with a median followup of 28 months. p16 overexpression was associated with a trend towards increased OS (80.8% vs. 55%, $p=0.062$). Patients with either intratumoral, marginal, or peritumoral Foxp3 staining had a significantly worse 2 year overall survival (70% vs. 36.5%, $p=0.012$); (80% vs. 29.1%, $p=0.004$); (73.3% vs. 31.2%, $p=0.022$), respectively. The predictive value of Foxp3 was further increased in combination with CD8+ status (CD8+/Foxp3-, 66.7%; CD8+/Foxp3+, 33.3%, CD8-/Foxp3-, 66.7%, CD8-/Foxp3+, 23.7%; $p=0.041$). Negative Foxp3 and positive p16+ staining status also showed a trend towards improved 2 year overall survival (p16+/Foxp3-, 83.3%, p16+/Foxp3+, 66.7%; p16-/Foxp3-, 50%; p16-/Foxp3+, 26%; $p=0.083$). **Conclusions:** Immune profiling of immune effector (CD8+ T cells) and inhibitory (Treg) lymphocytes can provide prognostic information in patients with locally advanced disease. CD8+ T cell and Treg infiltration appear to influence the survival of patients with both HPV associated (p16+) and classical HNSCC.

11:03

Outcomes of Advanced and Recurrent Cutaneous Malignancies of the Scalp

Larissa Sweeny, MD, Birmingham, AL; Brendan T. Eby, BS, Birmingham, AL; J. Scott Magnuson, MD*, Birmingham, AL; William R. Carroll, MD, Birmingham, AL; Eben L. Rosenthal, MD*, Birmingham, AL

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the predictors of poor survival and outcomes in patients with advanced or recurrent scalp malignancies.

Objectives: Advanced and recurrent cutaneous malignancies of the scalp require aggressive surgical excision and reconstruction. This study assesses the predictors of poor survival and outcomes in patients with large scalp malignancies. **Study Design:** Retrospective review. **Methods:** Patients undergoing free flap reconstruction ($n = 45$) of the scalp for defects resulting from a new primary ($n=22$) or recurrent ($n=23$) cutaneous malignancy. **Results:** The majority of patients were male ($n=32$), with a mean age of 67. The histology of new primaries were primarily squamous cell carcinoma (SCC; $n=8$), sarcoma ($n=8$) or basal cell carcinoma (BCC; $n=4$) compared to recurrent lesions which were primarily SCC ($n=17$) followed by BCC ($n=4$). Myocutaneous free flap reconstruction included radial forearm ($n=26$), followed by latissimus ($n=17$) and rectus ($n=9$). The method of reconstruction did not affect duration of hospitalization ($P=0.40$) or incidence of complications ($P=0.23$). The overall 2 year and 5 year survival from initial operation at our institution were similar for patients presenting with a new primary (59% and 38%) versus those who presented with a recurrence (68% and 36%) ($P=0.72$). Overall survival of patients presenting with a new primary was unrelated to histology ($P=0.90$), radiation therapy ($P=0.96$), perineural invasion ($P=0.66$), recurrence ($P=0.06$), or regional lymph node disease ($P=0.77$). Similarly, overall survival of patients presenting with a recurrent lesion was also unrelated to these factors. However, overall survival was lower in patients requiring outer table excision or craniectomy ($P=0.03$). **Conclusions:** In our study of 45 patients, poor overall survival in large scalp malignancies is determined by bone invasion rather than histopathologic factors or even regional lymph node disease.

11:11

The Effect of Pneumonia on Short Term Outcomes and Cost of Care after Head and Neck Cancer Surgery

Yevgeniy R. Semenov, MA, Baltimore, MD; Heather M. Starmer, MA CCC-SLP, Baltimore, MD; Christine G. Gourin, MD MPH*, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the effect of postoperative pneumonia on in-hospital mortality, complications, length of stay, and costs in patients undergoing head and neck cancer surgery as well as describe the risk factors associated with the development of pneumonia in this population, and discuss strategies for prevention.

Objectives: The Centers for Medicare and Medicaid Services (CMS) has threatened to discontinue reimbursements for ventilator associated pneumonia (VAP) as a preventable never event. We sought to determine the relationship between pneumonia and in-hospital mortality, complications, length of stay and costs in head and neck cancer (HNCA) surgery. **Study Design:** Retrospective cross-sectional study. **Methods:** Discharge data from the Nationwide Inpatient Sample for 93,663 patients who underwent an ablative procedure for a malignant oral cavity, laryngeal, hypopharyngeal or oropharyngeal neoplasm in 2003-2008 was analyzed. **Results:** VAP was rarely coded. Infectious pneumonia was significantly associated with chronic pulmonary disease (OR=1.5, $P<0.001$) while aspiration pneumonia was associated with dysphagia (OR=2.0, $P<0.001$). Pneumonia from any cause was associated with weight loss (OR=3.3, $P<0.001$), age ≥ 80 years (OR=2.0, $P=0.007$) comorbidity (OR=2.3, $P<0.001$) and major procedures (OR=1.6, $P<0.001$), with increased in-hospital mortality for infectious (OR=2.9, $P<0.001$) and aspiration pneumonia (OR=5.3, $P<0.001$). Both infectious and aspiration pneumonia were associated with postoperative medical and surgical complications, increased length of hospitalization, and hospital related costs. **Conclusions:** Postoperative pneumonia is associated with increased mortality, complications, length of hospitalization, and hospital related costs in HNCA surgical patients. The variables associated with an increased risk of pneumonia are inherent comorbidities in HNCA patients, making this a high risk group for this never event. Caution must be used in the institution of reforms that threaten to inadequately reimburse the provision of care to this vulnerable population. Aggressive preoperative identification and treatment of underlying pulmonary disease, weight loss and aspiration may reduce morbidity and mortality.

Friday

11:19 Palliative Surgery for Head and Neck Cancer with Extensive Skin Involvement
David W. Jang, MD, New York, NY; Eric M. Genden, MD*, New York, NY; Marita S. Teng, MD, New York, NY;
Bukola Ojo, BS, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) identify the difficulties in treating head and neck cancer patients with unresectable disease and extensive skin involvement; and 2) describe the utility of palliative resection and reconstruction with regional and free tissue transfer in improving quality of life for these patients.

Objectives: Although the curability of advanced unresectable tumors of the head and neck is low, chemoradiotherapy is commonly administered with palliative intent. This approach can be effective, yet patients who present with extensive skin involvement often suffer from difficult to manage open wounds. This study is the first to evaluate the role of palliative surgery in the management of head and neck cancer patients with extensive skin involvement. **Study Design:** Retrospective review. **Methods:** A retrospective review was performed of 25 head and neck cancer patients with extensive skin involvement but otherwise unresectable tumors. All patients were treated with a palliative resection and reconstruction using regional or free tissue transfer. Patients were analyzed for surgical approach, complications, recurrence patterns, and cause of death. **Results:** The charts for 387 patients undergoing regional or free tissue transfer at a single institution in a five year period were reviewed. 25 patients met the inclusion criteria for unresectable tumor with extensive skin involvement. The most common primary sites were skin, oral cavity, larynx, and parotid gland. The average skin defect after resection was 107 cm². 14 patients underwent regional flap reconstruction and 11 patients underwent free flap reconstruction. 24 of 25 patients had an uncomplicated postoperative hospital course. Long term followup demonstrated that 17 patients (68%) received further radiotherapy and/or chemotherapy. The time to develop distant metastases after surgery was 6 months. Median survival was 9.5 months. 3 of the 4 patients (75%) with distant metastases at the time of surgery survived between 6 and 12 months. 16 of 18 patients (89%) did not manifest local recurrence after surgery. Of these 16 patients, 12 died of distant metastases, 2 died of other causes, and 2 were alive and disease free at the time of review. Only 2 of 18 patients (11%) developed extensive local disease with major wound complications. **Conclusions:** For unresectable tumors with extensive skin involvement, palliative resection and reconstruction provides patients an opportunity for palliative care without the need for extensive wound care. This approach appears to change the pattern of disease such that patients die of distant metastases without having to suffer the consequences of locally advanced cancer. Although survival may not be affected, patient quality of life can be greatly improved by addressing the odor, bleeding, pain, and infection associated with skin involvement.

11:27 Discussion/Q&A

11:35 STATE OF THE ART LECTURE
PET/CT in Head and Neck Oncology: 2012
Jonas T. Johnson, MD FACS*, Pittsburgh, PA

Noon Adjourn

FRIDAY, APRIL 20, 2012

1:00 - 5:00 SCIENTIFIC SESSION

OTOLOGY, LARYNGOLOGY, HEAD & NECK,

FACIAL PLASTICS AND SLEEP MEDICINE

OTOLOGY

Elizabeth F-G-H

Moderators: Robert F. Labadie, MD PhD*, Nashville, TN
Alan G. Micco, MD FACS*, Chicago, IL

1:00 Impact of Unilateral Conductive Hearing Loss due to Aural Atresia on Academic Performance in Children
Bradley W. Kesser, MD*, Charlottesville, VA; Kaelyn A. Krook, BS, Charlottesville, VA; Lincoln C. Gray, PhD,
Harrisonburg, VA

Educational Objective: At the conclusion of this presentation, the participants should gain an understanding of current practice patterns including utilization of amplification, including the FM system, need for individualized education programs (IEPs), need for speech therapy, and academic performance of children with unilateral moderate conductive hearing loss secondary to aural atresia.

Objectives: This study evaluates the effect of unilateral conductive hearing loss secondary to aural atresia on children's academic

performance. **Study Design:** Chart review to recruit eligible patients; survey completed by patients or parents of children with atresia. **Methods:** 132 surveys designed to assess academic performance were mailed to families of children with aural atresia. 70 responses (53%) were received. Children with prior atresia repair (21), age less than 5 (22) or bilateral atresia (1) were excluded leaving 26 unilateral atresia study patients. Use of amplification, grade repeated, need for special education, individualized education program (IEP), or speech therapy were tallied and compared to earlier studies of children with unilateral sensorineural hearing loss. **Results:** Of the 26 patients (12F, 14M; mean age 9.7; range 5-31) only 2 (7.7%) currently use a hearing aid and 8 (31%) use(d) an FM system in school. Twelve patients (46%) had an individualized education program (IEP). Speech or language delay requiring therapy was common affecting 11 (42.3%) patients. Only 3 (11.5%) patients required special education in school; none repeated a grade. **Conclusions:** Unilateral conductive hearing loss due to aural atresia has an impact on academic performance, although not as profound when compared to earlier studies on children with unilateral sensorineural hearing loss. These children often require special support in the school system via an FM system, IEP, speech therapy or special education. Educators and health care professionals should be aware of the impact of unilateral conductive hearing loss and offer appropriate rehabilitative services.

1:08

Audiometric and cVEMP Outcomes following Surgery for Superior Canal Dehiscence Syndrome

Marlien E.F. Niesten, MD, Boston, MA; Michael J. McKenna, MD, Boston, MA; Barbara S. Herrmann, PhD, Boston, MA; Wilko Grolman, MD PhD, Utrecht, The Netherlands; Daniel J. Lee, MD FACS, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand that 1) cervical vestibular evoked myogenic potential (cVEMP) thresholds can be used to determine the more symptomatic ear in patients with bilateral SCD; 2) in patients with SCDS, elevation of postoperative cVEMP thresholds correlate with improvement of SCD signs and symptoms; 3) closure of the ABG following SCD repair is seen; and 4) most patients will have a mild sensorineural hearing loss (primarily high frequency) after SCD repair.

Objectives: To determine the audiologic and cervical vestibular evoked myogenic potential (cVEMP) outcomes following surgery for superior canal dehiscence syndrome (SCDS). **Study Design:** Retrospective review. **Methods:** We identified thirty-three patients who underwent surgical treatment for SCDS from our database of 140 patients diagnosed with SCD. The diagnosis of SCDS was based on clinical signs and symptoms, audiometric and cVEMP testing and high resolution temporal bone computed tomography. Surgical repair was performed through a middle fossa craniotomy or through a transmastoid approach. **Results:** Thirty-three patients underwent surgery for SCDS on 34 ears (1 bilateral). Data was available for 29 patients with pre and postoperative audiometric testing. A 15 dB (99% CI = 4 ; 26) mean closure of the air bone gap at 250Hz and a 13 dB (99% CI = -25 ; -1) bone conduction loss at 4000Hz was seen. In patients with bilateral SCD, cVEMP thresholds showed lower values in the more symptomatic ear in 6/7 patients. cVEMP thresholds normalized in 9/9 (100%) patients following primary SCD repair and did not improve in one patient with persistence of symptoms after revision surgery. **Conclusions:** In our 33 patients, surgical plugging of SCD results in closure of the air bone gap and a mild high frequency sensorineural hearing loss. Preoperative cVEMP thresholds are important to determine the more symptomatic ear in patients with bilateral SCD. In addition, our data show that postoperative cVEMP thresholds correlate with clinical improvement of signs and symptoms in the largest patient series assessing pre and postoperative cVEMP testing.

1:16

Diffusion Tensor Imaging in Children with Unilateral Hearing Loss: A Pilot Study

Tara D. Rachakonda, MD, Saint Louis, MO; Joshua S. Shimony, MD PhD, Saint Louis, MO; Judith E.C. Lieu*, MD MSPH, Saint Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to describe educational and behavioral differences between children with and without hearing loss and understand, at a very basic level, what diffusion tensor imaging is.

Objectives: Children with unilateral hearing loss (UHL) have scored poorly on speech-language tests and have demonstrated educational and behavioral problems. Diffusion tensor imaging (DTI) is used to detect microstructural damage in white matter (WM). This pilot study was conducted to observe differences in DTI parameters, such as fractional anisotropy (FA) and mean diffusivity (MD) in several structures in the brain between children with severe to profound UHL and their normal hearing (NH) siblings. **Study Design:** Prospective observational study. **Methods:** 16 children with UHL and 10 with NH underwent audiometry, IQ and oral language testing, and DTI. Parents provided demographic and educational data. The FA and MD of 8 regions of interest (ROIs) were measured. Appropriate non-parametric tests provided statistical comparisons. **Results:** Rightward FA asymmetries with corresponding FA asymmetries were seen regardless of hearing status in the centrum semiovale, Heschl's gyrus (gray and white matter), middle cerebellar peduncle (MCP) and posterior limb of the internal capsule; a leftward asymmetry was observed in the middle cingulate gyrus. No significant differences in DTI parameters were observed between the UHL and NH groups of children. Correlation analyses revealed significant relationships (Pearson $r = 0.5$) between cognitive scores and DTI parameters in the MCP and globus pallidus (GP). **Conclusions:** DTI asymmetries between sides were observed regardless of hearing status. Changes in MCP and GP have been associated with attentional disorders; such changes may account for educational difficulties in children with UHL. These findings suggest that white matter microstructural patterns in several brain regions are preserved despite unilateral rather than bilateral auditory input.

Friday

- 1:24 **Improvement of Eustachian Tube Function by Tissue Engineered Regeneration of the Mastoid Air Cells**
Shin-ichi Kanemaru, MD PhD, Osaka, Japan; Juichi Ito, MD PhD, Kyoto, Japan

Educational Objective: At the conclusion of this presentation, the participants should be able to understand comparative relationships between gas exchange function of mastoid air cells (MACs) and eustachian tube function. Tissue engineered regeneration of mastoid air cells contributes to improve not only gas exchange function of MACs but also eustachian tube function. This new tissue engineered treatment will change the former concept of the tympanoplasty with simple mastoidectomy.

Objectives: Most chronic otitis media (OMC) are observed poor development of mastoid air cells (MACs) and poor function of eustachian tube (ET). We have reported that regeneration of MACs is effective in perfect cure of intractable OMC. In this study, we assessed whether regenerated MACs has gas exchange functions or not and contribute to improve ET function or not. **Study Design:** Randomized control trial. **Methods:** 76 patients with cholesteatoma, adhesive otitis media or chronic otitis media were received tympanoplasty and regeneration of MACs. At the first stage of tympanoplasty, artificial pneumatic bones/autologous bone fragments were implanted into the opened mastoid cavity. At the second stage operation, a nitrous oxide (N₂O) gas study was performed in 5 patients for measurement of the middle ear pressure (MEP) through the opened bar hole of the mastoid. For control, 5 patients with good development of MACs were measured the MEP during cochlea implant or facial nerve decompression. ET functions were measured more than 2 times before first/6 months after second operation in all patients. **Results:** At the second stage operation, in all cases with regenerated MACs and normal control, middle ear pressure changed after administration of N₂O. Contrarily, MEP change was not observed in cases with unregenerated MACs. In 70% (n=37/53) of MACs' regenerated group, ET function was improved. However, improvement of ET function was observed in only 13% (n=3/23) of MACs' unregenerated group. **Conclusions:** Tissue engineered regeneration of MACs improves eustachian tube function and gas exchange functions of the middle ear.

- 1:32 **Discussion/Q&A**

LARYNGOLOGY Elizabeth F-G-H

Moderators: Robert T. Sataloff, MD DMA FACS*, Philadelphia, PA
Albert L. Merati, MD FACS*, Seattle, WA

- 1:40 **Salvage Endoscopic Angiolytic KTP Laser Treatment of Glottic Cancer after Failed Radiotherapy**
Anca M. Barbu, MD, Boston, MA; James A. Burns, MD*, Boston, MA; Aaron D. Friedman, MD, Boston, MA; Tali Landau-Zemer, MD, Boston, MA; Gerardo Lopez-Guerra, MD, Boston, MA; Steven M. Zeitels, MD*, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the principles underlying KTP laser salvage endoscopic treatment of early glottic cancer after failed radiotherapy.

Objectives: Management of glottic cancer subsequent to failed radiotherapy is challenging, especially balancing oncologic control and function preservation. Patients have frequently been incentivized against surgical management, which is why they selected radiotherapy. This orientation compounds the difficulty in surgical management after recurrence. Typically, endoscopic salvage is less morbid than transcervical partial laryngectomy and clearly desirable over total laryngectomy. However, there are appropriate concerns about the efficacy of endoscopic salvage and the overarching impact on larynx preservation and survival. Given our success with endoscopic angiolytic KTP laser treatment of untreated T1 and T2 glottic cancer, we examined our results treating similar sized lesions after failed radiotherapy. **Study Design:** Retrospective chart review. **Methods:** Twenty patients were identified from our cancer database that had failed radiation therapy elsewhere for glottic cancer and were treated by endoscopic angiolytic KTP laser treatment. **Results:** Of the 20 patients identified, based on the geographic tumor presentation to us, 5 were stage T1aN0M0 and 16 were T2N0M0, while 15/16 of the T2 lesions were bilateral (T2b). Four of 20 (20%) had local recurrence (all T2b) and required subsequent total laryngectomy. Two of 20 (10%) ultimately died of disease. The remaining 16 patients (80%) are free of disease at least 2 years subsequent to endoscopic salvage with an average followup of 39 months. **Conclusions:** The investigation herein provides preliminary evidence that angiolytic KTP laser salvage treatment of early glottic cancer is effective after failed radiation. Larger cohorts will be necessary to establish efficacy.

- 1:48 **Exercise Induced Paradoxical Fold Motion Disorder: Strategies for Improving Diagnostic Yield and Management**
Tendy Chiang, MD, Columbus, OH; Brad W. DeSilva, MD, Columbus, OH; Anna M. Marcinow, Columbus, OH; B. Nicholas Ence, BS, Columbus, OH; Spencer E. Lindsey, BS, Columbus, OH; L. Arick Forrest, MD*, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the strategies for diagnosis and management of exercise induced paradoxical vocal fold motion disorder (EPVFMD), a subset of paradoxical vocal fold motion

disorder seen only with physical exertion. This entity has been described in the literature affecting elite athletes and has commonly been misdiagnosed as asthma or reactive airway disease. The affected demographic, diagnosis and management of this elusive disorder has been sparsely described in the literature. We seek to further define this clinical entity (EPVFMD) by reviewing our experience at a tertiary level voice and swallowing disorder clinic.

Objectives: To review our experience with the diagnosis and management of EPVFMD. **Study Design:** A single institution retrospective review and cohort analysis. **Methods:** A single institution retrospective review was performed identifying all patients with paradoxical vocal fold motion disorder (PVFMD). Patients with isolated exercise induced symptoms were selected for further review. Flexible fiberoptic laryngoscopy exams (FFL) performed on these patients were reviewed with regard to presence of laryngeal pathology as well as the presence of PVFMD at rest and/or with exertion. The type of therapy was identified. Symptom outcomes were graded as complete resolution, improvement, or unchanged following therapy. **Results:** 758 patients were identified with PVFMD. 104 patients demonstrated symptoms of PVFMD that were only exercise related (EPVFMD). 93/104 (89%) patients underwent a pre and post-trigger FFL. 48/93 (52%) patients had no evidence of PVFMD on initial FFL. After subjecting these patients to exertion, 83/93 (89%) had evidence of PVFMD on post-exertion FFL. 39/93 (42%) patients had evidence of PVFMD on both pre-exertion and post-exertion FFL. 87/104 (84%) had evidence of laryngeal edema. 23/104 (23%) had one or more laryngeal lesion on exam. 67 were enrolled in laryngeal control therapy and attended at least session with 48/67 (72%) demonstrating improvement or complete resolution of their symptoms. **Conclusions:** EPVFMD is a unique clinical entity from PVFMD. The diagnostic yield for EPVFMD can be improved with the addition of exertion to FFL. Laryngeal edema was a common coexistent finding. Similar to PVFMD, EPVFMD responds well to laryngeal control therapy.

1:56

Modulating Phonatory Function through Alteration of Vocal Fold Contour

Ted Mau, MD PhD*, Dallas, TX; Joseph Muhlestein, BS, Dallas, TX; Sean Callahan, MD, Dallas, TX; Roger W. Chan, PhD, Dallas, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to understand alteration of the medial vocal fold surface contour as a means to improve phonatory function and to appreciate the impact of injection materials on vocal fold vibrations.

Objectives: To demonstrate that alteration of the vocal fold medial surface contour can lead to improved phonatory function, and that implant material properties can affect vibrations even when implant is placed deep to the vocal fold cover. **Study Design:** Induced phonation of fresh excised human larynges. **Methods:** Twelve larynges were harvested within 24 hours postmortem. Phonation threshold pressure (PTP) and flow (PTF) were measured before and after small volume injections into the medial aspect of the thyroarytenoid (TA) muscle using either calcium hydroxylapatite (CaHA) paste or hyaluronic acid (HA) gel. Locations of the implants were confirmed by histology. **Results:** The effect of implant placement on PTP was material dependent. CaHA tended to increase while HA gel tended to decrease PTP. The difference between the two materials was statistically significant ($P = 0.0018$ for onset, 0.0096 for offset). In contrast, the effect of implant placement on PTF was similar between the two materials. Both tended to decrease PTF ($P = 0.72$ for onset, 0.85 for offset). **Conclusions:** These data suggested an effect on the geometry of the vocal fold contour to be present. Implant placement in the medial aspect of the TA muscle potentially resulted in a less convergent or more rectangular glottal geometry, leading to improved phonatory efficiency. An implant with closer viscoelastic match to human vocal fold cover is desirable, since its material properties can affect vibrations even when the implant is placed deep to the vocal fold cover. This result is consistent with theoretical predictions and implies greater need for surgical precision in implant placement and care in material selection.

2:04

Outcome of a Multimodality Approach to the Management of Idiopathic Subglottic Stenosis

Reza S.A. Nouraei, MBBChir MRCS, London, UK; Guri S. Sandhu, FRCS, London, UK

Educational Objective: At the conclusion of this presentation, the participants should be able to learn about a proposed set of diagnostic criteria for idiopathic subglottic stenosis and to evaluate the outcome of a multimodality approach to the management of this condition.

Objectives: To assess the outcome of a uniform diagnostic approach and a multimodality treatment paradigm for managing idiopathic subglottic stenosis. **Study Design:** Prospective observational study. **Methods:** Fifty-five consecutive female patients treated between 2004 and 2009 were prospectively studied. Patient and lesion characteristics, treatment details, complications and treatment rates were studied. A new surgical procedure of anteroposterior laryngotracheoplasty with biological inhibition was developed. Airway outcome was assessed using the ADVS system. **Results:** Mean age at first treatment was 47 years and over 90% of patients were of north European ancestry. The average delay in diagnosis was four years. Forty-five patients elected to undergo serial endoscopic treatment and the mean intervention rate in this group was 1.28 per year. All patients undergoing serial endoscopy were prosthesis free and had MRC dyspnea grades of 1 or 2 at last followup. Ten patients underwent anteroposterior laryngotracheal reconstruction with skin graft based biological fibrosis inhibition. There were three poor voice outcomes, two occurring in patients with total laryngeal stenosis. The same two patients required a second open procedure for treating posterior commissure stenosis. All patients were prosthesis free with MRC dyspnea grades of 1 or 2 at a maximum followup of 5 years. **Conclusions:** Idiopathic subglottic stenosis is often misdiagnosed as asthma for prolonged periods, but once diagnosed can be effectively treated with a combination of serial endoscopic surgery or open reconstruction aimed at increasing laryngotracheal dimensions and preventing fibrosis

Friday

with a special grafting technique.

2:12 Airway Obstruction Due to Unilateral Laryngeal Paralysis

Gayle E. Woodson, MD*, Springfield, IL; Jennifer L. Nelson, MD, Springfield, IL (Presenter)

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the pathophysiology of airway obstruction from unilateral laryngeal paralysis and identify appropriate treatments, which include arytenoid abduction and recurrent laryngeal nerve transection with ansa reinnervation.

Objectives: Airway obstruction is an uncommon presentation of unilateral laryngeal paralysis. Previously described treatments include tracheotomy, arytenoidectomy or cordotomy. We present a case series of patients with obstruction secondary to unilateral laryngeal paralysis, addressing the pathophysiology of obstruction and the outcomes of treatment with arytenoid abduction and laryngeal reinnervation. **Study Design:** Case series. **Methods:** Patients were evaluated with flexible laryngoscopy, direct laryngoscopy, EMG, and spirometry. Patients with an overhanging arytenoid were offered arytenoid abduction. Synkinetic adduction was managed by recurrent laryngeal nerve transection and ansa reinnervation. **Results:** In all cases, paralysis was caused by recurrent laryngeal nerve (RLN) injury during either thyroidectomy or cervical spine surgery. Arytenoid prolapse was identified in 3 patients, who were subsequently treated with arytenoid abduction. Airway was significantly improved in all 3 patients, including 1 patient with a tracheotomy who was decannulated after abduction. However, this patient still had exertional dyspnea. Bulging of the vocal fold was noted during inspiration and laryngeal EMG confirmed abnormal adductor muscle activity. Such paradoxical adductor activity was detected in 4 other patients, for a total of 5 of the 6 patients. 4 patients were treated with RLN transection and reinnervation with an ansa loop, with resolution of stridor. **Conclusions:** Surgical injury of the RLN can result in airway obstruction due to arytenoid prolapse and/or paradoxical vocal fold adduction. Treatment of airway obstruction should address the underlying pathophysiology. Arytenoid abduction and RLN transection with ansa reinnervation can be effective.

2:20 Discussion/Q&A

2:25 STATE OF THE ART LECTURE

Current Concepts on the Applications of Lasers in Laryngology: Science not Magic

Mark S. Courey, MD*, San Francisco, CA

2:50 - 3:20 Break with Exhibitors - View Posters

HEAD & NECK Elizabeth F-G-H

Moderators: Dennis H. Kraus, MD FACS*, New York, NY

Jesus E. Medina, MD FACS*, Oklahoma City, OK

3:25 Factors Related to Persistent Tracheostomy Requirement after Primary Chemoradiation for Advanced Laryngeal Cancer

Paul A. Tennant, MD, Louisville, KY; Jeffrey M. Bumpous, MD*, Louisville, KY; Kevin L. Potts, MD, Louisville, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to identify pretreatment factors which are predictive of persistent tracheostomy requirement after primary chemoradiation for advanced laryngeal and hypopharyngeal squamous cell carcinoma and to assess short term mortality of patients with pre-treatment tracheostomy requirement.

Objectives: To identify pretreatment factors which are predictive of persistent tracheostomy requirement after primary chemoradiation for advanced laryngeal and hypopharyngeal squamous cell carcinoma and to assess short term mortality of patients with pre-treatment tracheostomy requirement. **Study Design:** Retrospective case control. **Methods:** Patients who underwent primary chemoradiation treatment for advanced laryngeal and hypopharyngeal squamous cell carcinoma between 2006 and 2008 were selected for study from a tertiary care head and neck multimodality clinic database. They were categorized by patient demographic, initial staging, and pre-treatment tracheostomy status. Rate of persistent cannulation was evaluated at 6 and 12 months after chemoradiation. The 12 month overall mortality rate was calculated for patients with and without pre-treatment tracheostomy.

Results: Sixty patients (12 female) were identified for study. Average age was 58.5 years at presentation. Average smoking history was 53.3 pack years. Age and smoking history were not statistically different between genders ($p > 0.05$). Sixteen patients required pre-treatment tracheostomy. T3/T4 status and TVC mobility in these patients did not predict rate of pre-treatment tracheostomy ($p=0.074$ and $p=0.52$); however, these factors did correlate with persistent cannulation rate at 6 and 12 months after completion of therapy ($p=0.026$, 0.016 and $p=0.0322$, 0.0495 , respectively). Two of 16 patients were decannulated within 12 months, while five patients who did not initially require tracheostomy received a tracheostomy after completion of treatment. Twelve month mortality in patients who demonstrated no evidence of recurrent disease was higher in patients who received pre-treatment tracheostomy, even

when controlling for primary tumor stage (31% vs. 8.3%, $p=0.032$). **Conclusions:** Patients with advanced laryngeal cancer and pre-treatment tracheostomy requirement have low rates of decannulation and higher short term mortality than those who do not require tracheostomy prior to organ preservation treatment.

3:33 **Biobanking in Primary Head and Neck Squamous Cell Carcinoma**

Jose M. Godoy, MD, Nashville, TN; Micah S. Moseley, MD, Nashville, TN; Andrew B. Sewell, MD, Nashville, TN; Robert J. Sinard, MD, Nashville, TN; James L. Nettekville, MD*, Nashville, TN; Wendell G. Yarbrough, MD*, Nashville, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) explain and gain insights into current tumor-specimen preservation approaches in primary head and neck cancer; and 2) discuss targeted therapy and future biomarkers in the context of personalized medicine and tumor-specimen preservation techniques.

Objectives: To study the feasibility of a cell biorepository method in head and neck squamous cell carcinoma (HNSCC) of primary tumors. **Study Design:** Laboratory based translational study. **Methods:** Tumor-specimen samples diagnosed with HNSCC were collected from patients who underwent head and neck surgery. Samples were then grown in short term culture, frozen, and then regrown in cell culture. Histology and immunohistochemistry (IHC) were used to confirm HNSCC and human origin. **Results:** Initial short term cell culture survival was achieved in eleven specimen samples. The main subsites were oral cavity (64%) and larynx (36%). Cell culture regrowth after storage was successful in all 11 samples, presenting a predominant epithelial morphology with increased colony density and confluency rate under microscopy ≥ 7 days in cell culture. One sample was passaged in mouse and then regrown after being frozen. **Conclusions:** Biopreservation of a HNSCC short term cell culture is a feasible method. Initial cell culture technique is of paramount importance for future specimen integrity and regrowth. The ability to passage samples in animal models may suggest an alternative to traditional cell culture approaches. Success rate of regrowth provides an alternative and accessible framework to future health care providers to advance in developing effective personalized medicine treatment schemes and a simple way to study samples at a molecular level. This could also foster innovation in biomarkers and targeted therapies. Further studies are encouraged to understand the role of biopreservation times and genes expression to fully comprehend specimen preservation.

3:41 **HPV in Oropharyngeal Squamous Cell Carcinoma: Assessing Virus Presence in Normal Tissue and Activity in Cervical Metastasis**

Jeffrey R. Janus, MD, Rochester, MN; Steven M. Olsen, MD, Rochester, MN; Rebecca R. Laborde, PhD, Rochester, MN; Vivian W. Wang, MD PhD, Rochester, MN; Joaquin J. Garcia, MD, Rochester, MN; Eric J. Moore, MD*, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the role of HPV in normal and cervical metastatic tissue in HPV+ oropharyngeal squamous cell carcinoma patients.

Objectives: Human papilloma virus (HPV) has been established as an etiologic and prognostic factor in oropharyngeal squamous cell carcinoma (OPSCC). HPV oncogenesis involves expression of E6/E7 mRNA, resulting in expression of E6/E7 oncoproteins, with downstream p53 degradation and pRb inhibition. While much research has focused on disease aggressiveness, progression, and survival with respect to HPV, minimal information exists about HPV in normal and metastatic tissue. **Study Design:** Patient matched tumor, normal, and metastatic tissue was gathered from 55 OPSCC patients and tested with qPCR and ISH. **Methods:** Quantitative polymerase chain reaction (qPCR) was performed using total RNA isolated from fresh frozen tissues and primer sets optimized for detection of HPV 16 specific- E6, E7 and p16 transcripts. HPV- in situ hybridization (ISH) was also performed to detect the presence of HPV DNA. **Results:** We discovered 25 patients with HPV+ OPSCC. When comparing the presence of HPV16 DNA in tumor, metastatic and normal tissue as measured by ISH, perfect correlation is found at all subsites ($p<0.0001$). However, active infections as measured by HPV16- E6 and E7 expression using qPCR was present only in primary and metastatic tissue ($p=0.0012$, E6; $p=0.02$, E7). No such E6/E7 correlation was found in normal tissue when compared to primary or metastatic tissue. **Conclusions:** There is a very clear pattern of active HPV expression that correlates to disease course. In the HPV positive patients, all sites including primary, metastatic and normal tissues are DNA positive. Transcriptionally active infections were detected in primary and metastatic tissues, while normal tissues appear to have latent infections.

3:49 **Transorbital Skull Base Surgery: Technical Notes, Indications and Outcomes**

Ryan J. Li, MD, Baltimore, MD; Jason Y.K. Chan, MD, Baltimore, MD; Shaan Raza, MD, Baltimore, MD; Michael Lim, MD, Baltimore, MD; Alfredo Quinones-Hinojosa, MD, Baltimore, MD; Kofi Boahene, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate understanding of surgical anatomy relevant to transorbital access of the anterior cranial base. Participants should be able to discuss the indications and techniques for transorbital minicraniotomies, as well as counsel appropriate patients on clinical, functional, and cosmetic outcomes of this approach.

Objectives: The medial, superior, and lateral orbital walls form a large portion of the anterior cranial base. Minicraniotomies and osteotomies through these walls can provide minimal access corridors for managing select anterior cranial base lesions. We present

our experience with transorbital endoscopic approaches for the management of anterior cranial base pathology detailing the surgical techniques, indications and outcomes. **Study Design:** Case series study, via institutional retrospective review. **Methods:** Access to the orbit was achieved through either a transpalpebral or transconjunctival approach. Modified orbitofrontal craniotomies were performed for midline and lateral anterior cranial base exposure. Lesions along the cribriform plate were accessed through medial orbital roof osteotomies. **Results:** Between 2008 and 2011, 23 patients underwent the transorbital approach for management of anterior cranial base lesions. Patient ages ranged from 3 to 80 years. Nineteen patients underwent the transpalpebral approach and four the transconjunctival approach. The transpalpebral minicraniotomy provided adequate exposure for extracranial and intracranial exposure from the frontal sinus to the pituitary fossa. The transconjunctival precaruncular incision facilitated medial orbital roof osteotomies to access the entire cribriform plate. Pathologies treated included persistent CSF leaks, mucoceles, traumatic pneumocephalus, and various neoplasms including meningiomas, esthesioneuroblastoma, and one low grade ganglioglioma. Postoperatively, no neurological sequelae, sinus complications, ptosis, or ocular compromise developed. Transient mild, unilateral hypesthesia was common. **Conclusions:** Transorbital approaches provide excellent access to the anterior cranial base and should be considered in select cases. These approaches combine the advantages of both open and endoscopic skull base techniques to create a logical surgical corridor that respects both functionality and cosmesis.

3:57 **Improved Localization of Sestamibi Imaging at High Volume Centers**
Michael C. Singer, MD, Augusta, GA; David J. Terris, MD*, Augusta, GA (Presenter); Manoj Mathew, MS, Augusta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the possible benefits of performing sestamibi scans in high volume centers. They should be able to identify situations in which rescanning patients might provide additional information.

Objectives: Sestamibi imaging can provide critical information regarding the location of suspected parathyroid adenomas. However, this modality can be challenging to perform and interpret reliably. The impact of experience on the localizing efficacy of sestamibi scanning was assessed. **Study Design:** Prospective analysis of a consecutive series of patients undergoing parathyroidectomy was undertaken after IRB approval was obtained. **Methods:** Patients undergoing parathyroid surgery from October 2003 through June 2011 were considered. Inclusion criteria represented primary surgery for primary hyperparathyroidism in which a single adenoma was excised and cure obtained. Sestamibi scan results, performed at our institution and at outside imaging centers, were compared to intraoperative findings. **Results:** 389 parathyroidectomies were performed; 188 patients met inclusion criteria. Fifty-four patients had sestamibi scans performed at outside institutions; 36 (67%) were localizing and 18 (33%) were non-localizing. Among localizing studies, half identified the correct quadrant and half recognized the correct side. At our institution, 147 patients underwent sestamibi imaging; 121 (82%) localized and 26 (18%) did not ($p < 0.05$ compared with outside). Among localizing studies, the correct quadrant was reported in 65% and the correct side in 30%. Thirteen of the 18 patients with a non-localizing outside scan were rescanned at our institution. All localized; 6 identified the correct quadrant and 7 the side of the adenoma. **Conclusions:** A high volume of experience may improve the yield of sestamibi imaging. Repeating this study at a high volume center when it was non-localizing elsewhere may provide useful additional information.

4:05 **Discussion/Q&A**

FACIAL PLASTICS AND SLEEP MEDICINE **Elizabeth F-G-H**

Moderators: Wm. Russell Ries, MD FACS*, Nashville, TN
Kathleen L. Yaremchuk, MD*, Detroit, MI

4:13 **Predicting Positive Margins in Resection of Cutaneous Melanoma of the Head and Neck**
J. Jared Christophel, MD, Charlottesville, VA; Dane M. Barrett, MD, Charlottesville, VA; Andrew K. Johnson, BS, Charlottesville, VA; Stephen S. Park, MD*, Charlottesville, VA; Paul A. Levine, MD*, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the benefits of staged reconstruction after achieving negative margins in cutaneous melanoma of the head and neck. In addition, participants should be able to compare the various methods for peripheral sampling of large cutaneous melanomas.

Objectives: Head and neck melanoma surgeons must achieve negative margins before performing margin compromising reconstructions such as a local flap closure. This often necessitates staged operations, including further margin resection. Peripheral sampling is often used prior to definitive resection to help guide extent of the resection. If melanoma margin status could be predicted based on lesion characteristics, the surgeon could be more confident in performing definitive closure immediately after resection of some lesions or confident in the need to take larger margins in predictably extensive lesions. **Study Design:** Retrospective review and logistic regression analysis. **Methods:** IRB approval was obtained and patients treated for H&N melanoma by the otolaryngology dept in the last 10 years were reviewed. 457 patients were identified and pathologic margin status after pri-

mary definitive resection was collected as the dependent variable. Predictor variables of demographics, lesion size, pathologic subtype, location on face, and depth of invasion were collected. **Results:** Failed to reject the null hypothesis. Positive pathologic margin could not be reliably predicted based on the predictor variables. **Conclusions:** In this large series of head and neck melanoma patients, pathologic margin status could not be predicted based on the most common available predictors. This is surprising given the published data that melanoma in situ has a higher rate of positive margin compared to subtypes of invasive melanoma. This reinforces the need for delaying reconstruction until margins are clear or performing reconstruction at time of resection that does not compromise ability to resect margins further (e.g., skin graft).

4:21 Resection of Membranous Septum in Rhinoplasty to Increase Tip Rotation and Decrease Nasal Length
Justin C. Cohen, MD, New York, NY; Albert S. Jen, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the aesthetic role of the membranous nasal septum and understand how its selective resection during rhinoplasty can impact tip rotation and nasal length.

Objectives: The objectives of this study are to explore the aesthetic role of the membranous nasal septum and to determine the degree of change in tip rotation and nasal length that is obtained from its selective resection. **Study Design:** Retrospective review of patients in a single private practice setting. **Methods:** We analyzed the charts of 30 adult female patients who underwent endonasal rhinoplasty that included selective excision of the membranous nasal septum. Our surgical technique focused on removing the soft tissue between the caudal edge of the cartilaginous septum and the cephalic edge of the medial crura, with more tissue taken anteriorly. The subsequent closure resulted in a cephalic rotation of the nasal tip and an overall shortening of the nose. Perioperative photographs were then evaluated for degree of change in nasolabial angle and length of nasal dorsum. **Results:** Of 30 patients reviewed, 7 (23%) felt their nose was too short on initial followup, however all had satisfactory to excellent results by one year. No patients required revisions related to the membranous septum resection. At 12 months, the amount of cephalic tip rotation ranged from 4 to 10 degrees (average of 6). The nasal dorsum was shortened between 1.3 to 4.1%. No patients experienced perioperative complications. **Conclusions:** Selectively excising the membranous septum with more tissue removed anteriorly is a simple way to increase tip rotation and decrease nasal length during rhinoplasty. Patients in our series experienced no complications and had good aesthetic results.

4:29 Nell-1 and BMP-2 Impregnated Scaffolds Induce and Guide Bone Formation in an Animal Marginal Mandibular Resection Model
Adam S. DeConde, MD, Los Angeles, CA; Douglas Sidell, MD, Los Angeles, CA; Min Lee, PhD, Los Angeles, CA; Tara Aghaloo, DDS MD PhD, Los Angeles, CA; Sotirios Tetradis, DDS PhD, Los Angeles, CA; Maie St. John, MD PhD*, Los Angeles, CA

Educational Objective: To demonstrate osteoinductive capabilities of Nell-1 and BMP-2 impregnated scaffolds in a rat marginal mandibular resection model.

Objectives: Mandibular deficits are a consequence of tumor resection in head and neck cancer patients. Development of scaffolds that can induce bone regeneration to restore the defect would obviate the need for free bone flap reconstruction. We test the osteoregenerative potential of bone morphogenetic protein-2 (BMP-2) +/- vascular endothelial growth factor (VEGF) or Nell-1 +/- VEGF impregnated biomimetic scaffolds in a rat model. **Study Design:** Prospective study using an animal model. **Methods:** BMP-2 +/- VEGF or Nell-1 +/- VEGF was loaded onto a biomimetic scaffold. Scaffolds were implanted into marginal mandibular defects in rats. Blank scaffolds, unfilled defects and undrilled mandibles served as negative controls. Bone healing was analyzed with micro-computerized tomography (micro-CT) 8 weeks postoperatively. **Results:** Micro-CT analysis demonstrated Nell-1 +/- VEGF and BMP-2 +/- VEGF impregnated scaffolds induce successful healing of marginal mandibular defects compared to blank and empty defects. Micro-CT volume analysis revealed that Nell-1 scaffolds retain a similar bone to total tissue volume ratio seen in native mandible (81.58 +/- 4.02 vs. 83.72 +/- 1.76, respectively) in contrast to BMP-2 scaffolds (34.25 +/- 8.29). BMP-2 scaffolds produce a higher volume of bone than Nell-1 scaffolds (30.96 +/- 4.10 mm³ vs. 13.33 +/- 2.85 mm³, respectively). **Conclusions:** Both Nell-1 and BMP-2 impregnated biomimetic scaffolds successfully induce bone healing in a marginal mandibular defect in the rat. These results hold great promise for bone reformation in our head and neck cancer patients.

4:37 A Comparison of Sleep Endoscopy and Polysomnography in Determining Severity of Sleep Disordered Breathing
Israel Pena Jr., BS, Houston, TX; Masayoshi Takashima, MD, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role of utilizing sleep endoscopy as a tool in grading the severity of sleep disordered breathing (SDB).

Objectives: The purpose of this study is to compare the accuracy of sleep endoscopy in grading severity of SDB to that of polysomnography (PSG). **Study Design:** A retrospective study. **Methods:** The sleep endoscopies of 200 consecutive patients between January 2007 and September 2011 who were diagnosed with SDB and subsequently underwent sleep endoscopy were reviewed blindly by the single operating surgeon from an archive. An obstructive severity score of mild, moderate, or severe was documented after reviewing only the sleep endoscopy videos. For each patient, the severity score determined by sleep endoscopy

Friday

was compared to the corresponding score obtained by polysomnography; the former was considered accurate if it matched the polysomnography result. **Results:** Sleep endoscopy had 84% accuracy overall, with 92% accuracy in identifying severe SDB (n=72, p<0.001), 68% accuracy for moderate SDB (n=47, p<0.001), and 86% accuracy for mild SDB (n=81, p<0.001). **Conclusions:** As far as the authors are aware, this is the first study looking at the feasibility of predicting the degree of SDB by the use of sleep endoscopy. Our results suggest that sleep endoscopy is a useful predictor of SDB severity that could, in some patients with symptomatic sleep issues, potentially be used as a screening tool for establishing the need for a PSG. It also provides more compelling evidence of the validity of using sleep endoscopy in patients with SDB.

4:45 The Effects of Nasal Surgery on the Upper Airway: A Sleep Endoscopy Study
Andrew J. Victores, BA, Houston, TX; Masayoshi Takashima, MD, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role of nasal surgery and how it affects the upper airway as seen on sleep endoscopy.

Objectives: To evaluate the impact of nasal surgery on the oropharyngeal and hypopharyngeal anatomy of patients with obstructive sleep apnea (OSA) by comparing sleep endoscopy data prior to and following nasal surgery. **Study Design:** Retrospective review of medical records and sleep endoscopy video recordings. **Methods:** Twenty-four patients with obstructive sleep apnea were identified who underwent nasal surgery for symptomatic nasal obstruction. Clinic charts and sleep endoscopy video recordings were reviewed. Preoperative and postoperative sleep endoscopy recordings were compared to determine if nasal surgery affected the level and degree of upper airway obstruction. **Results:** Overall, the pattern of upper airway obstruction did not change significantly following nasal surgery (p > 0.05). Almost all patients demonstrated residual obstruction by postoperative sleep endoscopy with no change in plans for surgical management of oropharyngeal and hypopharyngeal collapse (96%). Partial improvement in palatal collapse was present in a subset of patients without retroglossal obstruction (p < 0.05). Postoperative apnea-hypopnea index decreased from a mean of 23.6 to 20.4 events/hour, but this change was not significant (p > 0.05). **Conclusions:** For most patients with obstructive sleep apnea, surgical repair of nasal obstruction does not significantly improve oropharyngeal or hypopharyngeal collapse seen on sleep endoscopy. However, mild improvement is seen in palatal collapse, which corresponds to patient's appreciation of snoring improvement. This study reveals that if a sleep endoscopy is being utilized to direct surgical management of OSA, it does not need to be repeated after nasal surgery to direct surgical care.

4:53 Discussion/Q&A

5:00 ADJOURN

5:30 - MEET THE AUTHORS POSTER RECEPTION
7:00

SATURDAY, APRIL 21, 2012

7:00 - 7:50 Business Meeting (Fellows Only) - Elizabeth F-G-H

7:55 - 12:00 SCIENTIFIC SESSION GENERAL, RHINOLOGY, ALLERGY Elizabeth F-G-H

7:55 Announcements

GENERAL

Moderators: Sigsbee W. Duck, MD FACS*, Rock Spring, WY
Roland D. Eavey, MD FACS*, Nashville, TN

8:00 **Morbidity and Mortality after Tonsillectomy: Findings of a National Survey**
Michael J. Brenner, MD, Springfield, IL; Reginald F. Baugh, MD, Temple, TX; Julie L. Goldman, MD, Louisville, KY;
Jean J. Brereton, MD, Alexandria, VA; Lee D. Eisenberg, MD, Englewood, NJ; David W. Roberson, MD*, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) describe the existing state of knowledge regarding major morbidity and mortality after tonsillectomy; 2) identify underlying causes and risk factors for post-tonsillectomy death or permanent disability after tonsillectomy; and 3) discuss challenges and controversies in monitoring, admission, and pain management in the post-tonsillectomy patient.

Objectives: To collect data regarding catastrophic complications, including death or permanent disability, after tonsillectomy. **Study Design:** Electronic mail survey. **Methods:** The survey was disseminated via the American Academy of Otolaryngology - Head & Neck Surgery weekly newsletter. Recipients were queried regarding patient morbidity and mortality after tonsillectomy, capturing demographic data, risk factors, and detailed descriptions. **Results:** 552 respondents with a collective tonsillectomy experience of 1.4 million procedures reported 63 events (overall catastrophe incidence of 1/20,500 procedures). Of events reported, there were 59 deaths and 4 instances of permanent disability. These events occurred in 32 children (51%), 11 adults (17%), and 20 patients of unstated age (32%). Apneic deaths accounted for 48 of 63 (76%) deaths, whereas bleeding was associated with 11 of 63 (17%) and 4 of 63 (6%) were of unknown cause. Most patients had no risk factors, and a preoperative diagnosis of OSA did not predict increased risk of apneic death. Medication errors or aspiration was implicated in 12 of 29 cases (41%). Most events occurred within 72 hours of surgery, with 35% of cases occurring on the day of surgery or the first postoperative day. **Conclusions:** This study, the largest report to date of tonsillectomy related mortality, found that apneic death accounted for the preponderance of deaths regardless of age, risk factors, or primary diagnosis. Mortality after tonsillectomy is a rare but catastrophic event that poses a quandary for otolaryngologists regarding appropriate care. Further research is needed to establish best practices for patient admission, monitoring, and pain management to optimize patient safety after tonsillectomy.

8:08 **Women Otolaryngologist Representation in Specialty Society Membership and Leadership Positions**
Sukgi S. Choi, MD*, Washington, DC; Robert H. Miller, MD*, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate their understanding of the current representation of women otolaryngologists in the specialty societies and leadership positions.

Objectives: To determine the proportion of female otolaryngologists in leadership positions relative to their number in the specialty, their membership in various otolaryngology organizations, and age. **Study Design:** Cross-sectional analyses of otolaryngology organization membership with a subgroup analysis on female membership and leadership proportion comparing 5 year male/female cohort groups. **Methods:** Information on the number of members and leaders was obtained from various specialty societies by direct communication and from their web sites between June and December 2010. The number of female and male otolaryngologists and their age distribution in 5 year age groups was obtained from the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS). Statistical analyses were used to determine whether women had proportional membership and leadership representation in various specialty societies. Additionally, female representation in other leadership roles was analyzed using the male/female ratio within the 5 year cohort groups. **Results:** Female otolaryngologists were found to constitute approximately 11% of practicing otolaryngologists. The American Society of Pediatric Otolaryngology had a significantly higher proportion of female members (22%) compared to five other societies. When the gender composition within each organization was taken into account, female representation in specialty society leadership positions was proportionate to their membership across all societies. When gender and age were considered, women have achieved proportionate representation in each of the specialty societies' leadership positions. There was also proportionate representation of females as program directors, American Board of Otolaryngology directors, Residency Review Committee members, and journal editors/editorial board members. Finally, fewer female chairs or chiefs of departments/divisions were seen, but when age was taken into consideration, this difference was no longer significant. **Conclusions:** Women have achieved parity in otolaryngology leadership positions. As the number and seniority of women increase, the specialty should continue

to monitor representation of women in leadership positions.

8:16 **Simulation Based Training in Advanced Airway Skills in an Otolaryngology Residency Program**
Milan R. Amin, MD, New York, NY; David R. Friedmann, MD, New York, NY (Presenter)

Educational Objective: At the conclusion of this presentation, the participants should be able to utilize similar methodologies and course work as presented here to effectively impart advanced airway management skills to otolaryngology residents using simulation based educational training.

Objectives: Life support training emphasizes the primacy of airway management. Acquiring these skills requires practice and exposure to events. Otolaryngology residents, while called upon to deal with emergency airway problems, currently lack standardized training in advanced airway skills. This project aimed to create such a program by using simulation based methodology and to evaluate it using specific educationally based tools. **Study Design:** N/A. **Methods:** The program consisted of lectures and simulation based laboratory training sessions designed to impart competency in a set of defined airway skills to otolaryngology residents in our program. Participating residents who completed the course (n=13) were evaluated for their fund of knowledge through multiple choice examinations and for clinical reasoning and technical skills as assessed by a panel of academic otolaryngologists in simulated difficult airway situations, both before and after the course. Self-assessment tools were also incorporated. **Results:** The average multiple choice score was 12/27(44%) before the course and 15/27(55%) after the completion of the course. Faculty assessment yielded a cumulative score of 81% and 91% pre- and post-course, respectively. While all residents reported prior experience in a critical emergency airway situation, only one reported prior training in advanced airway skills. A significant increase in self-perceived ability to carry out critical airway related skills were observed. All respondents felt the course was effective while the practicum/hands-on training was deemed most educational. **Conclusions:** Simulation based airway training courses can be effectively incorporated into existing otolaryngology resident educational curricula. Residents demonstrated measurable improvement in clinical knowledge base, technical skills and self-perceived abilities to handle difficult airway situations.

8:24 **Achievement of Competency in Endoscopic Sinus Surgery of Otolaryngology Residents**
Sandra Y. Lin, MD, Baltimore, MD; Kulsoom Laeeq, MD, Baltimore, MD (Presenter); David A. Diaz Voss
Varela, MD, Baltimore, MD; Andrew P. Lane, MD*, Baltimore, MD; Douglas P. Reh, MD, Baltimore, MD; Nasir I.
Bhatti, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the objective assessment of competency for endoscopic sinus surgical skills of otolaryngology residents in the operating room. In particular, we will discuss the number of procedures required to demonstrate competency in endoscopic sinus surgery.

Objectives: The goal of our study was to identify the number of endoscopic sinus surgery (ESS) procedures required to demonstrate competency in ESS, using previously validated assessment tool. **Study Design:** Prospective observational study. **Methods:** Seventeen residents from an otolaryngology-head & neck surgery residency program were evaluated while they performed endoscopic sinus surgery in the operating room. Eight faculty members participated as evaluators. Global and checklist parts of the ESS assessment tool were used for evaluation purposes. The instrument used in the study is based on the Objective Structured of Assessment Skills (OSATS) tool and has been previously validated for use in laboratory and operating room. Residents were deemed competent if they achieved a minimum score of 3 on a 5 point Likert scale, on each step of the surgery. **Results:** A total of 73 evaluations were completed for 17 residents (post-graduate level 2-5) by 8 evaluators between 2009 and 2011. An 80% probability of demonstrating competency in ESS is achieved after performing 50 ESS procedures, and the probability approaches 100% after performing 55 endoscopic sinus surgery procedures. On average it took residents 23 cases to become competent in performance of maxillary antrostomy and anterior ethmoidectomy. **Conclusions:** Our results suggest that it requires 50 ESS procedures to attain an 80% probability of competency in ESS. These results have implications for otolaryngology residency programs when developing competency based curriculum for teaching surgical skills.

8:32 **Sinus Surgery Task Trainer: A Model for Training and Assessment of Endoscopic Sinus Surgery Skills**
Matthew K. Steehler, MD, Washington, DC; Hana Na, MSc BS, Washington, DC; Michael J. Pfisterer, MD, Newark,
NJ; Hosai N. Hesham, MD, Washington, DC; Marieta Pehlivanova, BSc, Washington, DC; Sonya Malekzadeh, MD
FACS, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to evaluate the objective structured assessment of technical skills (OSATS) of a low cost sinus surgery trainer and assess its value in training novice residents the fundamental maneuvers of functional endoscopic sinus surgery.

Objectives: To perform an objective structured assessment of technical skills (OSATS) on a validated low cost sinus surgery task trainer in acquisition of skills for endoscopic sinus surgery. **Study Design:** Blinded prospective study. **Methods:** Medical students (N=52) with no sinus surgery experience performed nasal endoscopy and five specific sinus surgery tasks using the validated task trainer. Subsequent training on the model included regimented expert instruction, peer instruction/observation, and experienced based learning. Pre- and post-training video recordings of nasal endoscopy and five sinus surgery skills were obtained. Two blinded expert otolaryngologists performed an OSATS of pre- and post-training performance using a checklist and global rating scale.

Medical student post-training results were compared to their pre-training results and those of experienced otolaryngologists (N=10).

Results: Medical student post-training performance was significantly better than pre-training performance as calculated by analysis of variance (ANOVA) ($p < 0.001$). When compared to experienced otolaryngologists, the post-training results were nearly equivalent. The study demonstrated good inter-rater reliability and internal consistency. **Conclusions:** The sinus surgery task trainer provides an effective means of teaching basic sinus surgery skills to novice surgeons. With repeated practice, there was significant improvement in performance. The students' post-training results were similar to experienced surgeons. An OSATS using the sinus surgery task trainer suggests that we can effectively measure endoscopic sinus surgery ability with the potential to reliably determine competency outside the operating room.

8:40 Do U.S. Medical Licensure Examination Scores Correlate with Otolaryngology In-Training Examination Scores and the American Board of Otolaryngology Examination Performance?

Beth N. McNulty, MD, Louisville, KY; Jeffrey M. Bumpous, MD*, Louisville, KY; Jarrod A. Little, MD, Louisville, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to: discuss the relationship between the U.S. Medical Licensure Examination (USMLE) Step One score, the annual Otolaryngology Training Examination (OTE), and subsequent performance on the American Board of Otolaryngology (ABOto) examination.

Objectives: To test the hypothesis that U.S. Medical Licensure Examination (USMLE) Step One scores have a positive correlation with performance on the annual Otolaryngology Training Examination (OTE) and subsequent performance on the American Board of Otolaryngology (ABOto) examination. **Study Design:** A retrospective cohort study of 70 residents completing otolaryngology residencies from 2005-2009. **Methods:** USMLE Step 1 scores, OTE scores, and performance on the ABO examination were collected for the graduating chief residents from 2005-2009 from a limited number of residency programs. The associations between the examinations were evaluated using Spearman's rank correlation coefficient and Pearson's correlation. **Results:** USMLE Step 1 scores and board performance were provided for 70 residents from 7 otolaryngology residency programs. Positive correlations were found using Pearson's and Spearman's correlation to be significant for USMLE Step 1 scores compared with scores on the OTE-2 ($p < 0.000$), OTE-3 ($p < 0.005$, $p < 0.004$), OTE-4 ($p < 0.000$), OTE-5 ($p < 0.045$, $p < 0.006$), and the board examination ($p < 0.005$, $p < 0.027$). Statistically significant correlation was seen between the OTE-4 score and performance on the board examination using both Pearson's ($p < 0.039$) and Spearman's ($p < 0.049$), but not for the OTE-2, OTE-3, OTE-5 and performance on the written board examination. **Conclusions:** An objective criterion for interview selection is the USMLE Step 1 score; we found a positive correlation with performance on the annual OTE and subsequent performance on the American Board of Otolaryngology examination. The OTE-4 score was also found to positively correlate with board examination performance. Larger numbers and longitudinal followup is necessary to establish the significance of these findings.

8:48 Discussion/Q&A

8:55 PANEL: PAY FOR PERFORMANCE—QUALITY MATTERS

Moderator: Kathleen L. Yaremchuk, MD*, Detroit, MI

Panelists: David W. Roberson, MD FACS*, Boston, MA
Michael N. Neuss, MD, Nashville, TN
David B. Hoyt, MD FACS, Chicago, IL

9:45 - 10:15 Break with Exhibitors - View Posters

**GENERAL, RHINOLOGY, ALLERGY
Elizabeth F-G-H**

Moderators: Timothy L. Smith, MD MPH FACS*, Portland, OR
Dale H. Rice, MD FACS*, Los Angeles, CA

10:15 Drug Induced Sleep Endoscopy Effects on Surgical Management for Obstructive Sleep Apnea

M. Boyd Gillespie, MD MSc, Charleston, SC; Ryan P. Reddy, MD, Charleston, SC; Shaun A. Nguyen, MD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the difference between awake endoscopy and drug induced endoscopy in the evaluation of obstructive sleep apnea.

Objectives: Examine the role of drug induced sleep endoscopy (DISE) compared to supine awake fiberoptic endoscopy (AE) in the surgical management of obstructive sleep apnea (OSA). **Study Design:** Prospective, controlled trial. **Methods:** Patients with OSA who failed CPAP were evaluated for surgical salvage with AE and DISE in an effort to identify the level of airway collapse. DISE exams were performed under targeted controlled infusion of protocol to achieve gradual and steady sedation. Assessment scores from AE and DISE were correlated with surgical plan changes and patient outcomes. **Results:** Thirty-eight patients (22 M, 16 F) with

age range of 19 - 67 years and mean BMI of 31.9 underwent preoperative assessment with AE and DISE. DISE was successfully performed in the majority of patients (97%) without complication. DISE was discontinued in one patient (3%) who became combative during propofol infusion. When compared using a novel airway grading scale, DISE demonstrated significantly more levels of collapse with greater severity compared to AE ($p=0.0001$). The surgical plan formulated on the basis of AE was changed after DISE in 24 (65%) cases and left unchanged in 13 (35%) cases. The majority of patients (73%) had multi-segmental airway collapse on DISE with fewer having only palate (16%) or tongue base (11%) collapse. Scoring of DISE videos demonstrated good intraterater (Kappa 0.61) and interater (Kappa 0.65) correlation when blindly reviewed by the surgeon and two experienced colleagues. **Conclusions:** DISE provides more clinical information to assess airway function and collapse than routine clinical inspection and AE alone and can assist surgical planning in OSA patients.

10:23 Sprayable Chitosan/Starch Based Gel Reduces Adhesion Formation in a Sheep Model for Chronic Sinusitis
Subinoy Das, MD, Columbus, OH; Jennifer G. Medina, MS, Jacksonville, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the efficacy of a novel sprayable gel's ability to reduce adhesion formation in a surgical sheep model for chronic sinusitis.

Objectives: Postoperative adhesion formation after endoscopic sinus surgery (ESS) remains a complication associated with high revision rates. This study determines the efficacy of a sprayable chitosan/starch based gel for reducing adhesions in an endoscopic sinus surgical sheep model for chronic sinusitis. **Study Design:** Prospective, randomized controlled trial. **Methods:** Fourteen sheep with eosinophilic rhinitis (determined by the presence of eosinophilia in nasal secretions) underwent ESS with middle turbinectomies, standardized mucosal injuries created on the lateral nasal wall, and partial thickness wounds created around the ethmoid cell region. Surgery was performed bilaterally (28 nasal cavities). Animals were randomized into treatment with a sprayable chitosan/starch based gel ($n=7$, 14 nasal cavities) or no treatment ($n=7$, 14 nasal cavities). Two animals in the treatment group expired due to anesthetic complications associated with the turbinectomy procedure leaving 5 animals (10 sites) that completed the study. Presence of adhesions was assessed by endoscopic evaluation at days 14 and 28 post-initial surgery. Adhesion formation was confirmed via necropsy of the sinus cavities at day 28 post-initial surgery. **Results:** Adhesions were observed in all 7 control animals resulting in an 86% adhesion rate (12 of 14 sites). The 5 surviving treatment animals had a 10% adhesion rate (1 of 10 sites). Treatment with the sprayable chitosan/starch based gel resulted in a 76% reduction of ethmoidal adhesions $p<0.001$. **Conclusions:** In this sheep model for chronic sinusitis, treatment with a sprayable chitosan/starch based gel reduced adhesion formation by 76% after ESS $p<0.001$.

10:31 A Role for Anti-BP180 Autoantibodies in Chronic Rhinosinusitis
Jill S. Jeffe, MD, Chicago, IL; Robert P. Schleimer, PhD, Chicago, IL; Bruce K. Tan, MD, Chicago, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the distribution of BP180 in nasal epithelium and discuss the possible role of anti-BP180 autoantibodies in CRS.

Objectives: Epithelial host defects are being increasingly implicated in the etiology of chronic rhinosinusitis (CRS). CRS is accompanied by evidence of a vigorous adaptive immune response, and emerging studies demonstrate that some nasal polyps manifest a polyclonal autoantibody response. We previously found that antibodies against BP180, a component of the hemidesmosome complex and the dominant epitope in autoimmune bullous pemphigoid, were found at elevated levels in nasal polyp tissue. Given the critical role of hemidesmosomes in maintaining epithelial integrity, we sought to investigate the distribution of BP180 in the nose and evaluate for evidence of autoimmunity against this antigen in CRS. **Study Design:** Prospective laboratory based study. **Methods:** The expression and distribution of BP180 in normal nasal tissue and cultured nasal epithelial cells were confirmed using immunohistochemistry, immunofluorescence, real time PCR and Western immunoblotting. Sinonasal tissue extracts and sera were collected from three groups: normal, CRSsNP, and CRSwNP. A commercially available ELISA and direct immunofluorescence were utilized to compare anti-BP180 autoantibody levels in sera and tissue extracts. **Results:** BP180 is expressed in nasal epithelium, but is not confined to the basement membrane as it is in human skin. BP180 is also present in greater quantities in nasal epithelial cells than in epidermal keratinocytes. There are locally elevated levels of anti-BP180 autoantibodies in nasal polyp tissue and significantly higher levels of circulating nonpathologic anti-BP180 autoantibodies in CRS ($P<0.05$). **Conclusions:** BP180 may serve a different role and function in nasal epithelium versus skin. Further investigations are ongoing to characterize the pathogenicity of the anti-epithelial antibody response in CRS.

10:39 Perineural Invasion in Squamous Cell Carcinoma Detected by High Field 3.0 Tesla Magnetic Resonance Imaging, a Case Series
Stanley W. McClurg, MD, Columbus, OH; Patrick L. Bockenstedt, MS, Columbus, OH; D. Bradley Welling, MD PhD*, Columbus, OH; Claudia F. Kirsch, MD, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss high field 3.0 tesla MRI imaging and its use in diagnosing perineural invasion in squamous cell carcinoma.

Objectives: Perineural invasion (PNI) is associated with a poor prognosis and decreased survival in squamous cell carcinoma (SCC) of the head and neck. PNI may be initially clinically silent, therefore accurate radiographic diagnosis is imperative for improved treatment planning and outcomes. In this study, high field 3.0 tesla (T) MRI proved superior in evaluating PNI in two

patients with parotid PNI, initially not appreciated on 1.5-T MRI imaging. **Study Design:** Case series. **Methods:** Radiographic images from 1.5 and 3.0 T MRI in 2 patients with cutaneous SCC and facial nerve weakness were reviewed. The first patient presented with a cutaneous left infra-auricular SCC treated initially with Mohs surgery, subsequently developing a left facial nerve weakness. The second patient presented with parotid gland invasion of SCC and facial nerve weakness. Both patients underwent surgical resection. **Results:** 1.5-T MRI imaging revealed no obvious parotid or facial nerve signal abnormalities in both patients. In the patient with Mohs surgery 3-T MRI imaging obtained within one month of 1.5-T imaging, revealed abnormal left facial nerve enhancement in the stylomastoid foramen and posterior digastric, stylohyoid, and posterior auricular branches. In the second patient, 3-T MRI showed abnormal enhancement along the left facial nerve and left frontal branch. Histopathology from surgical resection confirmed PNI of the facial nerve and branches in both patients. **Conclusions:** PNI in head and neck SCC remains a diagnostic challenge, however the utilization of high field 3-T MRI imaging may allow for improved preoperative assessment, surgical planning, and treatment outcomes.

10:47 Implementation of a Novel Subspecialty Clinic for Indigent Patients

Robbi A. Kupfer, MD, Ann Arbor, MI; Andrew G. Shuman, MD, New York, NY; Carol R. Bradford, MD*, Ann Arbor, MI; Erin L. McKean, MD, Ann Arbor, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss implementation of a free subspecialty clinic for indigent patients at a tertiary care academic otolaryngology department.

Objectives: This study was designed to describe the implementation, utilization and outcomes of an otolaryngology clinic for indigent patients employing a novel design. **Study Design:** Prospective pilot study. **Methods:** A tertiary care academic otolaryngology department partnered with a nonprofit outpatient clinic for indigent patients in order to provide free subspecialty consultation services. A novel format was utilized in which the department provided onsite, scheduled outpatient multidisciplinary consultation on weekends, staffed by volunteer clinicians and ancillary staff. A review of the program was conducted using prospectively collected data. Clinic design, manpower, utilization and feasibility were described along with demographic and clinical data for all patients participating in the clinic from 2010-2011. **Results:** Four clinics were held over 12 months, totaling 60 patient visits, with uniformly positive feedback regarding accessibility and quality of services provided. A total of 42 procedures were performed, including audiograms, endoscopies, otologic procedures, biopsies and/or excisions, nasal polypectomy, and uvulectomy. The total cost of medical services that were provided to patients was estimated at \$28,000. Four potentially life threatening conditions were newly diagnosed. Fifteen patients received conclusive evaluation and treatment at the time of their first visit. Nine patients required further subspecialty treatment and/or surgery that could not be provided in the outpatient setting and were referred appropriately. **Conclusions:** The partnership between an academic otolaryngology department and a nonprofit clinic successfully provided free onsite consultation for indigent patients. Such an arrangement is feasible, well utilized, and successful in delivering high quality care to indigent patients who lack traditional access to medical care.

10:55 Global Health Initiatives of U.S. Otolaryngology Residency Programs: A Profile; 2011 GHI Survey Results

Peter G. Volsky, MD, Norfolk, VA; John T. Sinacori, MD, Norfolk, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the extent of, and type of work and participation of U.S. otolaryngology faculty and residents/fellows in global health volunteer initiatives.

Objectives: 1) Quantify the involvement of U.S. otolaryngology residency programs in global health endeavors; 2) identify the goals and services provided; and 3) determine the degree of participation of residents/fellows. **Study Design:** Cross-sectional survey of U.S. otolaryngology faculty. **Methods:** A ten point online questionnaire distributed to 103 U.S. otolaryngology residency program directors. All faculty involved in global health volunteerism were invited to participate. **Results:** Twenty-nine global health initiatives of 26 residency programs were represented. Most initiatives involve one (35%) or more than one (41%) faculty member. Common locations served are freestanding hospitals or clinics (24%); compared to American NGOs (17%), academic centers (14%) and remote locations (14%). Most (96%) otolaryngology initiatives abroad provide specialty surgical services, but some provide primary care (28%) and general surgical services (14%). Residents/fellows participate 65% of the time, mostly on a volunteer basis. About three-fourths of initiatives train foreign surgeons. Most respondents (79%) report that their endeavors are likely to merit ACGME approval. A majority of sites are not religiously affiliated (61%), while the remainder mostly Christian. Only one-fifth of respondents knew the name of the nearest otolaryngology training institution. Research was a less prevalent goal (14%) than faculty exchange (21%) and resident/fellow exchange (45%). **Conclusions:** At least one in four (26) U.S. otolaryngology residency programs engage in global health volunteerism. While implementation varies, patient population is sufficient to provide training experience for U.S. residents/fellows and local surgeons. Such initiatives support the ACGME competency of systems based practice; there remains a need to develop relationships between U.S. medical teams abroad and local training institutions.

11:03 Laser Tonsil Cryptolysis, In-Office 500 Cases Review

Victor Z. Kizhner, MD, New York, NY; Yosef P. Krespi, MD*, New York, NY (Presenter)

Educational Objective: At the conclusion of this presentation, the participants should be able to understand benefits of laser tonsil cryptolysis offering a sound alternative beneficial to patient and provider.

Objectives: Tonsilloliths were proven to be tonsillar biofilms. Symptoms may vary from halitosis, foreign body sensation and recur-

rent infection. The common treatment options are tonsillectomy or intracapsular tonsillotomy under general anesthesia. Laser tonsil cryptolysis (LAIT) performed in the office under local anesthesia (LA) may represent an excellent alternative. **Study Design:** A retrospective chart analysis using CPT codes was performed. **Methods:** Data recorded included complications, re-bleeding, the need for an additional procedure, conversion rate to complete tonsillectomy and patient reported satisfaction. **Results:** 500 LTC performed in the office were identified. All procedures were under LA using two different surgical lasers, CO2 and diode with laser settings of 18W and 10W for the CO2 laser and the diode respectively in continuous mode. Re-bleeding occurred in 5 patients requiring bleeding control under local anesthesia in 1 patient. 80 patients required a repeated procedure, comprising 1.16 procedures per patient, 18 (3.6%) patients required complete tonsillectomy. Patient satisfaction was high overall with 1-2 work days lost. Patient followup was 1-8 years. **Conclusions:** LTC with correct surgical indications (small tonsils, controllable gag reflex, patient cooperation) allows numerous advantages over standard tonsillectomy. The avoidance of general anesthesia with the benefits of limited intracapsular tonsillotomy (reduced pain and complications) allows reduction of perioperative time for the patient and the provider while optimizing convenience. With 1.16 sessions required per patient, low conversion rate to standard tonsillectomy and minimal re-bleeding LAIT should be considered the first option for the right patient.

11:11 Discussion/Q&A

Moderators: Marvin P. Fried, MD FACS*, Bronx, NY
Robert C. Kern, MD FACS*, Chicago, IL

11:18 Preoperative Topical Antimicrobial Decolonization in Head and Neck Surgery: A Randomized Controlled Trial

Andrew G. Shuman, MD, Ann Arbor, MI; Emily K. Shuman, MD, Ann Arbor, MI; Samantha J. Hauff, MD, Ann Arbor, MI; Emily Light, MS, Ann Arbor, MI; Carol E. Chenoweth, MD, Ann Arbor, MI; Carol R. Bradford, MD*, Ann Arbor, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role of preoperative topical antimicrobial decolonization in head and neck surgery, describe the incidence and implications of preoperative *S. aureus* colonization, and identify independent of surgical site infections after head and neck surgery.

Objectives: Surgical site infections (SSI) are an important cause of morbidity and mortality after head and neck surgery. Our objectives were to 1) determine the efficacy of preoperative topical antimicrobial decolonization; 2) describe the incidence and implications of preoperative *S. aureus* colonization; and 3) determine independent predictors of SSI after head and neck surgery. **Study Design:** Prospective, randomized controlled trial. **Methods:** Patients presenting for head and neck surgery requiring admission were randomized to preoperative topical antimicrobial decolonization with chlorhexidine rinses and intranasal mupirocin coupled with standard perioperative systemic antimicrobial prophylaxis versus standard prophylaxis without decolonization. The main outcome was the incidence of SSI at 30 days. Secondary outcome measures included the determination of what clinical variables, including preoperative colonization status, significantly affected the rate of SSI. **Results:** 84 patients were analyzed; groups were well matched. Despite a trend suggesting a decrease in SSI with the institution of perioperative topical antimicrobial decolonization (24% incidence of SSI in control group versus 10% incidence of SSI in experimental group), there was no significant difference in outcomes between the two groups (OR 0.34; 95% CI 0.10 - 1.18; p=0.079). Patients with a higher American Society of Anesthesiologists Physical Status classification (3 vs. 1, p=0.02), with more operative blood loss (p=0.05), and who required operative takeback (p=0.04) had a higher rate of SSI. **Conclusions:** Preoperative antimicrobial decolonization did not significantly decrease the incidence of SSI after head and neck surgery. Risk factors for SSI after head and neck surgery are identified for the first time in a prospective study.

11:26 Comparison of Endoscopic versus 3D CT Derived Airway Measurements

E. Hollin Calloway, BA BS, Chapel Hill, NC; Julia S. Kimbell, PhD, Chapel Hill, NC; Stephanie D. Davis, MD, Chapel Hill, NC; George G. Retsch-Bogart, MD, Chapel Hill, NC; Elizabeth A. Pitkin, BSN, Chapel Hill, NC; Carlton J. Zdanski, MD, Chapel Hill, NC

Educational Objective: The participants should understand how endoscopic airway measurements compare to 3D CT derived measurements, where these methods are potentially useful, and where each has limitations.

Objectives: To understand 1) how endoscopic airway measurements compare to 3D CT derived measurements; 2) where these methods are potentially useful; and 3) where these methods have limitations. **Study Design:** Quantitative comparison of airway measurements from endoscopic images versus computer generated 3D CT. **Methods:** Videobronchoscopy was performed on an adult sized commercially available airway mannequin and recorded. At pre-chosen cross-sectional levels within the mannequin, still video frames were used to measure the cross-sectional area using a referent placed via the biopsy port and imaging software. From the same mannequin, 3D reconstructions were generated from high resolution CT and cross-sectional areas were obtained. **Results:** At three levels of mechanically generated stenosis within the trachea the differences between the endoscopic measurement and the 3D model cross sectional area were 1%, 0%, and 7% (1.8, 0.8, and 14 mm²). At the vocal folds, the difference was 9% (7.8 mm²). The minimal cross-sectional area of the pharynx and choana differed by 36%, and 30% (36.67 mm², 122.71 mm²). **Conclusions:** Endoscopy is an effective tool for obtaining airway measurements compared with 3D reconstructions. Concordance is best where the entire cross-section measured is visible within one camera field of view and in areas that are geometrically simple (trachea, round; and vocal folds, triangular) versus geometrically complex areas that encompass more than one field of view (i.e. pharynx,

choana). Correlation of the exact level of measurement can be challenging. Use of both the mannequin and CT does not account for the dynamic nature of the airway.

11:34 Clinical Value and Cost Implications of Routine Pathological Examination of Tissues Removed during Septoplasty

Timothy M. Haffey, MD, Cleveland, OH; Aaron P. Hoschar, MD, Cleveland, OH; Raj H. Sindwani, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be stimulated to compare their own practice habits in the handling of septal tissues with those presented from our healthcare system and evaluate whether the clinical utility is worth the associated costs.

Objectives: During septoplasty, otherwise normal cartilage and bone are removed and routinely submitted for pathologic examination. According to the College of American Pathologists (CAP), however, the examination of bone and cartilage from septoplasty and rhinoplasty may be left to the pathologist's discretion. We explored the processing of tissues removed during septoplasty in our healthcare system, examining the clinical value and cost implications of current practices. **Study Design:** Retrospective chart review. **Methods:** Our database was searched for septoplasty (CPT code 30520) procedures performed specifically for the indication of nasal obstruction. **Results:** Five hundred consecutive cases from 16 surgeons spanning a 2.5 year period were identified. In almost all cases, septal tissues removed during surgery were submitted to pathology. The majority of cases (over 90%) involved septoplasty performed in conjunction with another procedure, most commonly addressing the inferior turbinates. All septal specimens received gross examination by a pathologist and a very small fraction were also examined histologically. Gross findings included the qualitative appearance of the specimen and dimensional measurements of bone and cartilage fragments. No abnormalities were identified (by gross or histologic examination) in any of the specimens. Associated costs included specimen handling, storage, and pathology professional fees. **Conclusions:** In our healthcare system, it is common practice to submit tissues removed during septoplasty for pathologic examination. This study demonstrates that routine evaluation of septal tissues following surgery for obstruction has no clinical value whatsoever and is associated with significant direct and indirect costs. Given the current healthcare climate, this practice should be further scrutinized and reconsidered.

11:42 Intraoperative Ice Pack Application for Post-Tonsillectomy Pain Reduction: A Randomized Control Trial

Brian W. Rotenberg, MD MPH FRCSC, London, ON Canada; Brandon Wickens, MD, London, ON Canada (Presenter); Jason Parnes, BSc, London, ON Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the role of intraoperative ice pack application for the reduction of pain following electrocautery tonsillectomy.

Objectives: Pain after tonsillectomy causes patients significant morbidity. The literature has evaluated multiple techniques employed to reduce post-tonsillectomy pain, with none as yet being definitive. The purpose of this study was to evaluate the effect of intraoperative ice pack application on post-tonsillectomy pain. **Study Design:** A two arm randomized control trial was conducted comparing room temperature and cold pack application during tonsillectomy. **Methods:** After inclusion and exclusion criteria were met, patients were enrolled and underwent standard electrocautery tonsillectomy. Packs (room temperature vs ice pack) were placed into the tonsillar fossae immediately following tonsil removal. The primary outcome measure was pain rating following surgery, which was assessed via a daily self-report visual analog scale. Return to work and return to normal diet were also assessed. T-test and Mann Whitney statistical analyses, as well as routine descriptive statistics, were conducted. **Results:** Eighteen subjects were recruited. Patients that received intraoperative cold packs experienced a statistically significant mean reduction in pain when compared to patients receiving room temperature packs (3.4 +/-1.2 (p < 0.001)). No difference in return to work (p = 0.21) and return to normal diet (p = 0.32) was identified. **Conclusions:** Intraoperative ice pack administration results in significantly reduced pain following electrocautery tonsillectomy. The technique is inexpensive and highly effective.

11:50 Discussion/Q&A

Introduction of President-Elect
Jesus E. Medina, MD FACS*, Oklahoma City, OK

12:00 ADJOURN

Allergy/Rhinology

A131. Nasal Hydrocodone-Acetaminophen Abuse Induced Necrosis of the Septum and Palate

David K. Alexander, BS, Lexington, KY; Keith J. Alexander, MD, Lexington, KY; Joseph Valentino, MD, Lexington, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the common pathological presentation and treatment of intranasal hydrocodone-acetaminophen abuse.

Objectives: Two million new users will abuse prescription narcotics this year, most commonly hydrocodone. The most commonly prescribed form is hydrocodone-acetaminophen (H-A). Many individuals crush the tablets and snort the product to take advantage of the transmucosal delivery of narcotics. The resultant pathology of intranasal abuse of H-A products has been described only in a few case studies. We present a large patient series of intranasal H-A abuse. Characterizing the disease's presentation, pathology, and treatment management will improve providers' abilities to diagnose and treat this condition. **Study Design:** This is a retrospective chart review. **Methods:** Thirty-two patients presenting for treatment between 2004 and 2011 for sequelae of intranasal ingestion of crushed H-A were identified. The patients were from three independent otolaryngology practices. **Results:** Most patients will initially deny the behavior frequently delaying diagnosis. Followup was limited as only 19% returned for follow up care. Patients presented with facial or nasal pain (34%), sore throat (31%), and nasal congestion (25%). Active necrosis or prior tissue loss was noted in 75% of patients. Fifty percent of patients presented with septal perforations and 19% with palatal perforations. Two cases of invasive fungal sinusitis were clearly documented with one resultant death. **Conclusions:** The vast majority of cases presented with acute necrosis of soft tissue and bony oronasal structures. The condition in most cases is self-limited after cessation of the abuse. Acute debridement is likely beneficial in severe cases. The psychosocial issues of these patients preclude longitudinal study of the disease process.

A132. Effects of Maxillary Antrostomy Configuration and Size on Nasal Spray Deposition in the Maxillary Sinus: A Virtual Surgery Study Using Computational Fluid Dynamics

Vishal H. Dhandha, BS, Chapel Hill, NC; Dennis O. Frank, PhD, Chapel Hill, NC; Kibwei A. McKinney, MD, Chapel Hill, NC; Deepak R. Dugar, MD, Chapel Hill, NC; Julia S. Kimbell, PhD, Chapel Hill, NC; Adam M. Zanation, MD, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role virtual surgical techniques and computational fluid dynamics (CFD) analysis may have in the optimization of outcomes and topical drug delivery in functional endoscopic sinus surgery (FESS) patients.

Objectives: As part of an ongoing clinical trial studying pre and post-FESS nasal airflow, this study alters the antrostomy size virtually in a three dimensional (3D), post-FESS nasal reconstruction and uses CFD analysis to simulate and quantify nasal spray delivery in the maxillary sinus. **Study Design:** Comparison of particle deposition simulations in a controlled and virtually altered post-FESS CFD model. **Methods:** A 3D nasal reconstruction was made from a post-FESS CT scan using Mimics™ software. The existing bilateral 1.5cm antrostomies were enlarged to 2.5cm, with ("mega") or without ("large") partial removal of the inferior turbinates. Steady-state inspiratory airflow and sprayed particle transport were simulated using ICEM-CFD™ and Fluent™ with a particle size distribution of 10µm to 110µm and spray speeds of 1 or 10m/s. Particle deposition on anterior and posterior sinus walls and antrostomy regions was normalized by surface area. **Results:** In all simulations, less than 10% of sprayed particles bypassed the nasal passages, with most particles depositing in the anterior nose and very little antrostomy or maxillary sinus deposition. Generally, more particles/mm² deposited in the right antrostomy/sinus areas (3%) than on the left (0.3%), and was predominately limited to the posterior sinus wall. There was no anterior antrostomy deposition. Effects of antrostomy size and spray speed were minimal. **Conclusions:** Preliminary results suggest that partial resection of the inferior turbinate may have little advantage in nasal spray drug delivery to the sinus. These results are not generalizable to irrigation or nebulized drug delivery systems.

A133. Endoscopic Endonasal Approach for the Maxillary Sinus Inverted Papilloma

Yasuyuki Hinohira, MD PhD, Tokyo, Japan; Masahiro Komori, MD PhD, Nankoku, Japan; Harumi Suzuki, MD PhD, Tokyo, Japan

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) understand endoscopic endonasal sinus surgery is a successful technique for the maxillary sinus inverted papilloma; and 2) explain the alternative to endonasal medial maxillectomy that seems relatively invasive.

Objectives: This study demonstrated that endoscopic endonasal sinus surgery (ESS) is a successful technique to remove inverted papilloma (IP) originating from the maxillary sinus, which frequently recurs. Translacrimal bone approach as the alternative to endonasal medial maxillectomy (EMM) was advocated. **Study Design:** Retrospective study. **Methods:** Between 1998 and 2010, 21 patients with maxillary sinus inverted papilloma (IP) were operated on, using endoscopic endonasal sinus surgery (ESS) techniques. The patients consisted of 16 men and 5 women, and the age ranged from 25 to 81 years old. Krouse's stage classification of the 21 patients was distributed as follows, II; 10, III; 10, IV; 1. ESS was completed in all patients. Translacrimal bone approach was added to the conventional middle meatal antrostomy in 4 patients classified as stage III. In these patients, IP had originated from the anterior-lateral wall of the maxillary sinus. The new approach accompanied by submucous inferior turbinate bone resection could totally remove IP, preserving the nasolacrimal duct and the turbinate mucosa. **Results:** No evident complication was found intra or postoperatively. No recurrence was seen in 4 patients to whom translacrimal bone approach was added. Recurrence of IP was seen in the other 4 patients (stage II; 2, III; 2). Revision ESS was successfully performed. **Conclusions:** ESS is a successful technique even in patients in which IP originates from the deep maxillary sinus. Our new approach is less invasive and can be alternative to EMM

Posters

although the number of patients and the followup period were limited in this study.

A134. Computer and Catheter Assisted Frontal Sinusotomy

Yi H. Kao, MD, State College, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand a new technique for frontal sinus surgery using computer navigation to guide the vortex catheter into the frontal sinus then use the catheter as a guide for performing frontal sinusotomy.

Objectives: To introduce a new technique for computer and catheter guided frontal sinus surgery. **Study Design:** IRB approved cohort prospective study. **Methods:** Patients with history of recurrent and chronic sinusitis and with confirmed frontal sinus disease on CT scan are selected. LM and SNOT-20 scores are collected before and 3 months after surgery. Preop planning includes colorization of the nasofrontal duct and the areas to be resected. Real time navigation is used to guide the luma wire and then the catheter into the frontal sinus. The catheter is left in place to guard the skull base and anterior ethmoidal artery. Digital subtraction imagery is used for real time observation of the progress and extent of resection. **Results:** In 90+ patients we report 99% frontal sinus cannulation rate and 1% redo rate. There were no major complications. One patient had postop bleeding requiring return to OR for packing. **Conclusions:** Computer and catheter assistance increases the success rate and safety of frontal sinus surgery.

A135. Minimizing Sinonasal Morbidity during Endoscopic Pituitary and Rathke's Cleft Cyst Surgery: Clinical Outcomes of the Novel Nasoseptal Rescue Flap Technique

Rounak B. Rawal, BA, Chapel Hill, NC; Adam J. Kimple, BS, Chapel Hill, NC; Deepak R. Dugar, MD, Chapel Hill, NC; Adam M. Zanation, MD, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the indications, technique, methodology, and results of patients requiring use of the nasoseptal rescue flap in expanded endoscopic skull base surgery.

Objectives: Nasoseptal flap (NSF) vascularized skull base reconstruction has reduced postoperative CSF leak rate to less than 5%. The NSF has historically been raised at the beginning of the case to protect the pedicle during sphenoid opening. During pituitary tumor surgery, intraoperative CSF leak is not always encountered and thus unnecessarily harvested NSF increases patient morbidity. The novel nasoseptal rescue flap allows for partial harvesting of the most posterior aspect of the NSF to protect its pedicle while still providing access to the sphenoid face. The rescue flap can then be fully harvested for reconstruction after tumor dissection if needed. **Study Design:** Retrospective consecutive case series. **Methods:** Patients requiring nasoseptal rescue flaps were identified from the senior author's database. **Results:** Nasoseptal rescue flaps were harvested in 26 consecutive patients, with only seven (27%) patients actually requiring use of the rescue flap for skull base reconstruction due to intraoperative CSF leak. Six patients had low flow CSF leaks, while one patient had a high flow CSF leak. 19 patients had pituitary adenomas, while seven patients had Rathke's cleft cyst. Mean followup time was six months (range: 1 - 16 months). Since surgery, no patients have presented with CSF leak or septal perforation. The success in those seven patients with rescue flap utilization was 100%. **Conclusions:** The nasoseptal rescue flap is an effective surgical technique for patients undergoing pituitary surgery without a planned NSF. It allows for vascularized skull base reconstruction if an intraoperative CSF leak is encountered and minimizes donor site morbidity if a leak is not encountered.

A136. Efficacy of a Topical Sesame/Rose Geranium Oil Compound in Patients with Hereditary Hemorrhagic Telangiectasia Associated Epistaxis

Douglas D. Reh, MD, Baltimore, MD; Kevin A. Hur, BS, Baltimore, MD; Christian A. Merlo, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to better understand the effectiveness of sesame/rose geranium oil in the treatment of HHT related epistaxis.

Objectives: Topical sesame/rose geranium oil compound is an effective therapy for hereditary hemorrhagic telangiectasia (HHT) associated epistaxis. **Study Design:** Cohort study. **Methods:** Twenty patients with HHT confirmed by the Curacao criteria were treated with a sesame/rose geranium oil topical compound between April 2010 to June 2011. A treatment evaluation survey was conducted at no less than 3 month followup. Changes in epistaxis severity scores (ESS), patient satisfaction, and any adverse effects were assessed. **Results:** A total of 20 patients completed the study. The average (SD) age was 54.4 (14.6) and 14 (70%) were female. The median time on rose geranium oil was 183 days (IQR: 114-311). At the conclusion of the study, 18 (90%) were still using rose geranium oil. The majority (75%) of patients subjectively felt improvement with the treatment. The improvement was felt to be gradual in 25% and immediate in 50% of patients. Mean (SD) overall satisfaction using a 10 point Likert scale was 7.8 (3.1) with 50% of the patients reporting a satisfaction rating of 10. Mean (SD) epistaxis severity score (ESS) prior to treatment was 5.3 (1.7). After treatment with sesame/rose geranium oil, mean (SD) ESS was found to be 3.5 (1.8). Treatment with rose geranium oil was associated with a statistically significant improvement in ESS by 1.81 ($p < 0.0001$). There were no adverse side effects from the treatment. **Conclusions:** A sesame/rose geranium oil compound can significantly reduce the epistaxis severity scores of patients with hereditary hemorrhagic telangiectasia related epistaxis.

A137. Diplopia and Epiphora Secondary to Medial Orbital Wall Fracture following Maxillary Balloon Sinuplasty

Sudeep Roy, MD, Philadelphia, PA; Robert B. Penne, MD FACS, Philadelphia, PA; Marc R. Rosen, MD, Philadelphia, PA; Edmund A. Pribitkin, MD FACS*, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the mechanisms of potential complications from balloon sinuplasty and learn how to avoid, recognize and treat them.

Objectives: The use of balloon sinuplasty for the treatment of chronic rhinosinusitis has grown tremendously despite the paucity of large published clinical trials supporting its safety and efficacy. This trend may be partly justified by a limited number of studies demonstrating improved postoperative morbidity outcomes with balloon sinuplasty alone versus traditional FESS. Commentary on major complications related to the use of balloon catheters such as significant postoperative bleeding, cerebrospinal fluid leaks and orbital injury is relatively lacking. **Study Design:** We describe the sentinel case of a 51 year old female referred to our practice after undergoing maxillary balloon sinusotomy complicated by medial orbital wall disruption confirmed by a postoperative CT scan. **Methods:** Case report and PubMed literature review of terms “balloon sinuplasty” and “sinuplasty”. **Results:** The patient presented with left orbital swelling, pain and discomfort on eye movement as well as left lateral gaze diplopia due to left medial rectus injury, which has improved but not resolved in the year following sinuplasty. Moreover, the patient has experienced recurrent sinus infections requiring multiple treatments with antibiotics and has developed unilateral epiphora. A CT scan reveals the previous medial orbital wall injury and a new frontoethmoidal mucocoele with resultant opacification of the left frontal sinus and disruption of the nasolacrimal duct. These injuries require FESS and endoscopic dacryocystorhinostomy for correction. Other published complications associated with the use of balloon sinuplasty include cerebrospinal fluid leaks and orbital injury. **Conclusions:** Practitioners must be aware of potential complications arising from balloon sinuplasty in order to avoid, recognize and treat them.

A138. ~~WITHDRAWN~~--Office Based Biopsy of Human Olfactory Neuroepithelium as a Source of Neural Progenitor Cells for the Study of Neuropsychiatric Disorders

Bozena B. Wrobel, MD, Los Angeles, CA; Jill M. Mazza, MD, Los Angeles, CA (Presenter); Valeria N. Spitsyna, BA, Los Angeles, CA; Reaghan M. Gittin, BA, Los Angeles, CA; James A. Knowles, MD, Los Angeles, CA; Oleg V. Evgrafov, PhD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand office based endoscopic technique of harvesting olfactory neuroepithelium and the technique of developing neuronal cell cultures which consist mostly of neural progenitor cells.

Objectives: To determine if olfactory progenitors could be obtained via office based biopsy from healthy individuals and patients with schizophrenia in a safe and feasible manner and to explore the use of cultured neuronal cells derived from olfactory neuroepithelium (CNON) as a model for study of neuropsychiatric disorders. **Study Design:** The study was IRB approved, informed consent was obtained, study was performed in conjunction with the department of psychiatry and the behavioral sciences. **Methods:** Endoscopic office based biopsy samples were collected and CNON cultures were established from 35 healthy individuals and 35 schizophrenia patients. The sites of biopsy included middle turbinate and superior-posterior septum. CNON cell cultures were established and neural progenitor nature of these cells has been confirmed by RNA-Seq expression profiling and immunostaining. **Results:** CNON cultures were successfully developed from 98.5% of patients. No complications of biopsy were observed. The CNON were primarily composed of neural progenitor cells. **Conclusions:** Office based biopsy of olfactory neuroepithelium is a safe and feasible method for obtaining neural progenitor cells both from healthy individuals and patients with schizophrenia. The cultured neuronal cells derived from olfactory neuroepithelium can be used as a model to investigate the neuropsychiatric disorders and particularly schizophrenia.

Facial Plastic & Reconstructive

A139. The Novel Use of Follicular Unit Extraction for Pediatric Post-Radiation Intracranial Alopecia

Jay M. Bhatt, BS, Washington, DC; William H. Lindsey, MD FACS*, McLean, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) report the first ever use of follicular unit extraction (FUE) on irradiated scalp tissue; 2) discuss the use of state of the art hair transplantation as an option for patients with radiation induced alopecia.

Objectives: We present a case of radiation alopecia treated with two hair transplant procedures in what is believed to be the first ever FUE on an irradiated scalp. **Study Design:** Case report and review of literature. **Methods:** Patient data was collected from a secondary care delivery practice. **Results:** A 16 year old boy was referred with significant hair loss over the left occiput secondary to external beam radiation (XRT) therapy for anaplastic astrocytoma. The patient was treated with 2 follicular unit transplants and 100 FUE grafts. FUE harvest was unable to be performed at first, but just 4 months later, 100 units were easily harvested for transplantation. The patient tolerated the procedure without any complications. Postoperative followup over 14 months demonstrated excellent coverage of the bald scalp. **Conclusions:** Radiation induced alopecia can be devastating for patients. State of the art FUE offers selected patients an option for natural coverage of bald scalp in an irradiated tissue bed, helps avoid a linear scar, while exposing them to minimal risks and complications.

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A140. Thyroidectomy Scar Preference—An Experimental Prospective Randomized Paired Comparison Analysis

Kevin Fung, MD FRCS(C) FACS, London, ON Canada; Chandeeb Rajakumar, BSc, London, ON Canada; Michael G. Brandt, MD FRCS(C), Toronto, ON Canada; Philip C. Doyle, PhD, London, ON Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the most important surgical variables when planning a thyroidectomy incision to optimize the aesthetic outcome.

Objectives: To determine the length and position of thyroidectomy scar that is most cosmetically appealing to naïve raters. **Study Design:** Prospective, paired comparison assessment. **Methods:** Images of a well healed thyroidectomy scar were reproduced for a normal rhytid free male and female neck using photo manipulation software. Surgical variables studied included position (high vs. low) and length (long vs. short). Variables controlled for included rhytids, scar color, width, and thickness. Fifteen naïve raters were each presented with 76 randomized pairings of scars and asked to identify which was more cosmetically desirable using an experimental paired comparison, forced choice paradigm. All pairings were presented in counterbalanced format to reduce recency-primacy effects. Duplicate pairings were included to assess intra- and inter-rater reliability. In total, raters assessed 1140 pairings. All individual responses were initially maintained prior to pooling to determine selection patterns. Raw data were then converted to percentage scores by scar category and rank order specific to preference was established. **Results:** Analysis indicates a strong and consistent preference for short scars (>71% of comparisons). A differential preference of >17% was observed for low when compared to high scars. Short-low scars were preferred by 13 of 15 and 11 of 15 raters for male and female necks, respectively. No differences in preference were observed between ratings of male and female necks. **Conclusions:** Naïve raters consistently preferred low, short scars over the alternatives. If other factors influencing incision site are considered equal, surgeons should consider this preference in scar position and length when planning their thyroidectomy approach.

A141. Pneumothorax after Rib Cartilage Harvest: Is a Chest X-ray Necessary?

Philip A. Gaudreau, MD, Portsmouth, VA; Benjamin W. Cilento, MD, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the risks associated with harvest of costal cartilage for rhinoplasty and appreciate the importance of postoperative chest radiographs.

Objectives: The rib is a well established cartilage harvest site for rhinoplasty. Newer methods of cartilage harvest limit the amount removed and preserve the posterior perichondrium. There has been little emphasis in the literature on how surgical technique can alter the complication rate and perhaps obviate the need for postoperative chest x-ray. We attempted to determine an updated rate of this complication and assess whether postoperative chest radiographs are necessary. **Study Design:** A retrospective chart review of patients that underwent rhinoplasty with costal cartilage grafts from January, 2008 to September, 2009 was performed. **Methods:** Records were assessed for risk factors for pneumothorax and presence of pneumothorax postoperatively. A review of the literature was also performed. **Results:** Forty-one patients received costal cartilage grafts. In these patients there was one pneumothorax detected postoperatively by chest x-ray in an asymptomatic patient. The complication rate was 2.4% (1/41). **Conclusions:** Although the incidence of pneumothorax after costal cartilage harvest is low, a chest x-ray is still indicated. An undiagnosed pneumothorax may have potentially disastrous implications for the patient, and a screening portable chest radiograph is easily available, low cost, and without significant morbidity.

A142. Facial Nerve Monitoring in Resection of Complex Vascular Malformations of the Head and Neck: Description and Outcomes of a New Methodology

Saral Mehra, MD MBA, New York, NY; Teresa M. O, MD, New York, NY; Sedat Ulkatan, MD, New York, NY; Inanna Weiss, MD, New York, NY; Vedran Deletis, MD PhD, New York, NY; Milton Waner, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participant should understand the operation, application, and outcomes of an innovative intraoperative continuous compound muscle action potential method to monitor the facial nerve in complex facial vascular malformations.

Objectives: To describe and evaluate outcomes of a new intraoperative facial nerve monitoring technique used in over 300 patients with complex vascular malformations of the head and neck. **Study Design:** Retrospective chart review with prospectively gathered data. **Methods:** Charts of 323 consecutive resections of complex head and neck vascular malformations performed by a single senior surgeon using a new intraoperative continuous compound muscle action potential (CMAP) facial nerve monitoring technology were reviewed. Patient, pathology, surgical, and facial nerve outcome data was reviewed along with prospectively gathered data on CMAP potential changes at the end of each procedure. **Results:** Between 2005 and 2011, 302 head and neck vascular malformation resections were performed using this monitoring technique and met inclusion criteria. Pathology included venous malformation (37%), hemangioma (23%), lymphatic malformation (22%), arteriovenous malformation (12%), and other (6.6%). The median age of patients was 7.7 years. Facial nerve CMAP changes were noted at the end of 94 cases (31%). A 50% or greater degradation in CMAPs was seen in 56 cases (19%), but new clinically apparent facial nerve deficit in at least one distribution was seen in only 11 cases (3.6%), all of which had a greater than 70% degradation in CMAPs at the end of the case. **Conclusions:** The continuous intraoperative CMAP method of facial nerve monitoring is a new active evoked monitoring technique that imparts less electrical power than standard nerve stimulators, gives real time feedback for potential or impending facial nerve injury, gives an objective measurement of nerve activity, and may predict postoperative clinical nerve function. It is therefore useful in surgical excisions with a high risk

of facial nerve injury.

A143. In Vivo Oxygen Tension in Human Septal Cartilage Increases with Age

Marsha S. Reuther, MD, San Diego, CA; Kristen K. Briggs, PhD, San Diego, CA; Barbara L. Schumacher, BS, San Diego, CA; Koichi Masuda, MD, San Diego, CA; Robert L. Sah, MD ScD, San Diego, CA; Deborah Watson, MD FACS, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the oxygen content of human nasal septal cartilage in vivo and how it relates to differences in age.

Objectives: Tissue engineered septal cartilage is expected to provide a source of autologous cartilage for repair of nasal framework defects. The production of clinically useful neocartilage involves multiple steps that include manipulating the tissue culture environment. The partial pressure of oxygen (ppO₂) is a property that has been shown to influence cartilage development. Specifically, studies suggest that low ppO₂ augments in vitro growth of articular cartilage. While in vivo measurements of articular cartilage ppO₂ have demonstrated hypoxic conditions, measurements have not been performed in septal cartilage. The objective of this study was to determine the ppO₂ of septal cartilage in vivo. **Study Design:** Prospective, basic science. **Methods:** The ppO₂ was measured in 14 patients (mean±SD age, 35.9±14.5 years; range, 18-63 years) during routine septoplasty or septorhinoplasty using the OxyLab pO₂ monitor (Oxford Optronix Ltd, Oxford, UK). Measurements were taken from the septum and inferior turbinate as a control. Each patient's age and sex were recorded. **Results:** The average ppO₂ measured at the septum and inferior turbinate was 10.5±10.1 mmHg (1.4±1.3 %) and 27.6±12.4 mmHg (3.6±1.6 %), respectively. The ppO₂ of these locations was significantly different (P < .005). Advancing age was positively correlated with septal ppO₂ (R² = .42; P < .05). Septal ppO₂ showed no significant sex variation.

Conclusions: This is the first report of in vivo measurement of ppO₂ in septal cartilage. The data demonstrate reduced oxygenation of septal cartilage relative to the inferior turbinate. This elucidates an important characteristic of the in vivo milieu that can be applied to septal cartilage tissue engineering.

A144. Voice Outcomes following Reconstruction of Laryngopharyngectomy Defects Using the Radial Forearm Free Flap versus the Anterolateral Thigh Free Flap

Peter C. Revenaugh, MD, Cleveland, OH; P. Daniel Knott, MD, San Francisco, CA; Daniel S. Alam, MD, Cleveland, OH; Joann Kmiecik, MA, Cleveland, OH; Michael A. Fritz, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the voice outcomes of both anterolateral thigh and radial forearm flap reconstruction laryngopharyngectomy defects.

Objectives: Patients undergoing laryngopharyngectomy with extensive pharyngeal mucosal resection or those failing chemoradiation protocols are commonly reconstructed using free tissue transfer. Radial forearm free flaps (RFFF) and anterolateral thigh free flaps (ALT) are two of the most commonly used free flaps for laryngopharyngectomy reconstruction. It has been suggested that tracheoesophageal prosthesis (TEP) voice outcomes in patients undergoing ALT reconstruction may be inferior due to the possibly bulkier flap. We report the results of patients treated with ALT and RFFF with regard to postoperative TEP voice outcomes. **Study Design:** Retrospective chart review. **Methods:** Forty-two consecutive patients were identified who were treated with total laryngopharyngectomy and free flap reconstruction utilizing either radial forearm free flaps (20 patients) or anterolateral thigh flaps (22 patients) between 6/2002 and 6/2010. Blinded evaluations with statistical analysis of standard TEP speech outcome measures (maximal sustained phonation, fluent count, syllable count) and qualitative variables were conducted. **Results:** Patient demographics were similar between the RFFF and ALT groups. Ninety-five percent and 91% of RFFF and ALT patients received radiation therapy, respectively. Subjective voice quality did not significantly differ between the groups. Differences in speech outcomes of intelligibility, maximal sustained phonation, maximum number of syllables and fluent count, as evaluated by a single speech pathologist, were not statistically significant between RFFF and ALT patients. There was no difference on postoperative complications. **Conclusions:** These data indicate that reconstruction of laryngopharyngectomy defects using either the anterolateral thigh flap or radial forearm free flap defects can produce similarly acceptable TEP voice results.

A145. Endoscopic Forehead Cyst Removal: Case Series and Review of Current Literature

Christopher G. Tang, MD, Oakland, CA; Dennis C. Kuo, MS, Detroit, MI; Mary H. Tang, BA, Berkeley, CA; Charles W. Shih, MD, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of endoscopic forehead mass excisions.

Objectives: For many years, endoscopic surgery has been utilized in the craniomaxillofacial area to hide incisional scars in an aesthetic manner. However, endoscopic forehead osteoma/cyst removal has only recently been described within the last 15 years in several case reports. We describe a seven case series performed within the last eight years with this endoscopic technique. **Study Design:** Chart review of patient data along with literature review. **Methods:** Seven cases of endoscopic forehead surgery were reviewed and surgical technique was described. **Results:** Three patients with forehead osteomas, 2 patients with forehead lipomas, 1 patient with a forehead schwannoma and 1 patient with a forehead cyst secondary to a giant cell reaction received endoscopic excisions by the chief of facial plastic surgery at our institution. All seven patients had good cosmetic outcomes, with no postoperative

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complications. **Conclusions:** Endoscopic surgery has revolutionized facial aesthetic surgery. Endoscopic excision of forehead osteomas, lipomas, and other masses is a safe, feasible method of removing forehead masses in an aesthetic manner.

General and Clinical Fundamentals

A146. Safety of Simultaneous Nasal and Pharyngeal Surgery for Obstructive Sleep Apnea

Victoria E. Banuchi, MD MPH, New York, NY; Ashutosh Kacker, MD BS*, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the safety of simultaneous nasal and pharyngeal surgery compared to pharyngeal surgery alone for obstructive sleep apnea.

Objectives: To evaluate the safety of simultaneous nasal and pharyngeal surgery compared to pharyngeal surgery alone for obstructive sleep apnea. **Study Design:** This study is a retrospective chart review. **Methods:** We performed a retrospective chart review on all patients having either simultaneous nasal and pharyngeal surgery or pharyngeal surgery alone for obstructive sleep apnea from 2006 to 2011. All surgeries were performed by the senior author. We identified 20 patients that underwent simultaneous nasal and pharyngeal surgery (group 1) and 24 patients that underwent pharyngeal surgery alone (group 2). We compared the percentage of ambulatory cases, the length of hospitalization and the rate of complications in both groups. **Results:** In group 1, all patients were male. In group 2, 23 patients were male and 1 was female. Median age of group 1 was 35, with a range of 25 to 72. In group 2, the median age was 37, with a range of 23 to 71. In both groups all patients had a primary complaint of sleep apnea and snoring. In group 1 all patients also had a deviated nasal septum and bilateral inferior turbinate hypertrophy. 7 patients in group 2 also had a septoplasty and a turbinectomy performed on a separate date than their pharyngeal surgery. In group 1, 65% of patients were ambulatory compared to 67% of patients in group 2. In all cases the patients that were not ambulatory were kept under observation just one night after surgery. 10% (2/20) of patients in group 1 had a complication, compared to 8% (2/24) in group 2. In group 1 both recorded complications were postoperative tonsillectomy bleeds. In group 2, one patient had a postoperative tonsillectomy bleed and one patient presented to the emergency room with dehydration due to poor pain control. There was no statistically significant difference in length of hospitalization or rate of complications in these two groups. **Conclusions:** This study suggests that simultaneous nasal and pharyngeal surgery in patients with obstructive sleep apnea is safe when compared to pharyngeal surgery alone and in most cases can be performed in an ambulatory setting.

A147. Iatrogenic Esophageal Perforation during Endoscopy Caused by an Orogastric Tube

Peter C. Baxter, MD, New York, NY; Peter C. Baxter, MD, New York, NY; Benjamin D. Malkin, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the causes of iatrogenic esophageal perforations and to describe their appropriate management.

Objectives: To present a unique case of iatrogenic esophageal perforation from an orogastric tube during upper gastrointestinal endoscopy. **Study Design:** Case report and literature review. **Methods:** Pertinent information was extracted from the medical record, including the patient's history, physical exam, operative findings and radiology studies. A PubMed search was performed for reports of similar cases in the English literature. **Results:** The patient was a 73 year old man undergoing upper gastrointestinal endoscopy to assess for bleeding; a double lumen orogastric tube had been placed, but not secured. During the procedure, the tube was accidentally advanced until the larger proximal tip was in the cervical esophagus. On attempted removal, resistance was met and the patient developed diffuse cervicofacial crepitus. A CT scan showed the proximal tip of the tube perforating the esophagus, just below the cricopharyngeus. The patient was taken to the OR for successful removal of the tube and perforation repair. He ultimately died as a result of other comorbidities. Esophageal perforation caused by naso and orogastric tubes is a recognized though rare complication. A literature review did not identify any other cases of perforations occurring secondary to the presence of a naso or orogastric tube during endoscopy. **Conclusions:** Esophageal perforations are serious life threatening events that require rapid identification and treatment. In the era of routine endoscopic evaluations iatrogenic causes account for more than 50% of all perforations. For patients undergoing endoscopy in the presence of a naso or orogastric tube, the tube should be properly secured to minimize the risk of complications.

A148. Airway Management in Patients with Large Defects of the Anterior Skull Base: A Case Report and Literature Review

Amy R. Best, BS, Indianapolis, IN; Nathaniel R. Peterson, MD, Indianapolis, IN; Michael G. Moore, MD, Indianapolis, IN

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the perioperative risks associated with anterior skull base defects and understand the alternatives to airway management in patients with such defects.

Objectives: Tension pneumocephalus is a rare but serious complication that can occur after neurosurgery and other procedures involving the skull base. It can also be exacerbated during times of resuscitation. We describe a case where tension pneumocephalus developed after mask induction prior to anterior skull base repair and purpose alternative options for perioperative airway management. **Study Design:** Case report and literature review. **Methods:** The electronic medical record of a patient who developed tension pneumocephalus after anterior skull base surgery was reviewed, and the relevant aspects of the case are described. A search of Ovid Medline databases and a manual review of article bibliographies were completed. **Results:** A female patient was

noted to have tension pneumocephalus on postoperative day 2 following frontal bone resection of a metastatic tumor and frontal sinus cranialization. Conservative management, including lumbar drain clamping and high flow oxygen via nasal cannula, was attempted. Progression of the pneumocephalus required needle decompression and pursuance of definitive surgical treatment. Prior to operative care of the patient, the pneumocephalus was iatrogenically worsened with positive pressure mask ventilation. The increased air was promptly evacuated, allowing for a combined surgery by otolaryngology and neurosurgery to definitively repair the defect. The patient did well postoperatively and recovered without any long term neurological compromise. **Conclusions:** Positive pressure mask ventilation can produce or worsen tension pneumocephalus in patients with defects of the anterior skull base. Alternative techniques such as rapid sequence induction or laryngeal mask airway should be considered in these patients in an effort to avoid potential complications.

A149. Treatment of Oral Leukoplakia with Angiolytic Laser: A Single Institution Experience

Carrie Marie Bush, MD, Augusta, GA; Ashli K. O'Rourke, MD, Augusta, GA; Scott S. Derossi, DMD, Augusta, GA; Paul M. Weinberger, MD, Augusta, GA; Gregory N. Postma, MD, Augusta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the use of angiolytic laser therapy for oral leukoplakia, as well as understand the risks, benefits and outcomes of angiolytic laser treatment.

Objectives: Laser therapy of oral leukoplakia offers several advantages over traditional methods of excision. These include low morbidity, good wound healing, and lack of need for general anesthesia. The objective of this study is to review the use of angiolytic laser for treatment of patients with oral leukoplakia. **Study Design:** Retrospective review. **Methods:** A retrospective review was conducted to identify patients having undergone treatment of oral leukoplakia with the pulse dye laser at our institution from November 2008 to October 2011. Patient demographics, number of treatments, treatment dose, lesion response and histology were examined. **Results:** 13 patients were eligible and all were included in the study. Mean age at time of treatment was 63 years (+/- 9). 38.5% of patients were male and 61.5% were female. 10 (77%) of patients had complete resolution of their lesions. In these patients, an average of 2.2 (+/- 1.1) treatments were required and a mean of 123 pulses at 0.75J was administered per treatment. In the three (27%) patients without complete resolution, two patients (15%) continue to be followed clinically and one (8%) patient underwent wide local excision. Patient histology ranged from hyperkeratosis to carcinoma in situ. Despite complete resolution of their lesions, two patients (15%) ultimately developed oral cavity malignancy. Complications included bony exposure of the alveolus in one patient (8%). **Conclusions:** Angiolytic laser therapy allows for complete resolution of oral leukoplakic lesions with a minimal risk profile. As with all treatment options, there is potential for recurrence and malignant transformation, so long term routine surveillance is required.

A150. Transoral Submandibular Gland Excision: A Single Institution Experience

Carrie M. Cantrell, MD, Augusta, GA; Tanimia Jana, MD, Augusta, GA; John Drew Prosser, MD, Augusta, GA; Jimmy J. Brown, MD*, Augusta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the surgical technique of transoral submandibular gland excision and understand the expected outcomes.

Objectives: Transoral access to the floor of mouth has been utilized for decades. Extended procedures to remove the submandibular gland via a transoral approach have recently gained popularity. Benefits include the decreased risk of injury to the marginal mandibular nerve and absence of a visible transcervical incision. Our aim is to review the experience at our institution and identify the successes, challenges and complications associated with transoral submandibular gland excision. **Study Design:** Retrospective review. **Methods:** Charts of patients having undergone transoral submandibular gland excision between 8/2009 and 5/2011 were reviewed. Data was obtained in regard to indication, diagnosis, pathology and complications. **Results:** 8 patients underwent transoral submandibular gland excision. Indications included sialoadenitis (3), sialolithiasis (3) and submandibular gland mass (2). One patient required conversion to a transcervical approach secondary to trismus. 50% had a temporary lingual nerve paresthesia that completely resolved within a period of 3 months. All patients recovered without permanent complication. No patients experienced restriction of tongue movement or persistent floor of mouth pain. **Conclusions:** Transoral submandibular gland excision is a safe and efficacious procedure in carefully selected patients. Patients should be clearly counseled about the benefits and risks of both transcervical and transoral approaches to the submandibular gland in order to make a well informed decision.

A151. Distal Limited Sialodochotomy for Sialendoscopy of the Submandibular Duct

Jolie L. Chang, MD, San Francisco, CA; Kevin C. Huoh, MD, San Francisco, CA; David W. Eisele, MD*, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the use of limited anterior sialodochotomy for sialoendoscope introduction in select cases of submandibular sialendoscopy.

Objectives: To present our experience with the use of distal sialodochotomy to allow for sialoendoscope introduction into the submandibular duct when standard serial dilations of the submandibular duct papilla is not possible. **Study Design:** Case series retrospective review and description of surgical technique. **Methods:** Clinical data was reviewed for patients who underwent submandibular sialendoscopy from January 2005 to October 2011 at a single institution. **Results:** Sialendoscopy is a useful diagnostic and therapeutic technique for submandibular ductal disorders. Several approaches to facilitate the introduction of the sialoendoscope have been described for the submandibular duct, however, duct papillotomy risks the development of stenosis. We describe a

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technique of limited distal sialodochotomy that has proven useful to facilitate sialoendoscope insertion. Of 135 submandibular sialendoscopies performed from January 2005 through October 2011, 121 cases were performed for sialolithiasis and 14 for chronic sialadenitis. The distal sialodochotomy technique was used in 43% (58/135) of cases and allowed for submandibular duct sialendoscopy in 100% of cases. Distal sialodochotomy was required in 79% (11/14) of sialendoscopy cases performed for chronic sialadenitis compared to 40% (47/121) of cases for sialolithiasis ($p < 0.05$). **Conclusions:** Distal limited sialodochotomy is a reliable technique to facilitate submandibular sialendoscopy in select cases.

A152. Oxygen Profiling in Radiation Induced Wound Healing

Eunice Y. Chen, MD PhD, Lebanon, NH; Benjamin B. Williams, PhD, Lebanon, NH; Lesley A. Jarvis, MD PhD, Lebanon, NH; Sassan Hodge, PhD, Lebanon, NH; Thomas P. Matthews, BS, St. Louis, MO; Kevin Rychert, BS, Lebanon, NH

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the oxygen profile, as measured by electron paramagnetic resonance (EPR) oximetry, of tissue after radiation and surgery and its relationship to wound healing.

Objectives: 1) Describe the oxygen profile obtained by EPR oximetry of tissue after radiation and surgery and its relationship to wound healing; and 2) identify how EPR oximetry can be used clinically to improve wound healing. **Study Design:** Rodent model for wound healing. **Methods:** Ten rats per group were implanted with paramagnetic char in 2 sites on each hind leg. One leg was irradiated at week 0, while a z-plasty flap was performed at 1 site on both legs at week 3. EPR measurements and biopsies were taken at 1-3-week intervals for 12 weeks after irradiation. Wound healing was evaluated by gross photos and histology. **Results:** At 1 week after irradiation, the average tissue oxygen measurement is significantly different between the radiated and unirradiated legs (28.3 vs 43.3 mmHg, $p < 0.05$). The oxygen measurement 1 week after z-plasty flap formation is not significantly different from nonsurgical site (33.9 vs 39.7 mmHg, $p = 0.282$). There is a significant difference in oxygenation between flap and non-flap tissue in an irradiated bed (28.3 vs 46.6, $p = 0.006$). On gross evaluation, wound healing from z-plasty flap is significantly worse in irradiated tissue compared to nonirradiated tissue. Radiation results in fibrosis with epithelial thickening and abnormal pilosebaceous units on histology.

Conclusions: Radiation results in decreased tissue oxygenation at 1 week after irradiation. Skin flaps result in decreased tissue oxygenation in irradiated beds. Wound healing is compromised in irradiated tissue. Histological evidence for fibrosis in irradiated tissue occurs at 2 weeks and persists out to 12 weeks after irradiation. Oxygen profiling with EPR oximetry can be used to identify timing of oxygen interventions to improve wound healing.

A153. Post-Tonsillectomy Hemorrhage after Nutraceutical Use

Brianna K. Crawley, MD, Albuquerque, NM; Garth T. Olson, MD, Albuquerque, NM; Mark L. Beauchamp, MD, Albuquerque, NM; David A. Garcia, MD, Albuquerque, NM

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the mechanism by which forskolin affects coagulation, and be reminded of the importance of screening for all preparations and forms of nutraceutical or alternative supplements and medications.

Objectives: Our objective is to report a case of serious postoperative bleeding, the first in the otolaryngologic literature, associated with the use of forskolin, and to review its activity. **Study Design:** This is the report of a case and associated literature concerning the hematologic activity of forskolin. **Methods:** A 25 year old otherwise healthy, non-coagulopathic male underwent tonsillectomy for chronic tonsillitis, suffering two non-traditional post-tonsillectomy hemorrhages requiring operative control. Subsequent scrutiny revealed that the patient had been wearing a transdermal patch called Jen Fe Next, on his left lower extremity. Investigation into the constituents of this energy enhancing patch revealed the presence of black and white pepper, guarana, and forskolin. **Results:** Forskolin, a diterpene derived from the Indian plant, *coleus forskohlii*, activates cell membrane adenylate cyclase which, in turn converts cAMP to ATP. Its role in the cAMP signaling cascade effects many changes in the body, from increasing cardiac contractility to influencing differentiation of mesenchymal cells. It also inhibits platelet activation, an action that may be potentiated by other platelet inhibitors and anticoagulation agents. **Conclusions:** Forskolin is marketed without regulation as a weight loss agent and energy enhancer. It should be discontinued prior to undergoing surgery, for at least two weeks. This report serves as a reminder that all forms of nutraceuticals, herbal supplements, and over-the-counter alternative medications should be completely reviewed with a patient during preoperative evaluation.

A154. Comparison of Residents' and Faculty Perception of Mentorship Experience in Otolaryngology

David A. Diaz Voss Varela, MD, Baltimore, MD; Kulsoom Laeeq, MD, Baltimore, MD (Presenter); Yuri Agrawal, MD, Baltimore, MD; Howard W. Francis, MD, Baltimore, MD; Charles W. Cummings, MD*, Baltimore, MD; Nasir I. Bhatti, MD, Baltimore, MD; Sandra Y. Lin, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to have an understanding about the perceived benefits of having a mentoring relationship. We will explain how the residents' and faculty's perception of a formal mentorship training could potentially improve mentors and mentees relationship throughout their training.

Objectives: Providing effective mentorship has become increasingly challenging due to work hour restrictions. The purpose of our study was to compare faculty's and trainees' perceptions of their mentorship experience in an otolaryngology-head and neck surgery

training program. **Study Design:** Cross-sectional survey design. **Methods:** Residents and faculty were surveyed regarding their perceptions of mentoring relationship. Trainees were asked about the characteristics of their mentorship experience. In a separate survey, faculty were asked to describe their mentorship relationship, whether they have the appropriate resources to provide effective mentorship, and to identify areas in which further training would improve their mentoring skills. Analysis of variance was used to compare differences between faculty and trainee responses. **Results:** Twenty trainees (86%) and thirty faculty (85%) completed the survey. Residents met with their mentors at least twice a year, corresponding to the minimum departmental requirement. More than 80% of faculty and residents reported that career planning was the most commonly addressed topic in their mentorship sessions. However, faculty and residents differed in their perceptions of providing mentorship in other areas including research ($p = 0.014$) and clinical judgment ($p = 0.184$). While 83% of the faculty reported providing mentorship for research, only 50% of the residents agreed. Forty-six percent of faculty felt formal mentorship training would improve their skills as mentors, particularly in career planning and providing feedback. **Conclusions:** Further insights into differences between faculty and trainee perceptions may improve the mentorship experience. Moreover, providing formal mentorship training for mentors could make mentorship more effective.

A155. Complications of Bordetella Pertussis in the Adult Population

Alphi P. Elackattu, MD, Boston, MA; Timothy D. Anderson, MD, Burlington, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the diagnosis, expected disease course, and treatment for treatment of Bordetella pertussis infection.

Objectives: Adults infected with Bordetella pertussis often present atypical to the familiar presentation observed in the pediatric population. By the time the patient reaches an otolaryngologist, the cough has been unresponsive to attempted therapies. Diagnosis of this process is often reassuring to the patient and prevents unnecessary treatments or tests. **Study Design:** Case series. **Methods:** Retrospective chart review with accompanying literature review. **Results:** Three patients were referred to the otolaryngology service for chronic cough with associated laryngospasm. Two of these patients had prior laryngopharyngeal reflux which seems to have been exacerbated by the coughing. One patient's symptoms were so severe that she required a tracheotomy due to recurrent severe laryngospasm. Diagnosis was achieved with Bordetella pertussis antibody detection. **Conclusions:** Bordetella pertussis is a self-limiting process which should be on the differential of persistent cough. Diagnosis can be elicited by history and serology. If diagnosed early, patients may be treated with a course of antibiotics. Subsequently, however, patients may be treated symptomatically until the disease is cleared.

A156. Intraoperative Laryngocele Inflation with LMA

Nathan J. Gonik, MD MHSA, Bronx, NY; Sudarshan Setty, MD, Bronx, NY; Bradley Schiff, MD, Bronx, NY

Educational Objective: We intend to demonstrate a new method of facilitating safe and complete laryngocele excision by intraoperative inflation of the laryngocele using a laryngeal mask airway.

Objectives: To present a case of laryngocele excision utilizing a laryngeal mask airway (LMA) device to inflate the laryngocele and facilitate a safe and complete excision. **Study Design:** This is a case report with intraoperative images and anatomical illustrations. **Methods:** A patient with right sided external laryngocele for several years was referred to our service for resection. She had recurrent infections of the laryngocele treated with several courses of antibiotics in the past. During lateral neck dissection, there was extensive fibrosis and difficult surgical planes. Throughout the operation the patient was ventilated using an endotracheal tube (ETT). Additionally, a laryngeal mask airway (LMA) was inserted posterior to the ETT, resting in the hypopharynx and attached to a Jackson Rees circuit. Air was passed through the LMA to inflate the laryngocele and better define its borders. This generated the supraglottic pressure created by the trumpet maneuver that has been described in eliciting neck findings during tomography and physical exam. The LMA was also used to identify the root of the laryngocele in the paraglottic space and ensure its airtight closure. **Results:** We felt that the LMA assisted our dissection and helped progress the surgery safely in a fibrosed surgical field. We were successful in achieving a complete excision without damage to surrounding structures. **Conclusions:** LMA inflation of the laryngocele is a safe and simple method to improve the safety and completion of external laryngocele excision.

A157. Wound Botulism Presenting as a Deep Space Neck Infection

Christopher J. Gouveia, BA, San Francisco, CA; Somnath Mookherjee, MD, San Francisco, CA; Matthew Russell, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe when to suspect wound botulism in patients presenting with a deep space neck infection and to discuss key elements in the treatment of this syndrome.

Objectives: Present a case in which the initial clinical presentation was attributed to a deep space neck infection but ultimately proved to be due to wound botulism (WB). **Study Design:** Case report and review of the literature. **Methods:** We reviewed the patient chart (imaging studies, electromyography (EMG), and laboratory results) and published literature on WB. **Results:** In this case, a thirty-five year old woman with history of injection drug use (IDU) presented with dysphagia, dysphonia, odynophagia, and neck pain. Multiple subcentimeter deep space neck abscesses were seen on imaging. Flexible nasopharyngoscopy showed normal vocal fold movement, a widely patent airway, and no pharyngeal wall edema. Treatment with intravenous antibiotics was initiated. Within hours, she was emergently intubated for respiratory failure. EMG and wound cultures confirmed the diagnosis of WB;

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descending paralysis and diaphragmatic weakness had led to apnea. Botulism antitoxin was given, and further evaluation for drainable abscesses was initiated. To our knowledge, this is the first report of WB presenting as a deep space neck infection.

Conclusions: This case illustrates the importance of considering WB in patients with history of IDU, particularly black tar heroin, presenting with dysphagia, dysphonia, visual changes, or proximal muscle weakness. In this patient, a deep space neck infection complicated the clinical picture. Otolaryngologists should consider WB in the setting of cranial nerve neuropathies or bulbar symptoms out of proportion to clinical and radiologic findings.

A158. Significant Practice Variation in Post-Adenotonsillectomy Admission Practices in 24 Pediatric Hospitals

Samita S. Goyal, BS, Washington, DC; David W. Roberson, MD*, Boston, MA (Presenter); Margot L. Schwartz, MPH, Boston, MA; Rahul K. Shah, MD*, Washington, DC

Educational Objective: At the conclusion of this presentation, participants should be able to demonstrate an understanding of the extreme practice variation across pediatric tertiary care hospitals in post-adenotonsillectomy admissions. Participants should be able to discuss reasons and patient characteristics that account for these discrepancies, and be able to understand the end goal of the need to standardize care for such patients.

Objectives: To identify practice variations in the admission of post-adenotonsillectomy patients using a national sample from 24 pediatric hospitals. **Study Design:** Retrospective analysis of the Pediatric Health Information System (PHIS) database. **Methods:** Analysis of children undergoing adenotonsillectomy in 24 children's hospitals from July 2009 to June 2010 using PHIS. Patient characteristics were compared with hospital length of stay. **Results:** Across all hospitals, younger patients (0-2 years) were admitted more regularly as inpatients than outpatients, as were patients with comorbidities (those with OSA or PHIS flags, i.e., patients with complex chronic conditions, such as cystic fibrosis, etc.). Significant practice variation was noted across all age groups. Some hospitals admitted as few as 32.7% of patients 0-2 years old; others admitted 100%. The ranges for age 2-3 years were 8.0-100%, for 3-5 years 3.6-88.8% and for >5 years 4.0-99.0%. Less overall practice variation was noted across patients diagnosed with OSA and/or comorbidities, although there was still substantial variation among these patients. **Conclusions:** There is extraordinary variation amongst the 24 pediatric tertiary care hospitals examined in regards to who is admitted post-adenotonsillectomy. Although younger children and children with comorbidities are more likely to be admitted, significant practice variation remains after controlling for these factors. Understanding the rationale for this variation and standardization of post-tonsillectomy admission practices offers an opportunity to improve quality and efficiency.

A159. The Nutty Patient: A Case Report of an Intraoral Almond Masquerading as an Abscess

William Marshall Guy, MD, Houston, TX; Masayoshi Takashima, MD, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to better recognize the appearance, characteristics, and setting where intraoral comestible objects would appear in the differential diagnosis for intraoral pathology.

Objectives: To appreciate the presence and appearance of comestible foreign bodies which may resemble more sinister diagnoses in the differential diagnosis for intraoral pathologies. **Study Design:** Case report. **Methods:** A patient is presented complaining of dysphagia following a recent neurological insult and odynophagia following dental work and was found to have a comestible intraoral foreign body misdiagnosed as an intraoral abscess. **Results:** A CT scan reported a small fluid pocket in the lateral aspect of the oral cavity on the left slightly above the expected location of the submandibular duct with possibilities including an obstructed duct or an abscess; however, physical exam by the otolaryngology-head and neck surgery service revealed an intraoral almond as the offending agent. **Conclusions:** Modern radiographic imaging does not replace a thorough history and physical exam with regards to diagnosing diseases, and one must have a high index of suspicion for intraoral comestible items in the proper setting.

A160. Rosai-Dorfman Disease with Extranodal Lesions

Kaori Hashimoto, MD, Fukuyama, Hiroshima Japan; Shin Kariya, MD PhD, Okayama, Japan; Tetsuo Ooué, MD, Fukuyama, Hiroshima Japan; Yasuhiko Yamashita, MD PhD, Fukuyama, Hiroshima Japan; Kikuko Naka, MD, Fukuyama, Hiroshima Japan; Kazunori Nishizaki, MD PhD, Okayama, Japan

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the overview of Rosai-Dorfman disease, also known as sinus histiocytosis with massive lymphadenopathy, including clinical presentation, pathological characteristics, radiographic findings, and treatment with an emphasis on multifocal and extranodal presentation.

Objectives: Rosai-Dorfman disease is a rare condition of marrow hemopoietic stem cell origin. Most patients present with lymphatic involvement, whereas less than one third of cases are extranodal presentations. Only about 5% of the extranodal cases involve bone. The purpose of this study is to present a case of Rosai-Dorfman disease with lymphadenopathy, intracranial tumors and bone lesions mimicking malignant neoplasm. **Study Design:** Case report. **Methods:** Case report concerning the diagnosis and treatment of Rosai-Dorfman disease with extranodal presentations including intracranial tumors and multifocal bone lesions. **Results:** A 53 year old man was admitted to our hospital because of three month history of bilateral cervical lymphadenopathy. He also had a five year history of dizziness. Computed tomography, magnetic resonance imaging and positron emission tomography showed cervical, mediastinal and inguinal lymphadenopathy. Intracranial tumors and multiple bone lesions of the skull and pelvic bone were also detected. The cervical lymph node biopsy confirmed the diagnosis of Rosai-Dorfman disease. The patient received oral prednisolone and his

neck pain was improved. The massive cervical lymph nodes, intracranial tumors and bone lesions didn't progress. **Conclusions:** Rosai-Dorfman disease should be considered in the differential diagnosis of lymphadenopathy, even though the disease is rare. The predominant clinical manifestation of the disease is painless cervical lymphadenopathy. Rosai-Dorfman disease is considered a benign disease, however the disease can be fatal because of combination of cellular infiltration and mass forming. Very careful management is required.

A161. Directed Educational Training Improves Coding and Billing Skills for Residents

Stacey L. Ishman, MD MPH, Baltimore, MD; James R. Benke, BS, Baltimore, MD (Presenter); Sandra Y. Lin, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) compare coding and billing scores in practitioners before and after compliance training; and 2) discuss the relationship between improvement in coding and billing and level of training.

Objectives: To determine if coding and billing acumen improves after a single directed educational training session. **Study Design:** Case control series. **Methods:** Fourteen otolaryngology practitioners including trainees each completed two clinical scenarios before and after a directed educational session covering basic skills and common mistakes in otolaryngology billing and coding. Ten practitioners had never coded before; while four regularly billed and coded in a clinical setting. **Results:** Individuals with no previous billing experience had a mean score of 54% (median 55%) before the educational session which was significantly lower than that of the experienced billers who averaged 82% (median 83%, $p=0.002$). After the educational billing and coding session, the inexperienced billers mean score improved to 62% (median, 67%) which was still statistically lower than that of the experienced billers who averaged 76% (median 75%, $p=0.039$). The inexperienced billers demonstrated a significant improvement in their total score after the intervention ($P = 0.019$); however, the change observed in experienced billers before and after the educational intervention was not significant ($P = 0.469$). **Conclusions:** Billing and coding skill was improved after a single directed education session. Residents, who are not responsible for regular billing and coding, were found to have the greatest improvement in skill. However, providers who regularly bill and code had no significant improvement after this session. These data suggest that a single 90 minute billing and coding education session is effective in preparing those with limited experience to competently bill and code.

A162. Operative Log Growth Charts: A New Tool for Tracking Resident Operative Experience

Noel Jabbour, MD, Minneapolis, MN; Seth C. Janus, MD, Minneapolis, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to understand how to design and use operative log growth charts to graphically display and to critically assess trainee operative progress.

Objectives: 1) To develop an easily reproducible method for displaying resident case numbers in a graphical fashion as a growth curve; 2) to use this method to meet the ACGME requirements for program directors to compare sufficiency of operative numbers and parity of cases; and 3) to evaluate the efficiency of this graphical model in comparison to viewing the raw data alone. **Study Design:** Descriptive research. **Methods:** A simple method was developed to graphically display the operative experience for every resident within our otolaryngology training program using operative log growth charts. Time was graphed on the x-axis and the number of procedures performed on the y-axis for every key indicator case to create operative log growth curves for every resident in the program for each key indicator case. Historical data was used to establish norms for each 3 month interval of residency training. **Results:** Use of these operative log growth charts allowed for evaluation of each resident's operative experience in comparison to classmates and against a background of historical norms. Using only 1 year of graduate resident data this method allowed for graphical synthesis of 65 data points per resident per class. That is, in a residency program with a class size of 4, a total of 260 data points can be summarized graphically in a single graph. **Conclusions:** Operative log growth charts are a simple, reliable method to evaluate sufficiency of operative numbers and parity between residents. Similar methods could be employed to develop national normative operative log growth charts for each key indicator procedure in otolaryngology.

A163. Tonsils, Tonsil Stones and Halitosis

Victor Z. Kizhner, MD, New York, NY; Y. P. Krespi, MD*, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to perform better exam of tonsils and be more proficient in treating halitosis.

Objectives: Recently a proof for tonsilloliths being an active nidus of oral bacteria in a biofilm was provided. Oral malodor is caused by bacterial overgrowth, we can postulate that at least part of the odor originates or is aggravated by the tonsil stones. **Study Design:** Patients presenting with objective halitosis were examined. Twenty patients with oral malodor and tonsil stones were recruited and treated. A novel two hand technique of tonsillar exam and palpation is described. Treatment consisted of education and laser assisted intracapsular tonsillotomy (cryptolysis). All subjects filled a self-reported questionnaire monitoring their symptoms-HALT, which was validated previously. **Methods:** Prospective non-randomized study. **Results:** In 40% the tonsilloliths were hidden behind the pillars and only careful palpation and retraction could reveal them. Improvement on the self-reported questionnaire was 46% ($P<0.05$). There was no connection between tonsil size and tonsil stone production. **Conclusions:** Tonsil stones usually hide behind the upper anterior pillar and can be retrieved, extracted and smelled. The current exam upgrades the discovery of tonsilloliths

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and the tonsil crypts in halitosis. We present a proof of vast improvement by laser cryptolysis for patients with halitosis found to have tonsilloliths. As oral malodor is a dynamic symptom any objective measurement may fail to reveal the habitual nature of it. Therefore, we prefer to judge improvement on subjective patient's report by using HALT. We urge providers to seek for tonsilloliths hiding within tonsil crypts in all patients complaining of halitosis and treat them accordingly. Intracapsular laser tonsillotomy under local anesthesia was found to be effective in this group of patients.

A164. Trends and Attitudes Toward the PGY-1 Year in Otolaryngology: Results of a Nationwide Survey

Andrew J. Kleinberger, MD, New York, NY; Victor J. Schorn, MD, New York, NY; Marita S. Teng, MD, New York, NY; Benjamin D. Malkin, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss issues pertaining to the current structure of the PGY-1 year in otolaryngology and program directors' views related to its impact on overall otolaryngology resident training.

Objectives: In 2007, the Accreditation Council for Graduate Medical Education (ACGME) issued revised guidelines governing the structure of the PGY-1 year in otolaryngology. The objective of this study was to determine otolaryngology residency program directors' attitudes towards these guidelines as well as how they feel these changes have affected resident training and performance.

Study Design: Cross-sectional survey. **Methods:** All 105 program directors in ACGME accredited otolaryngology programs were contacted via email linked to an online survey; two followup emails were distributed after initial notification. **Results:** Seventy-one (68%) of the 105 program directors responded to the survey; thirty-three were excluded because of incompleteness or inconsistency. 71% of program directors reported that their PGY-1 year curriculum adheres to the current ACGME guidelines. Respondents felt that the three PGY-1 year rotations most important to otolaryngology resident training are otolaryngology, critical care, and general surgery, while emergency medicine and certain general surgery subspecialties were least useful. When asked how the 2007 changes in ACGME guidelines have affected overall resident performance, 47% reported some improvement, 32% noticed no change, and 21% cited a worsening in performance. Overall, 68% of respondents felt the guidelines need some changes, while 32% believe they should remain the same. **Conclusions:** There is variation among otolaryngology residency programs in PGY-1 year structure, but the majority seems to adhere to current ACGME guidelines. More than two-thirds of respondents feel that changes are warranted; careful review of curriculum guidelines may be indicated to optimize the PGY-1 year training experience for otolaryngology residents.

A165. Does a Mood Disorder Affect the Outcome of Nasal Obstruction Surgery?

Brandon K. Musgrave, MD, Detroit, MI; Paul D. Judge, BS, Detroit, MI (Presenter); Lamont R. Jones, MD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to differentiate between the effect of mood disorders on inflammatory conditions of the nose and noninflammatory conditions. They should understand that depression does not worsen the outcome of septal deviation surgery, while it does negatively effect treatment of seasonal allergies and sinus surgery for chronic rhinosinusitis.

Objectives: Mood disorders can negatively affect a patient's outcome of seasonal allergy and chronic rhinosinusitis treatment. The purpose of this study was to analyze a possible link between surgical failure of nonallergic nasal obstruction and a comorbid mood disorder. **Study Design:** Retrospective case series. **Methods:** The ICD-9 code for septal deviation was searched from 2005 to 2010 and limited to those who had surgical intervention (septoplasty, turbinate surgery) within one year of diagnosis. The data was cross-referenced for patients with a concomitant anxiety or depression diagnosis. **Results:** The data was analyzed with a chi-squared and a Wilcoxon two sample test. 398 patients (91.1%) were found to have surgical success versus 39 (8.9%) who failed surgery. 31.4% of the surgical success group was positive for a comorbid mood disorder compared to 35.9% of the surgical failures. This difference in mood disorder prevalence was not statistically significant ($p=0.566$), nor was there a statistical difference in antidepressant use ($p=0.722$). The only significant result was that successfully treated nasal obstruction patients had shorter followup postoperatively ($p=0.028$). **Conclusions:** Although the literature supports more negative outcomes of allergic rhinitis and chronic rhinosinusitis patients with mood disorders, our data does not support a similar relationship for septal deviation. The difference could be the inflammatory nature of rhinosinusitis and seasonal allergies. As expected, patients with successful resolution of symptoms after surgery had a shorter followup period than their treatment failure counterparts.

A166. Pseudogout Presenting as an Infratemporal Fossa Mass

Kevin A. Peng, MD, Los Angeles, CA; Keith E. Blackwell, MD, Los Angeles, CA; Scott D. Nelson, MD, Los Angeles, CA; Jeffrey D. Suh, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the presentation and differential diagnosis of infratemporal fossa masses and demonstrate knowledge of current surgical approaches to the infratemporal fossa.

Objectives: Infratemporal fossa masses encompass a wide range of benign and malignant pathologies. Precise diagnosis is crucial in formulating a management strategy, and we describe an endoscopic, transmaxillary approach in diagnosing pseudogout manifesting as an infratemporal fossa mass. **Study Design:** Retrospective case report. **Methods:** The clinical presentation, radiographic images, operative technique, and histopathologic analysis are presented of a patient referred to a tertiary medical center with an

infratemporal fossa mass. **Results:** A 65 year old male was referred to the head and neck surgery clinic with one year of intermittent left otalgia and aural fullness. Pure tone audiometry revealed a left sided mixed hearing loss. Magnetic resonance imaging and computed tomography (CT) revealed a well circumscribed 5 cm mass in the left infratemporal fossa. CT guided biopsy was nondiagnostic, and an endoscopic, transmaxillary approach to the infratemporal fossa via the pterygopalatine fossa was employed to obtain tissue for definitive diagnosis. Intraoperatively, a firm, yellow, bony mass was identified and intraoperative biopsy returned as a chondroid neoplasm. Permanent section pathologic examination revealed chondrocytes with mild to moderate cellular atypia and abundant aggregates of calcium pyrophosphate crystals, consistent with pseudogout. **Conclusions:** Pseudogout presenting as an infratemporal fossa mass is exceedingly rare, and care must be taken to distinguish it from the graver diagnosis of chondrosarcoma. An endoscopic, transmaxillary approach to the infratemporal fossa via the pterygopalatine fossa is well tolerated and should be strongly considered for tissue diagnosis of infratemporal fossa masses.

A167. Subcutaneous Emphysema following Endoscopic Zenker's Diverticulum Repair and Postoperative CPAP Use

Jon-Paul Pepper, MD, Ann Arbor, MI; Mark E. Prince, MD, Ann Arbor, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss CPAP as a possible risk factor for postoperative complication following endoscopic Zenker's diverticulum repair.

Objectives: Discuss continuous positive airway pressure (CPAP) as a possible risk factor following endoscopic repair of Zenker's diverticulum. **Study Design:** Case report. **Methods:** A 66 year old male underwent routine endoscopic repair of a Zenker's diverticulum using a gastrointestinal anastomosis (GIA) stapler with carbon dioxide laser lysis of residual diverticulum. The patient was discharged home after overnight observation. **Results:** The patient mistakenly restarted CPAP use once returning home. On postoperative day 5, the patient presented to the emergency department with dysphagia, odynophagia, and subcutaneous emphysema. A barium swallow revealed a small anastomotic leak as well as an impressive air collection in the deep neck tissues. The air collection resolved quickly with conservative measures, observation, and withholding CPAP use. **Conclusions:** Postoperative CPAP use may be a risk factor for anastomotic leak and subcutaneous emphysema following Zenker's repair. This complication has never been reported in our literature. Given the high prevalence of CPAP use, particularly in patients treated by otolaryngologists, this case is noteworthy and merits discussion.

A168. Ultrasound Guided, Transfacial Sialendoscopy for Complete Parotid Duct Stenosis

William R. Ryan, MD, San Francisco, CA; Jolie L. Chang, MD, San Francisco, CA; David W. Eisele, MD*, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the technique of ultrasound guided, transfacial sialendoscopy for complete parotid duct stenosis and its potential indications.

Objectives: Parotid duct stricture can be a challenging clinical problem. Ultrasound can be used to evaluate this problem. We present a case of complete stenosis of the parotid duct that was managed with an ultrasound guided, transfacial parotid duct catheterization, diagnostic sialendoscopy, and parotid duct stent placement. **Study Design:** Illustrative case report, technique description, photographs, and literature review. **Methods:** A 57 year old man presented with a one year history of a persistent right parotid swelling after undergoing a transoral sialolithotomy of the parotid duct. An ultrasound and computed tomography scan showed a dilated parotid duct approximately 1 cm in diameter and 4 cm long without evidence of sialolithiasis. Standard transoral sialendoscopy was not possible due to complete distal parotid duct stenosis. The duct stenosis was managed by an ultrasound guided transfacial needle catheterization of the dilated parotid duct, anterograde sialoendoscopy, recanalization of Stensen's duct, and stent placement. **Results:** The patient is currently being observed without any further visible or palpable swelling in his face. We believe that this is the first report of this particular technique. Other techniques for salivary duct stricture treatment are reviewed. **Conclusions:** This case demonstrates the safety and effectiveness of transfacial sialendoscopy for management of complete stenosis of the parotid duct.

A169. Correlation of Manual Dexterity Testing of Incoming Otolaryngology Applicants with Surgical Skill of Chief Residents

Luke J. Schloegel, MD, Oakland, CA; Barry M. Rasgon, MD, Oakland, CA; Raul M. Cruz, MD, Oakland, CA; Raymond L. Hilsinger Jr., MD*, Oakland, CA; Frederick M. Byl, MD*, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the pros and cons to manual dexterity testing of otolaryngology residency applicants, discuss the components of surgical skill evaluation, and compare different criterion used for resident selection.

Objectives: Typical otolaryngology residency applications provide little information about an applicant's surgical skills or ability to be trained as a technically competent surgeon. The role of manual dexterity testing in applicant selection is controversial; however, some demonstration of technical aptitude by applicants may have a place in predicting surgical competency. The objective of this study was to test the validity of a pre-residency manual dexterity test in predicting surgical skill of graduated chief residents. **Study Design:** A retrospective study at an otolaryngology residency program. **Methods:** For over 25 years, otolaryngology residency applicants at the senior author's residency program have completed a manual dexterity test by carving soap. The pre-residency soap

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carvings of graduated chief residents were blindly evaluated by four senior physicians using a 1-to-5 scoring system in four categories. Additionally, the same senior physicians rated the graduated chief residents in four components of surgical skill on a 1-to-5 scale. A regression model was used to predict surgical skill by pre-residency manual dexterity testing. **Results:** The mean pre-residency dexterity score was 14.0, standard deviation (SD) 3.4. The average total chief resident surgical skill score was 12.7, SD 2.7. The Pearson correlation coefficient r was equal to 0.16, indicating weak to no correlation. **Conclusions:** To our knowledge, this represents one of the few studies that utilizes longitudinal data comparing pre-residency manual dexterity testing with post-training surgical skill. Since no correlation was noted in the present study, limitations of the present study, inherent limitations to dexterity testing, and the subjective nature of surgical skill evaluation are discussed.

A170. Interventional Sialoendoscopy after Sialadenectomy

Sunitha M. Sequeira, MD, St. Louis, MO; Brian Nussenbaum, MD*, St. Louis, MO; M. Allison Ogden, MD, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the role of sialoendoscopy in the treatment of persistent sialadenitis and sialolithiasis in patients with prior sialadenectomy.

Objectives: To describe the use of diagnostic and interventional sialoendoscopy for patients with prior parotidectomy or submandibular gland excision who have persistent sialadenitis and/or sialolithiasis. **Study Design:** Retrospective case series.

Methods: Medical records including clinic notes, radiologic studies, and operative reports were reviewed. **Results:** Five patients, who had undergone prior sialadenectomy for sialadenitis and/or sialolithiasis, underwent sialoendoscopy for persistent symptoms. Three patients were female and two were male, with a range of ages from 39 to 63 years (mean 46.8 years). Three patients had prior parotidectomy and two had prior submandibular gland excision. Duration of time from sialadenectomy to sialoendoscopy ranged from 3.25 months to 5 years (mean 32 months). Four of the five patients had successful interventional sialoendoscopy, with resolution of their symptoms. Three of these four patients had extraction of stones; one of which was previously unrecognized. The fourth patient had improvement after irrigation and stricture dilation. In one patient, duct cannulation was unable to be performed due to scarring at the Stensen's papilla, and the patient's symptoms persisted after the procedure. No complications occurred.

Conclusions: Sialoendoscopy after sialadenectomy is a safe and frequently effective intervention for persistent sialolithiasis and sialadenitis.

A171. Intranasal Landmarks for Adequate L-Strut Preservation during Endoscopic Septoplasty

Rahul Seth, MD, Cleveland, OH; Peter C. Revenaugh, MD, Cleveland, OH; Raj Sindwani, MD, Cleveland, OH

Educational Objective: At the end of this study, the participant should be able to appreciate how to use intranasal landmarks such as the inferior turbinate head and vertical middle turbinate attachment to guide cartilage resection and preserve an adequate L-strut during endoscopic septoplasty.

Objectives: A 1cm L-strut in the dorsal and caudal areas of the nasal septum is preserved during septoplasty to maintain structural stability and prevent external deformity. However, during endoscopically performed septoplasty the surgeon has a different perspective, which may make it a challenge to ensure an adequate strut is preserved. No reliable intranasal landmarks have yet been established. We demonstrate intranasal landmarks that may be utilized during endoscopic septoplasty to safely maintain sufficient caudal and dorsal support. **Study Design:** Cadaveric and live subject anatomic study. **Methods:** The distance from the inferior concha to the caudal aspect of the quadrangular cartilage (caudal strut) was measured using calipers in 15 human cadavers. Dorsal strut height was measured from a line parallel to the nasal dorsum that extended from the middle turbinate axilla to the nasal vestibule. The use of these landmarks was evaluated in 30 human subjects undergoing endoscopic septoplasty (ES). **Results:** In cadavers the caudal L-strut averaged 17.2mm. Average dorsal strut measured 14.5mm. In all live subjects, the distance from the inferior turbinate head (post decongestion) to the caudal edge of the septal cartilage left a >1.0cm caudal strut, establishing it as a safe and effective landmark for caudal extent of cartilage resection. The intranasal line defining the dorsal strut served as a reliable landmark to define extent of dorsal cartilage removal. **Conclusions:** The inferior turbinate and vertical middle turbinate attachment may be used to guide cartilage resection during ES. Use of these landmarks allow preservation of an adequate L-strut and may therefore reduce support related complications.

A172. Assessment of Phonomicrosurgical Training in Otolaryngology Residencies: A Resident Survey

Manish D. Shah, MD, Toronto, ON Canada; Adam M. Klein, MD, Atlanta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the current state of resident training in phonomicrosurgery and the potential need for changes to residency curricula.

Objectives: The primary objective of this study is to assess the adequacy of clinical and laboratory based phonomicrosurgical training in US and Canadian otolaryngology residency programs using a self-report survey. Our study aims to establish whether there is a need and desire for focused surgical training in phonomicrosurgery. **Study Design:** Internet based survey. **Methods:** An anonymous internet based survey was sent to all current residents in otolaryngology training programs in the United States and Canada via their residency program directors. For portions of the analysis, the residents were categorized into two groups - junior (R2 and R3) and senior (R4 and R5). Interns (R1) were excluded. **Results:** 191 residents responded to the survey, representing a response rate of 34.3%. Approximately 60% of residents stated that their residency program includes a rotation during which the main emphasis is

laryngology; however, only 49.8% of residents were fairly or very satisfied with the phonosurgery experience that their program offers. Only 51% of senior residents felt fairly or very comfortable performing a phonosurgical removal of a vocal fold lesion. The majority of respondents (60%) stated that they infrequently were able to objectively assess their patients postoperatively. Whereas the vast majority of respondents found temporal bone laboratory training to be helpful, 82% had never performed laboratory training in phonosurgery and only a small percentage (23.9%) had attended a laryngeal dissection course. The majority (88%) felt that their comfort level with phonosurgery would increase if they had access to laboratory based training. **Conclusions:** Our study demonstrates that there is a lack of emphasis on clinical and laboratory based training in phonosurgery. This is likely an important factor in explaining why a large proportion of residents do not feel comfortable performing these procedures. Furthermore, the results of the study establish that there is a need and desire for focused surgical training in phonosurgery.

A173. Clinical Based Discharge Criteria for Pediatric Outpatient Adenotonsillectomy

Rahul K. Shah, MD*, Washington, DC; Layla San Martin, RN, Washington, DC; Sheila Buerger, RN, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) use a quality improvement methodology to improve a practice pattern; 2) demonstrate proof of principle for clinical based discharge criteria; and 3) propose clinical based discharge criteria for adenotonsillectomy.

Objectives: To develop and evaluate clinical based discharge criteria for pediatric outpatient adenotonsillectomy. **Study Design:** Three phase quality improvement (QI) initiative. **Methods:** Phase 1 involved testing myriad clinical characteristics to ascertain the validity of the approach. Phase 2 utilized a collection tool with time stamps. Phase 3 was implementation of the tool. **Results:** A total of 66 patients were part of this QI initiative. Prior to intervention, mean time to discharge was 103 minutes (SD 53). In phase 1, n=25 patients; mean time to discharge was 78 minutes (SD 20, range 50-120). In phase 2, n=31; mean time to discharge was 83 minutes (SD 22, range 58-142). In phase 2, the age of the patients was 7.5 years (SD 3.5) and pain scores on a 10 point scale (0 no pain) was a mean of 1.9 (SD 1.9). Seven specific discharge criteria are used in phase 3. To date, in phase 3, there are 10 patients (mean age 7.8 years, SD 3.1), the mean time to discharge is 92 minutes (SD 23) and mean pain score of 2.3 (SD 1.8). There were no adverse outcomes in any phase of the study. **Conclusions:** Implementation of clinical based discharge criteria resulted in significant improvements in patient through-put while maintaining clinical outcomes. Compared to normative discharge times at our facility, this QI intervention resulted in an 11% improvement in time to discharge with no difference in outcomes. Utilization of QI methodology to specific cases in otolaryngology to derive clinical based discharge criteria has significant value for our specialty.

A174. Presbyosmia and Early Neurological Disease

Michael H. Stevens, MD*, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the evaluation and management of patients who have possible early neurological disease.

Objectives: To help practicing otolaryngologists be aware that the first presenting symptom of neurological disease may be a loss of olfaction, and that the evaluation of these mature adults requires considering items not normally included in the head and neck examination. **Study Design:** A retrospective study of 100 patients with olfactory loss seen at our institution over a 2 year period included 19 patients with loss greater than that expected for their age. The SIT (Smell Identification Test) was used as well as taste testing and an MRI. **Methods:** A history included questions regarding neurological symptoms such as memory loss, visual disturbances, difficulty in performing ordinary daily activities, motor difficulties, and sensory loss. The head and neck examination included a screening neurological exam similar to that for patients with neurologic symptoms such as testing cranial nerves, finger to nose and rapid alternating movements, gait and performing a Romberg test. **Results:** One patient was discovered to have a meningioma of the olfactory tract, and one patient was found to have Parkinson's disease. The other 17 were felt to either have early neurological disease or to have presbyosmia. **Conclusions:** Olfactory testing and an MRI will not detect most patients with early neurological disease that present with olfactory loss. It is therefore imperative to include a focused neurological history and examination. Even when there is no evidence of a neurological disorder these patients and their primary care physician need to be told that they may have early neurological disease so that proper followup can be done. Safety issues also need to be explained to them. Until other diagnostic markers are developed this approach is critical.

A175. Retrospective Evaluation of the LRINEC (Laboratory Risk Indicator for Necrotizing Fasciitis) Score in Cervical Necrotizing Fasciitis

Andrew J. Thomas, BA, Seattle, WA; Tanya K. Meyer, MD, Seattle, WA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand differences in characteristics of cervical necrotizing fasciitis and non-necrotizing cervical infection, and to understand the limitations of an existing necrotizing fasciitis prediction model.

Objectives: The LRINEC score was developed to distinguish necrotizing fasciitis from other soft tissue infections on the basis of laboratory values (Wong et al., 2004). Cervical necrotizing fasciitis (CNF) is a minority of necrotizing fasciitis cases, and likely underrepresented in this model. We evaluated the LRINEC score in neck infection and identified characteristics strongly associated with CNF as the basis for a new model. **Study Design:** Retrospective chart review. **Methods:** We reviewed twenty consecutive

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cases of CNF and seventy cases of non-CNF neck infection occurring at our institution over a 10 year period. CNF was confirmed by operative report documentation. LRINEC scores were calculated as per Wong et al. **Results:** Laboratory values required for LRINEC score calculation were obtained for 45% of CNF cases and 11% of non-CNF infection cases, respectively. For CNF cases, 44% had a LRINEC score considered low risk, 33% moderate, and 22% high risk. For non-CNF infection, 50% were low risk, 37.5% moderate, and 12.5% high risk. CNF and non-CNF LRINEC scores were not significantly different ($p>0.63$). CNF cases had significantly lower average calcium (6.9), magnesium (1.8), protein (4.3), albumin (1.6), bicarbonate (19.2), and pH (7.3), but higher average glucose (201) and BUN (23.7) levels compared to cases of non-CNF infection. **Conclusions:** The LRINEC score requires data not routinely obtained at our institution, and the score performs poorly in our retrospective review. This data supports the unique nature of head and neck infection and the potential utility of a CNF specific prediction score.

A176. Evaluating the Usefulness of the Minor Salivary Gland Biopsy for Sjogren's Syndrome

Stephen V. Tornabene, MD, Oakland, CA; Raul M. Cruz, MD, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the signs, symptoms, and laboratory values that are predictive of a positive minor salivary gland biopsy for Sjogren's syndrome.

Objectives: Sjögren syndrome (SS) is a systemic chronic inflammatory disorder characterized by lymphocytic infiltrates in exocrine organs. The minor salivary gland biopsy is a common procedure used to aid in the diagnosis of this condition. The goal of this study was to identify analytical and clinical variables that may improve the effectiveness of this procedure. **Study Design:** Retrospective chart review. **Methods:** This study examined all minor salivary gland biopsies done in this medical center in the past four years. Variables including demographic information, laboratory information (SSA, SSB, ANA), presence of sicca symptoms, salivary gland enlargement, joint pain, peripheral neuropathy, and other organ system involvement were recorded. **Results:** Thirty-four biopsies were completed in the study period, half of these were positive for SS. There were no significant differences between the positive and negative biopsy groups in regards to sicca symptoms, joint pain, peripheral neuropathy, salivary gland enlargement, or other autoimmune conditions. There was a significantly higher percentage of patients with positive autoantibody tests in the positive biopsy group compared with the negative group. Ocular testing and salivary flow testing were not performed frequently at our institution. **Conclusions:** The minor salivary gland biopsy is an easy and reliable test to diagnose SS. However, it can be difficult to predict positive results based on clinical signs and symptoms.

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A177. Gastrostomy Tube Use after Transoral Robotic Surgery for Oropharyngeal Cancer

Samer Al-khudari, MD, Detroit, MI; Scott Bendix, BS, Detroit, MI; Jamie Lindholm, CCC-SLP, Detroit, MI; Erin Simmerman, RN, Detroit, MI; Francis T. Hall, MBChB, Detroit, MI; Tamer A. Ghanem, MD PhD, Detroit, MI

Educational Objective: At the completion of the presentation the reader should be able to understand the utility of gastrostomy tubes after transoral robotic surgery and evaluate patterns of use in oropharyngeal resections.

Objectives: To evaluate disease and treatment factors that influence gastrostomy tube use after transoral robotic surgery (TORS) for oropharyngeal cancer. **Study Design:** Retrospective review of database with planned data collection. **Methods:** Forty patients underwent TORS between March 2010 and September 2011. Gastrostomy use was recorded before and after surgery and as clinically indicated. Kaplan-Meier and Cox hazards model evaluated effects of early (T1&T2) and advanced (T3&T4) disease, adjuvant therapy, and free flap reconstruction on gastrostomy tube use. **Results:** Twenty-nine patients underwent TORS as primary therapy with 22 for early and 7 for advanced disease. Eleven patients underwent salvage therapy, 7 for early and 4 for advanced disease. Tumor location included 18 tonsil, 17 tongue base, and 5 other. Twelve patients underwent robotic assisted microvascular reconstruction and 25 patients received adjuvant therapy. Four groups were compared, primary early disease (PED), primary early disease with adjunctive therapy (PEDAT), primary advanced disease (PAD) and salvage therapy. 0% of PED, 30.8% of PEDAT, 42.9% of PAD, and 72.7% of salvage patients required a gastrostomy tube via Kaplan-Meier analysis, comparison between 4 groups showed a significant difference ($p=0.040$). Five of 6 patients who underwent primary therapy with a free flap required a feeding tube, and 5 of 6 patients undergoing salvage therapy with a free flap required a gastrostomy tube ($p=0.092$). No additional variables were significant on multiple variate analyses. Among 16 patients with followup at 1 year, only 1 patient maintains a gastrostomy tube. **Conclusions:** Primary early disease can be managed without a gastrostomy tube after TORS. Salvage patients have a high rate of gastrostomy tube need after TORS.

A178. HPV Positive Head and Neck Cancer: The Predictive Value of Sociodemographic and Disease Characteristics

James K. Byrd, MD, Charleston, SC; Christina S. Wilhoit, CCRP, Charleston, SC; Theodore R. McRackan, MD, Nashville, TN; Shaun A. Nguyen, MD, Charleston, SC; Marion B. Gillespie, MD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to identify which clinical and sociodemographic features are associated with HPV positive head and neck cancer. Participants will be aware that many HPV positive patients do not fit the typical HPV profile, and that using these predictors instead of routine laboratory testing may fail to identify HPV positive patients. This may affect patient counseling and treatment choice in the future.

Objectives: We sought to determine whether HPV positivity of head and neck cancers could be reliably predicted based on sociodemographic and disease characteristics alone. **Study Design:** Clinical records of HNSCC patients treated between 2006 and 2010 were reviewed to identify patients who either had tumor tissue that had been tested for HPV. Sociodemographic and clinical features on each patient were obtained from the clinical record. The database was de-identified and the HPV/p16 results were removed. Four otolaryngology-head and neck surgery trainees were given the resulting database and were asked to predict HPV status for each patient. **Methods:** Each trainee's responses were scored for accuracy, positive and negative predictive value, and inter-rater agreement. Multiple linear regression analysis was performed to determine predictors of HPV positivity. **Results:** 174 patients meeting inclusion criteria were identified, 95 of whom were determined to have HPV positive tumor tissue. Residents were able to accurately predict HPV status in 110-125 (63-72%) of patients, with positive predictive values 76-84% and negative predictive values 61-69%. The only variables significantly related to HPV status were male sex ($p = 0.011$) and oropharyngeal subsite ($p = 0.016$). Only 4 patients met the "typical" profile: < 55 yrs of age, oropharynx primary, never-smoker status, and the presence of cystic neck disease. **Conclusions:** Knowledge of patient age, race, stage, smoking status, primary site, basaloid features, tumor differentiation, and presence or absence of cystic neck disease did not allow accurate predictions of HPV status in many patients. Clinical testing of tumor tissue remains essential for a diagnosis of HPV positive disease.

A179. Akt/mTOR Activation in Precancerous Lesions of Head and Neck Squamous Cell Carcinoma

Matthew J. Clavenna, MD, Shreveport, LA; Cheryl A. Clark, PhD, Shreveport, LA; Fleurette Abreo, MD, Shreveport, LA; Tara N. Moore-Medlin, BS, Shreveport, LA; Cherie-Ann O. Nathan, MD*, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to appreciate that the Akt/mTOR pathway plays a role in the progression of head and neck precancerous lesions to squamous cell carcinoma.

Objectives: Prior studies have looked at the clinical application of biomarkers in the AKT/mTOR pathway in head and neck squamous cell cancer (HNSCC) showing greater reliability in pmTOR over p4EBP1 when cancer was compared to non-cancer specimens. Understanding the molecular mechanisms in HNSCC progression is critical for precancerous lesion diagnosis and development of novel strategies for targeted therapies. **Study Design:** Retrospective study of precancerous lesions of the oral cavity and larynx. **Methods:** Oral cavity and larynx pathology specimens were reviewed from 2007-2008 for pre-cancer (hyperplasia/hyperkeratosis, dysplasia, and carcinoma in situ, $n=31$) and compared to cancer ($n=22$) and benign (UP3) specimens ($n=25$) using biomarkers for pmTOR and p4EBP1 by immunohistochemistry (IHC). **Results:** IHC demonstrated expression of p4EBP1 and pmTOR were significantly higher in various degrees of precancerous and cancerous lesions, when compared to normal tissue ($p < 0.05$). In differentiating precancerous from benign tissue, pmTOR was 58% sensitive and 96% specific, whereas p4EBP1 was 90% sensitive but only 83% specific. Differentiating cancer from benign tissue, pmTOR was 86% sensitive versus 50% in p4EBP1, with the same specificity (96% and 83%, respectively). **Conclusions:** Both biomarkers appear to be overexpressed in premalignant lesions of the head and neck. Although phosphorylated 4EBP1 appears to be a more sensitive biomarker in precancerous lesions compared to benign tissue, pmTOR becomes more sensitive with increasing grades of dysplasia and is more specific. Hence, pmTOR appears to be an ideal biomarker in HNSCC carcinogenesis.

A180. BRAFV600E Mutation Correlates with Increased Expression of KLK7 and KLK10 in Papillary Thyroid Cancer

E. Ashlie Darr, MD, New York, NY; Vikas Mehta, MD, New York, NY; Melanie MacEwan, BS, Valhalla, NY; Codrin Iacob, MD, New York, NY; Edward Shin, MD, New York, NY; Jan Geliebter, PhD, Valhalla, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the relationship between the BRAFV600E mutation and kallikreins 7 and 10 with regard to papillary thyroid cancer.

Objectives: Papillary thyroid carcinomas (PTCs) possessing the BRAFV600E mutation have been associated with greater local invasion and regional metastatic potential. Additionally, prior studies have demonstrated the upregulation of kallikrein 7 (KLK7) and kallikrein 10 (KLK10), serine proteases involved in extracellular matrix remodeling, in PTC samples. The objective of this study is to determine the relationship between BRAFV600E mutation status and levels of KLK7 and KLK10 in PTC. **Study Design:** A retrospective study using 39 patient thyroid tissue samples obtained over a 6 year period at a single tertiary care center. **Methods:** DNA and RNA were obtained from patient PTC and matched, normal thyroid tissue samples using the Trizol method. BRAFV600E mutational status of the DNA was determined using the TaqMan SNP genotyping assay, while RNA was analyzed for differences in KLK7 and KLK10 transcription levels (relative to matched, normal thyroid tissue) by qRT-PCR. A 50% increase in expression (1.5 fold expression) was considered significant upregulation. **Results:** Sixty-four percent of the PTC samples possessed the BRAFV600E mutation. PTC samples bearing the BRAFV600E mutation displayed significantly higher KLK7 and KLK10 RNA levels (relative to matched control tissue) than those samples with wild type BRAF ($p = 0.04$; Fisher's Exact). **Conclusions:** These data provide new evidence of the roles of BRAFV600E and kallikreins in PTC invasive pathology and demonstrate for the first time that BRAFV600E status is able to predict higher KLK7 and KLK10 levels in PTC.

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A181. A Novel Modular Polymer Platform for the Treatment of Head and Neck Squamous Cell Carcinoma

Miranda S. Dennis, MD, Los Angeles, CA; Yuan Lin, PhD, Los Angeles, CA; Arnold Suwarnasarn, PhD, Los Angeles, CA; Elliot Abemayor, MD PhD*, Los Angeles, CA; Ben M. Wu, DDS PhD, Los Angeles, CA; Maie A. St. John, MD PhD*, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the benefits of a modular polymer platform, which will improve the outcome for patients with advanced HNSCC.

Objectives: To evaluate the therapeutic efficacy of an immunomodulator secreting polymer platform in the treatment of HNSCC.

Study Design: In vivo animal study. **Methods:** C3H/HeJ mice injected with SCCVII/SF cells. After tumors reached 1 cm in size, animals then underwent surgery and were randomized to receive implantation of 1) no polymer; 2) plain polymer; 3) plain polymer with dendritic cells (DC) secreting the chemokine CCL21; 4) plain polymer with DC alone; and 5) plain polymer + daily CCL21 injection. Tumor size was measured until the mice were euthanized. At necropsy, the tumors were excised and weighed. **Results:** We were able to demonstrate that DC are viable and functionally secrete CCL21 up to 14 days in the polymer. DC-CCL21 secreting polymer effectively reduced tumor growth mice by over 16-fold ($P < 0.01$) as compared to control, plain polymer, and plain polymer + intratumoral CCL21 injection groups. Flow cytometry analysis revealed that there was a significant increase in CD4+ T cells, as well as a significant decrease in CD4+/CD25+ regulatory T cells in the tumor site, underlying the significant tumor regression observed.

Conclusions: The major limitation for the clinical use of cytokines is the lack of an effective protocol for the sustained delivery of cytokines to the tumor milieu. We demonstrate the efficacy of a novel polymer platform in delivering DC-CCL21 to SCCA in a murine model. Our results indicate that this polymer may represent a new therapeutic modality for patients with HNSCC. Once this polymer platform is optimized we will plan for validation in the context of a prospective trial in patients with unresectable advanced or recurrent HNSCC.

A182. Impact of Treatment Modality on Survival and Recurrence Rate in Head and Neck Squamous Cell Carcinoma

Isaac F. Dingle, MBA, Charleston, SC; Elizabeth G. Hill, PhD, Charleston, SC; Briggs M. Ahearn, BS, Charleston, SC; Eric J. Lentsch, MD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the findings of recent literature on the impact of treatment modality in head and neck squamous cell carcinoma and demonstrate an understanding of sites and/or stages where certain treatment modalities are favored over others.

Objectives: Determine impact of treatment modality in HNSCC. **Study Design:** Retrospective review. **Methods:** An analysis of patients seen at an NCI designated cancer center for squamous cell carcinoma of the oral cavity, oropharynx, or larynx and treated with curative intent by primary surgery (S) or chemoradiation (CR) between 2000 and 2011 was completed. The study included 407 patients stratified by site (oral cavity: 20 CR, 153 S; oropharynx: 122 CR, 72 S; larynx: 62 CR, 46 S) and stage. Median followup was 20.1 months. Endpoints were overall survival and recurrence. **Results:** No significant difference in overall survival by site was seen. Hazard ratios (HR) for risk of death in surgical patients versus CR patients were: oral cavity HR = 0.6 (95% CI = 0.3-1.19, $P = 0.142$), oropharynx HR = 0.92 (95% CI = 0.53-1.62, $P = 0.778$), larynx HR = 0.66 (95% CI = 0.31-1.4, $P = 0.277$). Oral cavity patients treated with CR recurred more often than surgical patients (60% vs 28%, $P = 0.019$). When stratified by stage this trend remained but was insignificant. Oropharynx patients treated with CR recurred more often surgical patients (27% vs 12%; $p = 0.035$). When stratified by stage this trend remained but was insignificant. There was no difference in recurrence rate by treatment modality in laryngeal patients. **Conclusions:** Despite a trend towards increased recurrence rate in oral cavity and oropharynx patients treated with primary chemoradiation, when stratified by site and stage we observed no significant difference in overall survival or recurrence rate in primary surgery versus primary chemoradiation.

A183. Evaluating p16, p53, and EGFR Expression in Oropharyngeal Squamous Cell Carcinoma (OPSCC) and Their Association with Mortality

Praveen Duggal, MD, Atlanta, GA; Zhou G. Chen, PhD, Atlanta, GA; Susan Muller, DMD MS, Atlanta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role for p16, p53, EGFR with regards to survival and patient characteristics when evaluating patients with OPSCC.

Objectives: To identify the potential prognostic significance of immunohistochemical (IHC) staining for p16, p53, and EGFR in OPSCC. **Study Design:** Retrospective cohort study. **Methods:** The study population ($n=218$) included all available OPSCC tumor biopsy specimens in a tertiary health center from 1996 until 2008. IHC staining and scoring was performed for p16, p53, and EGFR expression. HPV in-situ hybridization testing was also performed on a subset of these specimens. Expression of these markers was then compared to clinical data that followed patient events for at least two years including demographic information, patient characteristics, and overall survival. **Results:** Of all OPSCC tumors, 64% were p16 positive. The sensitivity of p16 staining for HPV was 97%. The mean age of p16 positive patients was significantly younger (55.3 ± 9.9 years) compared to p16 negative patients (63.1 ± 11.7 years). P16 expression had a significant overall survival benefit with a decreased risk of mortality (RH 0.31, p -value < 0.0001 , 95% CI 0.198, 0.474) if a patient was p16 positive versus p16 negative. Nearly all tumors expressing p16 lacked p53 expression (99%, 120/121). EGFR expression was associated with p16 negative tumors (85% 58/68). **Conclusions:** P16 negative patients were on average older and showed a significant 3-fold increased risk of mortality. There is a significant prognostic difference when comparing patients with p16 expression in OPSCC.

- A184. Evaluation of Radiation Induced Xerostomia in Head and Neck Cancer Patients by Measuring Quality of Life after Transferring the Submandibular Gland to the Submental Space prior to the Start of Radiation Treatment**
Alexander R. Facque, MS4, Las Vegas, NV; Annabel E. Barber, MD, Las Vegas, NV; Marcia M. Ditmyer, PhD, Las Vegas, NV; Robert C. Wang, MD*, Las Vegas, NV

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the pathophysiology of radiation induced salivary gland damage, the current medical options available to prevent post-radiation xerostomia, and the development of surgical submandibular gland transfer as a method for reducing the incidence of chronic post-radiation xerostomia.

Objectives: The permanent loss of saliva that results from radiation treatment to the upper aerodigestive tract can be severely distressing. Xerostomia has been shown to cause difficulty chewing, swallowing, and severe pain due to dental caries. Several medical options are available for the prevention of radiation induced xerostomia but their use is often limited by patient tolerance. This study proposes that surgical transfer of the contralateral submandibular gland to the submental triangle can shield the gland during radiation treatment, and thus, prevent this unfortunate complication. **Study Design:** Prospective, nonrandomized clinical trial. **Methods:** Based on inclusion criteria, selected patients received submandibular gland transfer prior to chemoradiation treatment. A control group based on age, primary cancer location, and radiation dose was selected. All patients were followed clinically and with the University of Washington quality of life questionnaire. **Results:** All patients in the control group reported either severe saliva loss or complete absence of saliva production. In the group who received gland transfer, 10 of 15 reported minimal or no saliva loss. The distribution and medians of reported salivary loss and increased salivary thickness were significantly different according to Mann-Whitney U analysis (n1=15, n2=10; p<0.05). The distribution of the total quality of life score was also significantly different between the two groups (Mann-Whitney U=121, p=0.01). There were no reported surgical complications. **Conclusions:** Transposition of the submandibular gland to the submental space is an effective option in preserving salivary function for patients receiving radiation to the head and neck.

- A185. The Use of Transcutaneous Laryngeal Ultrasound to Diagnose Vocal Fold Paralysis**
Terry R. Fleck, MD, Loma Linda, CA; John C. Sok, MD PhD, Loma Linda, CA; Paul D. Kim, MD, Loma Linda, CA; Darron M. Ransberger, MD, Loma Linda, CA; Brent R. Wolford, BA, Loma Linda, CA

Educational Objective: At the conclusion of this presentation the participants should understand that in select patients the minimally invasive transcutaneous laryngeal ultrasound (TCLUS) can accurately distinguish between normal vocal fold (VF) mobility and VF paralysis.

Objectives: Determine the ability of TCLUS to diagnose VF paralysis in the outpatient clinical setting with the otolaryngologist serving as the ultrasonographer. **Study Design:** Prospective case control series. **Methods:** 19 patients were recruited from a single voice and swallow center. Fiberoptic laryngoscopy (FL) and TCLUS were performed on all patients. Real time ultrasound video segments were recorded for each patient and FL confirmed the diagnosis of VF mobility vs. paralysis. The ultrasound videos were then de-identified, randomized and shown to a group of otolaryngology attendings and residents. None of the participants had prior experience in reading TCLUS. Participants were asked to assess each patient on VF paralysis (distinguishing laterality) vs. mobility. **Results:** There were 9 male and 10 female patients. 11 patients had unilateral VF paralysis and 8 were controls (mobile). Attending physicians correctly diagnosed the patient 79.4% of the time (p<0.05), resident physicians were correct 77.9% (p<0.05). Both groups were slightly more accurate at diagnosing patients with mobility. There were five patients who were more commonly misdiagnosed (>40% of the time). All of the frequently misdiagnosed patients were male, two had VF paralysis, three had previous neck surgery and four were recorded on the first day of recruitment. **Conclusions:** TCLUS can accurately distinguish between VF mobility and paralysis in select patients when graded by both resident and attending otolaryngologists. The more acute angle of the anterior thyroid cartilage in males and previous neck surgery made TCLUS interpretation slightly more difficult. Furthermore, there is a fast learning curve for performing and reading the TCLUS.

- A186. HPV-16 and Laryngeal Carcinoma: Does Status Impact Survival?**
Laureano A. Giraldez, MD, San Juan, PR; Luisam Tarrats, MD, San Juan, PR; Jeamarie Pascual, MSIV, San Juan, PR; Adriana Baez, PhD, San Juan, PR

Educational Objective: At the conclusion of this presentation, participants should be able to establish the differences in overall survival of patients with HPV positive or negative carcinoma of the larynx.

Objectives: Determine the impact of HPV-16 tumor status in survival of patients with laryngeal carcinoma. **Study Design:** This is a secondary data analysis of a longitudinal prospective cohort study. A sample of 90 patients diagnosed with laryngeal squamous cell carcinoma was analyzed. Data was collected between 1993 and 2005. It included sociodemographic characteristics, lifestyle risk factors (alcohol and smoking status), tumor HPV status, and pathological results. **Methods:** A descriptive univariate analysis of this population was performed. The chi-square test was used to compare HPV-16 positive and negative status. Overall survival analysis was done with the Kaplan Meier Method. A Wilcoxon's Rank Sum Test was utilized to determine statistical significance. **Results:** Forty-eight patients had HPV-16 positive tumors and forty-two HPV-16 negative tumors. There were 17 patients with stage I and II tumors and 73 patients with stage III and stage IV tumors. Early staged patients with HPV positive tumors survived 166.3 months. HPV negative tumors survived 63.4 months (p=.017). Late stage HPV positive patients survived 120.0 months and HPV negative

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72.0 months ($p=.021$). Twenty-one patients underwent surgery. Nine had HPV positive tumors whose survival was 69.2 months. Fourteen tumors were HPV negative. Their survival was 58.61 months. Fifty-five patients underwent surgery and radiotherapy. HPV positive patients survived 164.0 months and HPV negative patients 91.5 months ($p=.017$). HPV positive patients who had surgery and chemoradiotherapy survived 68.0 months and HPV negative patients 21.7 months ($p=.028$). Differences were statistically significant. **Conclusions:** Patients with HPV positive carcinoma of the larynx have a survival advantage in early and late stages. This was particularly observed in HPV positive patients that received radiotherapy.

A187. Evaluation of Risk Factors for Stomal Recurrence following Total Laryngectomy in Laryngeal Cancer Patients

Adam D. Goodale, BS, Cincinnati, OH; Keith Casper, MD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to know the incidence of stomal recurrence and the risk factors for its development.

Objectives: Stomal recurrence is a devastating complication following total laryngectomy with a dismal prognosis despite aggressive treatment options. Recent efforts have focused on preventative measures as well as risk factor identification. This study consisted of a chart review of laryngeal cancer patients having undergone total laryngectomy to identify risk factors for stomal recurrence. **Study Design:** Retrospective chart review. **Methods:** The charts of 167 patients who underwent total laryngectomy from 2002 through 2010 were retrospectively reviewed. Numerous potential risk factors were evaluated including the following: primary tumor site, pre-operative tracheotomy, primary cancer staging, level of neck dissection, margin status, radiation treatment, age, and sex. **Results:** Between 2002 and 2010 a total of 167 patients underwent total laryngectomy with stomal recurrence developing in eight (4.8%) patients. The average time to recurrence was 13.8 months. Subglottic involvement of the primary tumor was the only statistically significant risk factor identified for stomal recurrence ($P = .045$). Stomal recurrence patients were more likely to have failed definitive radiation treatment as well as have a primary T4 staged tumor, although there was no statistical significance. Preoperative tracheotomy was not found to be a risk factor with similar prevalence among the two groups (37.5% vs. 42.1%). Of note, two of the patients with stomal recurrence had a mediastinal tracheotomy performed during surgery due to the lack of negative intraoperative margins. **Conclusions:** Prevention remains the optimal treatment for stomal recurrence given its poor outcome. Patients with subglottic primary tumor involvement with previously failed radiation treatment and high T-stage should be carefully evaluated.

A188. Metastatic Malignant Thyroid Teratoma: Case Report and Review of Literature

Ameet K. Grewal, MD, Washington, DC; Neda Ahmadi, MD, Washington, DC; Leonard Wartofsky, MD, Washington, DC; Duane J. Taylor, MD, Bethesda, MD; Dhruv Kumar, MD, Washington, DC; Stanley H. Chia, MD FACS, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand 1) the clinical presentation and histopathologic characteristics of malignant teratomas of the thyroid gland in adults; and 2) the available management options and prognosis for malignant teratoma of the thyroid gland.

Objectives: Malignant teratomas of the thyroid are very rare, with less than 30 cases reported in adults. In this study we present a rare case of malignant teratoma of the thyroid gland in a young adult. We also review literature on the incidence, clinical presentation, histopathologic characteristics and treatment options for this disease process. **Study Design:** Case report and literature review. **Methods:** Case report and literature review. **Results:** A healthy 33 year old woman presented with a rapidly growing right thyroid mass. Fine needle aspiration demonstrated poorly differentiated carcinoma favoring thyroid origin. The patient underwent total thyroidectomy and neck dissection. Histopathologic analysis confirmed the diagnosis of malignant teratoma of the thyroid gland with metastases to the neck bilaterally. **Conclusions:** Malignant teratomas are exceedingly rare tumors of the thyroid gland. These masses are typically diagnosed after thyroidectomy by histopathologic criteria. Fine needle biopsy typically does not allow for sufficient sampling of the tumor. Historically, malignant thyroid teratoma has a poor prognosis. No standard treatment protocol has been widely accepted given the rarity of the disease, but radiation and chemotherapy are the main therapeutic adjuncts to surgery. Survival time has increased since earlier reported cases, and this may be due to a trend towards more aggressive adjuvant treatment with chemotherapy and radiation.

A189. Merkel Cell Carcinoma (MCC) of the Head and Neck: A Clinical and Histopathological Approach

Stephan Kurt Haerle, MD, Toronto, ON Canada; Boban M. Erovic, MD, Toronto, ON Canada; David P. Goldstein, MD, Toronto, ON Canada; Danny M. Ghazarian, MD, Toronto, ON Canada; Jonathan C. Irish, MD, Toronto, ON Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the different treatment strategies for different presentations of Merkel cell carcinoma (MCC). Further, risk factors were shown to influence patient's outcome and therefore should be implemented in future treatment strategies. Novel histopathological parameters may need to be included in future treatment planning.

Objectives: To analyze any clinical prognostic factors for local/regional/distant recurrence/failure, potential treatment options for the N0 neck, and to correlate histopathological parameters with patient's outcome. **Study Design:** Retrospective review. **Methods:** Between 1990 and 2010, 61 patients with MCC of the head and neck were enrolled in this study. **Results:** 38 patients presented with a clinical N0 neck, 23 patients presented with a N+ neck. Local recurrence occurred in 11% of patients, regional and distant failure occurred in 20% and 25%. The incidence of regional failure in the N0 neck was 21.0%. The failure rate for the untreated N0 neck was

23.5%. Previous locally treated MCC and positive resection margins have been shown to be significant predictive factors for regional failure. Locoregional recurrence showed a trend towards developing distant disease ($p=0.065$). Immunotherapy was found to be a prognostic factor for disease specific survival, single treatment strategy (surgery or radiotherapy) and locoregional recurrence were significantly correlated with disease free survival, and single treatment strategy was associated with worse overall survival. Mitotic rates and other histopathological parameters were correlated with patient's outcome. **Conclusions:** Understanding the clinical and pathology parameters that determine patient outcome in MCC are increasingly being understood. A N0 neck in patients not at risk should best be assessed by sentinel node biopsy. A combined modality approach (surgery plus radiotherapy) needs to be assessed individually, with the N+ neck nearly always requiring a combined approach. Ultimately, the histopathological parameters reported in this study will provide an increasing understanding of those patients at higher risk for disease failure.

A190. The Effect of Deep Venous Thrombosis on Short Term Outcomes and Cost of Care after Head and Neck Cancer Surgery

Patrick T. Hennessey, MD, Baltimore, MD; Yevgeniy R. Semenov, MA, Baltimore, MD; Christine G. Gourin, MD MPH*, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the impact of DVT/PE on in-hospital mortality, complications, length of stay, and costs in patients undergoing ablative operations for head and neck cancer and discuss the risk factors for DVT/PE in this population.

Objectives: The Centers for Medicare and Medicaid Services (CMS) has threatened to discontinue reimbursements for deep venous thrombosis (DVT) and pulmonary embolus (PE) in hospitalized patients as a preventable "never event". We sought to determine the effect of DVT/PE on short term outcomes and costs in head and neck cancer (HNCA) surgery. **Study Design:** Retrospective cross-sectional study. **Methods:** Discharge data from the Nationwide Inpatient Sample for 93,663 patients who underwent an ablative procedure for a malignant oral cavity, laryngeal, hypopharyngeal or oropharyngeal neoplasm in 2003-2008 was analyzed using cross-tabulations and multivariate regression modeling. **Results:** DVT/PE was diagnosed in 1,860 cases (2%) and was significantly associated with major surgical procedures ($OR=1.4$, $P=0.048$) and advanced comorbidity ($OR=1.7$, $P=0.034$). After controlling for all other variables, no association was found between a diagnosis of DVT/PE and obesity, weight loss, age, chronic cardiac disease, paralysis, and smoking in this HNCA surgical population. DVT/PE was associated with increased risk of in-hospital mortality ($OR=3.1$, $P=0.001$), postoperative surgical complications ($OR=2.1$, $P<0.001$), acute medical complications ($OR=1.9$, $P<0.001$) and was associated with significantly increased length of hospitalization and hospital related costs. **Conclusions:** DVT/PE is uncommon in HNCA patients but is associated with increased mortality, postoperative complications, length of hospitalization, and hospital related costs. The lack of correlation with known modifiable variables suggests that despite targeted prophylaxis, the subset of patients with advanced disease and comorbidity remain at increased risk. Caution must be used in the institution of reforms that threaten to inadequately reimburse the provision of care to this vulnerable population.

A191. Outcomes of Combined Endoscopic and Open Techniques in Resection of Anterior Skull Base Tumors

Larry Allen Hoover, MD*, Kansas City, KS; Laura L. Neff, MD, Kansas City, KS (Presenter); Terrance T. Tsue, MD, Kansas City, KS; Ashwin A. Ananth, BS, Kansas City, KS; Kevin J. Sykes, MPH, Kansas City, KS

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) discuss common tumors of the anterior skull base; 2) demonstrate understanding of challenges presented by individual tumor types; and 3) explain the benefits of endoscopic techniques combined with open approaches.

Objectives: To detail the author's 22 year experience in anterior skull base tumor resection and survival at our institution. **Study Design:** Retrospective chart review over the past 22 years. **Methods:** Patients with malignant tumors of the anterior skull base undergoing resection were followed for an average of nearly five years (57 months). Endoscopic telescopes and techniques were used in all cases. **Results:** There were a total of 170 cases, 113 malignant and 57 benign. Patients with malignant tumors had an average followup of fifty-seven months. The overall survival of patients with malignant pathology was 83% ($n=94$) at the end of this review. 62% ($n=70$) of patients had no evidence of disease and 21% were alive with disease. Sixty-five percent ($n=73$) of these patients had no recurrence at the primary site. **Conclusions:** Endoscopic techniques have been utilized along with open incisions to gain access and visualization of anterior skull base tumors for now over 20 years. Our survival rates compare favorably with other large series. The use of endoscopic techniques has improved our ability to visualize and completely resect tumors of the anterior skull base. The 35% having local recurrence during our followup were largely very aggressive tumor types (melanoma, poorly differentiated squamous cell carcinoma, etc). Endoscopic techniques allow for smaller incisions, less tissue disruption, and faster healing hastening preparation for the important modality of postoperative radiation therapy.

A192. Low Grade Myofibroblastic Sarcoma of the Head and Neck Region—A Review of Two Rare Cases of this Uncommon Type of Sarcoma

Sashikanth Jonnalagadda, MD, Springfield, IL; K. Thomas Robbins, MD*, Springfield, IL; James P. Malone, MD, Springfield, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize, diagnose and manage low grade myofibroblastic sarcoma in the head and neck region.

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Objectives: Sarcomas of the head and neck are uncommon and account for less than 1% of all tumors in this region. Low grade myofibroblastic sarcomas (LGMFS) are rare with only a handful of cases ever reported in the head and neck region. We describe two cases with LGMFS of the maxilla and the mandible. **Study Design:** Case reports. **Methods:** We retrospectively reviewed two patients who carried the histological diagnosis of LGMFS. Previous clinic, operative and referral notes were reviewed along with histopathology slides and radiological studies. **Results:** Case 1: A 37 year old female presented with recurrent right maxillary sinusitis and CT scan evidence of an expanding mass in right maxillary sinusitis. Biopsy revealed it to be a LGMFS. She underwent total maxillectomy with orbital floor reconstruction, postoperative radiation and has been disease free for 18 months. Case 2: A 49 year old female presented with a radiolucent mass on routine dental examination. Biopsy revealed it to be a LGMFS and it was subsequently treated with segmental mandibulectomy and fibular free graft reconstruction and postoperative radiotherapy. **Conclusions:** Based on only 8 cases being reported arising from the entire skeletal system LGMFS of bone is extremely rare. The most common mode of presentation is an asymptomatic mass found incidentally. These tumors are malignant with a rare propensity to metastasize distally. Hence prompt and accurate histological diagnosis followed by wide surgical excision with adjuvant therapy form the important components of management.

A193. Polymorphous Low Grade Adenocarcinoma of the Head and Neck: How Aggressive Is It?

Grace G. Kim, MD, Chapel Hill, NC; Rupali N. Shah, MD, Chapel Hill, NC; Adam J. Kimple, BS MS PhD, Chapel Hill, NC; Adam M. Zanation, MD, Chapel Hill, NC; William K. Funkhouser, MD PhD, Chapel Hill, NC; William W. Shockley, MD*, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the clinical and pathologic features of polymorphous low grade adenocarcinoma (PLGA). They should be able to discuss treatment options and outcomes, along with diagnostic and management dilemmas.

Objectives: PLGA is thought to be an indolent, nonaggressive malignancy; however, there are no large series or systematic reviews reporting overall recurrence rates. We describe our experience combined with a systematic review to better understand the outcomes of this rare tumor. **Study Design:** Retrospective case series and systemic review. **Methods:** A retrospective review of 20 patients with pathologically reconfirmed PLGA of the head and neck at a tertiary care center was combined with 400 cases identified in the literature. Primary outcomes reported include recurrence rate, location, timing and incidence of dedifferentiation. **Results:** In our series the most common initial presentation was an asymptomatic mass (60%). Eighteen patients (90%) were treated with wide local excision, one received primary radiation, and one received primary neutron beam therapy. Two patients recurred locally at 3 and 8 years, one patient had persistent disease, and one patient developed pulmonary metastases (2.5y). Combining our data with the published literature, mean time to recurrence was 7 years (10mos - 19y). The overall recurrence rate was 30%. Recurrences occurred primarily locally (20%), but also regionally (10%) and at distant sites (8%). In some cases, PLGA dedifferentiated into a higher grade tumor. **Conclusions:** PLGA is a salivary gland malignancy that is typically slow growing and amenable to wide local excision. Despite their low grade nature, many PLGAs have a propensity to recur or metastasize or dedifferentiate, often many years later. Our review casts doubt on the concept that these tumors routinely behave in a low grade fashion, although the majority of tumors respond to conventional surgical treatment with negative margins.

A194. Hypoglossal Schwannoma Masquerading as a Carotid Body Tumor: A Diagnostic Dilemma

Matthew K. Lee, MD, Los Angeles, CA; Doug Sidell, MD, Los Angeles, CA; Abie H. Mendelsohn, MD, Los Angeles, CA; Keith E. Blackwell, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should demonstrate an understanding of the management of hypoglossal schwannomas. An emphasis will be placed on distinguishing its clinical and radiologic diagnosis from that of the more common carotid body tumor.

Objectives: 1) To describe the presentation, diagnosis and management of a rare neoplasm; and 2) to understand the clinical and radiologic characteristics distinguishing the hypoglossal schwannoma from the more common carotid body tumor. **Study Design:** Case report, including a detailed radiologic and histopathologic analysis and comprehensive review of the literature. **Methods:** A case report is described from a tertiary care university hospital. High resolution radiologic and histopathologic images are presented. A literature review is performed, detailing the background, incidence, and differential diagnosis of the lesion. Diagnostic and management principles are emphasized. **Results:** A 59 year old female presented with a two year history of an enlarging, pulsatile neck mass. Magnetic resonance angiography demonstrated a 5cm mass occupying the carotid bifurcation with resultant splaying of the internal and external carotid arteries. After a detailed history, physical examination and review of imaging, the diagnosis of a carotid body tumor was conferred. Preoperatively, the patient underwent formal angiography with planned embolization. However the mass was determined to be hypovascular and therefore endovascular treatment was foregone. Intraoperatively, the lesion was unequivocally identified as arising from hypoglossal nerve, readily separable from the carotid artery. The mass was excised, and histopathology confirmed a diagnosis of hypoglossal schwannoma. **Conclusions:** Hypoglossal schwannomas are uncommon lesions, with approximately one hundred cases currently reported. Albeit rare, the clinical and radiologic presentation of a hypoglossal schwannoma may closely mimic that of the more common carotid body tumor. As such, the consideration of alternative diagnoses is of paramount importance whenever an aberrancy in the usual presentation of a carotid body tumor is encountered.

A195. Giant Cell Reparative Granuloma of the Mandible

Jonathan Liang, MD, Sacramento, CA; Quang C. Luu, MD, Sacramento, CA; Donald Gregory Farwell, MD, Sacramento, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to highlight an uncommon benign jaw lesion, giant cell reparative granuloma (GCRG), and understand the current management of GCRG, including our approach to a fast growing aggressive variant.

Objectives: Highlight an uncommon benign jaw lesion, giant cell reparative granuloma (GCRG). Understand the current management of GCRG, including our approach to a fast growing aggressive variant. **Study Design:** Case report. **Methods:** We present a case report of a 44 year old woman with a large left anterior mandibular mass. We review the current literature on GCRG of the head and neck. **Results:** Patient presented with a three month history of progressively enlarging mass over her anterior jaw. On examination, she had a protruding firm immobile mass over the left anterior mandible with associated pain, numbness, and tooth mobility. There were no overlying skin changes or cervical adenopathy. CT demonstrated a 2x4cm lytic expansile lesion of the left mandibular symphyseal and parasymphyseal regions with bicortical and soft tissue involvement. She underwent a composite resection of the anterior mandible with fibular free flap reconstruction. Pathology showed a GCRG. **Conclusions:** GCRGs are a reactive process that represents 1-7% of benign jaw lesions. The differential diagnosis includes other benign lesions (fibrous dysplasia, aneurismal bone cyst, brown tumor of hyperparathyroidism, ameloblastoma) and malignant lesions (osteosarcoma, squamous cell carcinoma, and metastasis). Most are slow growing lesions, however, some fast growing lesions such as this one, have been reported in the literature. Fast growing jaw lesions should raise higher suspicion for malignancy and prompt surgeons to pursue a more aggressive approach. It is important to distinguish aggressive GCRG from malignant lesions. Large GCRG require segmental mandibulectomy and composite resection for soft tissue involvement. Anterior defects of the mandible are best addressed with fibula free flap reconstruction.

A196. Free Abdominal Fat Transfer (FAT) for Reconstruction of Parotidectomy Defects

Myriam Loyo, MD, Baltimore, MD; Christine G. Gourin, MD MPH*, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the use of abdominal fat grafts in the reconstruction of parotidectomy defects.

Objectives: A variety of techniques have been proposed for reconstruction of parotidectomy defects. We reviewed our experience with free abdominal fat transfer (FAT) graft reconstruction of parotidectomy defects for benign and malignant disease. **Study Design:** Retrospective review. **Methods:** The medical records of patients who underwent parotidectomy for benign or malignant disease from 2008-2011 were analyzed. **Results:** Seventy patients underwent 72 parotidectomies with FAT reconstruction, with bilateral parotidectomy performed in 2 patients. Eight patients (11%) presented with recurrent disease following previous parotidectomy and 3 (4%) patients had received previous parotid bed irradiation. The majority of patients had benign pathology (74%) and tumors <3 cm (60%). Superficial parotidectomy was performed in 37 patients (51%) and elective neck dissection was performed in 6 patients (8%). A facelift incision was utilized in 45 patients (63%). Postoperative radiation was used in 12 patients (17%). Abdominal donor site complications occurred in 11 patients (15%), consisting of hematoma in 8 patients (11%) and seroma in 3 patients (4%) requiring in-office drainage in 9 (13%). Parotidectomy wound dehiscence with fat necrosis occurred in 6 patients (8%); all cases responded to conservative management. There was no association between age, tumor size, comorbidity, smoking, extent of surgery, type of incision, prior radiation, or postoperative radiation on the development of wound complications. FAT graft debulking was required in 2 patients with persistent overcorrection beyond 6 months postoperatively. **Conclusions:** FAT reconstruction of the parotidectomy defect is safe and achieves excellent postoperative cosmetic results, particularly when combined with a facelift incision.

A197. Retropharyngeal Lymph Node Status in Oropharyngeal Squamous Cell Carcinoma

Jonathan R. Mark, MD, Norfolk, VA; Daniel K. Hodge, BS, Norfolk, VA; Matthew J. Bak, MD, Norfolk, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the evaluation and diagnosis of retropharyngeal lymph node metastasis in oropharyngeal squamous cell carcinoma.

Objectives: Determine the incidence of retropharyngeal lymph node (RPLN) metastasis in oropharyngeal squamous cell carcinoma (OPSCC) at the time of staging CT or PET/CT scan imaging. Compare CT and PET/CT scan imaging in detecting RPLN metastasis in OPSCC. **Study Design:** Retrospective chart review. **Methods:** 127 patients with newly diagnosed OPSCC from 2007 to 2009 were identified (169 charts were reviewed). 60 patients had undergone staging PET/CT scan, 67 patients had undergone CT scan imaging and were further analyzed. **Results:** The percentage of patients with N+ disease was 82% (105/127). The incidence of RPLN metastasis in OPSCC was found to be 5.5% overall. One RPLN metastasis was detected by PET/CT scan imaging. Six RPLN metastases were detected by CT scan imaging. The difference in incidence of RPLN metastasis detected by CT scan compared to PET/CT was not statistically significant. **Conclusions:** Staging CT and PET/CT in OPSCC found an incidence of RPLN metastasis lower than previously reported studies, and the difference in the incidence identified between imaging modalities was not statistically significant.

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A198. Transoral Excision of an Ectopic Parathyroid Adenoma from the Hypopharynx

James T. May, MD, Tampa, FL; James G. Norman, MD, Tampa, FL; Tapan A. Padhya, MD, Tampa, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the transoral approach to ectopic parathyroids located in the hypopharynx and describe the utility of SPECT/CT scanning for difficult cases involving ectopic parathyroids.

Objectives: To describe a case of primary hyperparathyroidism due to a parathyroid adenoma located submucosally in the pyriform sinus that was successfully cured by transoral resection using a flexible fiber carbon dioxide laser. **Study Design:** Case report.

Methods: A 40 year old male with primary hyperparathyroidism underwent unsuccessful neck exploration for what appeared to be an undescended hyperactive parathyroid gland on Tc99m sestamibi scan. Followup SPECT/CT located the tumor in the right pyriform sinus. Physical exam showed a bulge in the right pyriform sinus corresponding to the imaging finding. **Results:** On return to the operating room, direct laryngoscopy confirmed a bulge in the apex of the right pyriform sinus. The carbon dioxide fiber laser was used to incise the mucosa in the pyriform apex revealing the mass which was located superficial to the laryngeal muscles. After removal of the 1.4cm mass with the laser, the mucosa was reapproximated using a laparoscopic suturing device. Pathology confirmed parathyroid adenoma and postoperative PTH levels returned to normal. After observation in the hospital indicated no sign of pharyngeal perforation, the patient was discharged home on postoperative day 2. The remainder of his recovery was uneventful. **Conclusions:** This case demonstrates the utility of SPECT/CT imaging in difficult parathyroid cases with ectopic glands. The localization information obtained allowed for transoral resection of the adenoma with the aid of the carbon dioxide fiber laser, avoiding a second and potentially morbid open neck exploration.

A199. Not Your Average Eu-Tube Link: A Novel Multidisciplinary Treatment of Inverted Papilloma within the Middle Ear and Eustachian Tube

Candace A. Mitchell, BA, Chapel Hill, NC; Charles S. Ebert, MD MPH, Chapel Hill, NC; Craig A. Buchman, MD FACS *, Chapel Hill, NC; Adam M. Zanation, MD, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate understanding of the two surgeon approach employed by our team to resect an extensive, highly unusual inverted schneiderian papilloma. Participants should be able to describe the challenges presented by a tumor invading the eustachian tube and should become familiar with specific anatomic structures of interest during the complete resection of the eustachian tube.

Objectives: To describe a collaborative surgical technique—simultaneous transmastoid and expanded endonasal approach—employed to resect a unique tumor encountered at our institution. **Study Design:** Technical case report of a novel surgical resection.

Methods: We describe a 69 year old woman with a history of inverted schneiderian papilloma (ISP) who presented with a middle ear mass and resultant conductive hearing loss. Biopsy demonstrated ISP with possible SCCa, and imaging suggested that the tumor migrated to the middle ear via the eustachian tube (ET). We employed a combined transmastoid and expanded endonasal approach to resect the tumor from both sides, eventually meeting in the middle of the eustachian tube to achieve complete resection with negative margins. The complete resection of the bony and cartilaginous ET by lateral and anterior skull base surgical teams is described in detail. Management of the infratemporal fossa during ET resection and issues with the neighboring carotid artery are discussed.

Results: The patient was followed with serial endoscopic examinations for 3 years postoperatively without findings suggestive of recurrence. She received no adjuvant treatment and experienced no complications. She retained hearing function with her normal hearing contralateral ear. MRI performed 3 years after the resection showed no evidence of recurrent disease. **Conclusions:** ISP presenting as a middle ear mass is exceedingly rare: a mere handful of cases exist in the literature. Ours is the first report of a complete resection via a combined surgical approach. In this case of widespread disease, a combined transmastoid and endoscopic resection with complete resection of the ET was curative.

A200. Positron Emission Tomography (PET) Pitfalls Related to Oral Prosthesis

Yogesh I. More, MD, Kansas City, KS; Reginald W. Dusing, MD, Kansas City, KS; Shaheen M. Counts, MD, Kansas City, KS; Justin R. Bond, MD, Kansas City, KS; Terance T. Tsue, MD FACS, Kansas City, KS; Douglas A. Girod, MD FACS*, Kansas City, KS

Educational Objective: At the conclusion of this presentation the participants should understand the 1) clinical utility of FDG PET with CT imaging in post-treatment surveillance of head and neck cancer; 2) knowledge of normal physiologic and benign pathologic FDG distribution in PET/CT along with confounding artifacts that affect clinical evaluation and management protocol.

Objectives: To describe false positive PET/CT findings related to oral prostheses and its implications in cancer surveillance. **Study**

Design: Case series review. **Methods:** In head and neck cancer management, F18 fluorodeoxyglucose (FDG) PET with CT is widely accepted for evaluating treatment response and detecting recurrence. Interpretation of FDG PET/CT images in this setting is often challenging due to various prostheses and reconstruction methods. A 61 year old female status post-surgery for squamous cell carcinoma of maxillary alveolus had a FDG PET/CT scan on a 7 month followup. Physical exam showed no signs of inflammation or recurrence. A repeat CE/CT scan and PET/CT without the prosthesis was performed to evaluate for maxillary prosthesis artifact. We review few more false positive PET/CT cases. **Results:** The PET/CT attenuation corrected images (CTAC) demonstrated high FDG uptake (SUV 11.6) along the resection site corresponding to CECT images of the lesion. PET/CT non-attenuation corrected (NAC)

images also confirmed increased activity. Repeat PET/CT without the prosthesis was normal. FDG is not tumor specific; it can accumulate in inflammation, infection and post-therapy settings. Metallic and high density prostheses show radial artifacts on CT and falsely elevated FDG uptake on PET/CT in adjacent areas. Salivary pooling may concentrate FDG. The presence of oral prostheses has not been described as a cause of this high level of activity. **Conclusions:** PET/CT images that demonstrate intense activity corresponding to dense structures should be viewed with caution. A detailed history and physical exam as well as knowledge of artifacts are pertinent for the managing physician.

A201. A Study on Efficacy of Pregabalin in First Bite Syndrome

Tomoo Onoda, MD, Okayama, Japan; Motoharu Eguchi, MD, Okayama, Japan; Takuma Makino, MD, Okayama, Japan; Hisashi Ishihara, MD, Okayama, Japan; Haruka Hirai, MD, Okayama, Japan; Kazunori Nishizaki, MD, Okayama, Japan

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the management and pathogenesis of first bite syndrome.

Objectives: First bite syndrome is the development of pain in the parotid region after the first bite of each meal. First bite syndrome is a recently identified problem associated with surgery involving the deep lobe of parotid gland and parapharyngeal space. Recent studies showed that first bite syndrome might be caused by damage or removal of cervical sympathetic innervation to the parotid gland, resulting in a denervation supersensitivity of the sympathetic receptors that control myoepithelial cells within the parotid gland. The management of first bite syndrome has not been established. Pregabalin is a new synthetic molecule and can be used for peripheral neuropathic pain. This study evaluated the efficacy of pregabalin in first bite syndrome. **Study Design:** Before and after study. **Methods:** Seven patients with first bite syndrome were enrolled in this study. Pregabalin is administered orally. The initial dose of pregabalin is 25 mg per day and can be gradually increased to the most effective dose (150-300 mg per day). Clinical outcome was evaluated by visual analog scale (VAS) score for pain. **Results:** Pain reduction was observed in all cases. The mean VAS score for pain before the treatment was 67.0 on a scale of 0 to 100, and was 9.6 after the administration of pregabalin. There was a statistically significant difference before and after treatment in score of VAS ($p < 0.001$). **Conclusions:** These findings suggest that pregabalin may be one of the therapeutic options for first bite syndrome.

A202. Sinonasal Melanoma: Shifts in Paradigm with Open versus Endoscopic Surgery

Andrew K. Patel, MD, Phoenix, AZ; David P. Mullin, MD, Phoenix, AZ; Michael L. Hinni, MD*, Phoenix, AZ; Richard E. Hayden, MD*, Phoenix, AZ; Devyani Lal, MD, Phoenix, CA

Educational Objective: At the conclusion of this presentation, participants will be able to discuss the management of sinonasal malignant melanoma and obtain increased awareness of endoscopic management, an emerging technique with promise for reduced morbidity yet comparable survival outcomes relative to open techniques.

Objectives: To review patients presenting to our institution with primary sinonasal melanoma. **Study Design:** Retrospective case review. **Methods:** Our surgical database was reviewed for all cases of mucosal melanoma from 1994-2011. **Results:** Twenty-one mucosal melanomas were identified, of which 17 were sinonasal in origin. There were 12 women and 5 men with a mean age of 73.8 years (range 47-92 years). Average followup was 23.6 months (range 2-108 months). Ten patients underwent open resection, and since 2008 seven patients were managed with endoscopic surgery. Survival data was available for 15/17 patients. The overall survival of the entire group was 44% at 23.6 months average followup. In the open surgical group, 3 patients (30%) are alive at an average of 74 months (range 16-108), 6 are deceased at an average of 13 months following treatment (range 2-33), and 1 was lost to followup. In the endoscopic group, five patients (71%) are alive at an average of 10 months (range 2-28), one patient died at 32 months following treatment, and one patient was lost to followup. **Conclusions:** Sinonasal melanoma continues to have a grave prognosis with a survival rate of 44% in this group of patients, which compares favorably with reported 5 year survival rates ranging from 20-46%. Early results with minimal access approaches to these tumors suggest an equivalent result with respect to disease free survival, local recurrence and systemic metastasis. As morbidity from minimally access procedures is much reduced, these may have potentially wider applications in the management of these rare tumors.

A203. Transoral Laser Microresection of Thyroglossal Duct Cyst: A Novel Surgical Approach

April M. Landry, MD, Phoenix, AZ; Rachel B. Cain, MD, Phoenix, AZ; Alok S. Patel, BS, Tucson, AZ; Michael L. Hinni, MD*, Phoenix, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to consider transoral laser microsurgical resection of thyroglossal duct cysts as a feasible and effective minimally invasive option.

Objectives: Thyroglossal duct cysts (TGDCs) are the most commonly reported congenital neck mass. They may present anywhere from the foramen cecum to the suprasternal notch. Typically, surgical intervention involves a Sistrunk procedure. We present a novel surgical approach to TGDC removal via transoral laser microresection. **Study Design:** Case report and review of the literature. **Methods:** A healthy 38 year old female presented to our clinic with an incidental ovoid mass in the midline base of tongue found on MRI. She denied any history of dysphagia, odynophagia, glossal swelling, or infections, but did describe a long history of neck fullness. The mass was excised via a transoral laser microsurgical approach. Postoperative pathology was suggestive for TGDC. **Results:** The most common method of TGDC resection is an external approach via the Sistrunk procedure, in which the midportion

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of the hyoid bone along with all ductal tissue upwards toward the foramen cecum is removed. Endoscopic removal with transoral laser microsurgery was postulated as a viable alternative to an external approach. A CO₂ laser was used to divide the genioglossus muscle to remove the cyst en bloc. The anterior portion of the cyst was intimately connected to the hyoid bone and was also removed endoscopically. The superior endoscopic approach allowed concurrent removal of any ductal tract tissue between the foramen cecum and the TGDC. **Conclusions:** TGDCs are routinely removed externally via the Sistrunk procedure, which remains the gold standard intervention. Nonetheless, based on the location of the cyst within the tract, a transoral approach may be feasible and avoids the morbidity and cosmetic impact of an external approach.

A204. The Utility of Routine Staging Exam under Anesthesia for Patients with Oral Cavity Squamous Cell Carcinoma

J.K. John Rasamny, MD, Charlottesville, VA; Mark A. Greyson, BS, Charlottesville, VA; David C. Shonka, MD, Charlottesville, VA; James F. Reibel, MD, Charlottesville, VA; Paul A. Levine, MD*, Charlottesville, VA; Mark J. Jameson, MD PhD, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the utility of staging endoscopic examination for oral cavity squamous cell cancer.

Objectives: A staging exam under anesthesia (EUA) including rigid endoscopy has classically been part of the initial evaluation for oral cavity squamous cell carcinoma (OCSCC). Given the information obtainable from flexible fiberoptic endoscopy (FFE) and high resolution imaging, we examined the value of routine staging EUA for patients with OCSCC. **Study Design:** Retrospective chart review. **Methods:** Review of medical records, operative reports, and treatment plans for patients who underwent staging EUA for OCSCC from September 2006 to December 2010 (n=77). Clinical staging before and after EUA were compared. **Results:** Staging EUA included direct laryngoscopy in every case and rigid or flexible esophagoscopy in 73/77 (94.8%) cases. 32 (42.6%) staging EUAs were performed as distinct procedures and 45 (58.4%) were performed at the time of surgical resection. Staging EUA altered the previously assigned TNM stage in 7/77 (9%) patients. Second primary tumors were identified in 3/77 (3.9%) patients. Two of these were identified prior to staging EUA with physical exam, FFE and imaging. The third was initially identified during staging EUA. However, this patient had not previously undergone FFE or imaging and both modalities readily visualized the second primary after EUA. Staging EUA did not alter the final treatment plan in any patient. **Conclusions:** The routine use of staging EUA occasionally altered staging but did not affect the treatment plan in patients with OCSCC. All second primary tumors identified were recognizable with standard imaging or FFE. The routine use of staging EUA is not necessary for patients with OCSCC.

A205. Predictive Factors for Decannulation and In-Hospital Mortality following Open Bedside Tracheotomy

Hani M. Rayess, BS, Cleveland, OH; Peter C. Revenaugh, MD, Cleveland, OH; Michael S. Benninger, MD*, Cleveland, OH; Philip D. Knott, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss which group of patients will benefit the most from open bedside tracheotomy.

Objectives: Open bedside tracheotomy in the ICU has been advocated as a safe and more cost effective alternative to tracheotomy in the operating room. The objective of this study is to determine predictive factors for postoperative outcomes including decannulation and in-hospital mortality following open bedside tracheotomy. **Study Design:** Retrospective chart review of 218 patients who underwent open bedside tracheotomy between January 2005 and April 2011. **Methods:** The charts of 218 consecutive adult patients who underwent open bedside tracheotomy were reviewed. Perioperative variables including demographics, comorbidities, laboratory values, and time to tracheotomy were collected and analyzed in relation to the endpoints of in-hospital mortality and time to decannulation. **Results:** The decannulation rate was 26.1%. On multivariate analysis, this rate was significantly decreased in the presence of cardiac, respiratory or oncologic comorbidities. The admitting diagnosis and laboratory values did not significantly impact decannulation rates. Despite no major complications or deaths directly attributed to the tracheotomies, inpatient mortality was 24.2%. The likelihood of in-hospital mortality was increased in the presence comorbidities by as much as a factor of 6. **Conclusions:** Demographics and laboratory values did not significantly predict the rates of decannulation or in-hospital mortality. However, the presence and combination of certain comorbidities played a significant role in predicting hospital mortality or eventual decannulation. These data may help to create an algorithm for identifying those patients who may benefit most from bedside tracheotomy. Such data is beneficial to critical care physicians, otolaryngologists, and patients' families in the decision making process regarding bedside tracheotomy.

A206. An Undescended Parathyroid Adenoma in a Patient with Multiple Adenomas

William R. Ryan, MD, San Francisco, CA; John A. Ryan, MD, Seattle, WA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) understand an unusual case of an undescended parathyroid adenoma in a patient with multiple adenomas; and 2) discuss characteristics of supernumerary and undescended parathyroid glands and features of diagnostic techniques used in primary hyperparathyroidism.

Objectives: To report an unusual case of primary hyperparathyroidism and review clinical and anatomic vagaries. **Study Design:** Illustrative case report, photographs, and literature review. **Methods:** Case report: A 22 year old woman presented with primary hyperparathyroidism and equivocal sestamibi and ultrasound scans. On the day of operation, we excised three parathyroid adeno-

mas, biopsied a normal parathyroid gland, and found persistently elevated parathyroid hormone (PTH) levels. Intraoperative internal jugular venous PTH sampling showed the left venous blood being 10 times higher than on the right. Exploration of bilateral levels 6, 7, and 4, including a left thyroid lobectomy and a thymectomy, found no further parathyroid tissue. Reinterpretation of the sestamibi scan and a computed tomography scan of the neck showed a probable parathyroid adenoma high in the left neck. During the subsequent left upper neck exploration, we excised a fourth parathyroid adenoma that was adherent to the sheath of the vagus nerve and located just inferior to the jugular foramen. **Results:** Postoperatively, she had normal vagus nerve function and has had normal serum calcium and PTH levels with 2 years of followup. We review the characteristics of supranumery and undescended parathyroid glands and the features of diagnostic techniques. **Conclusions:** This case demonstrates unusual possibilities in patients with primary hyperparathyroidism.

A207. The Prognostigram: A Web Based Cancer Communication Program

Nancy L. Solowski, MD, St. Louis, MO; Oluwafunmilola Okuyemi, MD, St. Louis, MO; Dorina Kallogjeri, MPH, St. Louis, MO; Joyce Nicklaus, RN BSN CCRC, St. Louis, MO; Jay F. Piccirillo, MD*, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to describe how to more effectively communicate survival statistics to cancer patients.

Objectives: To gather input regarding the presentation, content, and understandability of survival and support information for an updated version of the Prognostigram that will use statistics to present individualized survival estimates to cancer patients. **Study Design:** Formative research was used to assist the development of a web based communication tool. **Methods:** Three total groups consisting of patients and physicians were interviewed. One group, consisting of physicians (n=5), was interviewed regarding their opinions on sharing prognostic information with patients. Two patient groups (total, n=40) were interviewed to assess patient desire for prognostic information as well as to assess baseline patient numeracy and health literacy. The first group (group A, n=20) was introduced to generalized survival curves on paper. The second group (group B, n=20) was introduced to individualized survival curves on the computer. Both patient groups were queried about the survival curves they viewed. **Results:** Ninety-eight percent of patient participants and one hundred percent of physician participants reported survival statistics as being somewhat or very useful to cancer patients. Numeracy assessments indicate that patients are able to understand the concepts and statistics presented by the Prognostigram. **Conclusions:** Formative research indicates that cancer patients and their families actively seek survival statistics. They search for prognostic information on their own, outside of the doctor's office, most frequently on the Internet. Focus groups show strong interest in a web based program that provides individualized survival information in a user friendly design. The Prognostigram is an effective software tool designed to produce individualized survival statistics to oncologists and cancer patients in a user friendly manner.

A208. Lipomas of the Parotid Gland: A Twenty-Five Year Review of 71 Cases

Sidney J. Starkman, BS, Rochester, MN; Alain N. Sabri, MD, Beirut, Lebanon; Steven M. Olsen, MD, Rochester, MN; Jean E. Lewis, MD, Rochester, MN; Kerry D. Olsen, MD*, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the common clinical symptoms, treatment options, and postoperative complications of parotid lipomas.

Objectives: To investigate the presenting signs and symptoms, preoperative work-up, and operative therapy, and morbidity of benign and malignant lipomatous tumors of the parotid gland. **Study Design:** A literature review and a retrospective chart review were performed for all patients who underwent surgery for lipomatous tumors of the parotid at Mayo Clinic from 1959 to 2009. **Methods:** Seventy patients underwent surgery for lipomatous tumors of the parotid during the study period. Histological sections stained with hematoxylin and eosin were reviewed in each case. Clinical information was obtained from hospital medical records. **Results:** Forty-nine patients (70.0%) were male and 21 (30.0%) female, with a mean age of 49.9; 43 (63.2%) tumors were intraparotid and 25 (36.8%) periparotid; 69 (98.6%) tumors were unilateral and one (1.4%) bilateral, with an average size of 3.7 cm. 59 patients underwent superficial or partial superficial parotidectomy, 8 underwent total parotidectomy, and 1 had a parapharyngeal space dissection. Complications included 6 (19%) cases of facial paresis/paralysis, 2 cases of hematoma, and Frey's syndrome in one (4%) case. Recurrence rate was 0%. **Conclusions:** We present the largest series of lipomatous tumors of the parotid gland. These rare tumors need to be considered when evaluating a parotid mass. This series provides insight into the clinical presentation, diagnostic evaluation, and surgical treatment of parotid lipomatous lesions. Surgical extent is dependent on the tumor's location within the gland. Lipomatous tumors can be effectively treated surgically with low morbidity and high cure rates.

A209. Inhibition of Cervical Lymph Node Metastasis by CD147 in an Orthotopic Base of Tongue Squamous Cell Carcinoma Implantation Model

Larissa Sweeney, MD, Birmingham, AL; Zhiyong Liu, PhD, Birmingham, AL; Benjamin D. Bush, BS, Birmingham, AL; Eben L. Rosenthal, MD*, Birmingham, AL

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the role of CD147 in head and neck squamous cell carcinoma metastasis.

Objectives: The mechanism allowing head and neck squamous cell carcinoma (HNSCC) cells to metastasize is not fully under-

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stood. We investigated the role of CD147 in HNSCC metastasis. **Study Design:** Preclinical investigation. **Methods:** HNSCC cell lines (FADU and OSC-19) vector controls were compared with knock-down CD147 (siE) HNSCC cells or treatment with anti-CD147 antibody. In vitro, cell proliferation and migration was assessed. In vivo, untreated mice bearing orthotopic HNSCC xenografts or systemically injected HNSCC cells were compared to siE xenografts or those treated with anti-CD147. Cervical lymph node and pulmonary metastasis were followed by IRDye imaging and confirmed by pathological staining for keratin. **Results:** In vitro, both treatment with anti-CD147 antibody and silencing of CD147 decreased HNSCC cell migration and proliferation ($p < 0.001$). Additionally, it was found that decreasing CD147 expression resulted in decreased AGR2 expression. Further investigation found inhibition or silencing of AGR2 also decreased cell migration and proliferation ($p < 0.001$). In vivo studies found both inhibition ($p = 0.01$) and silencing of CD147 ($p = 0.007$) decreased primary tumor growth. Additionally, vector control or untreated xenografts had a higher incidence of lymph node ($p > 0.05$) and pulmonary metastasis ($p = 0.04$). **Conclusions:** Inhibition or silencing of CD147 decreases HNSCC cell proliferation and migration, as evidenced by decreased primary tumor growth and cervical lymph node and pulmonary metastasis.

A210. Identification of a Forearm Muscle Anomaly during Free Tissue Harvest

Harry V. Wright, MD MS, Nashville, TN; Christian P. Hasney, MD, Nashville, TN; Kyle Mannion, MD, Nashville, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate knowledge of the few described variations of forearm musculature that may be encountered during harvest of a forearm free tissue graft. This includes the forearm muscle anomaly described below, to our knowledge the first report of such in the literature. A successful free tissue graft harvest is described.

Objectives: Few forearm muscle anomalies are described in the literature. We report a previously undescribed major muscle anomaly of the forearm, and our approach to the successful harvest of a free tissue graft in its presence. **Study Design:** Case report and literature review. **Methods:** A retrospective chart review was performed. The literature review included the English language literature relevant to forearm muscle anomalies from 1944 to present. **Results:** A 60 year old female required free flap reconstruction of an oropharyngeal defect. Preoperatively the left forearm was unremarkable and Allen's test revealed excellent collateral flow. Following dissection of the skin paddle and radial artery (RA) pedicle, the cephalic venous system was isolated and elevated off of brachioradialis. This which was separated from the flexor carpi radialis (FCR) muscle to expose the RA pedicle. In the mid-portion of the forearm, a large muscle belly was noted to extend from the FCR over the pedicle and insert on the radius. The extensive communication between the deep and superficial venous systems could not be maintained without sacrificing the muscle, thus the venous connection was divided and the RA venae comitantes and superficial venous system were dissected free. Free of the anomalous muscle, the remainder of the pedicle dissection was carried out in the usual fashion. On followup, the patient had no loss of function of the left upper limb or hand. **Conclusions:** To our knowledge this is the first report of the forearm muscle anomaly described herein, and the first successful harvest of a free tissue graft in its presence.

A211. Salivary Duct Carcinoma Metastatic to the Node of Rouviere

Harry V. Wright, MD, Nashville, TN; Clinton A. Kuwada, MD, Nashville, TN; Sarah L. Rohde, MD, Nashville, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate basic knowledge of salivary duct carcinoma (SDC), how it commonly metastasizes, and the novel finding of SDC metastatic to the retropharyngeal node of Rouviere.

Objectives: Salivary duct carcinoma is a high grade malignant tumor exhibiting aggressive growth with early regional and distant metastasis and frequent local recurrences following surgical excision. We report a case of parotid salivary duct carcinoma in a 65 year old man who also had regional metastasis to the retropharyngeal node of Rouviere. **Study Design:** Case report and comprehensive literature review (OVID, Medline). **Methods:** A retrospective chart review was performed. The literature review included the English language literature relevant to patterns of metastasis of salivary duct carcinoma from 1968 (when it was first described) to present. **Results:** A 65 year old male was referred for a parotid mass and cervical lymphadenopathy. A PET scan showed activity in the left parotid and multiple avid cervical lymph nodes, including a left retropharyngeal node. FNA was concerning for salivary gland malignancy. The patient underwent left total parotidectomy, modified radical neck dissection, and retropharyngeal node dissection. Final pathology revealed salivary duct carcinoma in all specimens. **Conclusions:** To our knowledge this is the first case reported in the literature of salivary duct carcinoma metastatic to a retropharyngeal lymph node (node of Rouviere).

Laryngology/Bronchoesophagology and Sleep Medicine

A212. Endoscopic Management of Tracheal Stenosis with Flexible CO2 Laser Fibers, Balloon Dilation, and Mitomycin C

Neda Ahmadi, MD, Washington, DC; Stanley H. Chia, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) understand the efficacy of using CO2 laser, balloon dilation and mitomycin C in managing patients with tracheal stenosis; and 3) explain the operative steps in dilating tracheal stenosis using CO2 laser, balloon dilation and mitomycin C.

Objectives: Tracheal stenosis is a challenging and complex disease process. This study reports our experience with the manage-

ment of tracheal stenosis using flexible CO₂ laser fibers, balloon dilation and mitomycin C. **Study Design:** Retrospective chart review. **Methods:** Retrospective chart review was performed at a tertiary care center. All subjects with tracheal stenosis treated between June 2007 and July 2011 who underwent endoscopic CO₂ laser incision using flexible fibers, balloon dilation and mitomycin C application were included. **Results:** A total of 12 (8 male, 4 female) subjects undergoing 44 procedures comprised the study group. The mean age at presentation was 39 years (range 19-62). Etiologies of tracheal stenosis included previous intubation (n=10, 83%), tracheostomy (n=6, 50%), and inhalational burn injury (n=4, 33%). One patient (8.3%) was preoperatively staged Cotton-Myer grade I stenosis, n=4 (33.3%) grade II, and n=7 grade III (58.3%). The mean number of laser incision with balloon dilation procedures performed was 3.6 (range 1-8). Two patients required tracheal resection, but developed re-stenosis postoperatively. These patients underwent salvage laser incision and balloon dilation with good effect. One patient had tracheomalacia requiring stent placement. The average followup was 10.4 months (range 3-32 months). At last followup, 12 of 12 (100%) patients had patent airways without dyspnea. There were no complications. **Conclusions:** Endoscopic management of patients with tracheal stenosis using flexible CO₂ laser fibers, followed by balloon dilation and mitomycin C application is both safe and effective. Multiple procedures may be required given the recalcitrant nature of this disease process.

A213. Polysomnography and Flow Volume Loop: Assessment of Decannulation Readiness in Chronic Upper Airway Obstruction

Jennifer Ann Anderson, MD, Toronto, ON Canada; Nikolaus Wolter, MD, Toronto, ON Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the benefit of utilizing polysomnography (PSG) to improve the safety of tracheotomy decannulation in chronic upper airway obstruction. The participants should be able to explain how the inspiratory limb of a flow volume loop (FVL) is a useful functional assessment of airway obstruction at the level of the larynx and can be utilized to compare within subject changes pre- and post-treatment.

Objectives: The purpose of this study was to evaluate the clinical value of polysomnography (PSG) and flow volume loop (FVL) testing in patients with a tracheotomy due to chronic upper airway obstruction (UAO) prior to attempting decannulation. The etiology of upper airway obstruction in the study group subjects included: glottic and/or subglottic stenosis, bilateral vocal fold paralysis or inflammatory disorders affecting the larynx. Fifteen patients met the inclusion criteria and were reviewed for this study. **Study Design:** Retrospective chart review. **Methods:** Possible subjects were identified using a clinical database as having been assessed by the senior author for chronic upper airway obstruction between 2000 and 2010. Demographic data, comorbidities, PSG indices, FVL tests and details of any medical or surgical treatment for airway obstruction were collected in a database from the patient's electronic medical record. Standardized evaluation of the upper airway by indirect laryngoscopy was also reported. All subjects had a tracheotomy, were assessed by the senior author in a tertiary care academic center, underwent PSG prior to (or attempted) decannulation and the majority required at least one surgical procedure prior to decannulation. Patients were excluded if they did not undergo PSG or had severe obstructive sleep apnea as the primary indication for tracheotomy at the time of evaluation. **Results:** The majority (73%) of patients were successfully decannulated after PSG showed acceptable (not normal) results for oxygenation and apnea indices when carried out with the tracheotomy corked. Twenty percent (3/15) of the patients were able to be decannulated after PSG demonstrated improvement with continuous positive airway pressure device. Patients who did poorly on the PSG and could not tolerate corking of the tracheotomy either went on to further treatment or no attempt was made to decannulate. **Conclusions:** Chronic upper airway obstruction (UAO) requiring tracheostomy can be challenging to treat and successfully decannulate. Indirect laryngoscopy is essential to evaluate the anatomy of the larynx and mobility of the vocal folds. However, laryngoscopy does not evaluate airflow quantitatively or assess potential increased obstruction during sleep. PSG evaluation was used to demonstrate acceptable oxygenation and apnea indices during sleep prior to decannulation in a group of patients with significant UAO. FVL has been utilized as a diagnostic test in UAO with a classic flattening pattern of the inspiratory limb. Within subject comparison of repeated FVL testing was a reliable indicator of clinical improvement in UAO. The study indicates that PSG can assist with the evaluation of decannulation readiness in patients with chronic upper airway obstruction as an adjunct measure in addition to imaging and laryngoscopy.

A214. A Preliminary Study Using Quantitative Airway Endoscopy Analysis to Describe Outcomes after Upper Airway Surgery Using TORS in Patients with Obstructive Sleep Apnea

Ryan C. Borek, BS, Philadelphia, PA; Richard J. Schwab, MD, Philadelphia, PA; Christopher Kim, BA, Philadelphia, PA; Jeff E. Mandel, MD, Philadelphia, PA; Erica R. Thaler, MD*, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss how propofol sleep endoscopy could be used as a tool in certain patient groups to help improve surgical outcomes of transoral robotic surgery for obstructive sleep apnea.

Objectives: The aim is to investigate whether airway caliber changes quantified from a preoperative propofol sleep endoscopy can be used to predict postoperative outcomes in patients with severe obstructive sleep apnea (OSA) undergoing transoral robotic surgery (TORS). **Study Design:** Case series. **Methods:** Patients underwent a bilateral lingual tonsillectomy and an uvulopalatopharyngoplasty by TORS for OSA after completing a propofol sleep endoscopy as part of a prospective trial assessing a patients' candidacy for TORS in OSA. **Results:** We analyzed 16 patients with severe OSA (AHI: 48.1±29.6 events/hour) who underwent TORS. Preoperatively the patients demonstrated a reduction in area of 55.8±32.7% in the retroglottal airway, and 78.52 ± 27.8% in the retropalatal airway during Propofol sleep induced endoscopy. Postoperative polysomnography showed that the patients average AHI improved to 24.8±21.2 events/hour (p-value <0.02). Patients were classified into four groups based on severity of ret-

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roglossal airway change (0-25%, 25-50%, 50-75%, 75-100%). The four groups all had retropalatal airway reductions of at least 57% with groups one, two, and four manifesting greater than an 80% reduction. Patients in the first three groups showed an improvement in AHI of at least 54% while the fourth group showed an overall worsening. **Conclusions:** Patients undergoing drug induced sleep endoscopy were shown to have significant reductions in retroglottal and retropalatal airway area with propofol. Overall, patients showed a reduction in AHI after undergoing TORS for OSA. Preliminary data suggest that propofol sleep endoscopy could be used as a tool in certain patient groups of patients to help improve surgical outcomes of TORS for OSA.

A215. Total Airway Reconstruction: A Case Report

Matthew Pierce Connor, MD, Lackland Air Force Base, TX; Jose E. Barrera, MD*, Lackland Air Force Base, TX; Robert L. Eller, MD, Lackland Air Force Base, TX; Scott B. McCusker, MD, Lackland Air Force Base, TX; Peter D. O'Connor, MD, Lackland Air Force Base, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the need to evaluate the entire upper airway and the role that supraglottic collapse can play in a complicated case of obstructive sleep apnea.

Objectives: We present a case of obstructive sleep apnea (OSA) that required multilevel surgical correction of the airway and discuss the role supraglottic laryngeal collapse can have in OSA. **Study Design:** Case report and literature review. **Methods:** The patient's record was reviewed. A literature search was performed on laryngomalacia and OSA surgery. **Results:** We report the case of a 34 year old male who presented to a tertiary otolaryngology clinic for treatment of OSA. He previously had nasal and palate surgeries and a Repose tongue suspension. His residual apnea-hypopnea index (AHI) was 67. He had a dysphonia associated with a true vocal cord paralysis following resection of a benign neck mass in childhood. He also complained of inspiratory stridor with exercise and CPAP intolerance. Physical exam revealed craniofacial hypoplasia, full base of tongue, and residual nasal airway obstruction. On laryngoscopy, the paretic aryepiglottic fold arytenoid complex prolapsed into the laryngeal inlet with each breath. This was more pronounced with greater respiratory effort. Surgical correction required a series of operations including awake tracheostomy, supraglottoplasty, midline glossectomy, genial tubercle advancement, reconstructive rhinoplasty, and finally maxillomandibular advancement. His final AHI was 1.9. **Conclusions:** Our patient's supraglottic laryngeal collapse could be considered a form laryngomalacia and constituted an area of obstruction not typically evaluated in OSA surgery. In fact, the role of adult laryngomalacia in OSA has not been studied. We believe the supraglottoplasty represented a key component of our patient's success. His case illustrates the need to evaluate the entire upper airway in a complicated case of OSA.

A216. Endoscopic Management of Cricopharyngeal Hypertrophy, an Analysis of 136 Cases

Michael L. Hinni, MD*, Phoenix, AZ; Taylor R. Pollei, MD, Phoenix, AZ (Presenter); Thomas H. Nagel, MD, Phoenix, AZ; Richard E. Hayden, MD*, Phoenix, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate understanding of procedural details, operative technique, and advantages of the endoscopic approach. Also, discuss factors that increase rate of success, decrease need for revision surgery, and decrease risk for conversion of endoscopic procedure to open.

Objectives: Further evaluate the efficacy of endoscopic CO₂ laser cricopharyngeal (CP) myotomy for treatment of CP hypertrophy and Zenker's diverticulum. Analyze specific factors predisposing toward success and failure, discuss procedure evolution and details, and examine pre and postoperative subjective and objective data. **Study Design:** A single institution, retrospective chart review. **Methods:** A review of 136 patients between January 2002 and August 2011 undergoing either CO₂ laser (113/136) or stapler assisted (23/136) endoscopic cricopharyngeal myotomy with or without a documented Zenker's diverticulum. **Results:** Mean operative time was 43.8 minutes, specifically 45.4 minutes for laser and 36.3 minutes for stapler cases. Laser incision size (average 8.6mm) decreased from first 50 procedures (12mm) to last 50 (7mm). (p=0.02) Median hospitalization was one day. 54 of 60 post-operative swallow studies showed complete resolution of hypertrophy/diverticulum. Ten of 136 patients complained of recurrent symptoms of which 6/10 had a preoperative diverticulum (cranial-caudal axis measurement) average of 4.3 cm and 4/10 had a history of laryngectomy and/or radiotherapy). Seven of 136 (5.1%) required conversion to open procedure, most often due to poor endoscopic exposure. Five of 136 (3.7%) required revision (2/5 endoscopic, 3/5 open) for persistent symptoms. Mean diverticulum size for revision cases was larger (4.5cm) than for patients not requiring revision (2.6cm). (p=0.06) Eleven minor complications occurred, most commonly a pharyngeal mucosal tear which did not require further treatment. One major complication occurred, requiring operative management. **Conclusions:** Endoscopic CP myotomy is a safe, predictable, effective treatment for cricopharyngeal hypertrophy with or without a Zenker's diverticulum.

A217. The Neurotized, Vascularized Cricothyroid Muscle Flap: A Novel Tool for Use in Laryngeal Reanimation

Matthew B. Hirsch, MD, Louisville, KY; Swapna K. Chandran, MD, Louisville, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the anatomic features of the neurotized, vascularized cricothyroid muscle flap.

Objectives: To assess the anatomic possibility of raising a neurotized, vascularized cricothyroid muscle flap for use in muscle transposition surgery to reanimate the paralyzed human larynx. **Study Design:** Cadaver study. **Methods:** Microdissection of the cricothyroid muscle and its neurovascular pedicle was attempted in six human cadavers for a total of 8 dissections. The following

objective measures were recorded: whether the superior laryngeal nerve, external branch (EBSLN) was identified; whether the cricothyroid artery was identified; whether an associated vein was identified; and the length of the neurovascular pedicle. An approach to identification, dissection, and preservation of the cricothyroid neurovascular pedicle was refined. A method of incision and elevation of the neurotized, vascularized cricothyroid muscle flap was developed. **Results:** The EBSLN was identified in 6/8 attempted dissections (75%), the cricothyroid artery was identified in 8/8 (100%), and corresponding vein was identified in 5/8 (62%). A method for dissection of the cricothyroid neurovascular pedicle was demonstrated. The average pedicle length was 3.3 cm. Elevation of the cricothyroid muscle flap without disruption of the neurovascular pedicle was demonstrated. **Conclusions:** Dissection of a neurotized, vascularized cricothyroid muscle flap was found to be anatomically possible and technically feasible with microsurgical instruments. The pedicle was consistently identifiable, displayed reliable anatomic consistency, and was of sufficient size to permit dissection. The neurotized, vascularized cricothyroid muscle flap holds promise as a tool for laryngeal reanimation. Further studies are necessary to investigate recipient sites within the larynx.

A218. Outcome of Treating Airway Stenosis due to Lambdoid Tracheal Deformity with Endoscopic Tracheal Resection
Reza S.A. Nouraei, MBBChir MRCS, London, UK; Guri S. Sandhu, FRCS, London, UK

Educational Objective: At the conclusion of this presentation, the participants should be able to learn about the outcome of an endoscopic approach to the management of lambdoid (A-frame) tracheal stenosis.

Objectives: To assess the outcome of treating lambdoid tracheal deformity which is a specific variant of postintubation laryngotracheal stenosis, in which airway obstruction is caused by inward collapse of over-resected tracheal cartilage following tracheotomy. **Study Design:** Prospective observational study. **Methods:** We evaluated the results of endoscopic tracheal resection as an alternative to open surgery in 15 patients treated for this condition between 2005 and 2009. " Patients were treated with endoscopic CO2 laser resection of collapsed tracheal rings and balloon dilatation. Shared airway surgery was undertaken using suspension laryngoscopy and high frequency supraglottic jet ventilation. Perioperative patient and lesion characteristics and results of treatment were assessed. **Results:** There were 9 males and 6 females and mean age at first treatment was 53 years. Lesions involved one tracheal ring in 6 cases and two consecutive rings in 9 patients and the mean glottis to stenosis distance was 38mm. Eleven patients were treated with one treatment session and four patients required further endoscopic surgery. The airway lumen was breached in one patient with a multinodular goiter, necessitating emergency hemithyroidectomy with no permanent sequelae. All patients achieved and maintained MRC dyspnea grade of 1 or 2 and there were no cases of dysphonia, dysphagia or prosthesis dependence. **Conclusions:** Endoscopic tracheal resection surgery is an effective minimally invasive treatment for lambdoid deformity of the trachea. We recommend its use as first line treatment for this condition.

A219. Survey of Fellowship Trained Laryngologists on the Current Incidence and Treatment of Bilateral Vocal Fold Immobility
Elizabeth C. Pearce, MD, Nashville, TN; Rajshri Mainthia, BS, Nashville, TN; Robert H. Ossoff, DMD MD*, Nashville, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss survey results in regards to incidence, management, and treatment of bilateral vocal fold immobility as reported by graduates of a single laryngology fellowship training program from the past 17 years.

Objectives: Bilateral vocal fold immobility (BVFI) is a rare but challenging condition classically referred to laryngologists. The literature lacks information on its current incidence, methods of diagnosis, and preferred surgical treatment in adult patients. We aimed to gather data on the case volume, treatment, and management of BVFI by querying graduates of a single laryngology fellowship program. **Study Design:** Anonymous survey. **Methods:** Twenty-eight fellowship graduates from 1992 to 2009 electronically received an institutional review board approved survey to be completed and submitted anonymously. **Results:** A total of 21 out of 28 surveys were returned (75%). Half of respondents saw 0-6 BVFI patients in the past 12 months and over 25% saw 10 or more. In the past five years, respondents saw a mean of 26 BVFI patients. Surgery and intubation were the two most common etiologies of BVFI. Cordotomy was the most commonly performed primary surgical treatment (75%). Only 20% of respondents reported a change in preferred surgical treatment over the past 5-10 years and most switched to cordotomy from either tracheotomy or arytenoidectomy. Regardless of surgical technique, aspiration was rarely noted postoperatively, yet most respondents (81%) reported surgery always/very often affected voice. Patient satisfaction and decannulation were the most commonly rated measures of successful surgical treatment of BVFI. **Conclusions:** Bilateral vocal fold immobility is still an uncommon condition, as revealed in a recent survey of graduates from a single laryngology fellowship program from the past 17 years. Additionally, surgery and intubation were the most commonly reported etiologies and cordotomy was the most commonly performed surgical treatment.

A220. Drug Induced Sleep Endoscopy vs. Awake Muller's Maneuver in the Diagnosis of Severe Upper Airway Obstruction
Danny J. Soares, MD, Detroit, MI; Adam J. Folbe, MD, Detroit, MI; George H. Yoo, MD*, Detroit, MI; Safwan M. Badr, MD, Detroit, MI; James A. Rowley, MD, Detroit, MI; Ho-Sheng S. Lin, MD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the existence of significant difference between drug induced sleep endoscopy (DISE) and awake fiberoptic nasal endoscopy with Muller's maneuver (FNMM) regarding the identification of severe upper airway collapse.

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Objectives: To compare fiberoptic nasal endoscopy with Muller's maneuver (FNMM) against drug induced sleep endoscopy (DISE) in diagnosing the presence of severe level specific upper airway collapse in patients with obstructive sleep apnea/hypopnea syndrome (OSAHS). **Study Design:** Retrospective clinical chart review. **Methods:** Medical records of all patients undergoing diagnostic DISE as part of their surgical evaluation were reviewed. Patients were included if they had also undergone FNMM and had documented Friedman palate position and tonsillar grade prior to DISE. Airway obstruction on both endoscopic procedures was described according to airway level and severity. Severe airway obstruction was defined as >75% collapse on endoscopy. **Results:** A total of 55 patients were included in this study. FNMM and DISE did not differ significantly regarding ability to diagnose severe retropalatal airway collapse. However, there was a statistically significant difference in the incidence of severe retrolingual collapse identified via DISE [85.5% (47/55)] compared to FNMM [36.4% (20/55)] ($p < 0.0001$). This discrepancy between FNMM and DISE was more noticeable in individuals with Friedman I & II tongue sizes (FNMM=16.7%, DISE=88.9%, $p < 0.0001$), compared to Friedman III (FNMM=31.8%, DISE=81.8%, $p = 0.002$) and Friedman IV (FNMM=71.4%, DISE=85.7%, $p = 0.65$). **Conclusions:** FNMM underestimates the severity of retrolingual collapse in OSAHS patients compared to DISE. Such discrepancy is more noticeable in patients with small tongue sizes, likely due to the additional muscle relaxation occurring during sleep.

A221. Modalities of Treatment for Laryngotracheal Stenosis

Salvatore J. Taliercio, MD, Norfolk, VA; John T. Sinacori, MD, Norfolk, VA; Elizabeth T.A. Duong, BA, Norfolk, VA; Chris P. Benson, BS, Norfolk, VA

Educational Objective: At the conclusion of this presentation, the participants will be able to identify trends in treatment for different types of laryngotracheal stenosis. The participant will be able to compare what is in treating different types of stenosis. The participant will understand what comorbidities are related to recurrence, as well as further surgical intervention.

Objectives: 1) To identify trends in surgical management of laryngotracheal stenosis based on site of lesion; and 2) to recognize factors associated with recurrence and need for repeat surgical intervention. **Study Design:** The study is a retrospective review of all patients referred to a tertiary care laryngology practice with a diagnosis of laryngotracheal stenosis. Lesions were categorized based on site (supraglottis, glottis, subglottis, trachea, or at multiple levels). Interventions included CO2 laser excision, balloon dilation, mitomycin C application, and laryngotracheal reconstruction. **Methods:** This study collectively measured demographics, comorbidities, etiologies, types and levels of stenoses, treatment modalities, recurrences, and the need for repeat surgical management. **Results:** The CO2 laser was the most commonly employed intervention. Balloon dilation was most commonly used in patients with multilevel tracheal stenosis (64%) and subglottic stenosis (50%). Those with multilevel tracheal stenosis were most likely to receive at least one CO2 laser treatment (77%). Patients presenting with multilevel tracheal stenosis received a total of 4.6 procedures, on average, significantly more than all other patient populations. Supraglottic and glottic stenosis recurred at the lowest rates. Patients suffering from diabetes mellitus recurred in an average time frame of 2.9 months, compared with those without who recurred every 7.7 months on average. **Conclusions:** Laser excision and/or balloon dilation are most effective in treatment of posterior glottic, subglottic, and tracheal stenosis. Patients with multilevel tracheal stenosis warrant closer followup and are more likely to require multiple procedures. Worsening stenosis despite endoscopic management warrants an open procedure. Diabetes plays a role in the frequent recurrence of stenosis.

A222. Effects of Chemesthetic Stimuli Mixtures with Barium on Swallowing Apnea Duration

Jerry Tee Todd, MD, Winston-Salem, NC; Susan G. Butler, PhD, Winston-Salem, NC; Drew P. Plonk, MD, Winston-Salem, NC; Karen Grace-Martin, MA, Ithaca, NY; Cathy A. Pelletier, PhD, Bethesda, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the effect of barium on swallowing apnea duration, as well as discuss whether barium changes the effects of chemesthetic stimuli on swallowing apnea duration.

Objectives: This study tested the hypotheses that swallowing apnea duration (SAD) will increase given barium versus water, chemesthetic stimuli (i.e., water < ethanol, acid, and carbonation) mixed with barium, age (older > younger), and genetic taste differences (supertasters > nontasters). **Study Design:** Prospective group design. **Methods:** Eighty healthy women were identified as nontasters and supertasters, equally comprising 2 age groups: 18 to 35 years and 60+ years. The KayPentax Swallowing Signals Lab was used to acquire SAD via nasal cannula during individually randomized swallows of 5 mL barium, 2.7% w/v citric acid with barium, carbonation with barium, and 50:50 diluted ethanol with barium. Data were analyzed using path analysis, with the mediator of chemesthetic perception, adjusted for repeated measures. **Results:** Significant main effects of age ($P = .012$) and chemesthetic stimuli ($P = .014$) were found, as well as a significant interaction between chemesthetic stimuli and age ($P = .028$). Older women had a significantly longer SAD than younger women. Post hoc analyses revealed that barium mixed with ethanol elicited a significantly longer SAD than other bolus conditions, regardless of age group. There were no significant differences in SAD between barium and water conditions, and no significant effect of chemesthetic perception ($P > .05$). **Conclusions:** Ethanol added to barium elicited longer SAD compared to plain barium, but not the other chemesthetic conditions. Older women had a longer SAD than younger women in all conditions. These findings may influence design of future studies examining effects of various stimuli on SAD.

A223. Isometric and Swallowing Tongue Strength in Healthy Adults

Jerry Tee Todd, MD, Winston-Salem, NC; Andrew Stuart, PhD, Greenville, NC; Catherine R. Lintzenich, MD, Winston-Salem, NC; Stephen B. Kritchevsky, MD, Winston-Salem, NC; Jeff Williamson, MD, Winston-Salem, NC; Susan G. Butler, PhD, Winston-Salem, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss similarities and differences in isometric and swallowing tongue strength in healthy adults of different age groups.

Objectives: This study tested the hypotheses that isometric tongue strength will decrease with age and that swallowing tongue pressure will be similar between young and older adults. **Study Design:** Prospective group design. **Methods:** Ninety-seven healthy individuals who were recruited as part of a larger study on swallowing participated in this study. Participants were divided into 3 age groups: 20-40 years, 41-60 years, and 61+ years. A KayPentax Digital Swallowing Workstation (KayPentax, Lincoln Park, NJ) with an air filled bulb array was placed on the tongue of each participant (anterior to posterior). Participants completed 3 swallows and 3 isometric tongue presses. **Results:** Repeated measures analyses of variance revealed a significant main effect of age ($p = 0.01$) and gender by location interaction ($p = 0.02$) for isometric tongue strength. That is, older adults had lower isometric tongue strength than young adults, and females had a greater difference between anterior and posterior tongue strength than males. Tongue strength during swallowing significantly differed only for tongue location with the anterior tongue generating greater swallowing pressure than the posterior. **Conclusions:** This study comprises the largest number of healthy participants reported to date and confirms previous findings that isometric tongue strength decreases with age. Given that young and older adults generate similar swallowing pressures indicates swallowing is a submaximal strength activity yet older adults have less functional reserve.

A224. Use of Sleep Endoscopy to Assess Positional Obstructive Sleep Apnea: A Prospective Study

Andrew J. Victores, BA, Houston, TX; Janet M. Gilbert, MD, Houston, TX; Masayoshi Takashima, MD, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the effects of body position during sleep on the upper airway of patients with obstructive sleep apnea (OSA).

Objectives: To assess the effect of body position on the oropharyngeal and hypopharyngeal anatomy of patients with obstructive sleep apnea (OSA) by comparing sleep endoscopy in supine and lateral positions. **Study Design:** Prospective study. **Methods:** Ten patients were identified with OSA. An equal number of patients were enrolled with and without positional OSA (non-supine 50% reduction in apnea-hypopnea index). Sleep endoscopy was performed and compared in both supine and lateral body positions to determine if sleep position affected the level and degree of upper airway obstruction. **Results:** Sleep position significantly altered the pattern of upper airway obstruction in patients with positional OSA ($p < 0.05$). Compared to supine, sleep endoscopy in the lateral position revealed a significant reduction in tongue base and epiglottic obstruction in positional OSA patients ($p < 0.05$). In contrast, no significant change was seen in patients without positional OSA. Apnea-hypopnea index and body mass index were not significantly different between the two groups. **Conclusions:** Sleep endoscopy performed in the supine versus lateral sleeping position changes the dynamics of upper airway collapse, especially in position dependent OSA patients. Identifying this may help tailor a less invasive surgical therapy. A review of the polysomnography hypnogram may also help decide if positional OSA is present, suggesting that a positional sleep endoscopy may be helpful. As far as the authors are aware, this is the first study which attempts to address one of the main criticisms of sleep endoscopy, the fact that it is usually only performed in the supine position.

Otology/Neurotology

A225. Transmastoid Repair of Superior Semicircular Canal Dehiscence Associated with the Superior Petrosal Sinus: Presentation of Two Cases and Review of the Literature

Joseph T. Breen, MD, Rochester, MN; Matthew L. Carlson, MD, Rochester, MN; Brian A. Neff, MD*, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the anatomy, etiology, and presenting symptoms of superior semicircular canal dehiscence syndrome, understand the relevant anatomy and unique considerations for dehiscences associated with the superior petrosal sinus, and be familiar with the transmastoid approach for occlusion of the superior semicircular canal.

Objectives: 1) Describe the presentation, evaluation, treatment, and outcomes of two patients with superior semicircular canal dehiscence (SSCD) associated with the superior petrosal sinus (SPS); and 2) discuss the rationale for transmastoid occlusion of the superior semicircular canal for SSCD when it is associated with the SPS. **Study Design:** Case series with literature review.

Methods: The records of 2 patients who presented to our institution with SSCD associated with the SPS were reviewed. **Results:** Both patients presented with autophony, conductive hyperacusis, disequilibrium, and pulsatile tinnitus. Low ocular VEMP thresholds on the left and CT scans suggested left SSCD involving the abutting SPS. Both subjects underwent successful and uncomplicated transmastoid plugging of the left superior semicircular canal with significant improvement in presenting symptoms. **Conclusions:** The understanding and treatment of SSCD continues to evolve. Dehiscence can be associated with either the middle cranial fossa floor or the SPS. Dehiscences associated with the SPS are more medially located, and visualization may require additional temporal lobe retraction when repaired via middle cranial fossa approach. Additionally, risk of intraoperative bleeding is likely increased. In contrast, transmastoid access may afford excellent visualization of relevant structures without brain retraction and minimal risk of

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bleeding. Our findings demonstrate that the transmastoid approach may have particular advantages over middle cranial fossa access in patients with SSCD involving the SPS.

A226. Methadone Induced Irreversible Bilateral Severe Sensorineural Hearing Loss

Audrey P. Calzada, MD, Los Angeles, CA; Nopawan Vorasubin, MD, Los Angeles, CA; Akira Ishiyama, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate awareness of sensorineural hearing loss caused by methadone ingestion and better understand the mechanism of opioid induced hearing loss and outcomes.

Objectives: Methadone is a synthetic opiate with similar action to morphine and heroin with widespread use as a heroin substitute for addicts. Naltrexone is an opioid receptor antagonist used in the chronic management of opioid dependence. We present a case of methadone induced sudden bilateral sensorineural hearing loss (SNHL) after chronic naltrexone use with important implications for patients undergoing treatment for opioid dependence. **Study Design:** Retrospective case report and review of the literature.

Methods: The clinical presentation, serial audiological evaluations, and vestibular testing are presented of a patient presenting to a tertiary medical center with methadone induced bilateral SNHL. **Results:** A 23 year old male with a history of multi-substance abuse was being treated with naltrexone 50 mg per day for 3 months after which he began ingesting methadone 30 mg per day for 5 days. On the 6th day, he consumed 90 mg of methadone, resulting in respiratory arrest. The patient awoke with bilateral severe SNHL with word discrimination scores of 64% and 48%. Serial audiological evaluations over the next 9 months remained the same despite multiple high dose steroid treatments. Vestibular testing was normal. The patient subsequently underwent evaluation for cochlear implantation due to persistent severe bilateral SNHL. **Conclusions:** Methadone induced hearing loss has been rarely described, with reported patients recovering functional hearing. This is the first report to our knowledge of irreversible bilateral severe SNHL following methadone ingestion. We propose prolonged naltrexone use as a predisposing factor for direct methadone induced cochlear injury.

A227. Cognitive Speed as an Objective Measure of Tinnitus

Sunil K. Das, BA, St. Louis, MO; Andre M. Wineland, MD, St. Louis, MO; Dorina Kallogjeri, MD MPH, St. Louis, MO; Jay F. Piccirillo, MD*, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to appreciate the potential of a computer-based measure of cognitive processing speed to objectively capture the cognitive impact of tinnitus.

Objectives: Subjective, idiopathic tinnitus is a common but poorly understood condition for which no objective measurement or effective treatment exists. Tinnitus, at least partially, results from maladaptive cortical processes that cause a decline in cognitive performance, particularly in attention and processing speed. This study examined whether cognitive processing speed can be used as an objective tinnitus measure. **Study Design:** Cross-sectional study of 96 chronic tinnitus participants. **Methods:** Participants with at least 6 months of subjective tinnitus were enrolled in this cross-sectional study. The Tinnitus Handicap Inventory (THI) captured the self-reported severity of tinnitus. Cognitive processing speed was objectively measured by the Brain Speed Test (BST), a short computerized test from Posit Science®. BST results were transformed into Z-scores using age adjusted normative data. Validated neurocognitive tests were also administered. Coexisting functional somatic syndromes and depression were captured by the Whitely-7 and Patient Health Questionnaire-9 (PHQ-9) forms to assess their relationship with THI. **Results:** There was a significant correlation ($r=0.54$, $p<0.001$) in those with severe tinnitus (THI \geq 30). Additionally, BST was correlated with the validated neurocognitive tests: Stroop Color-Word ($r=-.34$, $p=0.001$), PASAT 2.0 ($r=-.46$, $p<0.001$), and AQT Color-Form ($r=.46$, $p<0.001$). Multivariate analysis identified only PHQ-9 ($B=2.1$, 95% CI=1.19 to 3.00) as a significant predictor of THI. **Conclusions:** Cognitive processing speed, as defined by the BST, can serve as an objective measure of the severity of chronic, subjective tinnitus. The BST may allow investigators to objectively stratify patients into severity groups and assess responses to investigational treatments.

A228. Auditory Scene Analysis in the Elderly: Attentional and Automatic Processing

Elizabeth A. Dinces, MD MS*, Bronx, NY; Elyse S. Sussman, PhD, Bronx, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss differences in central processing and behavioral measures in sound segregation in complex auditory environments between aging and young adults.

Objectives: Aging individuals have increased difficulty communicating effectively in everyday listening situations, especially when there are multiple competing sound sources. The goal of this study was to test the hypothesis that difficulty hearing a single sound stream amongst competing sounds in the elderly is due to reduced attentional abilities. **Study Design:** 11 60-83 year old subjects were tested using auditory evoked potentials and behavioral measures. The subjects' abilities to segregate sounds within a complex auditory environment by their tone frequency, and to select target sounds embedded within one of the frequency streams was compared to data from young adults. **Methods:** 1046 Hz standard tones and tones up to 19 semitones higher were used to create a complex listening environment. Subjects were asked to perform tasks while paying close attention to the sounds. In a second condition, subjects ignored the sounds and watched a silent video. Task related d-prime and reaction time were determined and auditory event related potentials (AEPs) were recorded. Repeated measures ANOVA were used to identify the MMN and the P3b in the AEP. **Results:** As in young adults, the thresholds for the frequency separation required for identifying a target tone in a complex sound

environment is higher for unattended detection than for active detection in aging. Overall, aging adults have higher sound segregation thresholds than younger adults. **Conclusions:** These results indicate in aging adults that both automatic processes and attention play an important role in the ability to segregate sounds and that attentional decline is not the primary contributor to a decreased ability to select sounds in complex environments.

A229. Contemporary Changes with the Use of Facial Nerve Monitoring in the Setting of Otologic Surgery
Terry R. Fleck, MD, Loma Linda, CA; Helen Xu, MD, Loma Linda, CA; Jeffrey V. Hsu, BS, Loma Linda, CA

Educational Objective: At the conclusion of this presentation, the participants should understand that there is a growing trend for routine use of the facial nerve monitor (FNM) in the setting of chronic ear surgery. The increased use has been observed in both general otolaryngologists as well as fellowship trained otologists.

Objectives: Examine current patterns in the use of facial nerve monitoring for otologic surgery. **Study Design:** Descriptive design (survey). **Methods:** A ten question survey was designed to identify level of training, scope of practice, familiarity and access to the FNM, specific otologic surgeries where monitoring was most used and finally if the respondents felt that facial nerve monitoring should be considered standard of care for chronic and/or middle ear surgery. A randomized list of 2000 board certified members of the American Academy of Otolaryngology was generated. 1000 subjects received a mailed survey with a self-addressed return envelope and 1000 subjects received an emailed survey through SurveyMonkey.com. **Results:** There were 368 surveys returned by mail and 262 surveys returned electronically. 81% of respondents were in private practice, 30% were fellowship trained in otology/neurotology. 68% used the FNM in their training and virtually everyone had regular access to the FNM (97%). Revision mastoid surgery, cholesteatoma, canal wall down mastoidectomy and facial recess approach were the settings where the FNM was most used. 43% indicated they use the FNM in at least ¾ of their chronic and/or middle ear cases every month. 49% of respondents felt that the FNM should be used as the standard of care in chronic ear surgery; which is increased from 32% in a similar study done 9 years ago. Thoughts as to why there has been increased use of the FNM will be discussed. **Conclusions:** There is a growing trend for routine facial nerve monitoring in the setting of chronic ear surgery.

A230. Genetic Screening of High Frequency Hearing Loss
Alexandros Georgolios, MD, Richmond, VA; Kelley Melissa Dodson, MD, Richmond, VA; Michail Tzagkaroulakis, MD, Athens, Attica Greece; Noelle Barr, BS, Richmond, VA; Aristides Sismanis, MD*, Athens, Attica Greece; Arti Pandya, MD MBA, Richmond, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the etiology of high frequency hearing loss based on data derived from a national deafness repository.

Objectives: To investigate the genetic etiology of high frequency hearing loss (HL) in a national hereditary deafness DNA repository. **Study Design:** We conducted a clinical study of 39 subjects identified with nonprogressive high frequency hearing loss from our national hereditary deafness DNA repository. **Methods:** Clinical data and family history of HL were obtained on enrollment. Candidate deafness genes were screened either using direct sequencing (GJB2 and GJB6) or by SSCP, with mutation confirmation by sequencing. **Results:** The 39 subjects ranged in age from 3 to 57 years old, with a mean age at diagnosis of hearing loss of 14.6 years. There was an equal male to female ratio. The hearing loss affected both ears in 84.2% of the sample. The population was of Caucasian (56%), African American (30%), Hispanic (10%) and Asian (4%) origin. Twenty-seven subjects (73.0%) had a family history of hearing loss. Overall, sequence variants were present in 53.8% of the subjects, but most were considered nonpathogenic. We discovered GJB3 sequence variants in 23% of subjects; GJB2 variants in 20%; and 15% of subjects had heterozygous mutations in SLC26A4. In addition 3 heterozygous mutations in the COCH gene were noted, and 2 synonymous changes in TECTA were noted. Notably, 8 subjects (20%) had sequence variants in more than one gene. **Conclusions:** In this study of 39 subjects with high frequency hearing loss, we detected a number of nonpathogenic sequence variants, with alterations in the GJB3 being the most common. It is likely that gene/environmental interactions play a large role in the development of high frequency hearing loss. A thorough family history and a genetic etiology should be explored in patients exhibiting high frequency forms of deafness.

A231. Dural Sinus Thrombosis following Translabyrinthine Approach Acoustic Neuroma Microsurgery
Selena E. Heman-Ackah, MD MBA, New York, NY; John G. Golfinos, MD, New York, New York; J. Thomas Roland, MD*, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the rate, risk factors, and treatment of symptomatic postoperative dural sinus thrombosis following acoustic neuroma microsurgery.

Objectives: Within the literature the disease process of sigmoid sinus thrombosis has been evaluated and described at length in association with otitis media and other infectious etiology as well as in association with head trauma. However, within the otolaryngologic literature, there is a paucity of manuscripts describing dural sinus thrombosis following cerebellopontine angle surgery. The objective of this study is to describe the rate of sigmoid sinus thrombosis following translabyrinthine approach acoustic neuroma resection as well as its associated risk factors and treatment. **Study Design:** Retrospective review. **Methods:** A retrospective chart review was performed of all patients at a tertiary care facility who underwent translabyrinthine acoustic neuroma resection between January 2000 and July 2011. **Results:** Approximately 200 patients underwent translabyrinthine approach acoustic neuroma micro-

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surgery. Of these patients only one patient experienced symptomatic dural sinus thrombosis presenting with progressive, severe, unremitting headache starting approximately 2 weeks postoperatively. This patient was successfully treated with anticoagulation therapy with complete resolution of thrombus confirmed radiographically. The rate of asymptomatic dural sinus thrombosis as well as risk factors for thrombosis will be reported. There were no mortalities associated with dural sinus thrombosis. **Conclusions:** Dural sinus thrombosis is a potential complication of translabyrinthine acoustic neuroma resection. However, in the asymptomatic patient observation alone may be employed without complication. If symptomatic, dural sinus thrombosis may successfully be treated with long term outpatient anticoagulation therapy.

A232. Audiologic and Vestibular Manifestations of Free Diving Inner Ear Barotrauma

Daniel Jethanamest, MD, Miami, FL; Thomas J. Balkany, MD*, Miami, FL; Simon I. Angeli, MD*, Miami, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the symptoms, audiological and vestibular findings for patients with barotrauma due to free diving or apnea diving.

Objectives: To describe the audiologic and vestibular signs and symptoms of patients suffering inner ear barotrauma as a result of apnea or free diving. **Study Design:** Retrospective case series and literature review. **Methods:** A review of the medical records including progress notes, operative reports, audiological tests, vestibular tests and imaging results was completed. A literature search of published articles in PubMed and Medline were reviewed. **Results:** Four patients with varying auditory and/or vestibular symptoms caused by free diving were identified. All of these patients showed no otoscopic signs of middle ear barotrauma or disease, but all developed audiological or vestibular dysfunction after free diving. Sensorineural hearing loss was observed ranging from limited high frequency loss to profound hearing loss. One patient underwent middle ear exploration for evaluation of a suspected perilymphatic fistula. **Conclusions:** In contrast to scuba divers, free divers who descend on a single breath hold may be more likely to present with auditory and vestibular symptoms in the absence of middle ear findings. In this study, all treated divers showed some degree of improvement in hearing and vestibular symptoms.

A233. Neutralization of Endogenous Granulocyte-Macrophage Colony Stimulating Factor (GM-CSF) Inhibits Lipopolysaccharide Induced Middle Ear Inflammation in Mice

Shin Kariya, MD PhD, Okayama, Japan; Mitsuhiro Okano, MD, Okayama, Japan; Takaya Higaki, MD, Okayama, Japan; Seiichiro Makihara, MD, Okayama, Japan; Tomoo Onoda, MD, Okayama, Japan; Kazunori Nishizaki, MD, Okayama, Japan

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the management and pathogenesis of otitis media.

Objectives: Granulocyte-macrophage colony stimulating factor (GM-CSF) plays an important role in the pathogenesis of acute and chronic inflammatory disease as a major regulator governing the functions of granulocyte and macrophage lineage populations. We hypothesized that GM-CSF plays a pivotal role in middle ear inflammation and that neutralization of GM-CSF would inhibit neutrophil migration into the middle ear and inflammatory mediator production. **Study Design:** Animal model of otitis media. **Methods:** We used transtympanic administration of lipopolysaccharide, a major component of gram negative bacteria, to mice to induce an experimental otitis media. Control mice received PBS in middle ear cavity. Mice were systemically treated with the murine GM-CSF neutralizing antibody per intraperitoneal injection. Middle ear effusions were collected. Concentrations of interleukin 1 beta (IL-1²), tumor necrosis factor alpha (TNF- α), keratinocyte derived chemokine (KC, a member of the CXC chemokine family) and macrophage inflammatory protein-2 (MIP-2) in middle ear effusions were measured by ELISA. Histological examination in middle ear was also performed. **Results:** Transtympanic injection of lipopolysaccharide upregulated the levels of IL-1², TNF- α , KC, and MIP-2 in the middle ear. The concentrations of cytokine and chemokine were significantly decreased in mice injected with GM-CSF neutralizing antibody. We also showed that infiltration of inflammatory cells in middle ear cavity induced by lipopolysaccharide was reduced significantly by neutralization of GM-CSF. **Conclusions:** These data suggest that neutralization of GM-CSF may represent a novel treatment modality for intractable otitis media.

A234. Posterior Semicircular Canal Dehiscence following Endolymphatic Sac Surgery: A Case Report

Saman Kiumehr, MD, Irvine, CA; Hossein Mahboubi, MD MPH, Irvine, CA; Hamid R. Djalilian, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain posterior semicircular canal dehiscence following endolymphatic sac surgery.

Objectives: To report the first case of posterior semicircular canal dehiscence following endolymphatic sac surgery. **Study Design:** Case report. **Methods:** High resolution CT scan of temporal bone, audiological evaluation and videonystagmography were done on a patient who presented with left sided hearing loss, aural fullness, hyperacusis, continuous tinnitus and new vertigo attack exacerbations precipitated by sharp loud noise and pressure on left ear, following an endolymphatic sac surgery based on a diagnosis of left Ménière's disease. **Results:** Audiometric testing revealed profound sensorineural hearing loss of the left ear and significant increase in hearing thresholds at all frequencies compared to his audiometric findings prior to surgery. Videonystagmography including bithermal caloric testing with both cool and warm air revealed minimal vestibular response on the left side. Tragal pumping on the left side caused a rotatory nystagmus and a sensation of vertigo. Temporal bone CT imaging revealed an iatrogenic left posterior semicircular canal dehiscence. **Conclusions:** The posterior semicircular canal injury is possible when performing endolymphatic sac surgery as

the endolymphatic sac generally lies inferior and posterior to the posterior semicircular canal. The significantly reduced caloric function in this patient could be due to an injury to the membranous posterior semicircular canal. Although complete sensorineural hearing loss can be due to inadvertent labyrinthectomy during surgery, it also could be explained by perilymphatic fistula formation and posterior semicircular canal dehiscence.

A235. Evaluating the Utility of Non-Echo Planar Diffusion Weighted Imaging in the Preoperative Evaluation of Cholesteatoma: A Meta-Analysis

Peter M. Li, MD, Stanford, CA; Eleni Linos, MD DrPH, Stanford, CA; Richard K. Gurgel, MD, Stanford, CA; Nancy J. Fischbein, MD, Stanford, CA; Nikolas H. Blevins, MD, Stanford, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the utility of diffusion weighted MRI in evaluating the presence of middle ear cholesteatoma.

Objectives: To describe the accuracy of non-echo planar diffusion weighed magnetic resonance (DWI MR) imaging in identifying middle ear cholesteatoma. **Study Design:** A meta-analysis of the published literature. **Methods:** A systematic review of the literature was performed to identify studies in which patients suspected of having middle ear cholesteatoma underwent DWI MR scans prior to surgery. A meta-analysis of the included studies was performed. **Results:** Ten published articles (342 patients) met inclusion criteria. Cholesteatoma was confirmed in 234 patients, of which 204 were detected by DWI MRI (true positives) and 30 were not (false negatives). 108 patients did not have cholesteatoma on surgical examination, and of these 100 were correctly identified by MRI (true negatives) while 8 were not (false positives). The overall sensitivity of DWI MRI in detecting cholesteatoma was 0.94 (confidence interval 0.80 to 0.98) and specificity 0.94 (confidence interval 0.85 to 0.98). The majority of studies reported accurate imaging results identifying cholesteatomas measuring 3mm or greater in size. **Conclusions:** Non-echo planar diffusion weighted is a very accurate test: both highly sensitive and specific in identifying middle ear cholesteatoma. It is possible that in selected cases its use may avoid second look surgery.

A236. Prevalence and Characteristics of Tinnitus in the Youth Population of United States: National Health and Nutrition Examination Surveys, 2005-2008

Hossein Mahboubi, MD MPH, Irvine, CA; Sepehr Oliaei, MD, Irvine, CA; Sami Dwabe, BS, Irvine, CA; Saman Kiumehr, MD, Irvine, CA; Hamid R. Djalilian, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain how common youth tinnitus is and how to implement programs to prevent/treat tinnitus.

Objectives: To evaluate the prevalence, characteristics and associated risk factors of tinnitus in a nationally representative 12 to 19 years old population. **Study Design:** Cross-sectional, the National Health and Nutrition Examination Survey (NHANES) 2005 to 2008. **Methods:** The study population consisted of 3,520 individuals aged 12 to 19 years. Those without complete tinnitus related data were excluded. In addition to tinnitus, data regarding history of ear infections, tympanostomy tube placement, firearm, recreational and job exposure to noise, otoscopy, tympanometry and hearing thresholds were extracted and analyzed. **Results:** The prevalence of overall and chronic tinnitus was 7.3% and 4.2% respectively. These were corresponding to about 2.5 and 1.5 million of the U.S. population, respectively. Prevalence of both overall and chronic tinnitus was higher in subjects with: age of 16 to 19 years, cigarette smoking history, exposure to passive smoking at household, history of 3 or more ear infections, history of tympanostomy tube, firearm noise exposure, job exposure to loud noise, recreational noise exposure, and high frequency hearing loss.

Conclusions: This is the first study to report the prevalence and associated risk factors of tinnitus using a nationally representative sample of 12 to 19 year old population in the U.S. Although the prevalence appears to be lower than prior reports, this number still represents a substantial subset of the youth population.

A237. Invasive Pseudallescheria Boydii in Fungal Skull Base Osteomyelitis

Jacob S. McAfee, MD, Norfolk, VA; Thomas S. Higgins, MD, Baltimore, MD; Stephanie A. Moody, MD, Norfolk, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the clinical features of skull based osteomyelitis, understand the commonalities in its pathogenesis, and demonstrate an understanding of workup as well as management strategies.

Objectives: Fungal skull base osteomyelitis (SBO) is a rare clinical entity which commonly evades diagnosis, provoking crippling morbidity. Cases of fungal SBO have long demonstrated their predilection for patients with immunocompromising comorbidities. Invasive fungal pathogens most common to SBO are amongst the aspergillus species, yet involvement of various other pathogens have been reported, to include Pseudallescheria boydii on few occasions. This report demonstrates a case and literature review of fungal skull base osteomyelitis. **Study Design:** Review of a unique case alongside a literature review. **Methods:** A comprehensive narrative of this patient's clinical course is presented alongside a review of medical literature discussing presentation, diagnosis, and management of skull base osteomyelitis. Special attention is given to cases of fungal etiology. **Results:** In a literature review performed by Stodulski et al, AIDS was by far the most frequent risk factor for development of an invasive fungal SBO. The next most frequent risk factor was a disorder of the leukocyte system (chronic myelogenous leukemia, chronic lymphocytic leukemia). Although diabetes mellitus is unanimously implicated in pseudomonas related SBO, fungal SBO has demonstrated a lesser predilection for this

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patient population. **Conclusions:** Fungal SBO should be included in the differential of patients demonstrating the aforementioned symptoms and signs, even in the absence of more commonly acknowledged risk factors. Aspergillus proves the most common pathogen, yet cases refractory to routine management should prompt consideration of other infectious organisms. The gold standard of treatment for pseudallescheria SBO parallels that of SBO as a result of aspergillosis which is surgical debridement and systemic antifungal therapy.

A238. The Effect of Insomnia on Tinnitus

George S. Miguel, DO, Detroit, MI; Kathleen L. Yaremchuk, MD*, Detroit, MI; Christopher L. Drake, PhD, Detroit, MI; Ed L. Peterson, PhD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the effect of insomnia on the psychological distress associated with tinnitus.

Objectives: This study used the validated Tinnitus Reaction Questionnaire (TRQ) and Insomnia Severity Index (ISI) scales to evaluate the effect of insomnia on patients with tinnitus and determine if a correlation exists between the two conditions. **Study Design:** Prospective observational study. **Methods:** A total of 92 patients were studied. Patients with tinnitus only and patients with tinnitus and insomnia were identified from administrative data. TRQ and ISI responses for the two groups were obtained through written and telephone interviews. A standard Pearson correlation was used to determine the association between insomnia on tinnitus. A receiver operating characteristic analysis with an evaluation of screening parameters was performed to identify TRQ scores that were associated with a possible benefit from a sleep evaluation in tinnitus patients. **Results:** A significant association occurred between ISI score and TRQ severity ($r=0.65$; $p=0.002$). Severity of TRQ was shown to be a good predictor of sleep disturbance and in predicting group association, especially the emotional subscore component (sensitivity 81% and specificity 70.4% for identifying tinnitus patients with insomnia). The greater the insomnia disability as exhibited by an increased ISI score, the more severe the patient's distress was regarding the tinnitus. Results suggest that if the emotional score is ≥ 22 , the ISI is useful to determine which patients may benefit from treatment of insomnia. **Conclusions:** The TRQ and ISI demonstrate that patients with insomnia have increased emotional distress regarding their tinnitus. Evaluation and treatment of tinnitus patients with insomnia may result in reducing the psychological distress associated with tinnitus.

A239. Surgical Removal of Middle Ear Foreign Body from Complication of Ear Mold Fitting

Joshua R. Mitchell, MD, Nashville, TN; Stanely Pelosi, MD, Nashville, TN; George B. Wanna, MD, Nashville, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the risk of middle ear foreign body as a complication from routine ear mold fitting and treatment strategies.

Objectives: Aural foreign bodies are common, but are usually limited to the external auditory canal. Infrequently, certain foreign bodies can also involve the middle ear. Proper fitting of hearing aids is routinely performed by audiology with a very low incidence of complications. Although rare, perforation of the tympanic membrane with earmold cast migration and formation in middle ear may occur. **Study Design:** Retrospective case study. **Methods:** We present an unusual complication after traumatic ear mold fitting where a large amount of impression material penetrated the tympanic membrane and entered the middle ear encasing the ossicles. **Results:** We describe a novel method of otomicroscopic surgical management using a combination of CO2 laser and #1 knife excision, treatment outcome after safe removal of the foreign body while maintaining ossicular chain continuity, and review the literature of otologic foreign bodies related to ear mold impressions to discuss prevention strategies, risk factors, techniques for surgical removal, and hearing outcomes. **Conclusions:** Middle ear foreign bodies as a complication from ear mold fitting can be safely removed surgically with otomicroscopy using a combination of CO2 laser and #1 knife excision while maintaining ossicular chain continuity and thus preserving precomplication hearing.

A240. Examining the Association of Age at Implantation and the Side of the Implantation on Cochlear Implant Performance

Wasef K. Muzaffar, BS, Charleston, SC; Ted A. Meyer, MD PhD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to explain whether the age at implantation and the side of the implantation can be used as predictors for future cochlear implant performance.

Objectives: To assess whether age at implantation and the side of the implantation contribute to significant differences in cochlear implant performance. **Study Design:** A retrospective comparison of audiometric data. **Methods:** Data was collected from 50 cochlear implant recipients age 60 and older and 34 younger adults implanted between the ages of 18 and 50. We compared each group's performance on speech perception tests [Hearing In Noise test (HINT), Consonant-Vowel Nucleus-Consonant words (CNC), and phonemes] preoperatively and 1 year postoperatively. Within each group, speech perception performance was compared based on the ear implanted. **Results:** Preoperatively, both the younger and older groups demonstrated no significant differences in speech perception performance. Following cochlear implantation, the older group achieved significant improvement in performance on speech tests. On average, the older group performed more poorly than the younger group, but these differences did not reach statistical significance [HINT ($p=0.07$), CNC words ($p=0.0528$), and phonemes ($p=0.3494$)]. Evaluation of patient performance based on the side of implantation exhibited no significant differences in either group. **Conclusions:** While younger cochlear implant recipients

may have greater success, older individuals are able to show significant improvement in performance following cochlear implantation. Despite a known asymmetrical activation of the auditory cortex, no clear side dependent advantage in outcome is apparent. As clinicians continue to establish cochlear implantation criteria for the elderly, right ear advantage does not appear to be a dependable predictor of future performance.

A241. The Result of Surfer's Ear Medical Check Up in Surfing Competitions

Haruka Nakanishi, MD, Miyazaki, Japan; Tetsuya Tono, MD PhD, Miyazaki, Japan

Educational Objective: At the conclusion of this presentation, the participants should be able to know the incidence of external ear exostoses in avid surfers and the prognostic implication of exostoses.

Objectives: The objective of this study was to demonstrate the prevalence and severity of external auditory canal exostoses in a population of competitive surfers. We utilized a surfi index, the product of the period (years) as an active surfer and the frequency (the number of surfing days per week) to predict external auditory exostoses formation. **Study Design:** Retrospective epidemiological study. **Methods:** The ear canals of 373 surfers with an average age of 33.1 (11~80) years were examined with an otoscope in a total of five surfing competitions. The severity of exostosis was classified into 4 groups, from grade 0 to 3, according to otoscopic findings. Subjects also completed a questionnaire detailing their surfing habits. The survey was done by using original iPad application for this study. **Results:** There was a 59.8% overall prevalence of exostoses in 373 surfers. The incidences of grade 1 exostoses, grade 2 and 3 exostoses were 118 (31.6%), 71 (19.0%) and 34 (9.1%) respectively. The prevalence of grade 2 and 3 exostoses were higher in surfers with a surfing index of more than 20 ($p < 0.0001$). **Conclusions:** We determined that a positive association exists between the surfing index and the severity of exostoses. Our findings suggest that it is possible to assume the likelihood of exostosis formation from the surfing index, and this may be of help to spread awareness of exostosis among surfers.

A242. Conductive Hearing Loss Secondary to an Anomalous Facial Nerve

Angel J. Perez, MD, Portsmouth, VA; Justin R. Moy, MD, Portsmouth, VA; Jeffery J. Kuhn, MD, Portsmouth, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) review the embryology of the facial canal and facial nerve; 2) review the differential diagnosis of conductive hearing loss with intact stapedial reflexes; and 3) recognize an anomalous course of a dehiscence facial nerve a potential cause for a conductive hearing loss.

Objectives: Ossicular developmental anomalies related to the miscommunication between second branchial arch and otic capsule derivatives are relatively uncommon as a unilateral finding in patients without associated craniofacial developmental abnormalities. Specifically, the relative position of the developing tympanic facial nerve (fallopian canal) to that of the stapes anlage and oval window niche may lead to ossicular anomalies responsible for a conductive hearing loss. We present four cases of unilateral conductive hearing loss due to a dehiscence tympanic segment of the facial nerve causing impingement and/or anomalous development of the stapes crura. **Study Design:** Retrospective case series review. **Methods:** The clinical history, audiometric data, and findings on pre-operative high resolution computed tomography (HRCT) of the temporal bones are presented in four patients. The intraoperative findings are discussed in detail. **Results:** The stapes was found to be mobile in each of four patients suspected of having a conductive or mixed hearing loss due to otosclerosis. A dehiscence, inferiorly malpositioned, tympanic segment of facial nerve was found to be impinging on the stapes crura in all four cases and to be associated with a malformed stapes crura in two cases. No further surgery was performed in any of the four cases and conventional amplification was recommended postoperatively. **Conclusions:** An anomalous facial nerve is a rare cause of CHL in an otherwise normal middle ear. Although imaging studies and audiometry may suggest this possibility in these cases, exploratory tympanotomy was necessary in order to make a definitive diagnosis.

A243. A 3D Organotypic Human Cochlear Culture for Growth Factor and Drug Testing

Jason M. Roberts, MD, Albany, NY; Cormac D. Depan, MD, Albany, NY; Clara Rimmer, BS, Albany, NY; Susan K. Goderie, BS, Rensselaer, NY; Sally Temple, PhD, Rensselaer, NY; David Foyt, MD, Albany, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) discuss causes of sensorineural hearing loss and its irreversibility in mammals; 2) discuss current research that uses animal models to regenerate hair cells through gene therapy as well as stem cell regeneration and transplantation techniques; 3) understand concept of isolation and culture of human auditory hair cells and methodology utilized to recover these cells; and 4) explain how a 3D organotypic human cochlear culture is a valuable model to study how added exogenous factors impact the survival, and potentially the growth of the human inner ear neural cells.

Objectives: Although hair cells from the human cochlea have been isolated in vitro, no studies to date report their tissue culture, which is the focus of this report. **Study Design:** Prospective, basic science. **Methods:** Six brain dead donors were consented to donate cochlear tissue through our donation and transplant center. A canal wall down mastoidectomy was performed and the cochlea was blue lined prior to being recovered en bloc. The tissue samples were placed in a sterile saline on ice for transport to the NSCI labs for culture and immunocytochemistry. Tissue was plated either as dissociated cells or as organotypic explants. **Results:** Tissue was recovered from 9 cochleas. The dissociated cells grew into fibroblastic-like monolayers, indicating that mesenchymal rather than neural cells had been cultured. In contrast, organotypic explant cultures grown for 14-21 days maintained a 3D resemblance of the inner cochlear structure, with evident cell layers. Alpha-tubulin immunostaining indicated survival of ciliated cells and

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long connections resembling axons, likely related to the spiral ganglion neurons. **Conclusions:** The current study demonstrates the ability to successfully isolate and culture adult human cochlear derived cells in vitro in a novel 3D culture preparation. This model is valuable to study how added exogenous factors impact the survival, and potentially the growth of the human inner ear neural cells. In this manner, future studies will ascertain whether the adult human cochlea contains cells with regenerative potential for use in hearing restoration.

A244. Differential Cochlear Implant Outcomes in Older Adults

Daniel S. Roberts, MD PhD, Boston, MA; Harrison W. Lin, MD, Boston, MA; Barbara S. Herrmann, PhD, Boston, MA; Daniel J. Lee, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of differential cochlear implant outcomes in older adults and discuss possible reasons for these differences.

Objectives: The goals of this study were to 1) analyze whether cochlear implant (CI) users over 65 years of age have different surgical and audiological outcomes when compared to younger adult CI users; and 2) identify reasons for these possible differences.

Study Design: Retrospective single institution study. **Methods:** Records of 118 postlingually deafened adults with unilateral cochlear implants were reviewed. Preoperative and postoperative speech perception scores, medical and epidemiological data were recorded and analyzed. **Results:** Speech perception ability was significantly poorer in CI users over 65 years of age compared to younger adult patients ($p=0.009$). Patients over the age of 80 accounted for these findings. Older patients had a longer duration of hearing loss and were less likely to have a family history of hearing deficits. A history of noise exposure had no impact on audiological outcomes. A family history of hearing loss was associated with better speech recognition ($p=0.027$). Older patients did not experience more vestibular symptoms or other complications compared to younger patients. **Conclusions:** Patients over the age of 80 have lower speech perception scores than other adult CI recipients but did not have higher rates of dizziness or vertigo after surgery. A family history of hearing loss was associated with better speech recognition possibly representing a new prognostic variable. These findings provide important information that will aid clinicians in counseling older CI candidates.

A245. Primary Diffuse Large B Cell Lymphoma Presenting as Chronic Otomastoiditis

Jason Mark Roberts, MD, Albany, NY; Clara Rimmer, BS, Albany, NY; Elizabeth E. Redd, MD, Cooperstown, NY; David Foyt, MD, Albany, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the unique presentation of chronic otomastoiditis refractory to medical and even surgical management and understand that it may require more thorough evaluation. Without any cranial nerve deficits or other symptoms concerning for malignancy, it is imperative to exclude the possibility of temporal bone malignancy through proper neurotologic examination and appropriate imaging.

Objectives: Primary presentation of lymphoma of the middle ear is rare with only 11 cases being reported in the literature. Diagnosis of middle ear and mastoid tumors can be delayed because symptoms mimic more common otologic conditions. Only after worsening of clinical symptoms into mastoiditis with associated cranial nerve deficits do patients undergo further evaluation. We describe a case of diffuse large B cell lymphoma presenting as unresolved chronic otitis media and mastoiditis. Isolated presentation in the middle ear and mastoid without associated cranial nerve deficits or vestibular symptoms has not been described previously. **Study Design:** Case report. **Methods:** See objectives. **Results:** See objectives. **Conclusions:** The unique presentation of chronic otomastoiditis refractory to medical and even surgical management requires more thorough evaluation. Without any cranial nerve deficits or other symptoms concerning for malignancy, it is imperative to exclude the possibility of temporal bone malignancy through proper neurotologic examination and appropriate imaging. Early diagnosis and aggressive chemotherapeutic treatment are crucial for a good outcome in primary middle ear lymphoma.

A246. Breast Carcinoma Metastases to Bilateral Internal Auditory Canals

Adam C. Rourke, DO, Pontiac, MI; Ryan G. Porter Sr., MD, Farmington Hills, MI; Michael J. Larouere, MD, Farmington Hills, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the rare occurrence of breast carcinoma metastases to bilateral internal auditory canals (IACs).

Objectives: 1) To describe a rare case of breast carcinoma metastasizing to bilateral IACs along with a brief review of the pertinent literature; and 2) to distinguish metastatic carcinoma to the IACs from bilateral vestibular schwannomas arising from neurofibromatosis type II. **Study Design:** Case report. **Methods:** A case of a 45 year old female presenting to a neurotologic referral center with acute facial paralysis and hearing loss is described. Investigations revealed metastatic lesions to bilateral IACs from an invasive ductal breast carcinoma. The IAC tumor presentation occurred three years following lumpectomy and two years following salvage chemotherapy and radiation treatment for primary recurrence and regional nodal metastases. **Results:** The patient's left sided IAC lesion was treated with a translabyrinthine approach, excisional biopsy, and abdominal fat graft closure. Although the facial nerve was grossly free of tumor, a gold weight was implanted at the time of initial surgery due to complete preoperative ipsilateral facial paralysis. Tissue diagnosis confirmed carcinoma consistent with metastatic breast cancer. Following multidisciplinary discussion, the patient's right IAC lesion was treated with stereotactic radiotherapy. The patient ultimately required an Ommaya reservoir for intrathe-

cal chemotherapy and whole brain radiation. **Conclusions:** Breast carcinoma rarely metastasizes to the temporal bone, and metastasis to bilateral IACs is exceedingly uncommon. A multidisciplinary approach to such a rare presentation is necessary to offer the patient the best chance for survival. The clinician must consider metastatic disease when evaluating cases of bilateral IAC tumors, especially when the history or symptoms do not exhibit the classic patterns associated with vestibular schwannoma.

A247. Synthetic Sealants and Tympanic Membrane Repair

Robert T. Standing, MD, Detroit, MI; Samer Al-Khudari, MD, Royal Oak, MI; Michael D. Seidman, MD*, West Bloomfield, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the viability of using tissue sealants to repair tympanic membrane (TM) perforations.

Objectives: The purpose of this project was to describe a novel technique for myringoplasty in which the fat graft was reinforced with a synthetic sealant. One goal was to determine if current success rates for myringoplasties could be improved. Another objective was to develop a technique to heal TM perforations using sealants alone as an in-office procedure. **Study Design:** An IRB approved prospective study of patients with TM perforations undergoing myringoplasty and the use of sealants. **Methods:** Patients with new or recurrent TM perforations were selected for the procedure in the preoperative office visit. The operative technique consisted of freshening the edges of the perforation, harvesting and using lobule fat, then sealing with Tisseel or DuraSeal. Audiologic testing was performed pre and postoperatively. Followup ranges from 3-24 months. **Results:** 25 patients underwent fat graft myringoplasty covered by synthetic sealants. The perforation size ranged from 5% to 45%. 22 of 25 (88%) patients have an intact TM. The three failures were with the TM perforations that were 30, 40 and 45% of the TM. **Conclusions:** Review of the literature suggests success rates that vary inversely with the perforation size and the success ranges from 35-94%. This preliminary study demonstrates early superiority compared to most published studies, with 88% healed. This pilot investigation evaluates efficacy of this new technique. Ultimately, it is anticipated that this procedure will evolve to allow otolaryngologists to safely repair some perforations in the office using sealants alone. This study also demonstrates that the sealant enhances likelihood of success.

A248. Age Related Changes of Myelin Basic Protein in Mouse and Human Auditory Nerve

Shawn M. Stevens, MD, Charleston, SC; Yazhi Xing, BA, Charleston, SC; Devadoss J. Samuel, BA, Charleston, SC; Judy R. Dubno, PhD, Charleston, SC; Bradley A. Schulte, PhD, Charleston, SC; Hainan Lang, PhD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the age related pathophysiologic changes found in myelin basic protein in humans, discuss how these changes may be related to presbycusis, and compare this pathophysiology with the better understood murine model.

Objectives: To better understand the pathophysiologic processes behind presbycusis by investigating the underlying mechanisms at both the cellular and molecular levels. To investigate the age related molecular alterations in the human spiral ganglion and in an integral structural protein called myelin basic protein (MBP). **Study Design:** This study utilized CBA/CaJ mice to serve as a murine model for presbycusis. Fresh fixed human cadaveric specimens were also utilized. Ultrastructural observations were to be utilized in tandem with immunohistochemical analysis to evaluate spiral ganglion and acoustic nerve structural proteins with a special emphasis on myelin basic protein (MBP). Changes associated with aging were to be assessed and compared with specimens obtained from young and middle aged adults in both groups. **Methods:** The CBA/CaJ mice were evaluated with auditory brainstem response (ABR) testing to confirm age related hearing loss. Specimens were harvested from both young adult and aged mice and subjected to various immunohistochemical stains. Electron and confocal microscopy were utilized for ultrastructural analysis. Also examined were 13 temporal bones from 10 human subjects including 4 subjects aged 38-46 (middle aged group) and 6 subjects aged 63-91 (aged group). The temporal bones were harvested and fixed by perilymphatic perfusion 1-6 hours after death. Analysis was conducted on these specimens in a manner similar to that performed on the mouse tissues. **Results:** The ultrastructural observations and MBP immunohistochemical analysis demonstrated that pathological alterations of myelin sheath occur prior to the significant loss of SGNs in normal aging CBA/CaJ mice. In the human subjects, intense immunostaining of MBP was present throughout the auditory nerve, matching findings demonstrated in the mouse model. A significant loss of MBP+ auditory fibers was observed in the spiral ganglion of the aged human and mouse ears alike. Finally, we detected the loss of MBP+ myelin sheath around SGNs in the aged human subjects. **Conclusions:** This is the first study to define age related alterations in MBP in both a normal aging mouse model and postmortem human specimens. This study likely provides the first evidence demonstrating an age related decline of MBP expression in the spiral ganglion in both mice and humans. These results suggest that myelin degeneration and a decline in, or abnormality of, MBP expression may play a critical role in the loss of SGNs and the decline of auditory nerve function in aging human ears.

A249. Intralabyrinthine Schwannomas - A Systematic Review of the Literature

Katie M. Van Abel, MD, Rochester, MN; Matthew L. Carlson, MD, Rochester, MN; Colin L. Driscoll, MD*, Rochester, MN; Michael L. Link, MD, Rochester, MN; Brian A. Neff, MD*, Rochester, MN; Charles W. Beatty, MD, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the clinical presentation, natural history, and management of intralabyrinthine schwannomas. In addition, they should be able to discuss the association between tumor location and clinical presentation.

Objectives: To describe the clinical presentation, natural history, and management of intralabyrinthine schwannomas (ILS). **Study**

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Design: Systematic review of the literature. **Methods:** A search was conducted reviewing the English literature. Studies were reviewed for clinical, radiologic, and management data. **Results:** We identified 102 studies presenting 261 cases (48% male; average age 48, range 14 to 89) of ILS. Tumor classification was based on site of involvement and included intracochlear, intravestibular, intravestibulocochlear, transmodiolar, transotic, tympanolabyrinthine, intralabyrinthine, and those secondarily involving the cerebello-pontine angle. The most common tumors were intracochlear (118; 45%) and intravestibular (66; 15.2%). Hearing loss was the most common presenting symptom (242; 98%), with 85.8% of patients demonstrating class D hearing and 68.2% reporting gradually progressive loss. Average delay between symptom onset and diagnosis was 7.86 years (range 0 to 48). There was a significant difference between tumor site and the presence of vertigo ($p = 0.0002$), with an increased likelihood for tumors involving the vestibule. The presence of hearing loss, unsteadiness, or tinnitus did not statistically vary with anatomic site ($P > 0.05$). Tumor progression was seen in 39.2% (49/125) patients followed with serial MRI. A total of 115 patients underwent surgical resection (48.12%), 112 were observed (46.86%), and 2 underwent radiosurgery (0.84%). Average followup was 28.6 months (range 0 to 183).

Conclusions: Tumor classification, based on the involvement of specific structures, may impact both clinical presentation and time to diagnosis. We present the largest review to date describing the natural history of these tumors as well as an updated classification system.

A250. National Prevalence and Impact of Post-Surgical Complications Associated with Vagus Nerve Injury in Vestibular Schwannoma

Bryan K. Ward, MD, Baltimore, MD; Howard W. Francis, MD, Baltimore, MD; Simon R. Best, MD, Baltimore, MD; Heather M. Starmer, MD, Baltimore, MD; Lee M. Akst, MD, Baltimore, MD; Christine G. Gourin, MD*, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the prevalence of reported vagal injury associated complications after vestibular schwannoma surgery and the influence of these complications on cost and patient care.

Objectives: Lower cranial nerve injury may be an underreported complication of vestibular schwannoma surgery. This study aims to characterize the prevalence of complications associated with vagal nerve injury following vestibular schwannoma surgery and the impact of these complications on patient care. **Study Design:** Retrospective cross-sectional study. **Methods:** Discharge data from the Nationwide Inpatient Sample for 17,281 patients with vestibular schwannoma who underwent surgery in 2003-2008 was analyzed using cross-tabulations and multivariate regression modeling. **Results:** Dysphagia was reported in 443 cases (2.6%) and unilateral vocal cord paralysis in 115 cases (0.7%). The mean length of hospitalization was 5.3 days (95% CI 4.9-5.7) and was prolonged in patients with dysphagia (mean 11.7 days, 95% CI 8.9-14.4) and in those with unilateral vocal cord paralysis (mean 12.1 days, 95% CI 7.3-16.9). Compared to patients without dysphagia, a diagnosis of dysphagia was associated with advanced comorbidity status (37.0% v 18.8%), central nervous system complications (39.3% v 15.3%), aspiration pneumonia (7.1% v 0.4%), and greater likelihood of requiring medical care at another facility or at home after discharge (48.5% v 6.6%, $p < 0.001$). Tracheostomy (3.4% v 0.8%) and gastrostomy tube placement (20.9% v 0.5%) were significantly more likely in patients with dysphagia ($p < 0.0001$). After adjusting for other variables, postoperative vagal complications were independently associated with added cost per admission of \$6633 and an increased length of stay of 1.7 days ($p < 0.0001$). **Conclusions:** Although uncommonly reported, vagus nerve injury related complications following vestibular schwannoma surgery are associated with significantly increased length of hospitalization and costs of care.

A251. Intraoperative Intracochlear Recordings during Pediatric Cochlear Implantation

Benjamin P.C. Wei, MD PhD FRACS, Chapel Hill, NC; Baishakhi Choudhury, MD, Chapel Hill, NC; Oliver F. Adunka, MD, Chapel Hill, NC; Craig A. Buchman, MD*, Chapel Hill, NC; Shuman He, MD PhD, Chapel Hill, NC; Douglas C. Fitzpatrick, PhD, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to describe an algorithm to assess acoustically evoked hair cell and neural potentials in pediatric cochlear implant recipients.

Objectives: To study the acoustically evoked hair cell potential (cochlear microphonic or CM) and neural potentials including the (the compound action potential or CAP), and neurophonic in pediatric cochlear implant recipients. **Study Design:** Prospective control study. **Methods:** Children (1-10 years of age) undergoing cochlear implantation were recruited for this study. Each child had a no response ABR suggesting at least a severe to profound hearing loss. Immediately prior to insertion of the electrode array electrophysiologic responses to acoustic stimuli (250 and 500 Hz tone bursts at 90 dB nHL) were obtained at the round window niche. Both the cochlear microphonic (CM) as well as the compound action potential (CAP) were recorded. **Results:** In each child recorded ($n=5$) a CM of up to several microvolts was recordable at the round window, and in most cases ($n=4$) a CAP and a neurophonic were observed as well. All potentials disappeared once the tube of the acoustic delivery system was disconnected. **Conclusions:** In this study, we were able to demonstrate the presence of low frequency acoustically evoked hair cell and neural potentials in pediatric cochlear implant candidates without measurable ABR responses. This data suggests that most implant recipients have residual cochlear function despite a no response ABR. Recording of these potentials during electrode insertion may be useful as a marker to avoid cochlea trauma and to improve electrode placement.

A252. In-Office Tympanostomy Tube Placement under Local Anesthesia Using a Novel Tube Delivery Device

Jacob W.D. Zeiders, MD, Fort Lauderdale, FL; Andrew R. Gould, MD, Louisville, KY; Charles A. Syms, MD, San Antonio, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to be informed of a novel tympanostomy tube delivery system and procedure that safely and effectively delivers tubes in the office under local anesthesia to patients 6 months of age and older.

Objectives: To demonstrate the feasibility of in-office tympanostomy tube delivery under local anesthesia using a novel tube delivery system in adult and pediatric patients. **Study Design:** A prospective, multi-center, single arm clinical study. **Methods:** 43 ears were enrolled in the study among 28 subjects at least 6 months old. Tube placement was performed in the office setting under local anesthesia using the Acclarent Tube Delivery System (TDS). Local anesthesia was achieved using iontophoresis to enhance uptake of a 10:1:1 mixture of 4% lidocaine, 1:1000 epinephrine, and 8.4% sodium bicarbonate. All patients underwent pre and postoperative physical exam and audiometry. **Results:** Of the 43 enrolled ears, 77% were in the pediatric population and 55% of those were 5 years old or younger. Procedural success (tube placement) was achieved in 100% of the enrolled ears. At the two week followup, 97% of tubes were retained. The postoperative audiogram demonstrated improved hearing in 84% of study patients with remaining subjects demonstrating no hearing change. There were no serious procedural or device related adverse events during the study. **Conclusions:** This study has shown the feasibility, safety, and efficacy of in-office tube delivery under local anesthesia using the Acclarent TDS. The greatest potential benefit of this technique is in the pediatric population where the current standard of care for tube placement involves general anesthesia. This in-office technique for delivering tubes under local anesthesia could benefit patients, surgeons, and overall health care costs. Further clinical evaluation in the pediatric population is warranted and underway.

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A253. Diagnosis and Management of Congenital Enteric Duplication Cysts of the Anterior Tongue in Neonates

Kenneth J. Andrews, MD, New York, NY; Benjamin C. Paul, MD, New York, NY; Scott M. Rickert, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to be more familiar with the diagnosis and management of neonates presenting with congenital masses of the anterior tongue and the potential diagnosis of enteric duplication cysts.

Objectives: To review the diagnosis and management of patients presenting with congenital enteric duplication cysts of the anterior tongue. **Study Design:** Case series of two patients between August and October of 2011. **Methods:** Retrospective chart review of two neonates with prenatally detected anterior tongue masses of unknown etiology that underwent surgical excision with pathologic confirmation of enteric duplication cysts. **Results:** Anterior tongue masses, such as enteric duplications cysts, may be detected on prenatal ultrasound allowing for preassembly of a neonatal airway team. Despite each mass protruding through the lips and nearly filling the oral cavity, neither patient presented with immediate respiratory distress. Through a multidisciplinary approach, evaluation, preoperative imaging, and surgical intervention were expedited to avoid potential impending airway compromise and treat feeding difficulties. In the first case, the mass was surgically drained secondary to airway compromise on day two of life and biopsy confirmed enteric duplication cyst on histology. The patient subsequently underwent complete excision with no evidence of recurrence at one month postop. In the second case, the mass, though nonobstructive, caused significant feeding difficulty. Complete excision was performed as the first surgical intervention. **Conclusions:** While only 0.3% of enteric duplication cysts are encountered in the anterior tongue, they should always be included in the differential diagnosis of anterior tongue masses along with dermoid cyst, teratoma, ranula, cystic hygroma, hemangioma, ectopic thyroid, and thyroglossal duct cyst. A multidisciplinary team including otolaryngology, pediatrics and anesthesia must tailor management to the patient's clinical presentation to optimize outcome.

A254. Risk Factors for Orbital Infections in the Pediatric Population

Melanie N. Hood, MD, New York, NY; William I. Reisacher, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to identify pediatric patient populations at an increased risk for more severe orbital infectious processes.

Objectives: Subperiosteal abscess (SPA) is most commonly caused by extension from adjacent ethmoid or maxillary sinusitis. In this study, socioeconomic and demographic factors are analyzed to identify populations at risk for more severe disease. **Study Design:** The charts of 61 pediatric inpatients from 2002-2009 were retrospectively reviewed. **Methods:** Patients were stratified into three groups based on radiographic and clinical findings: pre-septal cellulitis, post-septal cellulitis, and SPA. Federal census data (1999) was used to estimate patient household income. Statistical analyses compared age, sex, ethnicity, insurance, and mean incomes between groups. **Results:** SPA accounted for 31% of orbital infections. Forty-two patients had cellulitis (29 pre-septal, 13 post-septal) and 19 had SPA. All groups had an equal distribution of male and female patients. No statistical difference in mean household income, ethnicity or insurance type was found between groups. SPA patients had statistically significant more children than infants ($p=0.003$). The group of patients with post-septal cellulitis had a trend towards more children than infants, whereas the group of patients with pre-septal cellulitis was equally composed of infants and children. **Conclusions:** Patients of varying ethnic and socioeconomic backgrounds were equally affected by a spectrum of orbital infections. More severe orbital infections were more likely to occur in older children. This finding may reflect different risk factors among subsets of the pediatric population. Identifying higher

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risk patient populations will allow for more informed management of pediatric sinonasal disease and associated orbital infections.

A255. Lemierre's Syndrome Caused by MRSA Infection in an Infant

Evelyn Kalyoussef, MD, Newark, NJ; Chirag Rajan Patel, MD, Newark, NJ; Huma Quraishi, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) discuss Lemierre's syndrome caused by MRSA sepsis; and 2) discuss treatment options and management of IJV thrombosis in children.

Objectives: 1) Describe an infant with Lemierre's syndrome caused by MRSA sepsis; and 2) discuss treatment options and management of IJV thrombosis in children. **Study Design:** Case report. **Methods:** Lemierre's syndrome is usually characterized by recent oropharyngeal infection complicated by internal jugular vein thrombosis. The main pathogen is usually *Fusobacterium necrophorum*. The vast majority of patients affected are adults. We present a case of community acquired methicillin resistant staphylococcus aureus (MRSA) in an eight week old male who was being breastfed by his mother, who was a MRSA carrier. He presented with a two day history of fever and left neck swelling and was found to have a deep neck abscess extending into the mediastinum with internal jugular thrombosis extending retrograde to involve the sigmoid sinus. **Results:** The infant was taken to the operating room multiple times for incision and drainage and washout procedures. The internal jugular vein was not ligated; however, he was treated with anti-coagulation with demonstration of recannulation of the sigmoid sinus. The patient was treated with long term IV antibiotics. In addition, his mother was treated with chlorhexidine baths for MRSA decolonization. **Conclusions:** Classically described in older patients with *Fusobacterium* infections, there is a growing body of literature reporting Lemierre's syndrome secondary to MRSA infections, particularly in a younger patient population suggesting a changing demographic as well as a changing microbial pattern. We present one of the youngest cases of Lemierre's syndrome secondary to community acquired MRSA.

A256. Pediatric Pneumoparotid: A Case Report and Literature Review

Rahul K. Shah, MD*, Washington, DC; Gurneet Bawa, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to expand their differential diagnosis of parotid gland swelling and further their understanding of the pathophysiology of parotid swelling.

Objectives: To present a case of a rare etiology of parotid gland swelling, pneumoparotid, and discuss the implications and medical/surgical management of this condition. **Study Design:** Case report and literature review. **Methods:** Presentation of a case and subsequent PubMed search for pertinent articles. **Results:** A seven year old boy presented with a frequent history of intermittent parotid swelling that was self-limiting, presented with erythema and tenderness without a fever, and occasionally was treated with antibiotics. The patient has an underlying seizure disorder and is taking oxcarbazepine. During an episode of bilateral parotid swelling, a computed tomography with contrast was obtained and revealed bilateral pneumoparotid. Pneumoparotid is a disease found in young children. It refers to swelling of one or both of the parotid glands that recurs. This can manifest as acute parotitis as the overlying skin becomes tender and erythematous during an episode and the pneumoparotid can be painful. It has been shown that there are spherical dilatations of the distal parotid ducts. A case presentation with images from the computed tomography will demonstrate the finding of pneumoparotid in this young child. **Conclusions:** The patient continues to be successfully managed with conservative medical management, however he may progress to parotidectomy if recurrent parotitis ensues. Patients at risk for development of pneumoparotid are wind instrumentalists, patients in a trauma, and self-induced. Pneumoparotid should be on the differential diagnosis of acute parotitis as the underlying precipitating factor of the infection can be from the air in the ducts.

A257. Massive Kaposiform Hemangioendothelioma of the Head and Neck

Lawrence M. Simon, MD FAAP, New Orleans, LA; Jeffrey C. Poole, MD, New Orleans, LA; Ernest S. Chiu, MD, New Orleans, LA; Evelyn A. Kluka, MD, New Orleans, LA

Educational Objective: Demonstrate the systemic and head and neck manifestations of kaposiform hemangioendothelioma (KHE), a rare congenital vascular tumor, and discuss its management options.

Objectives: Describe the successful management of a massive kaposiform hemangioendothelioma (KHE) of the head, neck, and chest with multiple complications. **Study Design:** Case report and review of the literature. **Methods:** Describe the case of a male child treated at a tertiary care, academic children's hospital for a massive KHE of the head, neck and chest complicated by pulmonary hypertension and Kasabach-Merritt syndrome. The pertinent literature is also reviewed using a PubMed search. **Results:** A male infant born with a massive KHE involving the scalp, neck, left upper extremity, and thorax. There was associated compression of the left lung and multiple cardiovascular structures. Complications related to the lesion included pulmonary hypertension and Kasabach-Merritt syndrome. The child was initially treated with corticosteroids and pressors. As the lesion shrank, cardiopulmonary circulation normalized and propranolol was initiated. The child has experienced near total regression of the lesion and is thriving. Imaging and pathology results are presented. The literature supports treatment with vincristine and other anti-neoplastics; however such therapy was not required in this case. **Conclusions:** Although the literature suggests that complicated KHE often requires treatment with anti-neoplastic medications, our case of KHE, complicated by pulmonary hypertension and Kasabach-Merritt syndrome, was successfully managed with steroids and propranolol.

A258. Presentation, Diagnosis, and Treatment of a Hairy Polyp Attached to the Soft Palate in a Neonate

Kevin Taheri, MD, New Orleans, LA; Kimberly A. Russell, BS, New Orleans, LA; Evelyn A. Kluka, MD, New Orleans, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize hairy polyps as an unusual presentation of a soft palate mass in a neonate that can lead to respiratory distress or feeding difficulty and be able to explain the embryological origin, pathology, and clinical signs of such lesion.

Objectives: To present a case of an oropharyngeal hairy polyp attached to the soft palate in a 14 day old female. **Study Design:** Case report and review of the literature. **Methods:** Review of literature covering hairy polyps including embryological origin, common presentations, pathology, diagnosis and treatment. **Results:** A 14 day old female presented to our institution with an asymptomatic oropharyngeal mass that was not well visualized on direct examination. A barium swallow obtained revealed a pedunculated soft tissue lesion extending from the lateral pharyngeal wall into the esophagus. The mass was excised in the operating room without any complications. Histopathology confirmed a 3.3 x 2.6 x 0.6cm hairy polyp. **Conclusions:** Hairy polyps are uncommon, usually pedunculated malformations that can originate in the naso or oropharynx. The clinical presentation depends on location and size but commonly includes respiratory distress and feeding difficulty in neonates. This benign tumor, also called a dermoid, is derived from ectoderm and mesoderm. Diagnosis is made by pathology but can be aided by radiological evaluation. Treatment includes airway management and excision of the lesion in the operating room.

A259. Tracheal Aggenesis: A Case Report, Review of Literature and Discussion of Recent Approaches to Management

Senja Tomovic, MD, Newark, NJ; Evelyne Kalyoussef, MD, North Brunswick, NJ; Antonio Gonzalez, MD, Newark, NJ; Huma Quraishi, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) discuss the initial airway management and clinical and radiological findings of tracheal agenesis; 2) explain the anomalies associated with tracheal agenesis; and 3) discuss novel approaches to treatment and tracheal reconstruction.

Objectives: 1) Present a case of tracheal agenesis; 2) discuss initial airway management and diagnostic techniques; and 3) review the literature on novel approaches to treatment and tracheal reconstruction. **Study Design:** Case report. **Methods:** Tracheal agenesis is a rare congenital anomaly generally incompatible with life with a reported incidence of 0.002%. The exact etiology and pathogenesis is unknown, however, there is a strong association with anomalies of other organs. Here we describe a case of tracheal agenesis in an ex- 32 week premature infant who was noted to have poor respiratory effort with cyanosis and an absent cry at birth. An endotracheal tube could not be passed beyond the level of the true vocal cords. Blind nasotracheal intubation was achieved and an emergent tracheostomy was performed at the bedside. Normal laryngeal cartilages were palpated, however upon surgical exploration, no trachea was found. **Results:** Subsequent workup demonstrated tetralogy of fallout, an imperforate anus and limb anomalies, all consistent with VACTERL. Direct laryngoscopy revealed the subglottis ending in a blind pouch. Esophagoscopy demonstrated the tracheostomy tube lying within the esophageal lumen. Fluoroscopy and bronchoscopy were diagnostic for tracheal agenesis with a distal esophageal fistula to the mainstem bronchi at the level of the carina. Due to multiple serious anomalies and limited experimental reconstructive options, the family opted for comfort care. **Conclusions:** A high index of suspicion at initial presentation, along with radiographic evidence and endoscopic findings help to confirm the diagnosis of tracheal agenesis. Establishing an airway via esophageal intubation is critical for survival. Overall, the prognosis is poor due to the compressibility of the esophagus as the primary airway and the other commonly associated anomalies.

A260. Long Term Outcomes of Balloon Dilatation for Acquired Subglottic and Tracheal Stenosis in Children

Seckin O. Ulualp, MD, Dallas, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss long term outcomes of balloon dilatation for acquired subglottic and tracheal stenosis in children.

Objectives: Balloon dilatation has been suggested as an alternative treatment to open surgical treatment of subglottic stenosis in children. The aim of the present study is to describe long term outcomes of balloon dilatation for acquired subglottic and tracheal stenosis in children. **Study Design:** Retrospective chart review. **Methods:** The medical charts of children who had balloon dilatation for subglottic and tracheal stenosis secondary to intubation were reviewed. Data included demographics, relevant history and physical examination, diagnostic workup, and management. Outcomes of balloon dilatation were assessed based on improvement in preoperative symptoms, grading of stenosis, complications, and need for additional procedures. **Results:** Four children (3 male, 1 female, age range: 6 months - 15 years) underwent balloon dilatation for subglottic (3 patients) and tracheal stenosis (1 patient). Patients presented with stridor and increased work of breathing. One patient with subglottic stenosis failed extubation. Duration of intubation ranged from 2 days - 3 weeks. Patients with subglottic stenosis became symptomatic 5 days to 6 weeks after extubation. Grade of subglottic stenosis was II in 2 patients and III in one. Subglottic stenosis patients had 2-4 dilations within 3-10 weeks. Patient with tracheal stenosis became symptomatic 6 weeks after extubation. Duration of intubation was 12 days. Grade III tracheal stenosis was dilated 3 times in 3 weeks. All patients were asymptomatic during 14 months - 21 months followup. **Conclusions:** Serial balloon dilatation was a safe and successful method to manage acquired subglottic stenosis in this group of children. No recurrence was noted in a followup more than a year after resolution of symptoms.

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Timothy L. Curran, MD Avon, CT	1954	.2011
Vijay S. Dayal, MD FACS Chicago, IL	1971	.2011
W. Copley McLean, MD FACS Charlottesville, VA	1963	.2011
Thomas F. Miller, MD Portland, OR	1974	.2011
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Francis O. Morris, MD Whittier, CA	1955	.2011
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Russell I. Williams, MD Cheyenne, WY	1947	.2009

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