

Message from the Vice Presidents

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

For those of you who are not Triological Society members or Fellows, we welcome the opportunity to answer your questions regarding how you can become part of this noble organization. The Society awards nearly \$500,000 per year in support of research efforts of otolaryngologist-head and neck surgeons, disseminates the latest basic science and clinical information in *The Laryngoscope*, and our Open Access journal, *Laryngoscope Investigative Otolaryngology* as well as sharing important and timely otolaryngology updates in *ENTtoday*. The Society continues to support resident, medical student and Fellow presenters through institutional travel awards. \$212,000 was awarded in 2019.

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



Gregory A. Grillone, MD
Eastern Section Vice President



Alan G. Micco, MD
Middle Section Vice President



Fred F. Telischi, MD
Southern Section Vice President



Albert L. Merati, MD PhD
Western Section Vice President

THURSDAY AT A GLANCE

7:30 Breakfast with Exhibitors/View Posters

Morning Session - Crown Room

- 8:00 - 9:10 Welcome and Introduction of Special Guests
- 9:10 Presidential Address
- 9:25 Eighth Annual Patrick E. Brookhouser, MD Award of Excellence
- 9:30 - 10:00 Break with Exhibitors/View Posters
- 10:05 - 11:00 Triological Society Best Practices (TRIO BP) Session
- 11:05 - 11:55 This Is How I Do It Video Session
- 12:00 - 1:00 Lunch/Visit Exhibits/View Posters

THURSDAY AT A GLANCE CONT'D

Concurrent Sessions 1A & 2A - Crown Room

- 1:10 - 3:05 Head & Neck Papers and Panel
PANEL: Multicenter Care for the Cancer Patient
- 3:05 - 3:30 Break with Exhibitors/View Posters
- 3:30 - 5:15 Rhinology/Allergy Papers and Collaborative Panel with American Rhinologic Society
PANEL: Biologics for CRS: Where Do We Stand in 2020?
- 5:15 Adjourn

Concurrent Sessions 1B & 2B - Empress/Regent-Grand Hall

- 1:10 - 3:05 Otology/Neurotology Papers and Panel
PANEL: Pulsatile Tinnitus - A Multidisciplinary Approach
- 3:05 - 3:30 Break with Exhibitors/View Posters
- 3:30 - 5:15 Laryngology/Bronchoesophagology Papers and Collaborative Panel with American Society of Geriatric Otolaryngology
PANEL: Swallowing Dysfunction in the Elderly
- 5:15 Adjourn

5:30 - 7:00 Vice President's Welcome Reception - Vista Terrace

FRIDAY AT A GLANCE

7:30 Breakfast with Exhibitors/View Posters

Triological Business Meetings (Fellows Only)

- 7:00 - 7:50 Southern Section - Continental
- 7:00 - 7:50 Western Section - Windsor Complex

Concurrent Sessions 3A & 4A - Crown Room

- 8:05 - 10:05 Facial Plastic/Reconstructive Surgery Papers and Panel
PANEL: Multidisciplinary Approach to Skin Cancer Therapy and Reconstruction
- 10:05 - 10:30 Break with Exhibitors/View Posters
- 10:30 - 12:30 General and Rhinology/Allergy/Sinus and Panel
PANEL: Balloon Sinuplasty - Benefits, Outcomes, Potential for Abuse

FRIDAY AT A GLANCE CONT'D

Concurrent Sessions 3B & 4B - Empress/Regent-Grand Hall

- 8:05 - 10:05 General/Sleep Medicine Papers and Panel
 PANEL: Infant Sleep Apnea - Evaluation and Treatment
- 10:05 - 10:30 Break with Exhibitors/View Posters
- 10:30 - 12:30 Laryngology/Bronchoesophagology and Pediatric Otolaryngology Papers and Panel
 PANEL: Vocal Fold Scar and Glottis Insufficiency

12:30 **Adjourn**

Afternoon Activities (registration required)

- 12:30 Golf Outing
- 12:45 - 1:30 Triological Thesis Seminar - Crystal/Continental
- 12:45 - 2:00 Resident Bowl - Crown Room
- 12:45 - 2:45 Physician/Scientist Meeting - Windsor Complex (by invitation only)
- 2:00 - 6:00 ASGO Scientific Session - Empress/Regent-Great Hall

SATURDAY AT A GLANCE

7:30 **Breakfast/View Posters**

Triological Business Meetings (Fellows Only)

- 7:00 - 7:50 Eastern Section - Windsor Complex
- 7:00 - 7:50 Middle Section - Continental

General Session - Crown Room

- 8:05 - 8:45 Guest Lecture and Panel on Patient Safety
 LECTURE: Patient Safety - How to Avoid Medical Errors
 PANEL: How to Avoid Medical Errors
- 9:30 - 10:00 Break/View Posters

Concurrent Sessions 5A & 6A - Crown Room

- 10:00 - 12:00 General and Head & Neck Papers and Panel
 PANEL: Melanoma - Imaging, Surgical Techniques and Outcomes
- 12:00 - 1:00 Lunch/View Posters

SATURDAY AT A GLANCE CONT'D

1:10 - 3:05 Pediatric Otolaryngology Papers and Collaborative Panel with American Society of Pediatric Otolaryngology
PANEL: Big Problems, Little Patients

3:10 - 3:30 Break/View Posters

Concurrent Sessions 5B & 6B - Empress/Regent-Grand Hall

10:00 - 12:00 Otology/Neurotology Papers and Panel
PANEL: Unusual Dizziness

12:00 - 1:00 Lunch/View Posters

1:10 - 3:10 General and Sleep Medicine Papers and Panel
PANEL: State of The Art - Image Guidance

3:10 - 3:30 Break/View Posters

General Session - Crown Room

3:30 - 4:40 General Panels
PANEL: How to Identify and Address the Person at Risk

4:45 Adjourn

Evening Activities

5:00 Meet the Authors Poster Reception - Ballroom

2020 COMBINED SECTIONS MEETING

January 23-25 • Hotel del Coronado • Coronado, California

About the Triological Society

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

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

Mission Statement

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

Learning Objectives for This Activity

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

- Identify stressors in their practice that may affect their well-being, and make interventions to avoid burnout.
- Explain the benefits of managing complex patients within a multidisciplinary team approach.
- Select the appropriate imaging studies in the management of head and neck diseases
- Distinguish the benefits and risks associated with different lasers in the treatment of various types of head and neck pathology
- Apply the practice care guidelines presented to patients within their communities

Exhibits

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

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

Disclosure Information

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

Program Evaluation and CME Certificates

Participant comments on program evaluation forms assist Program Advisory Committees in determining the direction of future educational activities. We appreciate your input and request that you complete a program evaluation in exchange for a CME certificate of attendance. Records are maintained in the Administrative Office of the Society and maintained by the American College of Surgeons for Fellows of the College. Requests may be made by sending a self-addressed envelope to: Triological Society • 13930 Gold Circle, Suite 103 • Omaha, NE 68144 • 402-346-5500.

CONTINUING MEDICAL EDUCATION CREDIT INFORMATION

Accreditation

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

AMA PRA Category 1 Credits™

The American College of Surgeons designates this live activity for a maximum of 18.75 *AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.



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Guests of Honor

Eastern Section	Kenneth M. Grundfast, MD
Middle Section	Robert C. Kern, MD
Southern Section	W. Jarrard Goodwin, MD
Western Section	Timothy L. Smith, MD MPH

Citation Awardees

Eastern Section

Andrew Blitzer, MD DDS
Michael P. Platt, MD
Mark A. Varvares, MD

Southern Section

Derald E. Brackmann, MD
Grayson K. Rodgers, MD
Christine Dinh, MD

Middle Section

James P. Chandler, MD
Richard J. Wiet, MD FACS
Claus-Peter Richter, MD PhD

Western Section

Jeffrey P. Harris, MD PhD
Gayle E. Woodson, MD
Lisa Orloff, MD

Middle Section George Adams Young Faculty Awardee

Catherine K. Hart, MD MS

8th Annual Patrick E. Brookhouser MD Award of Excellence

Jonas T. Johnson, MD, Pittsburgh, PA

Guests of Honor

Honored by Eastern Section - Kenneth M. Grundfast, MD



After graduating from medical school at the SUNY-Upstate Medical Center, Ken Grundfast completed his residency in Otolaryngology-HNS at the Boston University and affiliated hospitals, then went for fellowship training in pediatric otolaryngology at the Children's Hospital of Pittsburgh. In 1980, He became chair of the Otolaryngology Department at the Children's National Medical Center in Washington, DC and served in that position for 16 years including a one year sabbatical for research at the National Institute on Deafness and Communication Disorder. He joined the faculty of Georgetown University Medical School in 1996 and in 1999 he became chair of the Oto-HNS Department at Boston University School of Medicine (BUSM). At the Boston Medical Center (BMC), he served for ten years as chair of the Ethics Committee. Ken has served as president of these societies: American Society for Pediatric Otolaryngology, Metropolitan Washington ENT Society, New England Otolaryngology Society, and as Vice President of the Eastern Section of the Triological Society. In 2017, Ken stepped down from his position as chair of Otolaryngology at BUSM/BMC. Recently, Ken was designated at the Boston Medical Center to serve as Physician Leader for Improving Patient Experience and named at the Boston University School of Medicine Chair of the Faculty Appointments and Promotions Committee.

Honored by Middle Section - Robert C. Kern, MD



Robert C. Kern, MD was appointed in July of 2006 as Chairman of the Department of Otolaryngology - Head and Neck Surgery at Feinberg School of Medicine. Dr. Kern joined the Northwestern University faculty nearly two decades ago following a residency at Wayne State University and a two year NIH research training fellowship. His undergraduate degree is from Georgetown University and his medical degree is from Jefferson Medical College in Philadelphia, Pennsylvania. Dr. Kern's primary clinical interests are chronic rhinosinusitis, nasal polyposis, benign and malignant sinonasal tumors and the transnasal approach for cranial base tumors. He is the clinical PI of an NIH funded Program Project Grant on Chronic Rhinosinusitis.

Honored by Southern Section - W. Jarrard Goodwin, MD



Dr. W. Jarrard (Jerry) Goodwin completed residency training in Otolaryngology-Head and Neck Surgery at the University of Miami/Jackson Memorial Medical Center in 1977. After spending two years with the US Air Force in the Philippines, and a year in Head and Neck Surgery Fellowship at MD Anderson Hospital in Houston, he returned to Miami as an Assistant Professor of Otolaryngology in 1980. In 1985, he accepted a position as Associate Professor of Surgery at Yale University and returned to the University of Miami again in 1989 as Professor and Chair of the Department of Otolaryngology. He served in that role until 2000, leading the development of a modern, subspecialty oriented faculty. He was appointed Director of the University of Miami Sylvester Comprehensive Cancer Center in 1995, and served in that role through 2007, when he assumed his current position as Sylvester's Chief Medical Officer. He continues to be involved in the multidisciplinary care of head and neck cancer patients.

Dr. Goodwin is a member of many scientific societies and has authored or coauthored more than 120 scientific publications dealing principally with the prevention and treatment of cancer of the mouth and throat.

At this point in his career, Dr. Goodwin is most proud of the excellence and esprit de corps among his colleagues in the University's Department of Otolaryngology, and of the continuing development of the Department under his successors, Tom Balkany and Fred Telischi. He is most grateful to Ryan Chandler and Tony Maniglia, who taught him the fundamentals of Otolaryngology.

He has been happily married to his wife Sharon for 49 years and takes his greatest joy from his three daughters and 8 grandchildren.

Honored by Western Section - Timothy L. Smith, MD MPH



Timothy L. Smith, MD, MPH, FACS is a Professor and Vice Chair of Otolaryngology-Head and Neck Surgery at Oregon Health & Science University in Portland, Oregon, where he also serves as Director of the Oregon Sinus Center, Chief of Rhinology and Sinus-Skull Base Surgery, and Director of Clinical Research. Dr. Smith is actively involved in clinical practice and research and serves as the Principal Investigator of the first multi-institutional study of outcomes of sinus surgery funded by the National Institutes of Health. Dr. Smith has published over 300 peer reviewed articles and has mentored numerous faculty, fellows, residents, and post-graduate students who have substantially advanced the field of Otolaryngology-Head & Neck Surgery. He is the first American Rhinologist/Sinus Surgeon to be elected to the *Collegium Oto-Rhino-Laryngologicum Amicitiae Sacrum (CORLAS)*. Dr. Smith is a Past President of the American Rhinologic Society and has been elected to the Board of Directors of the American Academy of Otolaryngology-Head and Neck Surgery, and to the American Board of Otolaryngology-Head and Neck Surgery. He has previously served as an Associate Editor of the *International Forum of Allergy & Rhinology* and *JAMA Otolaryngology-Head and Neck Surgery* prior to being appointed Editor in Chief of the *International Forum of Allergy & Rhinology*.

Citation Awardees

Eastern Section - Andrew Blitzer, MD DDS



Andrew Blitzer, MD DDS FACS is an internationally known Otolaryngologist with expertise in voice and swallowing disorders, nasal and sinus surgery, and head and neck and reconstructive surgery. Dr. Blitzer is also a pioneer with over 36 years of experience and leading authority in the use of Botox (botulinum toxin) for conditions with excessive muscle function, muscle pain, tremor and muscle spasm including spasmodic dysphonia and facial lines and wrinkles. Dr. Blitzer is a graduate of the Mt. Sinai School of Medicine and the School of Dental and Oral Surgery of Columbia University. He completed his residency training at the Mt. Sinai Medical Center in New York City. He is currently Professor Emeritus of Otolaryngology-Head and Neck Surgery, Columbia University College of Physicians and Surgeons. He is also Adjunct Professor of Neurology of the Icahn School of Medicine at Mt. Sinai. He is Director of the NY Center for Voice and Swallowing Disorders and a Fellowship Training Program in Laryngology.

Dr. Blitzer is internationally recognized as a clinician, scientist, teacher, and author. He has published over 400 scientific articles and text chapters concerning head and neck surgery, voice and swallowing disorders, nasal and paranasal sinus disorders, and the use of Botox

for hyperfunctional conditions of the head and neck, and the cosmetic use of toxin and fillers. He helped establish the field of neurolaryngology and has one of the seven fellowship programs in the country. He is the author of 17 textbooks including the definitive texts *Surgery of the Paranasal Sinuses*, *Neurologic Disorders of the Larynx*, *Office-Based Surgery in Otolaryngology*, and *Management of Facial Lines and Wrinkles*, and *Botulinum neurotoxins for head and neck disorders*. In addition to his innovative work with laryngeal dystonia (spasmodic dysphonia), Dr. Blitzer has helped develop new surgical techniques for the rehabilitation the paralyzed vocal cord.

Dr. Blitzer has been an extramural consultant to the National Institutes of Health and is a member of the special sensory and language study section. Dr. Blitzer has also conducted several product and drug trials for the Food and Drug Administration, including the clinical trials for Botox for facial lines and wrinkles, temporomandibular disease, and migraine headaches. He is also the recipient of numerous awards and fellowships in recognition of his expertise and major contributions to the field of Otolaryngology, including the prestigious James A. Newcomb Award and the de Roaldes Award of the American Laryngological Association and the Chevalier Jackson Award of the Am. Bronchoesophagological Association for his outstanding contributions to the field of laryngology. Dr. Blitzer has been an editor or a member of the editorial board of 9 peer review journals. Dr. Blitzer was, for 6 years, the Coordinator for Instruction Courses and Member of the Board of Directors of the American Academy of Otolaryngology-Head and Neck Surgery. He is also the past-President of the American Bronchoesophagological Association and of the American Laryngological Association.

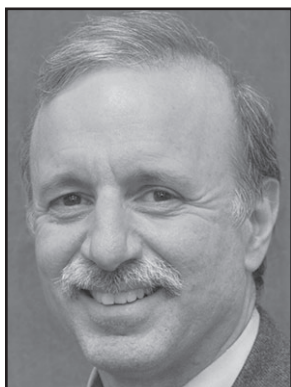
Dr. Blitzer lives in Manhattan and enjoys marathon running, skiing, photography, cooking, fly fishing, and making rustic furniture in his free time. For the past decade, Dr. Blitzer has been listed in the *Best Doctors in America (American Health)*, *Best Doctors in New York (New York Magazine)*, *Best Doctors in the New York Metropolitan Area (Castle and Connely)*, *Who's Who in America*, and *Who's Who in Science and Technology*. Dr. Blitzer is a world leader in the management of voice and swallowing disorders, nasal and sinus surgery, laser surgery, management of facial lines and wrinkles, and head and neck surgery and Botulinum toxin therapy.

Eastern Section - Michael P. Platt, MD



Michael Platt, MD MSc is an Associate Professor in the Department of Otolaryngology-Head and Neck Surgery at Boston University School of Medicine. He is a fellowship trained rhinologist who studies diseases of the upper airways via molecular bioinformatics approaches. He serves as Program Director for the Otolaryngology residency program at Boston University and Treasurer of the American Academy of Otolaryngic Allergy. Dr. Platt attended the University of Scranton and Jefferson Medical College before pursuing Otolaryngology training at Albany Medical Center and Rhinology Fellowship at the Massachusetts Eye and Ear Infirmary. While at Boston University, Dr. Platt obtained a Masters Degree in Clinical Bioinformatics. Dr. Platt lives in Brookline, MA, with his wife Judy who is the Director of Student Health Services at Boston University, and his three children.

Eastern Section - Mark A. Varvares, MD



Mark Varvares is a native of St. Louis, Missouri. He attended the University of Missouri-Columbia from 1976 to 1980 as a pre-dental student. He then received an acceptance to the University of Missouri-Kansas City School of Dentistry where he spent one year from 1980 to 1981. After one year of dental school, it was clear to Dr. Varvares that medicine, and not dentistry, would be the most appropriate career path. He entered the Saint Louis University School of Medicine in 1982 and graduated in 1986 magna cum laude and a member of the Alpha Omega Alpha Honor Society.

He trained in Otolaryngology - Head and Neck Surgery, completing one year at Saint Louis University and remainder at Harvard. Following residency, he completed a one year Head and Neck Ablative and Reconstructive Surgery fellowship at Harvard under the direction of Drs. William Montgomery and Mack Cheney. After completing training he held faculty appointments at both Saint Louis University and Harvard.

In 2003, he assumed the position as Chairman of the Department of Otolaryngology-Head and Neck Surgery at Saint Louis University. In January of 2006, Dr. Varvares was also named Director of the Saint Louis University Cancer Center. In April of 2008, Dr. Varvares was named the first incumbent of the Donald and Marlene Jerome Endowed Chair in Otolaryngology-Head and Neck Surgery. In February of 2015 he left St. Louis to return to Department of Otolaryngology, Head and Neck Surgery at the Massachusetts Eye and Ear Infirmary and the Harvard Department of Otolaryngology to serve as the Associate Chair. He currently holds the William Montgomery and John Merriam Endowed Chair at Harvard Medical School. In 2018 he was promoted to the rank of Professor of Otolaryngology at Harvard Medical School.

As Associate Chair he holds a number of administrative positions both within the Department of Otolaryngology at Massachusetts Eye and Ear and that of the Hospital Institutional structure as well.

His present clinical interests include all areas of head and neck surgical oncology, including major ablative and reconstructive surgery of the head and neck, multidisciplinary care of the head and neck cancer patient, skull base surgery, reconstruction of the larynx and trachea and the surgical management of thyroid and parathyroid disorders. He maintains a busy surgical practice in head and neck surgery.

Research interests include the impact that surgical pathology of head and neck cancers has on oncologic outcomes, intraoperative imaging in oral cancer resections, the functional evaluation of patients undergoing treatment for cancer of the oral cavity and how to optimize the outcomes and how level of education and socioeconomic status impacts treatment patterns and outcomes in head and neck cancer patients.

Middle Section - James P. Chandler, MD



James P. Chandler, MD FACS, is Vice Chair and the Lavin/Fates Professor in Neurological Surgery at the Feinberg School of Medicine of Northwestern University in Chicago, Illinois. He also holds an appointment as Professor in the Department of Otolaryngology - Head and Neck Surgery.

Dr. Chandler serves as co-director and surgical director of the Lou and Jean Malnati Brain Tumor Institute of the Robert H. Comprehensive Cancer Center of Northwestern University. In addition, he is the Rudy E. Sabbagha, MD, Distinguished Physician in Surgical Neuro-Oncology at Northwestern Memorial Hospital in Chicago, Illinois. In May, 2016, Dr. Chandler established the Skull Base Laboratory at Feinberg School of Medicine of Northwestern, a uniquely equipped facility that offers Northwestern neurosurgical residents and faculty unprecedented opportunities to conduct anatomical and surgical research.

Dr. Chandler received his undergraduate degree in neurobiology at the University of California at Berkeley and his medical degree from the University of Maryland Medical School in Baltimore. He then completed his residency in neurological surgery at Northwestern University Medical

School and completed fellowships in cranial base and microvascular surgery at the George Washington Neurological Institute in Washington, DC, and at the Institute Neurosurgery Sao Paulo (Brazil). He is board certified in neurological surgery.

Dr. Chandler has a strong interest in the evolving role of endoscopic skull base surgery and Gamma Knife radiosurgery as an alternative to conventional cranial base surgery. He is a regular contributor to scientific journals and neurosurgical textbooks and is a frequent presenter at national and international medical forums.

Middle Section - Claus-Peter Richter, MD PhD



Dr. Claus-Peter Richter is Vice Chair for Research in the Department of Otolaryngology, Head and Neck Surgery, and has joint appointments in the Department of Biomedical Engineering and the Department of Communication Sciences and Disorders. He is founding CTO of Resonance Medical, LLC. He was born in Erlangen, Germany, received his medical degree from the Johann Wolfgang Goethe-University in Frankfurt, Germany. Furthermore, he received his Masters degree in Physics and his PhD from the Johann Wolfgang Goethe-University. Following his postdoctoral research in the Department of Physiology at the Johann Wolfgang Goethe-University, he joined the Laboratory of Dr. P. Dallos at Northwestern University in 1996 and became full time faculty at Northwestern University Medical School in 2002. Dr. Richter's primary interests are the development and improvement of cochlear implant electrodes, the micromechanics of the mammalian cochlea, and the maturation of the mammalian inner ear. Recently, the research efforts of Dr. Richter's laboratory are focused to develop cochlear implants that use optical radiation rather than electrical currents to stimulate auditory neurons.

Middle Section - Richard J. Wiet, MD FACS



Currently, Dr. Wiet is Professor of Otolaryngology/Neurotology at Rush University's Department of Otolaryngology-Head and Neck Surgery, Chicago. He is transitioning to Professor Emeritus and will continue to teach residents and medical students at the University. He studied internationally and has a long and productive career in Otolaryngology/Neurotology. He has authored well over 100 peer reviewed articles, dozens of book chapters, and edited three textbooks in his field. Dr. Wiet was a Past President of the American Neurotology Society. At this time, he takes great satisfaction in watching the careers of the twenty fellows he trained. In addition, he currently enjoys working with his son, Mark, who leads the Division of Otolaryngology and Skull base Surgery at Rush.

Southern Section - Derald E. Brackmann, MD



Derald Brackmann, MD is an otologist/neurotologist at the House Clinic. He completed his undergraduate studies at the University of Illinois and graduated from medical school at the University of Illinois in Chicago. After serving in the Air Force, he completed residency at the University of Southern California, Los Angeles County program. Following completion of his Fellowship at the House Clinic, he joined that practice and has spent his entire career there. He has specialized in all facets of otology and neurotology. His research interests have been in electrophysiology of the inner ear, cochlear implants and auditory brainstem implants.

Southern Section - Christine Dinh, MD



Dr. Christine Dinh is a native of Miami, Florida. She graduated from the 6 year Honors Program in Medicine at the University of Miami, where she received a Bachelor of Science degree in Biology from the College of Arts and Science and Honors in Research from the Miller School of Medicine. Subsequently, she completed a clinical residency in Otolaryngology and a fellowship in Neurotology at the University of Miami/Jackson Memorial Hospital, where she received several prestigious resident and fellow research awards. Dr. Dinh joined the University of Miami faculty in 2015 as an Assistant Professor and surgeon scientist, where she also serves as the Director of Education at the University of Miami Ear Institute, Director of Resident/Fellow Research Education, and Associate Director of the Neurotology fellowship. As an academic clinician scientist, she is dedicated to caring for her patients, teaching the next generation of physicians and scientists, and performing cutting edge research that will carry the field forward. She has a productive research laboratory focused on vestibular schwannoma, neurofibromatosis type 2, ototoxicity/otoprotection, and hearing related disorders, which is funded by various NIH and foundation grants. She has delivered numerous oral and poster presentations and published several book chapters and peer reviewed manuscripts over the years. In addition,

Dr. Dinh has a busy clinical and surgical practice, with a strong emphasis on lateral skull base surgery. She was also instrumental in the development of the Auditory Brainstem Implant Program at the University of Miami, which she currently manages.

Dr. Dinh is a strong role model and mentor to undergraduate students, medical students, residents, fellows, and junior faculty. Furthermore, she plays an active role in the Miami Chapter of the Alpha Omega Alpha Honor Medical Society, where she has the privilege of recognizing and inducting exceptional medical students and physicians that have demonstrated high educational achievement, gifted teaching, leadership, humanism, and community service. She is thankful to all her mentors over the years, particularly Dr. Fred Telischi, who continually encourages her to see and reach her full potential. Dr. Dinh is married to her husband, Diego Castilla, MD, whose unwavering support and love has allowed her to achieve her dreams.

Southern Section - Grayson K. Rodgers, MD



Dr. Rodgers completed his undergraduate degree at University of North Carolina, Chapel Hill. He continued his education at the UNC School of Medicine, graduating with honors. His Otolaryngology residency took him to the University of Pittsburgh Eye and Ear Hospital, and he completed his fellowship training in Neurotology and Otology at the House Ear Institute in Los Angeles, California.

He entered private practice in Birmingham, Alabama in 1992 limiting his practice to disorders of the ear and skull base. 2019 brought a change in practice structure as he consolidated his practice with two other Otolologists to form Alabama Ear Specialists. His CV includes publications of research papers as well as textbook chapters. He has been a speaker at national and local educational activities and maintains membership in our professional societies.

Western Section - Jeffrey P. Harris, MD PhD



Dr. Jeffrey P. Harris is a native of Boston, Massachusetts. He attended the University of Pennsylvania where he was elected to AOA honor society and awarded an MD-PhD degree. He then completed a residency at Harvard/Massachusetts Eye and Ear Infirmary.

Following residency, Dr. Harris joined the faculty at UCSD in 1979 as an assistant professor. This appointment shifted his clinical focus from head and neck surgery to neurotology and skull base surgery. He was a recipient of a 5 year NIH Teacher-Investigator Development Award which later became known as a KO8 award. In 1983, he did advanced fellowship training at the University of Zurich in Switzerland under Professor Ugo Fisch. Upon returning to UCSD he led a laboratory effort in the basic science of inner ear inflammation and discovered that the inner ear was not immunoprivileged as was once thought, but rather possessed a functioning immune system. Over this period he was the recipient of multiple NIH and VA Merit awards.

In 1986, at the age of 37, he became the Chief of Otolaryngology-Head and Neck Surgery at UCSD. Thirty-three years into his tenure as chief, he has become one of the longest standing otolaryngology department chiefs in the nation and has been promoted to a Distinguished Professor in the UC system.

Under his leadership at UCSD, a program that started with only four physicians, has expanded to more than 30 faculty members, 14 residents, two neurotology fellows, and a pediatric fellow, and is home to a joint doctoral program in audiology with San Diego State University.

As a surgeon, Dr. Harris performed the first cochlear implant surgery in San Diego and continues to have an active clinical practice today where he specializes in stapedotomy, acoustic neuroma and cochlear implant surgery. His research interests began in immunology and led him to investigate autoimmune deafness and Meniere's disease, for which patients worldwide seek his consultation. His translational research led to the discovery of a diagnostic blood test for autoimmune inner ear disease and a classification system for this disorder. He has been a visiting professor at numerous departments both here and abroad. Over the course of his career, he has contributed over 375 publications, 5 books and 22 patents. Through his work, he has pioneered new methods of drug delivery to the middle and inner ear which led him to be a cofounder of a biopharmaceutical company, Otonomy, Inc.

During his 40 year career, he has been the President of both the American Otological Society (AOS) and the Association for Research in Otolaryngology. He served as the director of the San Francisco Otolaryngology Match, the chair of the AAO/HNS Research Committee and a member of the NIH Communication Disorders Study Section. He is the recipient of the Award of Merit and Presidential Citation from the AOS. He is a member of the Collegium Oto-Rhino-Laryngologicum Amicitiae Sacrum, which awarded him the Shambaugh Prize.

Western Section - Lisa Orloff, MD



Lisa A. Orloff, MD FACS FACE, is Professor and Director of Endocrine Head and Neck Surgery in the Department of Otolaryngology-Head and Neck Surgery, at Stanford University School of Medicine. She is Director of the Thyroid Tumor Program at the Stanford Cancer Center, and she is also the Director of the AHNS accredited Stanford Endocrine Head and Neck Surgery Fellowship. Dr. Orloff earned her BA from Stanford University and her medical degree from the University of California, Los Angeles. She completed her internship and residency in Otolaryngology-Head and Neck Surgery at the University of Washington in Seattle, and received mentorship in Microvascular and Reconstructive Surgery by Dr. Mark Urken at the Mount Sinai Medical Center in New York. Prior to joining Stanford's faculty in 2014, Dr. Orloff was the Robert K. Werbe Distinguished Professor in Head and Neck Cancer, and Chief of the Division of Head and Neck Surgery at the University of California, San Francisco, dedicating her practice to the care of patients with head and neck and thyroid cancer. She holds leadership roles within the American Head and Neck Society, the American Thyroid Association, the American Institute of Ultrasound in Medicine, and the American College of Surgeons. In the latter, she serves as a member of the Executive Board of the National Ultrasound Faculty and as Co-Chair of the

Thyroid and Parathyroid Ultrasound Program. Dr. Orloff is the first surgeon ever to be accredited by the American Institute of Ultrasound in Medicine for expertise in head and neck ultrasonography. She is a former Fulbright scholar, and she has served as a voting member of the FDA's Panel to evaluate medical devices for Otolaryngology. Dr. Orloff's current clinical practice is focused on surgical management of thyroid and parathyroid tumors and recurrent, metastatic and invasive thyroid cancer.

Dr. Orloff's work understanding and expanding the role of ultrasound within the multidisciplinary management of endocrine head and neck disease has transformed the manner in which patients with thyroid and parathyroid disorders are evaluated and cared for. Dr. Orloff recently authored the second edition of her textbook, *Head and Neck Ultrasonography* (Plural Publishing), and she co-directs the national ACS Thyroid, Parathyroid, and Neck Ultrasound course, providing ultrasound education and refined diagnostic assessment and treatment planning for scores of head and neck and thyroid surgeons.

Western Section - Gayle E. Woodson, MD



Dr. Gayle Woodson is Professor Emerita and former Chair of Otolaryngology at Southern Illinois University. Since retirement, she and her husband, Tom Robbins, spend two months each year as volunteer faculty at Kilimanjaro Christian Medical Center in Tanzania.

She is a graduate of Rice University and Baylor College of Medicine. After two years of General Surgery Training at John's Hopkins Hospital, she completed an Otolaryngology residency at Baylor and a fellowship in Laryngology at the Royal National Throat, Nose, and Ear Hospital in London, England. She began her Otolaryngology career as an Assistant Professor at Baylor. She was an Associate Professor at UC San Diego, and Professor at UT Memphis and the University of Florida, before moving to Illinois in 2003.

Dr. Woodson's research focused on respiratory muscle physiology, laryngeal nerve injury and repair, and vocal fold scar. She has given invited lectures in 21 countries on every continent except Antarctica. She has been active in global medical outreach in Africa, Central America, and the Middle East. Since retirement, she has published award winning short stories and a

novel, AFTER KILIMANJARO.

She was the first woman elected to the American Board of Otolaryngology and served as its Exam Chair for five years. She served as President of the American Laryngological Association, the American Academy of Otolaryngology-Head and Neck Surgery, the Society of University Otolaryngologists, and Chaired the Residency Review Committee for Otolaryngology. She has been elected to the Collegium Oto-Rhino-Laryngologicum Amicitiae Sacrum, the Johns Hopkins Society of Scholars, and the American Surgical Association. Her awards and honors include the Newcomb Award from the ALA, Chevalier Jackson Award from the American Bronchoesophageal Association, the Hans von Leden Award for Lifetime Achievement in Voice Care, and the Olga Jonasson Award from the Association of Women Surgeons. She and Tom raised 4 children and have 4 grandchildren.

Patrick E. Brookhouser MD Award of Excellence

Jonas T. Johnson, MD



Dr. Johnson has committed his life's work to the treatment of patients with diseases of the head and neck in an environment of education and inquiry. His current appointment is as Distinguished Professor and Chairman of the Department of Otolaryngology at the University of Pittsburgh School of Medicine. Dr. Johnson holds the Eugene N. Myers Chair in Otolaryngology. He holds joint appointments as Professor of Radiation Oncology (School of Medicine), of Communication Science and Disorders (School of Health and Rehabilitation Services), and of Oral Maxillofacial Surgery (School of Dental Medicine).

Dr. Johnson has limited his clinical practice to the treatment of patients with tumors of the head and neck. Most recently his work has focused on survivorship care for head and neck cancer survivors and the avoidance of low value interventions. In addition to his clinical practice, he has an established scholarly record of peer reviewed publications, extensive mentorship experience, and a history of interdisciplinary collaboration. He served as Editor of The Laryngoscope 2003-2011. Dr. Johnson is a Past President of the American Academy of Otolaryngology-Head and Neck Surgery (2003), the American Head and Neck Society (2004) and the Triological Society (2014).

George Adams, MD Young Faculty Award

Catherine K. Hart, MD MS



Dr. Hart is a pediatric otolaryngologist at Cincinnati Children's Hospital Medical Center in the Department of Otolaryngology Head and Neck Surgery at the University of Cincinnati College of Medicine. She also serves as the associate program director for the University of Cincinnati Otolaryngology residency program. Dr. Hart completed her residency training at the University of Cincinnati and her fellowship in pediatric otolaryngology at Cincinnati Children's Hospital Medical Center. Additionally, she completed a Master of Science degree in clinical and translational research, and the Quality Scholar in Healthcare Transformation program at the James M. Anderson Center for Health Systems Excellence.

Her clinical practice focuses on pediatric airway stenosis and the management of children with complex aerodigestive disorders, including children with CHARGE syndrome. Her research focus is on outcomes and quality improvement in pediatric airway patients, with a specific area of focus on tracheostomy dependent children. She has an additional interest in reproducible models of airway stenosis to prospectively study endoscopic airway interventions.

Dr. Hart has published on pediatric airway surgery and quality improvement and is frequently invited to lecture at scientific conferences throughout the United States and South America. She has been active in numerous national societies and organizations and serves on multiple national committees.

Triological Society Research Grant Programs

The Society promotes research into the causes of and treatments for otolaryngic diseases by providing financial support for the research efforts of young otolaryngologists-head and neck surgeons. The Society has awarded over \$5 million to otolaryngologists-head and neck surgeons in support of clinical and basic research, clinical trials, translational research, outcomes research, and health services research. These competitive research grant programs include funding for career development grants and clinical scientist awards. \$360,000 was awarded to grant recipients in 2019.

CAREER DEVELOPMENT AWARDS

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

1. Clinical Research - Prospective or retrospective clinical data collection with direct clinical application
2. Basic Research - Laboratory studies, in vivo, in vitro; animal studies, genetic studies
3. Health Services and Outcomes Research - Patient outcomes, health related QOL; epidemiology, diversity, population statistics; cost analysis, modeling, decision analysis, etc.
4. Technology/Procedure Development - Development, standardization, beta testing of new technology; equivalency studies
5. Otolaryngology Status and Trends - Resident and medical education; impact of health care delivery systems in society
6. Historical Perspectives - Medical history as it has influenced contemporary otolaryngology knowledge and practice

Letters of Intent were due December 1, 2019, and applications are due January 31, 2020. Call for proposals will be available later in 2020.

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

CLINICAL SCIENTIST DEVELOPMENT AWARDS

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

Applications are due May 22, 2020.

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

Grant Awardees

THE 2019-2020 TRIOLOGICAL SOCIETY CAREER DEVELOPMENT AWARDEES AND THE FUNDED PROJECTS ARE:

- Do-Yeon Cho, MD -- University of Alabama
The Role of Mucin Degrading Anaerobes in the Pathogenesis of Chronic Rhinosinusitis with Pseudomonas
- Rebecca J. Howell, MD -- University of Cincinnati
Dysphagia Outcomes after Zenker's Diverticulectomy
- Corinna G. Levine, MD MPH -- University of Miami Miller School of Medicine
Defining the Impact of Social Determinates of Health on Chronic Rhinosinusitis Disease Burden and Outcomes
- Hitomi Sakano, MD PhD -- University of Rochester Medical Center
The Role of Fragile X Mental Retardation Protein in the Auditory Brainstem
- Natalie L. Silver, MD MS FACS -- University of Florida
Reprogramming Host Immunity in Treatment Resistant Head and Neck Cancer Using Personalized RNA Nanoparticle Vaccines

THE 2019-2020 TRIOLOGICAL/AMERICAN COLLEGE OF SURGEONS CLINICAL SCIENTIST DEVELOPMENT AWARDEES (TRIO/ACS) AND THE FUNDED PROJECTS ARE:

New grant:

- Stephanie N. Misono, MD MPH -- University of Minnesota
Psychological Factors Influencing Voice Outcomes: Technology Based Assessment and Intervention

Renewals:

- Justin S. Golub, MD -- Columbia University College of Physicians & Surgeons
Mechanisms Linking Hearing Loss and Alzheimer's Disease and Related Dementias
- Alexander Tell Hillel, MD - Johns Hopkins University School of Medicine
Immune Cell Modulation in Laryngotracheal Fibrosis
- Rick F. Nelson, MD PhD -- Indiana University School of Medicine
Genetically Mediated Hair Cell Degeneration in 3D Inner Ear Organoids

REMINDERS AND INFORMATION

Thursday

- 7:30 - 8:00 Breakfast with Exhibitors/View Posters in the Ballroom
Please thank the exhibitors for supporting the meeting. Their generosity helps make the meeting possible.
- 8:00 - 5:15 Scientific Sessions in Crown Room & Great Hall
- 5:30 - 7:00 Vice President's Welcome Reception for all attendees at Vista Terrace

Friday

- 7:00 - 7:50 Southern Member Business Meeting in Continental
Western Member Business Meeting in Windsor
- 7:30 - 8:00 Breakfast with Exhibitors/View Posters in the Ballroom
Please thank the exhibitors for supporting the meeting. Their generosity helps make the meeting possible.
- 8:00 - 12:30 Scientific Sessions in Crown Room & Great Hall
- Afternoon Leisure and Activities
- 12:30 Golf outing - Coronado Course - Pre-registration required
 - 12:45 Thesis Seminar - Crystal/Continental - Pre-registration required. Open to registered candidates and potential candidates
 - 12:45 Neely Physician/Scientist Meeting - Windsor Complex - Invitation only
 - 1:00 Resident Bowl - Crown Room - Pre-registration required. Open to all registered attendees.

Saturday

- 7:00 - 7:50 Eastern Member Business Meeting in Windsor
Middle Member Business Meeting in Continental
- 7:30 Breakfast/View Posters in Ballroom
- 8:00 - 4:45 Scientific Sessions in Crown Room & Great Hall
- Noon "Tips for Peer Reviewers from the Editors" in Crystal/Continental
Presented by the journal editors, Drs. Sam Selesnick and Brad Welling
Open to all registrants - Current reviewers and those interested in serving as reviewers for *The Laryngoscope* and *Laryngoscope Investigative Otolaryngology*
- 5:00 - 6:30 MEET THE AUTHORS POSTER RECEPTION in Ballroom
Open to all registrants. Food and beverages available. Mingle with your colleagues, view and discuss posters with the authors, find out who wins the poster prizes including the winners of the new visual abstract competition.

2020 Resident Bowl Teams

Boston University, Henry Ford Hospital, Johns Hopkins, Kaiser Oakland, LSU Shreveport, Mayo Clinic, Naval Medical Center SD, SUNY Downstate, University of Alberta, UC Irvine, UCLA, UCSD, University of Cincinnati, University of Iowa, University of Rochester

PHOTO BOOTH will be open in the Ballroom throughout the meeting. Share your meetings photos on social media!!

THANK YOU

The Society extends a special thank you to the following for their contributions to the 2020 Combined Sections Meeting

Paul Willging, MD continues to give of his time and expertise in planning the Combined Sections Meeting Program. This is Dr. Willging's fourth year as Program Director.

Dana M. Thompson, MD as Thesis Chair, conducts the Thesis Seminar each January which is open to all candidates for Fellowship as well as potential candidates.

Shawn Newlands, MD has continued to coordinate the annual Physician/Scientist seminar named after its' founder, J. Gail Neely, MD, who passed away in 2017.

Drs. Brad Welling and Sam Selesnick will present "Tips for Reviewers from the Editors" for current reviewers and those interested in reviewing for The Laryngoscope and Laryngoscope Investigative Otolaryngology.

Drs. Michael Hoffer, Al Merati, Stacey Gray and Lamont Jones who plan and execute the Resident Bowl.



National Spasmodic Dysphonia Association has underwritten two travel grants for the 2020 meeting, as noted in the program.

Exhibitors - The support of our exhibitors is vital to the meeting. Please visit the exhibitors in the Ballroom and thank them for their support.

Thank you to the Program Committee, moderators, panelists, and all podium and poster presenters.

2020 TRIOLOGICAL SOCIETY COMBINED SECTIONS MEETING HOTEL DEL CORONADO, CORONADO, CALIFORNIA JANUARY 23-25, 2020

THURSDAY, JANUARY 23, 2020

7:30 *Breakfast with Exhibitors - Ballroom*

GENERAL SESSION - CROWN ROOM

8:00 **Welcome on behalf of the Section Vice Presidents**

Gregory A. Grillone, MD, Boston, MA

8:05 **Eastern Section Guest Introductions by Gregory A. Grillone, MD, Boston, MA, Eastern Section Vice President**

Citation Awardees: Andrew Blitzer, MD DDS, New York, NY
Michael P. Platt, MD, Boston, MA
Mark A. Varvares, MD, Boston, MA

Guest of Honor: Kenneth M. Grundfast, MD, Boston, MA
Professionalism

8:20 **Southern Section Guest Introductions by Fred F. Telischi, MD, Miami, FL, Southern Section Vice President**

Citation Awardees: Derald E. Brackmann, MD, Los Angeles, CA
Christine Dinh, MD, Miami, FL
Grayson K. Rodgers, MD, Birmingham, AL

Guest of Honor: W. Jarrard Goodwin, MD, Miami, FL
The Development of Subspecialty Care in an Academic Department of Otolaryngology

8:35 **Western Section Guest Introductions by Albert L. Merati, Seattle, WA, Western Section Vice President**

Citation Awardees: Jeffrey P. Harris, MD PhD, San Diego, CA
Lisa Orloff, MD, Stanford, CA
Gayle E. Woodson, MD, Merritt Island, FL

Guest of Honor: Timothy L. Smith, MD MPH, Portland, OR
Am I Upholding the Noble Legacy?

8:50 **Middle Section Guest Introductions by Alan G. Micco, MD, Chicago, IL, Middle Section Vice President**

Citation Awardees: James P. Chandler, MD, Chicago IL
Claus-Peter Richter, MD PhD, Chicago, IL
Richard J. Wiet, MD FACS, Sawyer, MI

Guest of Honor: Robert C. Kern, MD, Chicago, IL
Sinusitis: How Far Have We Come?

Presentation of Middle Section George Adams, MD Young Faculty Award to Catherine K. Hart, MD MS, Cincinnati, OH

Introduction by Alan G. Micco, MD, Middle Section Vice President

Thursday

- 9:10 Presidential Address - C. Gaelyn Garrett, MD MMHC, Nashville, TN**
A Brief History of the Triological Society
Introduction by Fred F. Telischi, MD, Southern Section Vice President
- 9:25 Presentation of Eighth Annual Patrick E. Brookhouser, MD Award of Excellence to Jonas T. Johnson, MD, Pittsburgh, PA**
Introduction by C. Gaelyn Garrett, MD MMHC, President
- 9:30 - 10:00 Break with Exhibitors/View Posters - Ballroom**
- 10:05 - 11:00 TRIOLOGICAL SOCIETY BEST PRACTICES**
Moderator: Cherie-Ann Nathan, MD, Shreveport, LA
Panelists: **When Should Pediatric Septoplasty be Performed for Nasal Airway Obstruction?**
Sukgi S. Choi, MD, Boston, MA
Do Topical Products Reduce Post-Incision Scars?
David B. Hom, MD, San Diego, CA
Which Patients with Asymmetric SNHL Should Undergo Imaging?
David M. Kaylie, MD, Durham, NC
Is Topical Epinephrine Safe for Hemostasis in Endoscopic Sinus Surgery?
Edward C. Kuan, MD, Irvine, CA
Does the Use of Steroids Perioperatively in Parotid Surgery Affect Facial Nerve Outcomes?
Maie A. St. John, MD, Los Angeles, CA
- 11:00 Q&A**
- 11:05 THIS IS HOW I DO IT: TRIOLOGICAL VIDEO SESSION**
Moderator: Adam M. Zanation, MD, Chapel Hill, NC
- 11:05 Endoscopic Resection of Zenker's Diverticulum**
Tyler S. Okland, MD, Stanford, CA
- 11:12 Surgical Technique: Endonasal Placement of the Butterfly Graft**
J. Madison Clark II, MD, Chapel Hill, NC
- 11:19 Minimally Invasive Epiglottopexy**
Yosef P. Krespi, MD, New York, NY
- 11:26 Endoscopic Posterior Cricoid Split with Rib Graft Insertion/Augmentation**
Vikash K. Modi, MD, New York, NY
- 11:33 Endoscopic Approach to Cholesteatoma with Infracochlear Extension**
Manuela Fina, MD, Minneapolis, MN
- 11:40 Septal Perforation Repair Utilizing Bilateral Mucosal Flaps and an Interposition Graft**
Amar Miglani, MD, Phoenix, AZ
- 11:47 Repair of Anterior Glottic Webs**
Rahul K. Sharma, BS, New York, NY
- 11:55 Q&A**
- 12:00 - 1:00 Lunch/Visit Exhibits/View Posters - Ballroom**

1:10 - 3:05 CONCURRENT SESSION 1A HEAD AND NECK - CROWN ROOM

Moderator: Niels C.T. Kokot, MD, Los Angeles, CA

- 1:10** **2019 Triological Society Thesis - With Distinction Award**
Antitumor Effect of Insulin-Like Growth Factor -1 Receptor Inhibition in Head and Neck Squamous Cell Carcinoma
 Mark J. Jameson, MD PhD FACS, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the effects of IGF1R antagonists on HNSCC cells in vitro.

Objectives: The insulin like growth factor-1 receptor (IGF1R) is overexpressed in a variety of human cancers, and its signaling has been implicated as a mechanism of therapeutic resistance. The use of small molecule tyrosine kinase inhibitors (TKIs) to inhibit IGF1R activity has emerged as a potential adjuvant anticancer therapy. For patients with head and neck squamous cell carcinoma (HNSCC), higher tumor expression of IGF1R is associated with poorer survival outcomes, but the effects of IGF1R inhibition have not been explored. Therefore, the antitumor effects of two IGF1R-TKIs, OSI-906 and BMS-754807, were evaluated in 8 HNSCC cell lines in vitro. **Study Type:** Evaluation of drug responses using in vitro tissue culture model. **Methods:** IGF1R expression was assessed in HNSCC tumor specimens by immunohistochemistry and correlated with survival outcomes. Multiple in vitro techniques were performed in up to 9 HNSCC cell lines to evaluate the impact of IGF1R tyrosine kinase inhibition. Immunoblots were used to quantify IGF1R and downstream target activation. AlamarBlue, trypan blue exclusion, and clonogenic assays were used to establish the impact of IGF1R inhibition on cell proliferation, viability, and survival, respectively. Flow cytometry was performed to assess the impact of the IGF1R-TKIs on basal apoptosis. Reverse phase protein array (RPPA) was used to evaluate the broad impact of IGF1R inhibition on the HNSCC phosphoproteome. **Results:** For patients with stage III and IV oral cavity SCC, higher expression of the IGF1R was associated with poorer overall survival at 5 years ($p=0.029$). Both BMS-754807 and OSI-906 caused a dose dependent inhibition of IGF-stimulated IGF1R and Akt phosphorylation. Both drugs inhibited proliferation in all HNSCC cells lines studied; BMS-754807 was noted to be more potent than OSI-906. Both drugs reduced HNSCC cell viability, although OSI-906 was able to eliminate all viable cells at 10 μM while BMS 754807 did not. The two drugs had similar effect on clonogenic cell survival. At 1 μM , OSI 906 had no impact on apoptosis, but BMS 754807 caused a 4 fold increase in the basal apoptotic rate. RPPA demonstrated broad effects of both drugs on canonical IGF1R signaling pathways and also inhibition of HER3, Src, paxillin and ezrin phosphorylation. **Conclusions:** OSI-906 and BMS-754807 effectively inhibit IGF1R activity in HNSCC cell lines with reduction in downstream pro-survival and proliferative signaling, and concomitant antiproliferative and pro-apoptotic effects. Such antagonists may have utility as adjuvants to existing therapies for HNSCC.

- 1:17** **Geographical Variation in Healthcare Disparities and Factors Associated with Survival and Diagnosis in Head and Neck Squamous Cell Carcinoma**
 Shekhar K. Gadkaree, MD, Boston, MA; Ciersten A. Berks, MD, Boston, MA (Presenter); Justin C. McCarty, MD MPH, Boston, MA; Daniel G. Deschler, MD, Boston, MA; Mark A. Varvares, MD, Boston, MA; Regan W. Bergmark, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss how sociodemographic factors and provider density affects diagnosis and survival outcomes in head and neck squamous cell carcinoma.

Objectives: To examine the association between access to otolaryngologists as measured by surgeon density per 100,000 with stage at diagnosis for head and neck squamous cell (HNSCC) in the United States. **Study Design:** Retrospective cohort study. **Methods:** The primary exposure was the number of otolaryngologists per 100,000 people divided into quartiles at the county level identified using the American Medical Association Masterfile in 2016. Secondary exposures of interest included the county and patient sociodemographic characteristics of patients registered in the SEER database. The outcomes assessed were the stage of diagnosis of HNSCC using multivariable logistic regression with state level clustering and overall survival using Cox proportional hazards for (1) counties with the highest versus lowest quartile density of otolaryngologists and PCPs; and (2) patient and county sociodemographic characteristics. **Results:** Patients in counties with the highest density of otolaryngologists had lower odds of presenting with stage 3 or 4 HNSCC [OR 0.92, 95% CI (0.88, 0.98), $p=0.004$ for highest quartile] compared to stage 1 or 2 HNSCC but a significant association with overall survival was not identified [HR 0.99, 95% CI (0.94, 1.0), $p=0.65$]. Conversely, patients in counties with the highest density of PCPs had increased odds of presenting with stage 3 or 4 HNSCC but with a positive impact on overall survival [HR 0.87, 95% CI (0.82, 0.92), $p<0.001$]. Among sociodemographic characteristics assessed, African-Americans (HR 1.3, 95% CI (0.96, 1.1), $p<0.001$), non-Medicaid insurance (OR 0.64, 95% CI (0.58, 0.70), $p<0.001$ for insured), were significantly associated with diagnosis of advanced stage 3 or 4 HNSCC. Older individuals (HR 1.5, 95% CI (1.4, 1.6),

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p<0.001 for 60-69 year old group), African-Americans (HR1.4, 95% CI (1.4, 1.5), p<0.001), Hispanics (HR=1.1, 95% CI (1.0, 1.1), p=0.009), and non-Medicaid insurance (HR=0.56, 95% CI 0.52, 0.60, p<0.001 for insured), were significantly associated with differences in overall survival. **Conclusions:** Improved access to otolaryngologists and improved insurance was associated with lower odds of presenting with advanced HNSCC. Access to PCPs and improved insurance are associated with improved survival in advanced HNSCC patients. Sociodemographic disparities were present in both stage of diagnosis and survival for HNSCC patients.

1:24 Tumor Phantom Model for Training and Technological Development in Transoral Surgery
Michael T. Sramek, BS, Hanover, NH; Erick A. Quintanilla, Lebanon, NH; Aravind S. Ponukumati, BS, Lebanon, NH; Xiaotian Wu, PhD, Boston, MA; Ryan J. Halter, PhD, Hanover, NH;
Joseph A. Paydarfar, MD, Lebanon, NH

Educational Objective: At the conclusion of this presentation, the participants should be able to describe tissue phantom (TP) constituents, methodology of implantation, and training and research potential in transoral surgery (TOS).

Objectives: TPs are often used for research and training purposes for a variety of tumor sites. Currently, no described TP for head and neck malignancies exist. We propose such a TP that is easy to implant and has material properties and imaging features similar to that of head and neck squamous cell carcinomas (HNSCCs). Here, we describe a novel injectable gelatin agar based head and neck TP in cadaver models. **Study Design:** TPs were developed, their physical properties optimized to literature values of HNSCC, and injected into ex vivo porcine and cadaver models with a novel 3D printed injector. TPs were imaged, segmented and their physical characteristics evaluated. **Methods:** A 4:1 gelatin to agar ratio and 4% glutaraldehyde served as the base TP. Omnipaque 350 was added to enhance CT visibility and food coloring for visual mimicry. Different volumes of olive oil or condensed milk were added to increase tumor heterogeneity. Fifteen TPs were injected into multiple ex vivo porcine tissue samples with a custom designed 3D printed mixing injector. TPs were then imaged with CT, segmented with ITK-SNAP and Mimics, and evaluated based on physical characteristics. **Results:** TP implantation was successful in 14/15 cases with one case of tissue extravasation. TP volumes ranged from 2.0-5.1mL with an elastic modulus of 3.4kPa, similar to previously reported values in HNSCC. Phantoms were easily visualized on imaging and segmented. Both olive oil and condensed milk improved TP heterogeneity on CT. **Conclusions:** This novel TP model mimics the material and imaging features of HNSCC and may aid development of future research and surgical training in TOS for HNSCCs.

1:31 Prognostic Significance of Smoking Status on HPV Positive Oropharyngeal Cancer Staged under the 8th Edition of the American Joint Committee on Cancer (AJCC-8) Staging Manual
Smrithi Chidambaram, BS, St. Louis, MO; Erik R. Nakken, BS BA, St. Louis, MO;
Wade L. Thorstad, MD, St. Louis, MO; Jose P. Zevallos, MD MPH, St. Louis, MO; Angela L. Mazul, PhD MPH, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the impact of smoking status on overall survival in HPV positive oropharyngeal squamous cell carcinoma and compare the prognostic significance of smoking between AJCC-8 stage I, II, and III disease.

Objectives: This study aims to determine the prognostic significance of smoking on human papilloma virus positive oropharyngeal squamous cell carcinoma (OPSCC) when controlling for AJCC-8 stage. **Study Design:** Retrospective cohort study. **Methods:** 344 HPV positive OPSCC cases with known stage and smoking status seen by a tertiary academic center from 1997-2017 were examined in this study. Smoking status was reported as ever or never tobacco smoker. Univariate and multivariable analyses were conducted. Kaplan-Meier curves were generated to compare 5 year overall survival (OS) in the ever and never smoking groups and stratified by AJCC-8 stage. Hazard ratios (HR) were estimated with Cox proportional hazard regression for the independent effects of smoking status and stage. **Results:** In this HPV positive OPSCC cohort, univariate analysis indicated never smokers demonstrated improved 5 year OS when compared with ever smokers. When 5 year OS was stratified by AJCC-8 stage, stage I never smokers had the best survival (98.15%; 95% CI: 94.62%-100%), with significantly better survival than stage I ever smokers (85.7%; 95% CI: 78.7-93.4). Statistically significant trends of smoking on prognosis were limited to stage I disease. In the multivariable analysis, after adjusting for sex and age, never smoking (HR: 0.46; 95% CI: 0.22-0.97) was associated with decreased risk of death compared to ever smoking while also adjusting by AJCC-8 stage. **Conclusions:** Smoking is prognostic in HPV positive OPSCC but may only be relevant in stage I and stage II disease. It is important to understand the impact of smoking in HPV positive OPSCC when considering treatment plans.

1:38 An Immunogenomic Investigation of Oral Cavity Squamous Cell Carcinoma in Patients Aged 45 Years and Younger
Christopher A. Maroun, MD, Baltimore, MD; Gangcai Zhu, MD PhD, Baltimore, MD; Carole Fakhry, MD MPH, Baltimore, MD; Drew M. Pardoll, MD PhD, Baltimore, MD; Rajarsi Mandal, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, participants should be able to understand differences in

the immunogenomic landscape amongst young patients presenting with oral cavity squamous cell carcinoma (OCSCC).

Objectives: To investigate differences in the immunogenomic landscape amongst young patients presenting with OCSCC, the etiology of which is not well understood. **Study Design:** Retrospective analysis. **Methods:** Normalized mRNA expression data were downloaded from the Cancer Genome Atlas (TCGA) database. Deconvoluted immune cell population data using the CIBERSORT algorithm and genomic data were retrieved from Thorsson et al (2018). OCSCC patients were categorized into young and older age groups with a cutoff of 45 years. HPV positive tumors were excluded. Cell fractions, marker expression and mutational load were compared between age groups using the Wilcoxon ranked sum test. Adjustment for multiple comparisons was performed using the Benjamini-Hochberg method, with false discovery rate of 0.05. **Results:** 247 OSCC tumors were included; 18 (7.3%) were young (35.8 ± 7.3 years) and 229 (92.7%) were older (64.2 ± 10.5 years). There was no significant difference between groups in the fraction of B and T lymphocytes, macrophages, monocytes, natural killers, and dendritic cells. Cytolytic activity score was similar. However, young patients had significantly lower expression of immunomodulatory markers of immune activation, including PD-1 (PDCD1 $p=0.0037$), CTLA4 ($p=0.0182$), TIGIT ($p=0.0027$), GITR (TNFRSF18 $p=0.0084$), OX40 (TNFRSF4 $p=0.0013$), LAG-3 ($p=0.0007$), and TIM-3 (HAVCR2 $p=0.0044$). Young patients had a significantly lower number of single nucleotide variant derived neoantigens (20.5 vs. 45.0, $p<0.0001$). **Conclusions:** OCSCC patients aged 45 years and younger appear to have an attenuated immune response that may be related to a lower frequency of immunogenic neoantigens. This may contribute to the pathogenesis of these tumors and ultimately help inform immune based clinical decision making.

1:45 Single Modality versus Multimodality Treatment for Sinonasal Squamous Cell Carcinoma: A 16 Year Institutional Experience

Terence S. Fu, MD, MBA, Toronto, ON Canada; Shiyi A. Chen, BBA MSc, Toronto, ON Canada; Shao H. Huang, MSc, Toronto, ON Canada; Jolie A. Ringash, MD MSc, Toronto, ON Canada; Ian J. Witterick, MD MSc, Toronto, ON Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to compare outcomes for single and multimodality treatment for sinonasal squamous cell carcinoma.

Objectives: To compare oncologic outcomes between single and multimodality treatment for sinonasal squamous cell carcinoma (SNSCC). **Study Design:** Retrospective cohort study. **Methods:** Patients with SNSCC treated with surgery and/or radiotherapy (RT) between 2000 and 2016 were identified. Oncologic outcomes including survival, locoregional control, and margin control were compared between multimodal therapy with neoadjuvant/adjuvant RT and single modality treatment with surgery alone. **Results:** Of 60 included patients, 16 (27%) received neoadjuvant RT, 32 (53%) received adjuvant RT, and 12 (20%) patients underwent surgery alone. The neoadjuvant RT group contained a significantly higher proportion of patients with advanced T category (T3/T4) tumors compared to the adjuvant RT and surgery only groups (100% vs. 59% vs. 33%, respectively, $p<0.001$). Survival analysis demonstrated no significant differences in oncologic outcomes or margin control between treatment groups. On multivariable analysis, advanced T category was associated with decreased overall survival (OR 3.45, 95% CI 1.18-10.10, $p=0.02$). However, subgroup analysis of advanced T category tumors failed to show any differences in oncologic outcomes between groups. Maxillary sinus subsite was associated with decreased disease free survival even after controlling for T category and RT use (OR 2.76, 95% CI 1.06-7.20, $p=0.03$). **Conclusions:** The use of multimodality treatment did not result in any significant improvement in oncologic outcomes or surgical margin status among patients with surgically treated SNSCC. Advanced T category and maxillary sinus subsite were associated with worse survival and local control, and represent important factors in the determination of surgical approach and use of adjunct therapy. The optimal combination and sequencing of treatment modalities requires further study.

1:52 Intraoperative Revisions Lead to Better Free Flap Outcomes than Postoperative Anastomotic Revisions

Perry B. Hammond, BS, Philadelphia, PA; Matthew J. Stewart, BS, Philadelphia, PA (Presenter); Emily Hunter, BS, Philadelphia, PA; Ishani Khatiwala, BS, Philadelphia, PA; Larissa Sweeny, MD, Baton Rouge, LA; Mark K. Wax, MD, Portland, OR; Joseph M. Curry, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the impact of various revisions of microvascular anastomoses on free flap failure.

Objectives: Although many studies have analyzed postoperative complications in free flap reconstruction and the success of flap salvages, few have focused on the impact of intraoperative and postoperative anastomotic revisions. We aim to investigate the relationship between the timing of anastomotic revisions and free flap failure. **Study Design:** Retrospective observational study. **Methods:** Out of 1025 head and neck free flap cases, 69 patients with arterial or venous anastomotic revisions were identified. Clinical and operative data, including failures and complications for intraoperative and postoperative anastomotic revision patients, was analyzed. **Results:** 69 patients were stratified into arterial and venous revisions done either: during the initial operation ($n=31$), up to four weeks later ($n=34$), or both ($n=4$). Patients who at the initial surgery had revision of the arterial anastomosis had a flap failure rate of 11.1% ($n=2/18$; $p=0.001$) whereas

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venous revision failure rate was 0.0% (n=0/8; p=0.039). Patients who had postoperative revision of the arterial anastomosis had a failure rate of 69.2% (n=9/13; p=0.001) and of the venous anastomosis, 38.5% failed (n=5/13; p=0.039). Of those who had microvascular revision at the initial surgery or at a subsequent operation, whether arterial or venous, 100% failed (n=4/4; p=0.001). **Conclusions:** When reoperation for revision of the microvascular anastomosis is required, there is an increased likelihood of flap failure. Intraoperative revisions demonstrate significantly lower failure rates. Likewise, arterial revisions were associated with worsened flap outcomes compared to venous revisions. Regardless of the type of anastomotic revision, the experience of both an intraoperative and postoperative revision strongly predicted flap failure.

1:59 Q&A

2:10 - 3:00 **Head and Neck Panel: Multicenter Care for the Cancer Patient**

Moderator: Maie A. St. John, MD, Los Angeles, CA

Panelists: **Guidelines for Multidisciplinary Care of Head and Neck Cancer Patients**

Carol R. Bradford, MD, Ann Arbor, MI

Targeted Therapy and Immunotherapy in Multidisciplinary Care

Jeffrey M. Bumpous, MD, Louisville, KY

When to Operate: Frailty, Life Choices and Survivorship

Jonas T. Johnson, MD, Pittsburgh, PA

Guidelines for Multidisciplinary Care; Thyroid Cancer

Dennis H. Kraus, MD, New York, NY

3:00 Q&A

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

1:10 - 3:10 CONCURRENT SESSION 1B OTOLOGY/NEUROTOLOGY - EMPRESS/REGENT-GRAND HALL

1:10 - 2:05 **Otology/Neurotology Panel: Pulsatile Tinnitus - A Multidisciplinary Approach**

Moderator: David J. Eisenman, MD, Baltimore, MD

Panelists: Matthew Amans, MD, San Francisco, CA (Neurointerventional Radiology, UCSF)

Sujana S. Chandrasekhar, MD, New York, NY

Bradley W. Kesser, MD, Charlottesville, VA

Prashant Raghavan, MBBS, Baltimore, MD

2:05 Q&A

Moderator: Harrison W. Lin, MD, Irvine, CA

2:10 **2019 Triological Society Thesis - Honorable Mention Award**

Engineered Oncolytic Virus for the Treatment of Cholesteatoma: A Pilot in vivo Study

Ravi N. Samy, MD FACS, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the mechanism of action of oncolytic virotherapy against tumors

Objectives: Oncolytic herpes simplex virus (oHSV) can eradicate cholesteatoma (CHST) in a gerbil model. **Methods:** An *in vivo* CHST model was developed using a double ear canal ligation approach in Mongolian gerbils (n=16). Before ligation, *Pseudomonas aeruginosa* (*P. aeruginosa*) was injected into the bony external auditory canal (EAC) to expedite the formation of CHST. Six weeks after *P. aeruginosa* inoculation and EAC ligation, the CHST and the associated bony changes were measured using morphometric and volumetric quantification techniques via high resolution microcomputed tomography (micro-CT). CHST findings were classified according to a previously described gerbil CHST staging system. Subsequently, each gerbil head was dissected to visualize the mass proliferation within the bulla. The CHST induction technique was then used bilaterally in an additional group of 10 gerbils (n=20 ears) to determine the within group treatment efficacy of oHSV against CHST *in vivo*. Treated animals received either one, two, or three intra-bullar injections of oHSV. CHST volume, the primary dependent variable, was derived from three dimensional compilations of high resolution micro-CT scans obtained pre- and post-oHSV treatments. **Results:** The *P. aeruginosa* inoculation plus double EAC ligation technique induced CHST growth ranging from stage II-V in the initial group of 16 gerbils. Single slice morphometric measures of CHST area were found to overestimate CHST size by more than a factor of 2 and underestimate CHST

size by up to 50% when compared to the more comprehensive volumetric measures of CHST volume. Osteolytic effects (e.g., erosion of bullar and cochlear bone) were observed in only 6% of ears while osteoblastic effects (e.g., bullar thickening) were observed in 31% of ears. oHSV reduced CHST volume by 20% or more in 85% (17/20) of the ears in the treatment group. CHST volume reductions as great as 77% were observed among the ears receiving one, two, or three injections of oHSV. In the three injection oHSV group, a reversal of osteoblastic effects was observed in 75% of the ears.

Conclusions: The *P. aeruginosa* inoculation plus double EAC ligation technique reliably induces CHST formation in gerbils. High resolution micro-CT based volumetric measures are significantly more accurate than single slice morphometric area measures for quantification of CHST size. Treatment with oHSV appears to be efficacious for reducing CHST volume by as much as 77% with as little as one injection. Additional *in vivo* research underway will further characterize the oHSV treatment effect by utilizing larger groups with longer post-CHST induction and post-treatment durations as well as after CHST debulking, mimicking surgical conditions. Future experiments will also assess the safety of oHSV within the central auditory nervous system as well as nearby neurovascular structures. If additional data support our initial observations, oHSV may become a valuable tool in the treatment of CHST.

2:17 Approach to Superior Semicircular Canal Dehiscence Repair: Comparing the Middle Fossa and Transmastoid Approaches

Noga Lipschitz, MD, Cincinnati, OH; Scott Shapiro, MD, Cincinnati, OH; Gavriel D. Kohlberg, MD, Seattle, WA; Joseph T. Breen, MD, Cincinnati, OH; Myles L. Pensak, MD, Cincinnati, OH; Ravi N. Samy, MD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the surgical approaches to superior semicircular canal dehiscence repair and discuss their efficacy and safety.

Objectives: To compare the clinical characteristics and surgical outcome in patients undergoing superior semicircular canal dehiscence (SSCD) repair via the middle cranial fossa (MCF) and the transmastoid (TM) approaches. **Study**

Design: Retrospective chart review. **Methods:** The medical charts of adult patients undergoing SSCD repair between 2008-2019 in a tertiary referral center were reviewed. Patients were grouped by surgical approach for comparison of demographic data, clinical characteristics, pre and postoperative symptoms, audiometric data, vestibular evoked myogenic potentials (VEMP), and postoperative complications. **Results:** Thirty-nine SSCD repairs in 34 patients (36 ears) were included. There were 28 MCF approaches and 11 TM approaches. Patients' characteristics were similar between groups. Patients undergoing the MCF approach experienced a significant reduction in imbalance ($p < 0.0001$), sound and pressure induced vertigo ($p < 0.0001$), tinnitus ($p < 0.0001$), and autophonia ($p < 0.0001$) after surgery, as well as a significant elevation in cVEMP thresholds (74.8 vs. 86.5 dB, $p = 0.02$). Patients undergoing the TM approach experienced a significant reduction only in sound and pressure induced vertigo ($p = 0.03$), and tinnitus ($p = 0.03$). Mean audiometric outcomes were unchanged after surgery in both groups. Complications included one case of cerebrospinal fluid leak requiring a lumbar drain in the TM group, and one case of delayed postoperative profound sensorineural hearing loss in the MCF group.

Conclusions: Both the MCF and TM approaches for SSCD repair are possible. Greater reduction in subjective and objective measures were seen in the MCF approach compared with the TM approach.

2:24 A New Longitudinal Cohort to Study the Mechanistic Relationship between Hearing Loss and Dementia

Justin S. Golub, MD MS, New York, NY; Rahul K. Sharma, BS, New York, NY; Brady Q. Rippon, MS, New York, NY; Adam M. Brickman, PhD, New York, NY; José A. Luchsinger, MD MPH, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand an approach to explore the mechanistic relationship between hearing and cognition.

Objectives: Studies examining the association between hearing loss (HL) and cognition have lacked detailed neuroimaging data that can be used to explore a mechanistic relationship. We introduce a new longitudinal cohort study containing rich neuroimaging, neurocognitive, and audiometric data. **Study Design:** Longitudinal cohort study. **Methods:** A validated tablet based audiometric test was added to an ongoing cohort of late-middle age adults containing neuroimaging and neurocognitive outcome data (NOMEM-H: Northern Manhattan Study of Metabolism and Mind-Hearing). A baseline cross-sectional analysis was performed, including a summary of better ear audiometry. Multivariable linear regression was used to examine the association between HL and outcomes. A power analysis, based on the preliminary data, was performed to guide enrollment targets. **Results:** Audiometry was performed on 95 subjects [mean age 64 years (SD=3.5, range=51-71)]. The mean 4 frequency pure tone average was 20.1 dB (SD=8.7) and mean word recognition was 98.8% (SD=3.2). Of those with audiometry, n=46-53 had neuroimaging or neurocognitive data available. Several trends were seen in multivariable regression, including relationships of hearing with amyloid PET standardized uptake value ratio [$r^2 = 0.14$ (95% CI=-0.15, 0.44); $p = 0.33$], cortical thickness [$r^2 = 0.11$ (-0.17, 0.39); $p = 0.44$], memory [$r^2 = -0.18$ (-0.47, 0.10); $p = 0.21$], and executive function [$r^2 = 0.27$ (-0.04, 0.57); $p = 0.09$]. **Conclusions:** A novel longitudinal cohort was created that contains audiometry as well as rich neuroimaging and neurocognitive data. Audiometry was consistent with normative values. Preliminary analyses show trending relationships between HL and markers of Alzheimer's pathology, neurodegeneration, memory, and executive function. Enrollment will continue to enable greater power.

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2:31 Surgical Outcomes of a Novel Alloplastic Technique for External Auditory Canal Repair in Tympanomastoidectomy

Karissa L. LeClair, BS, Hanover, NH; Christiaan A. Rees, PhD, Hanover, NH; James E. Saunders, MD, Lebanon, NH

Educational Objective: To discuss the utility of a novel alloplastic technique for EAC repair in tympanomastoidectomy. To compare advantages and disadvantages of this technique as compared to traditional cartilage repair.

Objectives: To analyze surgical outcomes of a novel alloplastic reconstruction technique for partial external auditory canal (EAC) defects in tympanomastoidectomy. **Study Design:** Retrospective study. **Methods:** 49 patients with cholesteatoma underwent repair of partial EAC defects during tympanomastoidectomy at a tertiary referral center over 9 years. 18 patients were treated with a novel alloplastic graft technique using hydroxyapatite cement and bone pâté for EAC repair. 31 patients treated with traditional cartilage repair of the EAC served as a control group. Primary outcomes measured were postoperative cholesteatoma recurrence rates, infection rates, and mean air bone gap (ABG). **Results:** 19 of the 49 cases (39%) were revision surgeries for recurrent cholesteatoma, with no significant difference in proportion of primary vs. revision surgeries between the 2 groups. Mean ABG at 6 months postop was lower in the alloplastic group (21.0 dB) as compared to the cartilage group (26.4 dB, $p = .048$). There was no significant difference in postoperative cholesteatoma recurrence ($p = 0.62$) or infection rates ($p = 0.61$) between the two techniques, with the alloplastic group experiencing slightly lower rates of recurrence (39%) and infection (6%) than cartilage repair (42% recurrence, 10% infection). **Conclusions:** Composite alloplastic and bone pâté reconstruction is an effective technique to repair partial EAC defects in tympanomastoidectomy, with slightly better hearing results and comparable postoperative infection and cholesteatoma recurrence rates as compared to traditional cartilage repair. Recurrence rates were relatively high in both groups, likely due to the high rate of revision surgeries.

2:38 Analysis of Bilateral Vestibular Schwannomas to Investigate the NF2 Patient Population: A National Cancer Database Study

Khodayar Goshtasbi, BS, Irvine, CA; Arash Abiri, BS, Irvine, CA; Mehdi Abouzari, MD, Irvine, CA; Tyler Yasaka, BS, Irvine, CA; Harrison W. Lin, MD, Irvine, CA; Hamid R. Djalilian, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the patient population with NF2 and bilateral vestibular schwannomas, and compare them with the general vestibular schwannoma population.

Objectives: To investigate presenting characteristics, treatments, and survival of the neurofibromatosis type 2 (NF2) patients with bilateral vestibular schwannoma (VS). **Study Design:** Retrospective analysis of the National Cancer Database (NCDB). **Methods:** The 2004-2015 NCDB was queried for patients with a diagnosis of VS. The "laterality" code was utilized to stratify patients into unilateral VS (UVS) and non-metastatic bilateral VS (BVS). **Results:** Of the 33,839 patients with VS, 155 (0.46%) were coded for primary BVS. This cohort's average age and tumor size were 37.4 ± 20.5 years and 23.5 ± 18.2 mm, respectively. Among 105 patients with specified treatment, 37% underwent surgery, 26% radiotherapy, and 32% watchful observation. Surgical treatment was associated with larger tumor size ($p=0.02$), while age was not a significant factor ($p=0.58$). Postoperative 30 and 90 day mortality rates were 0% and 2.4%, respectively. Compared to those with UVS ($n=33,684$), patients with BVS presented at a younger age ($p<0.001$) and with a larger tumor ($p<0.001$). Additionally, they had a statistically significant difference in the distribution between treatment modalities compared to UVS ($p=0.008$), with higher rates of observation ($p=0.001$) and lower rates of surgery ($p=0.01$). The 30 day ($p=0.61$) and 90 day ($p=0.34$) mortality rates and time from diagnosis to treatment ($p=0.85$) were similar. Kaplan-Meier log rank analysis demonstrated a similar survival probability between the two cohorts ($p=0.17$). **Conclusions:** This study is one of the largest to characterize NF2 patients with BVS. With a propensity for younger age and initial conservative management, their survival probability was similar to the general VS population based on the NCDB.

2:45 High Frequency Hearing Outcomes following Ossiculoplasty

Marc D. Polanik, BA, Boston, MA; Danielle R. Trakimas, MD, Baltimore, MD; Melissa Castillo Bustamante, MD, Boston, MA; Jeffrey T. Cheng, PhD, Boston, MA; Elliott D. Kozin, MD, Boston, MA; Aaron K. Remenschneider, MD MPH, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss frequency specific outcomes following ossiculoplasty and hypothesize contributing mechanisms for persistent high frequency conductive hearing loss.

Objectives: Conventional reporting of postoperative hearing outcomes utilizes a pure tone averaged air bone gap (ABG) biased towards low frequencies. Large high frequency ABG after otologic surgery may result in ongoing hearing difficulties. In this study, we evaluate changes in low and high frequency ABG in ossiculoplasty patients. **Study Design:** Retrospective review. **Methods:** All patients who underwent ossiculoplasty between July 2014 and March 2019 were

identified. Patients with an intact canal wall and pre and postoperative audiograms were included. Stapedotomy patients were excluded. Low frequency ABG was calculated as the mean ABG at 250, 500, and 1000Hz. High frequency ABG was calculated at 4000Hz. **Results:** Thirty-five patients were included. Mean age at surgery was 38 years (range, 7-77 years). Reconstruction materials included: cartilage (N=4), hydroxylapatite bone cement (N=5), and partial or total ossicular replacement prostheses (N=18 and N=8, respectively). Postoperatively, the mean low frequency ABG was reduced by 12.1 +/- 15.5 dB (P<0.001) and the mean high frequency ABG was reduced by 6.9 +/- 16.2 dB (P=0.017). The magnitude of ABG closure was significantly larger at low frequencies (P=0.018). The postoperative mean high frequency ABG was 22.0 +/- 14.1 dB. The type of reconstruction material used had no impact on low or high frequency ABG reduction (P=0.238 and P=0.275, respectively). **Conclusions:** In this series, ossiculoplasty improves ABG across all frequencies, but greater improvements are observed at low frequencies when compared to high frequency. Additional study of the mechanisms of high frequency sound conduction in reconstructed middle ears is needed to improve ossiculoplasty hearing outcomes.

2:52 Rationing Cochlear Implant Rotational Magnet Technology in a Single Payer Healthcare System

Colin G. Andrews, MD, Winnipeg, MB Canada; Justyn F. Pisa, AuD, Winnipeg, MB Canada;
Jordan B. Hochman, MD FRCSC, Winnipeg, MB Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the framework developed which rations the use of rotational magnet technology amongst cochlear implant recipients to those most likely to require the technology, while saving the healthcare system valuable resources.

Objectives: Magnets within the receiver stimulator of a cochlear implant (CI) system are crucial for device function but have historically challenged imaging. Two CI devices are available that do not require removal of the magnet or additional preparations prior to MRI. This new technology comes with an incremental cost [approximately 1500.00 USD]. There are significant constraints within a single payer health system and new expenses require justification. This study presents the considerations of a single center's attempt at rationing the benefits of rotational magnet technology (RMT) with the consideration of incremental cost increases. **Study Design:** We performed a retrospective review of six years of a single CI center to identify imaging needs for patients post-implantation. **Methods:** All patient imaging post-implantation was obtained from a provincial database. Imaging indications were reviewed with site specific consultants. It was then determined which patients would have benefited from MRI over CT. Disparate paradigms of CI distribution were evaluated to compare impact to existing patient wait times. **Results:** Greatest MRI needs were found between ages 45 and 75 (53%). Largest needs were brain (61.5%) and spine (8.7%) MRI. A schema for integration of RMT into practice was developed with use of a 10% threshold for probable MR needs over CI device lifespan. The implication to patient wait times was then determined as prolonged by 30%. **Conclusions:** We have developed a framework for distributing RMT devices based on age and comorbidity which selectively rations the technology to patients who will most likely benefit, with a manageable increase in surgical wait.

2:59 Q&A

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

3:30 - 5:15 CONCURRENT SESSION 2A RHINOLOGY/ALLERGY - CROWN ROOM

Moderator: John R. Craig, MD, Detroit, MI

3:30 A Validated Predictive Risk Model for the Diagnosis of Invasive Fungal Sinusitis

Linda X. Yin, MD, Rochester, MN; Aviv Spillinger, BS, Rochester, MN; Katherine A. Lees, MD, Salt Lake City, UT; Garret W. Choby, MD, Rochester, MN; Erin K. O'Brien, MD, Rochester, MN; Janalee K. Stokken, MD, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to calculate a predictive risk score to estimate a patient's probability of having invasive fungal sinusitis, as well as use the score to guide clinical decision making.

Objectives: Invasive fungal sinusitis (IFS) is a worrisome differential diagnosis in immunocompromised patients, but discerning which patients should undergo otolaryngology evaluation and biopsy can be a challenging decision for referring providers. The goal of this study is to develop and validate a comprehensive and accessible diagnostic tool to predict the probability of IFS. **Study Design:** Retrospective chart review from 1999 to 2017. Positive cases were defined by pathologic confirmation of angioinvasion. Comorbidities, medications, symptoms, and exam and imaging findings were all considered as potential risk factors. **Methods:** Stepwise selection was used to screen risk factors for input into the logistic regression model. Model calibration was assessed using the Hosmer-Lemeshow test, and discrimination was assessed using the area under the receiver operator curve (AUC). **Results:** 283 patients (244 negative controls, 39 with IFS) were

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included for analysis. Risk factors selected for our final diagnostic model included history of hematologic malignancy (OR 4.9), unilateral facial pain, swelling, or erythema (OR 11.0), unilateral opacification on CT (OR 3.8), disease extension into the pterygopalatine fossa (OR 9.0), and mucosal necrosis on nasal endoscopy (OR 109) [$p < 0.03$ for all factors]. Testing showed that the model had adequate calibration (Person $\chi^2 = 23.93$, $p > 0.05$) and discrimination (AUC = 0.96). Internal validation of the model using 500 bootstrap iterations estimated optimism at 0.01, suggesting minimal overfitting. **Conclusions:** This is a validated predictive risk model for IFS that may serve as a useful diagnostic tool for otolaryngologists and general practitioners alike. Higher risk patients should undergo definitive tissue biopsy.

3:37 A Systematic Review of Taste Dysfunction in Chronic Rhinosinusitis

Deborah Xie, MD, Baltimore, MD; Evelyn Leland, BS, Baltimore, MD; Stella M. Steal, MLS, Baltimore, MD; Nicholas R. Rowan, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to (1) understand the objective taste dysfunction exhibited by patients with chronic rhinosinusitis; (2) list patient characteristics associated with dysgeusia; and (3) recognize the importance of objective taste testing in patients with chronic rhinosinusitis.

Objectives: Patients with chronic rhinosinusitis (CRS) often describe alterations in their sense of taste. These complaints have historically been attributed to olfactory dysfunction; however, there is evidence of direct gustatory disturbances in the setting of CRS that is not thoroughly characterized. This study sought to investigate and summarize gustatory dysfunction experienced by patients with CRS. **Study Design:** Systematic review. **Methods:** Following PRISMA guidelines, five databases (PubMed, EMBASE, Cochrane Library, Web of Science, Scopus) were reviewed. Studies investigating objective taste in CRS patients were included. Papers with exclusively subjective measures of gustatory function were excluded. **Results:** Of 2748 studies screened, 12 publications underwent full text review. 575 unique patients were identified. Taste testing involved varying concentrations of sweet, salty, sour, or bitter compounds with scores based on identification and recognition thresholds. Hypogeusia was identified in 36/193 (18.7%) patients from 3 studies that used methods with a validated definition of hypogeusia. Older age, male gender, and smoking history were associated with taste dysfunction, while gustatory and olfactory dysfunction were not correlated. Subjective taste and quality of life measures were also not associated with objective taste. The impact of sinus surgery on objective taste is unclear. **Conclusions:** Approximately 19% of patients with CRS experience hypogeusia. Neither olfactory function nor subjective taste were associated with gustatory function. Given the substantial prevalence of taste dysfunction patients with CRS, there is significant potential for growth in understanding of pathogenesis, impact on quality of life, and potential treatment strategies of taste impairment in the CRS patient population.

3:44 Associations between Olfactory Dysfunction and Mortality in US Adults

Janet S. Choi, MD MPH, Los Angeles, CA; Jeehong Kim, MD, Los Angeles, CA; Elisabeth D. Ference, MD, Los Angeles, CA; Bozena B. Wrobel, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the associations of olfactory dysfunction with a greater risk mortality among US adults independent of demographics and cardiovascular factors.

Objectives: To investigate the associations of olfactory dysfunction using both objective and subjective assessments with all cause mortality in US adults. **Study Design:** Nationally representative prospective cohort study. **Methods:** Participants aged ≥ 40 years from the 2013-2014 National Health and Nutritional Examination Survey who had complete data on olfaction and mortality ($n=3,510$) were included. Olfaction was assessed by objective test (8 odor Pocket Smell Test) and self-report. Mortality was determined by linking with the National Death Index through February 2019. Cox proportional regression models were used to examine the associations between olfaction and mortality while adjusting for demographics and cardiovascular factors. Multivariate models were further adjusted for cognitive assessments for a subset of participants ($n=1,533$). **Results:** The prevalence of olfactory dysfunction was 13.5% (95% CI: 11.0-16.0%) and 21.6% (95% CI: 18.9-24.2%) based on objective smell test and self-report, respectively. Risk of mortality increased by 17% (95% CI: 7-27%) per one point decrease in smell test score when adjusted for demographics and cardiovascular factors. There was no association between self-reported olfactory dysfunction and mortality. The association between objective olfactory dysfunction and mortality remained significant after further adjusting for each cognitive assessment battery including the Animal Fluency Test and the Consortium to Establish a Registry for Alzheimer's Diseases but not with the Digit Symbol Substitution Test. **Conclusions:** Objective olfactory dysfunction is significantly associated with increased mortality in this first nationally representative sample of US adults. In addition to its impact on quality of life, olfactory dysfunction is a strong predictor of mortality that has implications on physical and cognitive health.

3:51 Examining Surgeon Volumes and Outcomes for Rhinological Sinus Procedures with Respect to Industrial Funding Using SPARCS Database and Sunshine Act

Roshan U. Nayak, BS, New York, NY; Enrique Gorbea, MD, New York, NY; Christopher Pool, MD, Hershey, PA; Jay J. Agarwal, MD, New York, NY; David Y. Goldrich, BA, New York, NY; Alfred M.C. Illoreta, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the impact of industrial funding on complication rates and volumes of rhinological sinus procedures performed. Participants will be able to think about and discuss best practices when considering industrial funding.

Objectives: This study aims to evaluate the impact of industrial funding on rhinological sinus complications and surgeon volume. **Study Design:** The Statewide Planning and Research Cooperative System database was used to identify outpatients who received rhinological sinus procedures (2013-2015). Open Payments Database was used to collect industrial funding to each operating physician. Surgeons were stratified into quartiles by payments received. **Methods:** Data was then examined for the effect of industrial funding on complications and volume. Data was analyzed using Kruskal-Wallis and Spearman Rho. **Results:** 24,601 procedures were identified. Total complication rate was 0.68%, with epistaxis 0.58%, CSF rhinorrhea 0.037%, skull base fracture 0.0081%, globe injury 0.0041%, meningitis 0%, and orbital fracture 0.0081%. For total complications between funding groups, Spearman's Rho was 0.14 ± 0.03 , and insignificant ($p > 0.05$). When examining surgeon volume between funding groups, Spearman's Rho was 0.17 ± 0.03 , and found to be significant ($p < 0.001$). For complication rates, there was a statistically significant difference between groups for epistaxis ($p < 0.00001$) and skull base fracture ($p = 0.022$). There was a weak correlation (0.16 ± 0.03) showing higher industrial funding is associated with more balloon procedures with statistical significance ($p = 0.010$). **Conclusions:** Surgeons with greater funding were found to have a nonsignificant weak correlation with complication rates, thus suggesting no significant consequences to patients. Additionally, although with statistical significance, there is a weak correlation between industry funding and total procedures performed, as well as balloon procedures performed. A key limitation was reduced outpatient procedure data (3 years).

3:58 **Sinonasal Manifestations in Autoimmune Disorders**

Chadi A. Makary, MD, Augusta, GA; Brittany J. Gill, BS, Augusta, GA (Presenter); Brock Parman, BS, Augusta, GA; Thomas Holmes, MD, Augusta, GA; Stilianos E. Kountakis, MD PhD, Augusta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate the autoimmune disorders with sinonasal manifestation have more severe subjective and objective presentation than CRSwNP.

Objectives: To study the subjective and objective measurements of sinonasal manifestations of autoimmune disorders. **Study Design:** Prospective observational cohort study. **Methods:** This is a prospective observational cohort study. All patients with autoimmune disorders referred to our tertiary care rhinology clinic from 2008-2019 with sinonasal symptoms were compared to randomly selected cohorts of non-eosinophilic CRS without nasal polyps (neCRSsNP) and eosinophilic CRSsNP. Demographic data, along with the 22 item Sinonasal Outcome Test (SNOT-22), Lund-Kennedy (LK) endoscopy score, Lund-Mackay (LM) CT score, nasal crusting and epistaxis were reviewed at presentation. **Results:** 53 patients with autoimmune disorders (26 with sarcoidosis, 14 with systemic lupus erythematosus, 10 with granulomatosis with polyangiitis (GPA), and 3 with pemphigoid vulgaris) were identified, and compared to 75 patients of neCRSsNP and 75 patients of eCRSsNP. Patients with autoimmune disease have an average SNOT-22 score of 45.61, compared to 34.33 and 37.85 for neCRSsNP and eCRSsNP patients, respectively ($p < 0.0001$) and an average Lund-Kennedy endoscopy score of 5.12, compared to 3.63 ($p = 0.005$) in neCRSsNP and 4.89 in eCRSsNP ($p = 0.2$). There was no significant difference in the CT score compared to both groups. Patients with autoimmune disorders also scored significantly worse on all 4 SNOT sub-domains, nasal obstruction, nasal crusting and epistaxis. Additionally, patients with GPA had the worst symptomatic and endoscopy scores. **Conclusions:** Patients with autoimmune disorders presenting with sinonasal symptoms have more severe subjective and objective presentation than patients with CRSsNP.

4:05 **Infection after Endoscopic Dacryocystorhinostomy: Incidence and Associated Factors**

Aria Jafari, MD, Boston, MA; Sarek A. Shen, BS, San Diego, CA; Catherine G. Banks, MBChB, Sydney, NSW Australia; Ashton Lehmann, MD, Boston, MA; George A. Scangas, MD, Boston, MA; Ralph Metson, MD, Boston, MA

Educational Objective: The purpose of this study was to identify factors associated with the occurrence of postoperative orbital and rhinologic infection after endoscopic dacryocystorhinostomy (EN-DCR).

Objectives: Endoscopic dacryocystorhinostomy (EN-DCR) is an increasingly common procedure performed by otolaryngologists. While EN-DCR has a high success rate at relieving blockage of the lacrimal sac, there are few data regarding its postoperative infection (POI) rate. The purpose of this study was to identify factors associated with the occurrence of postoperative orbital and rhinologic infection. **Study Design:** Retrospective review. **Methods:** 582 consecutive patients who underwent EN-DCR were reviewed. All patients received antibiotic prophylaxis as a single preoperative intravenous dose and ten day postoperative oral course. Patient demographics and clinical characteristics were reviewed, including any history of orbital or rhinologic infection within 30 days of surgery. Multivariable analysis was performed to identify factors predictive of POI. **Results:** Fifteen of 582 patients (2.6%) developed POI following EN-DCR. The most common POI was acute rhinosinusitis (10/15, 66.7%), followed by acute dacryocystitis (2/15, 13.3%), preseptal cellulitis (2/15, 13.3%), and acute conjunctivitis (1/15, 6.7%). Among the 79.7% (464/582) of patients who underwent adjunctive endoscopic sinus surgery (ESS) at time of EN-DCR, 65.1% (302/464) was performed for preoperative CT evidence of rhinosinusitis, and

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7.8% (36/464) was performed for surgical access. Patients undergoing adjunctive ESS were less likely to develop POI [HR: 0.17 (0.04-0.80), $p < 0.05$]. Evidence of mucopurulence at surgery increased the likelihood of POI [HR: 6.24 (1.51-25.84), $p < 0.05$]. **Conclusions:** Evidence of mucopurulence at surgery was predictive of POI, while adjunctive ESS, performed most commonly to address concomitant rhinosinusitis, was protective. Preoperative evaluation and intraoperative management of rhinosinusitis appear to reduce the rate of infectious complications of EN-DCR.

4:12 Emotional and Personality Traits Are Determinants of Activity Avoidance in Chronic Rhinosinusitis Patients

Madison V. Epperson, BA, Cincinnati, OH; Katie M. Phillips, MD, Boston, MA; Marlene M. Speth, MD MA, Aarau, Aargau Switzerland; David S. Caradonna, MD DMD, Boston, MA; Stacey T. Gray, MD, Boston, MA; Ahmad R. Sedaghat, MD PhD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to identify patient factors including demographic characteristics, personality traits, and chronic rhinosinusitis (CRS) symptomatology predictive of activity avoidance in CRS patients. Specifically, they should recognize that emotional traits and personality most strongly predict avoidance of activities in CRS patients.

Objectives: Chronic rhinosinusitis (CRS), like other sinonasal diseases, may be associated with avoidance of daily activities. Our goal was to identify characteristics that are associated with avoidance of activities due to CRS. **Study Design:** Cross-sectional analysis. **Methods:** A total of 194 CRS patients were recruited. CRS symptom burden was assessed with the 22 item Sinonasal Outcome Test (SNOT-22). SNOT-22 nasal, sleep, ear/facial discomfort and emotional/psychological subdomain scores were calculated. Depressed mood was assessed using the 2 item Patient Health Questionnaire (PHQ-2). Personality traits including conscientiousness, neuroticism, agreeableness, openness, and extraversion were assessed using the Big Five Inventory-10 (BFI-10) questionnaire. As the primary outcome, participants rated how often in the prior week that they had avoided any activities in day to day life due to their nasal or sinus symptoms on a scale of "Never", "Rarely", "Sometimes", "Often", or "Extremely often". Ordinal regression models, with bootstrap validation, were used to identify associations between activity avoidance and participants' characteristics. **Results:** On multivariate analysis, SNOT-22 score (odds ratio [OR]=1.03, 95%CI: 1.01 - 1.04, $p=0.026$), age (OR=0.98, 95% CI: 0.96 - 0.99, $p=0.049$), and conscientiousness personality trait (OR=1.38, 95% CI: 1.05 - 1.81, $p=0.019$) were associated with activity avoidance. Of CRS symptom burden/SNOT-22 subdomains, only the emotional/psychological subdomain score (OR=1.28, 95% CI: 1.12 - 1.46, $p < 0.001$), primarily due to sadness, was associated with activity avoidance. **Conclusions:** Younger age and the conscientiousness personality trait were associated with activity avoidance in CRS patients. Of CRS associated symptomatology, sadness was found to be associated with activity avoidance. Emotional traits and personality most strongly predict avoidance of activities in CRS patients.

4:19 Q&A

4:25 - 5:10 Collaborative Panel with American Rhinologic Society: Biologics for CRS: Where Do We Stand in 2020?

Moderator: Robert C. Kern, MD, Chicago, IL

Panelists: **Key Evidence for Biologics in the Treatment of CRS with Nasal Polyps**

Sandra Y. Lin, MD, Baltimore, MD

Why, When, Why Not To

Stilianos E. Kountakis, MD PhD, Augusta, GA

Economic Impact of CRS with Nasal Polyposis in the Era of Biologics

Timothy L. Smith, MD MPH, Portland, OR

5:10 Q&A

5:15 ADJOURN SESSION

5:30 - 7:00 VICE PRESIDENT'S WELCOME RECEPTION (for all attendees) – Vista Terrace

3:30 - 5:20 CONCURRENT SESSION 2B LARYNGOLOGY/BRONCHOSOPHAGOLOGY - EMPRESS/REGENT-GRAND HALL

3:30 - 4:15 Collaborative Panel with American Society of Geriatric Otolaryngology: Swallowing Dysfunction in the Elderly

Moderator: Karen M. Kost, MD, Montreal, QC Canada

Panelists: **Etiology with Special Emphasis on Medications**

David E. Eibling MD, Pittsburgh, PA

Imaging: What, When and How?

Ozlem E. Tulunay-Ugur, MD, Little Rock, AR

The Diagnostic and Therapeutic Role of TNE

Gregory N. Postma, MD, Augusta, GA

4:15 Q&A

Moderator: Alexander T. Hillel, MD, Baltimore, MD

4:20 Chosen as Recipient of National Spasmodic Dysphonia Association Travel Award Automated Detection and Classification of Laryngeal Lesions Using Deep Learning

Andres M. Bur, MD, Kansas City, KS; Hannah L. Kavookjian, MD, Kansas City, KS; Joseph Penn, BA, Kansas City, KS; Shannon M. Kraft, MD, Kansas City, KS

Educational Objective: At the conclusion of this presentation, the participants should be able to (1) recognize the potential of machine learning to provide diagnostic support in otolaryngology through automated interpretation of laryngoscopic exam findings; (2) discuss potential applications of automated laryngoscopic exam interpretation, including the care of populations with limited otolaryngology resources and training novice clinicians to interpret laryngoscopic exams; and (3) understand the strengths and limitations of developing neural networks to provide automated interpretation of laryngoscopic images.

Objectives: To develop and validate machine learning algorithms that automate identification and classification of laryngeal lesions using images obtained on flexible laryngoscopic exam. **Study Design:** Retrospective analysis of archived laryngoscopy images. **Methods:** Laryngeal images were collected during routine clinic exams at a tertiary care voice clinic using a KayPentax Model 9400 stroboscopy light and a VNL-1170K distal chip scope. Still images of fully abducted vocal folds were captured from stroboscopy videos for analysis. Clinical data, including pathologic diagnoses, were collected. A convolutional neural network (CNN) was trained to identify and classify laryngeal lesions from these images. The MobileNet CNN pretrained with 1.4 million images was used as a base model, and was retrained in Python using the collected images to classify laryngeal images as "normal", "benign lesion", or "suspicious for malignancy". The 249 images were randomly assigned to training and validation sets in an 80:20 distribution. Image augmentation was applied to the training images to generate 28,967 unique images for algorithm training. Classification accuracy on the validation image set was calculated. **Results:** The CNN correctly classified 39 of 48 validation images as "normal", "benign lesion", or "suspicious for malignancy", yielding a classification accuracy of 81.3%. **Conclusions:** Deep learning using CNNs can automate the detection and classification of laryngeal lesions in laryngoscopic images. Further development of this technology has applications in training novice clinicians to interpret laryngoscopic exam findings, and may improve access to care for patients living in communities with limited otolaryngology resources.

4:27 Post-Hospitalization Clinical Course after Tracheostomy: Opportunities to Improve Patient Care

Elizabeth Olivia Shay, BA, Cleveland, OH; Darcy M. Hull, MA, Cleveland, OH; William M. Tierney, MD MS, Cleveland, OH; Andrew J. Bowen, MD MS, Rochester, MN; Brandon S. Hopkins, MD, Cleveland, OH; Paul C. Bryson, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to: (1) demonstrate understanding that literature about followup post-tracheostomy is scarce; and (2) recognize that many patients retaining tracheostomy tubes after hospital discharge have scarce to no followup.

Objectives: (1) To delineate the natural history of patients post-tracheostomy in the period post-hospital discharge until 4 years later; and (2) to identify gaps in patient care post-tracheostomy. **Study Design:** Retrospective chart review. **Methods:** Electronic medical records of tracheostomized adults at a tertiary care medical center were reviewed. Data collected included indications for tracheostomy, tracheostomy related complications, followup visits, and disposition. **Results:** Seventy-two charts were reviewed. The median age at tracheostomy was 65.2 years. Most tracheostomies (56, 84.8%) were performed for respiratory failure with/without ventilator dependence. Fifty-four patients (75.0%) were discharged to long

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term acute care hospitals (LTACH), 9 (12.5%) were discharged home and 9 (12.5%) died prior to discharge. Of the 63 patients who survived to discharge, 9 (14.3%) were decannulated prior to discharge, 27 (42.9%) were decannulated after discharge, and 29 (46.0%) were never decannulated. Beyond any care received in the LTACH, 18 (32.1%) of the patients who retained tracheostomies at discharge returned for followup tracheostomy care. The remaining 38 (67.8%) patients did not have any documented evidence of tracheostomy care post-discharge. Twelve (21.4%) of fifty-six patients who retained tracheostomy after hospital discharge had airway related emergency department visits. **Conclusions:** Followup for the care of tracheostomy after hospital discharge is inconsistent. Efforts are needed to connect patients with physicians comfortable with tracheostomy care. Better followup could improve patient safety and reduce tracheostomy related emergency department visits. Followup guidelines for tracheostomy care are needed.

4:34 Gastric H⁺/K⁺ATPase Proton Pump Expression in the Larynx of Laryngopharyngeal Reflux and Laryngeal Cancer Patients

Caroline A. McCormick, BS, Milwaukee, WI; Tina L. Samuels, MS, Milwaukee, WI;
Michele A. Battle, PhD, Milwaukee, WI; Talia S. Frolkis, BS, Milwaukee, WI; Kenneth W. Altman, MD
PhD, Danville, PA; Nikki J. Johnston, PhD, Milwaukee, WI

Educational Objective: At the conclusion of this presentation, the participants will better understand gastric proton pump expression in the laryngeal mucosa of patients with laryngopharyngeal reflux (LPR) disease including laryngeal cancer.

Objectives: The gastric type H⁺/K⁺ ATPase proton pump has previously been shown to be expressed in the human larynx. The contribution of local proton pump expression to LPR disease including laryngeal cancer is currently unknown. The purpose of this study was to investigate proton pump expression in the laryngeal mucosa of patients with LPR and laryngeal cancer. A human hypopharyngeal cell line stably expressing the proton pump was generated to examine the effect of ectopic expression in vitro. **Study Design:** In vitro translational. **Methods:** Laryngeal biopsies were obtained from 3 patients with LPR and 8 patients with laryngeal squamous cell cancer (LSCC); paired normal/non-cancer regions were obtained for each LSCC case. ATP4A, ATP4B and HPRT1 gene expression were assayed via qPCR. A human hypopharyngeal cell line ectopically expressing gastric proton pump subunits was generated via lentiviral transduction of commercially available FaDu cells; proton pump expression was demonstrated by RT-PCR. **Results:** ATP4A was detectable in 1/3 LPR, 5/8 LSCC and 8/8 normal adjacent specimens. ATP4B was detectable in 3/3 LPR, 5/8 LSCC and 6/8 normal adjacent specimens. **Conclusions:** Gastric proton pump subunits are expressed in the larynx of patients with LPR and LSCC. Ongoing experiments using a proton pump expressing human hypopharyngeal cell line will examine the implications of its expression and role in maintaining or altering pH under normal and acidic conditions.

4:41 Novel Risk Factors for Adult Onset Recurrent Respiratory Papillomatosis

Virginia E. Drake, MD, Baltimore, MD; Elaine O. Bigelow, MD, Baltimore, MD; Simon R. Best, MD,
Baltimore, MD; Gypsyamber D'Souza, PhD, Baltimore, MD; Carole Fakhry, MD MPH, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should better understand the prevalence of potentially novel risk factors related to sexual behaviors and HPV related serologic data.

Objectives: Human papillomavirus (HPV) is the recognized cause of adult onset recurrent respiratory papillomatosis (AO-RRP), and while risk factors for the disease have been proposed, the exact mechanism of acquisition remains largely unknown. Here we evaluate the prevalence of potentially novel risk factors related to sexual behaviors and HPV related serologic data. **Study Design:** Case series. **Methods:** Participants were enrolled in a multicenter case control study of head and neck squamous cell carcinomas and completed a survey with questions including number of partners, age of sexual initiation, type and order of sexual acts, and partner dynamics. Study participants with diagnosis of AO-RRP were eligible for analysis. **Results:** Of 10 participants with AO-RRP, 9 had available survey data. Similarly to previous studies, 8/9 (89%) were male and had a median of 15 (IQR 4-30) lifetime oral sex partners. Additionally we present factors not reported before: participants had a median of 30 (IQR 25-100) deep kissing partners. Indicators of risky sexual behavior were common including having casual sexual partners (median 28, IQR 1-150), having a partner over 10 years older when younger than age 23 (44%) and extramarital sex (67%). All (8/8) patients with serology data were positive for L1 capsid protein to at least one HPV type and 1/8 (13%) were positive to HPV 16 L1. **Conclusions:** While we describe some known characteristics about AO-RRP including male predominance, number of oral sex partners, and presence of HPV L1 capsid protein, this a study describing sexual behaviors which have not been explored beforehand and may elucidate risk factors for transmission of disease.

4:48 Impact of Transnasal Humidified Rapid Insufflation Ventilatory Exchange (THRIVE) on Upper Airway Patency: A Pilot Trial

Tyler S. Okland, MD, Palo Alto, CA; George S. Liu, MD, Palo Alto, CA; Douglas Ryan Sidell, MD, Palo Alto, CA

Educational Objective: At the conclusion of this presentation, the participants should learn the effect of THRIVE on

upper airway patency in the pediatric patient.

Objectives: Transnasal humidified rapid insufflation ventilatory exchange (THRIVE) is a humidified high flow nasal cannula capable of extending apneic times by combining gaseous exchange and positive pressure. Anecdotally, THRIVE appears to stent the upper airway soft tissues, which may benefit the pediatric patient with fixed or dynamic upper airway obstruction. **Study Design:** Prospective pilot trial of pediatric patients younger than 18 years old who underwent drug induced sleep endoscopy (DISE) in the operating room at a quaternary care children's hospital. **Methods:** Eleven patients were enrolled in this pilot trial, with a mean age of 4.8 years (2-8). Six patients were female. Video recording was performed with a flexible fiberoptic laryngoscope. The laryngoscope was positioned in view of the larynx and photographs were taken at physiologic baseline as well as at 10 and 20 liters per minute (LPM) of administered THRIVE. Both lateral and anterior posterior vectors of upper airway patency were measured using intertonsillar width and epiglottis to posterior pharynx distance, respectively. Modified Cochrane-Lehane scores were also abstracted at the trialed parameters. **Results:** Our results indicate a flow dependent relationship between THRIVE and upper airway patency. Significant increases in intertonsillar width and epiglottis to posterior pharynx distance were noted at both 10 and 20 LPM. Modified Cochrane-Lehane scores demonstrated improvement in laryngeal view at both 10 and 20 LPM. **Conclusions:** THRIVE appears to stent the upper airway soft tissues in addition to providing oxygenation and gas exchange in the pediatric patient. This is the first study to evaluate impact of THRIVE on upper airway patency.

4:55 The Utility and Safety of Transnasal Humidified Rapid Insufflation Ventilatory Exchange (THRIVE) for Microlaryngeal Surgery

Bonnie Chen, BA BS, Cleveland, OH; Emily Zhang, BS, Cleveland, OH; William S. Tierney, MD MS, Cleveland, OH; Michael S. Benninger, MD, Cleveland, OH; Paul C. Bryson, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the technique and physiology of transnasal humidified rapid insufflation ventilatory exchange (THRIVE) and characterize operative and anesthetic details using THRIVE during microlaryngeal surgery.

Objectives: Microlaryngeal surgery typically requires ventilation via endotracheal intubation (ET), jet ventilation, or intermittent apnea with the ET tube. Transnasal humidified rapid insufflation ventilatory exchange (THRIVE) delivered by high flow nasal cannula has been reported to extend the apneic window. This methodology has not been reported for microlaryngeal surgery but may be a valid anesthetic strategy that allows for stable, unobstructed visualization of laryngeal structures. **Study Design:** Case series. **Methods:** The electronic medical record was reviewed for patients who underwent microlaryngoscopy using THRIVE anesthesia protocols. Patient demographics, procedural details, operative parameters and anesthesia record were reviewed. Descriptive statistics were calculated and reported. **Results:** 25 patients underwent microlaryngeal surgery with THRIVE. Of these, 16 were female, the average BMI was 27.9, and the average age was 50. Average procedure length was 21.9 min with a minimum length of 4 min and maximum length of 44 min. Eight patients received surgery for subglottic stenosis, 7 for vocal fold mass/lesion, 3 for vocal fold paresis, and 7 for other laryngeal pathologies. Average apneic time was 16.5 min ranging from 4 to 39 min. Ten patients had venous blood gases drawn and the average pCO₂ was 50.6 (range 23-76). Average SpO₂ nadir was 93.5% and 5 patients had one instance of SpO₂ below 90%. 2/25 patients required intubation for desaturation below 90%. There were no complications related to anesthesia management. **Conclusions:** THRIVE is a safe and effective anesthetic method for microlaryngeal, non-laser surgery in appropriately selected patients.

5:02 RNA Sequencing to Identify Cancer Associated Changes in Laryngeal Cells Exposed to Pepsin

Tina L. Samuels, MS, Milwaukee, WI; Joel H. Blumin, MD, Milwaukee, WI; Jonathan M. Bock, MD, Milwaukee, WI; Nikki J. Johnston, PhD, Milwaukee, WI

Educational Objective: At the conclusion of this presentation, the participants should better understand the carcinogenic potential of pepsin in laryngopharyngeal reflux.

Objectives: Reflux disease is a risk factor for laryngeal malignancy. Evidence supports pepsin as a carcinogenic element in gastric refluxate. Cancer associated gene expression changes have been demonstrated in aerodigestive tract cells exposed to pepsin. Whole transcriptomic analysis by RNA facilitates global analysis of affected molecular pathways and may reveal novel insights into the mechanism by which pepsin promotes carcinogenesis. In this study, RNA sequencing was used to examine transcriptomic changes in laryngeal cells following brief pepsin insult in vitro. **Study Design:** In vitro, translational. **Methods:** Previously described primary laryngeal epithelial cell culture was treated with 0.1mg/ml pepsin for 1 hour or cultured in normal growth media (control) in triplicate conditions prior to RNA extraction and sequencing. **Results:** 397 genes were identified with differential expression of fold change >1.3 and p<0.05. Of the 40 most significantly impacted genes, 29 were cancer associated. **Conclusions:** RNA sequencing analysis demonstrates that pepsin affects a number of cancer associated genes and pathways in laryngeal cells after a single brief exposure, revealing potential mechanisms by which chronic pepsin exposure during reflux disease may contribute to laryngeal carcinogenesis. Further study is warranted to demonstrate a causal role of identified pathways in laryngeal carcinogenesis.

5:09 Q&A

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5:15 ***ADJOURN SESSION***

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

FRIDAY, JANUARY 24, 2020

7:00 - 7:50 **Business Meetings (Fellows Only)**
 Southern Section - Continental
 Western Section - Windsor Complex

7:30 *Attendee Breakfast with Exhibitors - Ballroom*

8:00 - 10:00 CONCURRENT SESSION 3A
FACIAL PLASTIC/RECONSTRUCTIVE SURGERY - CROWN ROOM

8:00 **Announcements - Robert M. Kellman, MD, Syracuse, NY**

Moderator: David P. Goldstein, MD MSc, Toronto, ON

8:05 **The Incidence of Concussion in Facial Trauma Patients: A Prospective Study**
 Anthony A. Alessi, MD, Brooklyn, NY; Sydney C. Butts, MD, Brooklyn, NY (Presenter);
 Min Gyu Noh, BA, Brooklyn, NY; Sandro James Corti, MD, West Long Branch, NJ;
 Steven A. Yusupov, MD DDS, Brooklyn, NY; Walter A. Valesky, MD, Brooklyn, NY;
 Yaacov A. Anziska, MD, Brooklyn, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the risk of developing concussions in facial fracture patients and understand that in at risk patients, screening for concussions can be done readily, preventing missed or delayed diagnoses.

Objectives: Public health concerns about the cognitive and psychosocial sequela of concussions have increased significantly. The proximity of the brain and the maxillofacial skeleton suggests that injuries to the facial skeleton could result in a concomitant concussion. Concussions may be underdiagnosed in patients suffering facial fractures. This prospective study assessed the probability of concussion in patients with acute facial fractures. **Study Design:** Prospective study. **Methods:** Adult patients (≥ 18) presenting to the emergency department (ED) of two teaching hospitals in a major urban setting with a CT scan confirmed facial fracture from June 2017 - May 2019 were included. Patients underwent the cognitive portion of the Military Acute Concussion Evaluation (MACE): a validated evaluation. A raw score below 25 is predictive of a concussion diagnosis and should prompt further evaluation for definitive diagnosis. Exclusion criteria included: ICU admission, pre-injury cognitive impairment, psychiatric illness, skull or skull base fracture and/or drug/alcohol intoxication. **Results:** 29 patients participated in the study. The majority of the patients were male (69%) and under the age of 65 (72%). The most common mechanism of injury was assault (72%) and the most common site of injury was midface (62%). 17 of 29 patients (59%) scored below 25 on the SAC. **Conclusions:** In this prospective study, the majority of patients suffering facial trauma are also likely to have experienced some level of closed head injury. Physicians should have a low index of suspicion for concussions in facial fracture patients and initiate prompt treatment and followup for patients found to have concussions.

8:12 **Peripheral Nerve Regeneration after Primary Repair Using Magnesium Microfilaments**
 Brittany A. Leader, MD, Cincinnati, OH; Ryan M. Collar, MD MBA, Cincinnati, OH;
 Tracy M. Hopkins, BS, Cincinnati, OH; Xiaoxian An, BS, Cincinnati, OH; Kevin J. Little, MD,
 Cincinnati, OH; Sarah K. Pixley, PhD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss how magnesium microfilaments provide axonal guidance at the surgical repair site and decrease inflammation.

Objectives: Assess whether Mg metal microfilaments physically and biochemically improve axonal regeneration by increasing axonal penetration across a site of primary repair and decreasing inflammation and scarring. **Study Design:** Animal research study. **Methods:** Using IACUC approval protocols, one sciatic nerve per rat was surgically transected in four animals, and repaired using standard microsurgical techniques with primary end to end anastomosis. A Mg metal microfilament wire (99.9% pure, 250 μ m diameter, 5mm long) was inserted into opposing proximal and distal nerve ends in two repairs. After sacrifice at 7 days, the repair sites were embedded in paraffin, sectioned and stained for axons, Schwann cells, perineurial cells, and macrophages. **Results:** In the microfilament repairs, the nerves were well vascularized with mini-fascicles of axons and Schwann cells coalescing around and paralleling the Mg wire running immediately adjacent to it. The Mg repairs had scant macrophages and no multinucleated giant cells. In distinct contrast, there were no axonal fascicles surrounding the sutures, and there were condensed macrophages as well as many multinucleated giant cells around the sutures in the control rats. **Conclusions:** Our findings suggest Mg wires have the potential to provide physical contact guidance which promotes axon regeneration through a nerve repair site. Possible mechanisms

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include that Mg ions released during metal degradation have neuroprotective, attachment promoting, and anti-inflammatory effects. Further research is needed to determine whether Mg usage leads to (1) increased axon density distal to repair, and (2) greater end muscle contractile strength.

8:19 Rhinoplasty Surgical Instrument Utilization: A Quality Improvement Project

Sunder S. Gidumal, BA, New York, NY; Mingyang L. Gray, MD, New York, NY; Samuel Oh, BA, New York, NY; Joshua D. Rosenberg, MD, New York, NY

Educational Objective: At the conclusion of this presentation, participants should be able to recognize avoidable costs attributable to overpacking of surgical instrument trays and employ replicable methods to reduce such costs at their home institutions.

Objectives: Recognize the avoidable costs incurred due to overpacking of rhinoplasty instrument trays. Reduce rhinoplasty instrument trays by including only instruments used frequently or needed for uncommon emergencies. Establish methods to reduce instrument trays prepared for other otolaryngologic procedures. **Study Design:** This is a single site, prospective study. The study evaluates the specific use of instruments opened for rhinoplasty procedures performed by three surgeons from April to June 2019. **Methods:** Instruments were counted in 10 rhinoplasty cases. These cases were selected randomly from 20 scheduled cases over 10 weeks in order to obtain a representative sample. Usage rate was calculated for each instrument. All instruments used in at least 20% of cases has been included in a newly proposed list. Each instrument on the list was included in the average quantity in which they were used. **Results:** On average, 190 instruments were opened, and 33 instruments were used for each rhinoplasty, resulting in 17.1% instrument utilization. 51 instruments were used in at least 20% of cases. These 51 instruments have been included in the new list, some in multiples. The proposed tray comprises 64 instruments, 34% of the original tray size. **Conclusions:** This study has demonstrated that instruments are sterilized and packed in gross excess for rhinoplasty procedures. Previously published figures estimate resterilization costs of \$0.34 to \$0.77 per instrument. Reduction in instruments opened from 190 to 64 should lead to cost savings ranging from \$42 to \$97 per case, amounting to more than \$10,000 per year in hospital savings.

8:26 Management of the Failed Free Tissue Transfer to the Head and Neck: A Multi-Institutional Review and Algorithmic Approach

Adam Nicholas Bender-Heine, MD, Portland, OR; Daniel Petrisor, DMD MD, Portland, OR; Jeffrey Hyzer, BS, Portland, OR; Larissa Sweeny, MD, Baton Rouge, LA; Joseph M. Curry, MD, Philadelphia, PA; Mark K. Wax, MD, Portland, OR

Educational Objective: At the conclusion of this presentation, the participants should be able to algorithmically approach the acute perioperative management of free tissue transfer loss.

Objectives: To provide data and analysis for a logical, algorithmic, experience based approach to failed flap management. **Study Design:** Multi-institutional retrospective chart review of free tissue transfer to the head and neck region between 2010 and 2018. **Methods:** Patients with a failed free flap to the head and neck were identified and reviewed. Successive procedures to address a failed flap were included in the analysis. When a second flap was used the type of flap, interval between flaps, the complication rate, and the outcome were studied. A similar analysis was performed for those patients treated conservatively. **Results:** From 2010-2018 2600 free flaps were reviewed. There were 108 flap failures- failure rate of 4.2%. 43% overall received a second free flap, 31% a regional flap; 26% managed conservatively. Average time between first and second free flap and regional flap was 6.1 days. Patients that received a second free flap had an average length of stay of 14.0 days; those with a regional flap 21.5 days; and those treated conservatively 13.5 days. Patients with an osteocutaneous flap failure were most commonly treated with a second bone flap (40%). Patients with a fasciocutaneous flap failure were most commonly managed with a second free flap (45%). When a second free flap was not possible conservative wound care, complex closure, and/or regional flaps were utilized. **Conclusions:** The most common treatment of a dead free flap is a second free flap and bone is replaced with bone when feasible; however, recipient site, health status, and available donor sites are determinant factors.

8:33 Optimizing Intraoperative Videography for Rhinoplasty: A Guide for the Academic Otolaryngologist

Edward J. Chang, BS, Irvine, CA; Karthik R. Prasad, BS, Irvine, CA; Amir A. Hakimi, BS, Irvine, CA; Lauren T. Standiford, BS, Mission Viejo, CA; Brian J.F. Wong, MD PhD, Irvine, CA

Educational Objective: At the end of this presentation, participants should be informed on optimal intraoperative filming standards for rhinoplasty, unique recording challenges, and an alternative effective low cost video recording method.

Objectives: Intraoperative videography has been demonstrated to be a very useful tool in training and education across surgical specialties. However, acquiring sufficient rhinoplasty footage presents unique challenges due to crowding of the surgeon and learners around a narrow surgical field (2 x 2) as well as the difficulty in capturing anatomical detail with low cost devices without compromising image quality. Such complications make traditional videography methods cum-

bersome and may impede resident education. Here, we present a viable solution for rhinoplasty recording to enhance the experiences of both the learner and operator. **Study Design:** Review of surgical footage to evaluate optimal camera angles, camera settings, and refine video based rhinoplasty education. **Methods:** Three recording devices were mounted in an academic hospital's operating room to record several rhinoplasty procedures. Two 4k camcorders were positioned to capture lateral and inferior planes. One Samsung Galaxy S7 was positioned to capture an en face portrait. Recordings were reviewed by an experienced academic otolaryngologist and edited to include essential content from each vantage point. **Results:** The captured videos from these devices were high quality and sufficient for evaluating operative skill, surgical education, or presentation purposes. Surgical flow was uninterrupted. Focus group results demonstrated significant improvement in learners' comprehension of the procedure ($p < 0.05$). **Conclusions:** Recording with 4k camcorders and a smartphone from several fixed angles was determined to be a viable, cost effective, and nondisruptive alternative to rhinoplasty videography in an academic setting.

8:40 **Developing a Cost Effective Surgical Headlight Using Consumer LED Lighting and 3D Printing**
Deven K. Gupta, HS, Irvine, CA; Lily Chen, BS, Irvine, CA; Emon Heidari, BS, Irvine, CA; Steven Chau, MD, Irvine, CA; Brandyn Dunn, MD, Irvine, CA; Brian J. Wong, MD PhD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to appreciate that there are economical alternatives to commercially available surgical headlights that can be used in the healthcare arena.

Objectives: Battery powered LED surgical headlamps are large monetary investments for surgical trainees. For years low cost LED headlamps have been available for non-healthcare activities but are not readily adaptable for the OR. **Study Design:** We modified a consumer grade LED headlamp using a 3D printed mount and construct a device for use in a surgical setting. **Methods:** A consumer LED headlight (6000 lumens, 4.3V) was secured to a rigid headband using a custom 3D printed mounting bracket, which was designed to allow adjustment of the beam over the target. The component costs for the device were less than \$30 (vs \$1500 for a medical grade device). To assess functionality, 18 surgical residents performed simulation exercises that mimicked suturing in the oral cavity using both headlamps. The time required to complete the task with each headlight was recorded and an exit survey was administered. **Results:** On average, residents completed the simulation task in 27.21 seconds with the commercially available headlight and 20.68 seconds with the prototype. Results of the survey showed an overall positive consensus, with critiques made with respect to the security of the headband along with suggestions for smaller LED chassis and a more robust mounting bracket. Despite these critiques, some surgical trainees actually preferred the prototype due to its wider field of illumination, i.e. beam spread/beam angle. **Conclusions:** These findings demonstrate that our prototype model is a viable alternative to the conventional surgical LED headlight and warrants continued optimization for broader adoption by residents for who higher cost alternatives are not an option.

8:47 **Can Preoperative Lab Values Predict Postoperative Complications in Head and Neck Free Flaps?**
Pierce M. Cooper, BS, Newark, NJ; Leonardo F. Antelo, BS, Newark, NJ; Richard D. Bavier, BA, Newark, NJ; Soly Baredes, MD, Newark, NJ; Richard Chan Woo Park, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to determine if abnormal preoperative lab values are associated with increased rates of postoperative complications following head and neck free flap surgery.

Objectives: To determine if abnormal preoperative lab values are associated with increased rates of postoperative complications following head and neck free flap surgery. **Study Design:** Retrospective database review. **Methods:** The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database (2005-2017) was queried for patients who underwent free flap surgery of the head and neck (N = 3,900). Complications were categorized into major and minor. Bivariate and multivariate logistic regressions were used to identify associations between preoperative lab values and postoperative complications. **Results:** Overall complication rate was 44.2% with 12.3% of patients experiencing at least one major complication. On multivariate regression analysis, abnormal BUN (odds ratio [OR] 1.898, confidence interval, 95% [CI] 1.140-3.158), abnormal albumin (OR= 4.520, CI: 1.505-13.580), abnormal WBC (OR=1.751, CI: 1.091-2.811), abnormal hematocrit (OR=2.891, CI: 1.885-4.432) and abnormal prothrombin times (OR=1.984, CI: 1.160-3.391) were independent risk factors for having a postoperative complications. Abnormal sodium (OR=1.455 CI: 1.066-1.950), abnormal hematocrit (OR=1.293 CI: 1.029-1.624), and abnormal prothrombin time (OR=2.626 CI: 1.170-5.893) were significantly associated with major postoperative complications, while abnormal BUN (OR=1.949 CI: 1.167-3.254), abnormal albumin (OR=3.445 CI: 1.193-9.951), abnormal WBC (OR=1.888 CI: 1.173-3.040), abnormal hematocrit (OR=3.303 CI: 2.140-5.097) and abnormal prothrombin time (OR=1.79 CI: 1.043-3.070) were associated with minor complications. **Conclusions:** Abnormal sodium, BUN, albumin, WBC, hematocrit, and prothrombin time preoperative values were significantly associated with postoperative complications in free flap surgeries.

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8:54 **Evaluation of Open Source Software for 3D Imaging and Manipulation for Cosmetic Surgery**
Ellen M. Hong, BA, Irvine, CA; Brian J. Wong, MD PhD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the ease and cost of an open source 3D facial reconstruction and manipulation workflow to current proprietary options.

Objectives: This study aims to demonstrate and evaluate a 3D image manipulation workflow as a surgical planning tool using open source and web based software for cosmetic rhinoplasty. **Study Design:** Cross-sectional study. **Methods:** 50 photographs of patients' faces were captured at varying angles with a DSLR camera (EOS 6D Mark II, Canon) to map facial topography. The images were uploaded to open source software 3D Zephyr Free (Verona, Italy) to create a textured mesh. This mesh was uploaded to the web based manipulation program SculptGL (<https://stephaneginier.com/sculptgl/>). Using the inbuilt sculpting tools, the 3D mesh was manipulated to simulate surgical results. A teaching module was created based on this workflow and distributed to otolaryngology residents. After completing the module, residents were surveyed to assess the ease of education and use of the workflow. **Results:** The survey responses reported that the workflow was simple and straightforward. Surgical residents reported little to no fatigue while using the software. Responses confirmed that a short video tutorial provided the necessary information to become adept at using the software. **Conclusions:** This method of 3D facial reconstruction and manipulation is easier to use and significantly less expensive than current commercial software packages and imaging systems, which can reach as high as \$45,000. Furthermore, alternative 3D image manipulation software has been reported to induce fatigue from both education and usage. As facial plastic surgeons commonly use DSLR cameras, the cost of this workflow uses consumer grade hardware and totals to \$0. This free and easy surgical planning tool offers an alternative to current costly systems.

9:01 **Q&A**

9:05 - 10:05 **Facial Plastic/Reconstructive Panel: Multidisciplinary Approach to Skin Cancer Therapy and Reconstruction**

Moderator: Lamont R. Jones, MD MBA, Detroit, MI
Panelists: Tamer A. Ghanem, MD PhD, Detroit, MI
Timothy M. Johnson, MD, Ann Arbor, MI
William W. Shockley, MD, Chapel Hill, NC

10:00 **Q&A**

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

8:00 - 10:00 CONCURRENT SESSION 3B GENERAL & SLEEP MEDICINE - EMPRESS/REGENT-GRAND HALL

8:00 **Announcements - Adam M. Zanation, MD, Chapel Hill, NC**

8:05 - 8:55 **Sleep Panel: Infant Sleep Apnea - Evaluation and Treatment**

Moderator: Valerie A. Flanary, MD, Milwaukee, WI
Panelists: Stacey L. Ishman, MD MPH, Cincinnati, OH
Romaine F. Johnson, MD MPH, Dallas, TX
Dana M. Thompson, MD, Chicago, IL

8:55 **Q&A**

Moderator: J. Madison Clark II, MD, Chapel Hill, NC

9:00 **Changes in Adult Sleep Endoscopy Obstruction Patterns with Increasing BMI**

Stephanie J. Wong, MD, Rochester, NY; Martha E. Luitje, MD, Rochester, NY; Sveta Karelsky, MD, Rochester, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to compare drug induced sleep endoscopy findings in adult patients with OSA of different weight categories based on BMI.

Objectives: To evaluate and compare patterns of obstruction during drug induced sleep endoscopy (DISE) in adult patients with OSA of different BMI based weight categories. **Study Design:** Single institution retrospective chart review. **Methods:** A retrospective chart review was performed identifying adult patients diagnosed with OSA documented by

polysomnography who had undergone drug induced sleep endoscopy (DISE) with dexmedetomidine infusion from 2015-2018. Endoscopic findings recorded at the time were reviewed and graded for obstruction level (velum, oropharynx, tongue base, and epiglottis) and severity using VOTE criteria. Normal weight (BMI<25), overweight (25dBMI<30), and obese (BMI>=30) patient findings were compared. **Results:** 111 patients (including 24 normal weight, 56 overweight, and 31 obese patients) with obstructive sleep apnea and their DISE findings were reviewed. Normal weight patients were significantly more likely to have severe (grade 2) obstruction at the level of the tongue base (p=0.021) and epiglottis (p=0.032). Conversely, obese patients were significantly more likely to have concentric palatal obstruction (p=0.005) and severe obstruction at the level of the oropharynx (p=0.046), compared to their normal weight and overweight counterparts. **Conclusions:** In patients with obstructive sleep apnea, weight categories based on BMI have significantly distinct patterns of obstruction as seen on DISE. This includes higher rates of oropharyngeal and concentric palatal obstruction with increasing BMI. These findings have important ramifications on how increased weight affects airway anatomy, which in turn, can limit surgical options available for OSA treatment.

9:07 The Practicality of a Two Incision Surgical Approach for Hypoglossal Nerve Stimulator Implantation

Joseph B. Meleca, MD, Cleveland, OH; Alan H. Kominsky, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the practicality (or lack thereof) of using a two incision approach to Inspire device implantation.

Objectives: Determine the feasibility of a two incision surgical approach to hypoglossal nerve stimulator implantation. **Study Design:** Upper airway stimulation using the Inspire device has been a relatively recent, multilevel surgical advancement for the treatment of obstructive sleep apnea. Using three implanted devices--the implantable pulse generator, stimulation lead with electrode cuff and sensing chest wall lead--the Inspire device creates a closed loop circuit which couples velopharyngeal opening and tongue protrusion immediately prior to initiation of inspiration. However, the surgical approach requires three skin incisions located on the submandibular neck, anterosuperior chest wall and inferolateral chest wall. Our surgical team sought to combine the two chest wall incisions into one to minimize morbidity and reduce operative time by placing the chest wall sensing lead posterolateral to the implantable pulse generator site via the same incision. **Methods:** Descriptive study with cadaveric dissection. **Results:** Using a cadaveric specimen, the musculature along the anterior axillary line and anterior chest wall was found to be devoid of the innermost intercostal muscle group and had a much thinner external intercostal muscle component as it transitioned to more of a membranous layer when compared to the inferolateral chest wall. This left very little barrier between the thoracic musculature and the parietal pleural with dissection and placement of the chest wall lead. **Conclusions:** Given these anatomical findings, a two incision surgical approach for upper airway stimulation is not advised using the aforementioned methods.

9:14 Using the SPARCS Database to Evaluate the Relationship between Surgical Volume and Complication Rates for Uvulopalatopharyngoplasty Procedures

Katherine Y. Liu, BA, New York, NY; Sen J. Ninan, BA, New York, NY; Roshan U. Nayak, BA, New York, NY; Enrique Gorbea, MD, New York, NY; Jay Agarwal, MD, New York, NY; Alfred M. Illoreta, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the relationship between volume of UPPP procedures performed per surgeon and per hospital and the rate of postoperative complications.

Objectives: The purpose of this study was to evaluate whether there is a relationship between the volume of uvulopalatopharyngoplasty (UPPP) procedures performed and associated complication rates. **Study Design:** The Statewide Planning and Research Cooperative System (SPARCS) database was used to retrospectively identify all inpatients who underwent UPPP from 1995-2015. **Methods:** Hospitals and surgeons were categorized into lower quartile, median quartiles and upper quartile based on the volume of UPPP performed. Their complication rates were calculated. Specific complications examined included hemorrhage, hematoma, seroma, postoperative infection and sepsis. Statistical analyses were conducted using Kruskal-Wallis, Spearman Rho and chi square tests. **Results:** 4,384 total UPPP cases were identified across 495 surgeons and 134 hospitals with a total complication rate of 1.14%. UPPP volume per surgeon ranged from 1 to 180 and volume per hospital ranged from 1 to 238 total procedures. There was a statistically significant difference between hospital volume quartiles and complication rates. The top quartile of hospitals that performed the most UPPP had a complication rate of 0.97% while the bottom quartile of hospitals that performed the least UPPP had a complication rate of 1.72% (p=0.008). There was no statistically significant difference between complication rates for surgeon volume quartile. **Conclusions:** Overall, hospitals with the highest volume of UPPP procedures had less complications than hospitals with lower volumes of UPPP. Future studies should evaluate a larger sample size and additional complications such as postoperative myocardial infarction, airway obstruction requiring reintubation or emergency tracheotomy, as well as patients' concurrent comorbidities, BMI and sleep apnea disease severity.

Friday

9:21 ERAS Protocol Reduces Postoperative Pain and Opioid Use

Michele H. Schewe, BA, New York, NY; Matthew H. Kim, MD, New York, NY; Anthony P. Sclafani, MD, New York, NY; Ashutosh Kacker, MBBS MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the benefits of preemptive analgesia with regard to patients' postoperative pain and opioid use.

Objectives: Enhanced recovery after surgery (ERAS) is a philosophy for perioperative care that marries multidisciplinary and evidenced based approaches to improve care for the surgical patient. The utilization of this approach has led to a reduction in patients' postoperative length of stay and surgical complications. We sought to examine their role in reducing pain and opioid use after surgery. **Study Design:** We prospectively enrolled 46 patients undergoing septoplasty and/or sinus surgery. **Methods:** Preoperative demographic surveys were collected. Patients were asked to log daily pain scores and opioid use for 2 weeks after surgery. Opioid consumption was converted into morphine milligram equivalents (MME), and pain was reported on a 10 cm visual analog scale (VAS), anchored by "no pain" and "worst pain ever". The ERAS arm included 37 patients who received both acetaminophen and pregabalin preoperatively. **Results:** Patients in the ERAS arm had less pain and decreased opioid requirement. In the ERAS arm, mean cumulative pain was 142.8 (SD=184) and mean cumulative opioid use was 20.5 MME (SD=29), while the remaining patients had a mean cumulative pain score of 175.2 (SD=170) and mean cumulative opioid use of 25.5 MME (SD=30.9). **Conclusions:** The difference did not reach statistical significance, likely due to small sample size. However, it is clear that the patients who received the acetaminophen and pregabalin medications prior to surgery are trending toward a lower subjective pain scale and less opioid use.

9:28 Sialographic Analysis of Parotid Ductal and Acinar Abnormalities Associated with Sjogren's Syndrome

Megan J. Foggia, MD, Iowa City, IA; Joan E. Maley, MD, Iowa City, IA; Bruno A. Policeni, MD, Iowa City, IA; Henry T. Hoffman, MD, Iowa City, IA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role of sialography in Sjogren's syndrome and explain the correlations between sialography and disease duration. Additionally, the participants should be able to discuss the application of the proposed classification system for sialograms.

Objectives: To analyze the location and degree of parotid ductal and acinar abnormalities associated with Sjogren's syndrome and to correlate findings with multiple patient variables including duration of the disease. To develop a classification system based on contemporary sialography techniques. **Study Design:** Retrospective chart review. **Methods:** Retrospective chart review of a consecutive series of 337 sialograms done by the senior investigator over a 10 year period identified 28 cases with the CPT code M35.00 for Sjogren's syndrome. Individual, initial blinded review of these sialograms was performed by two experienced head and neck radiologists to comprehensively analyze identified abnormalities and was followed by collaborative reassessment following creation of a classification system for ductal and acinar abnormalities. Radiographic findings were correlated with patient history including symptom duration. **Results:** Ductal stenosis of the primary, secondary, and tertiary ducts was identified in 71.4% of sialograms. In 25% of patients, the main duct was of normal caliber. Acinar damage was identified in 85.7% of sialograms, characterized among those affected in patterns classified as destructive (32%), cavitory (25%), globular (14.3%) or punctate (14.3%). A significant positive correlation was identified between symptom duration and degree of main ductal stenosis. **Conclusions:** Sialography may be useful to determine the degree of parotid gland damage associated with Sjogren's syndrome and to categorize degree of ductal damage employing a newly proposed classification system. This assessment may assist clinicians in tailoring management to selectively include ductal dilation.

9:35 Otolaryngology Physician Well Being and Burnout across the Training Career Spectrum

David P. Larson, MD, Rochester, MN; Matthew L. Carlson, MD, Rochester, MN; Christine M. Lohse, MS, Rochester, MN; Garret W. Choby, MD, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the current landscape of well being across the career spectrum of otolaryngology, from early resident trainees to senior academic faculty.

Objectives: Describe the current landscape of well being across the career spectrum of otolaryngology, from early resident trainees to senior academic faculty. **Study Design:** A cross-sectional survey was conducted of 12 academic otolaryngology programs to assess well being and burnout in residents, fellows, and academic staff surgeons. **Methods:** A composite questionnaire encompassing the Physician Well Being Index (PWBI) and Maslach Burnout Inventory was utilized. The primary study outcomes were differences in questionnaire responses across the training-career spectrum. **Results:** Of 613 surveys sent, 340 were completed (55.5%). Faculty members had lower PWBI scores, indicating greater well being, compared to trainees ($p=0.017$). Faculty practicing > 10 years had greater well being compared to faculty practicing < 10 years ($p=0.013$). Among individually queried facets of well being, PGY-2 and PGY-3 residents were more likely to feel burned out compared to other trainees ($p=0.012$). More specifically, the highest levels of burnout were observed

among PGY2 (86%) and PGY3 (86%) residents and the lowest levels of burnout were observed among fellows (47%). Faculty also felt less callous toward patients compared to trainees ($p < 0.001$). PGY4 residents and fellows felt less callous towards patients compared to other trainees ($p = 0.019$). **Conclusions:** This is the first study to incorporate validated instruments of physician well being to investigate differences in burnout across the otolaryngology training career spectrum. Faculty have higher well being compared to trainees, with mid to late career faculty demonstrating better scores than early career faculty. PGY2 and PGY3 residents have the highest levels of burnout.

9:42 Current State of In-Training Otolaryngology Female Physicians

Kathleen E. McClain, DO, Clinton Township, MI; Kathleen L. Yaremchuk, MD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the gender balance of current otolaryngology residents and their associated program director or program chair.

Objectives: To investigate the impact of gender balance amongst current otolaryngology residents and determine if there is an association between the presence of a female program director or department chair and the number of female residents within residency programs. **Study Design:** A cross-sectional analysis of current otolaryngology residents in 2019 was performed. **Methods:** The gender of the program director, department chair and the number of residents within each program, and the balance of current male and female residents was determined by visiting each otolaryngology training program's website. **Results:** Currently, there are 120 otolaryngology resident training programs and 1,693 in-training otolaryngology physicians in the United States. There are 1,025 male residents (64.5%). Five hundred thirty-eight women are currently in their otolaryngology training (35.5%). There are currently 32 female program directors (26.6%) who mentor 457 residents. Women comprise 145 of these residents (31.7%). **Conclusions:** In 2017, women represented about 14.5% of practicing otolaryngologists within the United States. Currently, in 2019, there are 538 women otolaryngology physicians in training. While a lack of female mentorship has been identified as a source of female medical students' decreased interest in otolaryngology, the presence of a female program director does not affect the number of in-training female residents.

9:49 Twice as Nice: How Doubling the Required Otolaryngology Rotation Time Has Affected the Intern Experience Nationwide

Matthew T. Maksimoski, MD, Chicago, IL; Sean A. Mutchnick, MD, Detroit, MI; Samuel D. Racette, MD, Chicago, IL; Karina J. Yu, MD, Chicago, IL; Alan G. Micco, MD, Chicago, IL

Educational Objective: By the conclusion of this presentation, attendees should be able to discuss national trends among residency programs with new changes in intern year requirements. Additionally, attendees will describe how program size affects the experience and training of residents.

Objectives: New requirements by the Accreditation Council for Graduate Medical Education (ACGME) necessitate 6 months of the intern year be dedicated to otolaryngology rotations, and the remaining 6 months be chosen by the program among 12 non-otolaryngologic rotations. In this study, we aimed to discover how this affected the training experiences of otolaryngology residents. **Study Design:** This is a cross-sectional descriptive study investigating the use of intern rotations in otolaryngology training programs. The investigation was performed as an emailed questionnaire. **Methods:** Emails were administered to each of the 114 ACGME accredited otolaryngology training programs. Program coordinators were asked to send schedules for the incoming intern class, including descriptions of the rotations, and length spent on each rotation. For otolaryngology rotations, program coordinators were asked for the breakdown of inpatient and outpatient time. **Results:** Of 114 ACGME programs, responses were recorded for 87 (76.3%). The most common rotations are surgical ICU (97%), general surgery (92%), anesthesia (78%), and neurological surgery (69%). The least common were radiation oncology (8%), ophthalmology (9%), and neuroradiology (22%). Regardless of program size, interns spend the most time on average on general surgery rotations (1.9 months). Among otolaryngology rotations, larger programs were likely to devote more time to inpatient and subspecialty specific rotations. **Conclusions:** Although ACGME requires rotations be selected from 12 non-otolaryngologic options for intern year training, variability still exists in these rotations and with the allocation of time during the otolaryngology specific training time. These data may affect the residency experiences of those applying for otolaryngologic fellowships this year and beyond.

9:56 Q&A

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

10:30 - 12:30 CONCURRENT SESSION 4A GENERAL AND RHINOLOGY/ALLERGY/SINUS - CROWN ROOM

10:30 - 11:20 General/Rhinology/Allergy Panel: Balloon Sinuplasty - Benefits, Outcomes, Potential for Abuse

Moderator: Justin L. Antisdell, MD, St. Louis, MO
Panelists: Pete S. Batra, MD, Chicago, IL
Stacey T. Gray, MD, Boston, MA
Steven D. Pletcher, MD, San Francisco, CA

11:20 Q&A

Moderator: Jennifer J. Shin, MD, Boston, MA

11:25 Predictors of Short Term Morbidity in Surgical Treatment of Esthesioneuroblastoma

Khodayar Goshtasbi, BS, Irvine, CA; Arash Abiri, BS, Irvine, CA; Tyler Yasaka, BS, Irvine, CA; Mehdi Abouzari, MD PhD, Irvine, CA; Ethan Muhonen, MD, Irvine, CA; Edward C. Kuan, MD MBA, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss various demographic or clinical factors that may be associated with morbidity in surgical treatment of esthesioneuroblastoma.

Objectives: To evaluate the associations between various demographic or clinical factors and morbidity in surgical treatment of esthesioneuroblastoma (ENB), also known as olfactory neuroblastoma. **Study Design:** Retrospective analysis of the National Surgical Quality Improvement Program (NSQIP) database. **Methods:** The 2005-2017 NSQIP data was queried to identify patients diagnosed with ENB. American Society of Anesthesiologists (ASA) classification was binarized as low (ASA 1-2) vs. high (ASA 3-4), and age was binarized as adult (18-65) vs. elderly (65+). **Results:** A total of 200 ENB cases, with a mean age of 58.6 ± 14.7 years and mean body mass index (BMI) of 28.3 ± 6.1 were identified. The cohort was predominantly male (63%) and white (75%). Complications with an incidence of $\geq 1\%$ included blood transfusion (14%), clostridium difficile infection (10%), readmission (8%), reoperation (4%), wound dehiscence (2%), organ or space infection (2%), wound infection (1%), pneumonia (1%), and sepsis (1%). In total, 25% of patients experienced at least one complication. Complications were not significantly associated with sex ($p=0.45$), BMI ($p=0.51$), preoperative diabetes ($p=0.23$), smoking ($p=0.41$), or dyspnea ($p=0.88$). However, high ASA score ($p=0.02$), operation time ($p=0.04$), and younger age ($p=0.01$) were associated with the occurrence of complications. Multivariable logistic and Cox regression demonstrated that higher ASA scores ($p=0.01$) and longer operations ($p<0.01$) were independent predictors for complication with hazard ratios of 2.00 ($p=0.04$) and 1.15 ($p<0.01$), respectively. **Conclusions:** Postoperative morbidities in ENB are associated with certain demographic and clinical factors. Predictors of short term postoperative complications include high preoperative ASA score and operation time.

11:32 Long Term Olfactory Outcomes Following Frontal Sinus Surgery in Chronic Rhinosinusitis

David Y. Goldrich, BA, New York, NY; Sen J. Ninan, BA, New York, NY (Presenter); Katherine Y. Liu, BA, New York, NY; Sarah Kidwai, MD, New York, NY; Satish Govindaraj, MD, New York, NY; Alfred Marc Illoreta, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the impact of frontal sinus surgery on the olfaction scores of patients with chronic rhinosinusitis in the short term and long term.

Objectives: Patients with chronic rhinosinusitis (CRS) suffer from olfactory dysfunction. Currently, no studies have evaluated the impact of frontal sinus surgery (FSS) on olfaction scores. This study evaluated olfactory function and quality of life (QOL) in CRS patients before and after FSS. We believe that improved airflow to the olfactory epithelium will increase olfactory function and improve QOL. **Study Design:** A prospective study of adult CRS patients who underwent FSS was conducted at a tertiary care center. **Methods:** Primary outcomes included Brief Smell Identification Test (BSIT), SNOT-22 and modified Lund-Kennedy endoscopy scores (MLKES), which were assessed during preoperative evaluation, 6-9 weeks postoperatively, and 12-24 weeks postoperatively. Normosmia was defined as BSIT >9 . Statistical significance was determined using the Wilcoxon signed rank test with $\pm = 0.05$. **Results:** Twenty-three patients completed followup 12-24 weeks after FSS. The differences between baseline and long term outcomes for BSIT (5.39 vs. 7.78, $p=0.0091$), SNOT-22 (55.30 vs. 25.13, $p=0.0001$) and MLKES (10.29 vs. 4.58, $p=0.0015$) scores were found to be statistically significant. The incidence of olfactory dysfunction decreased significantly from 65% to 35% ($p=0.012$). There was no statistically significant change in data from 6-9 weeks to 12-24 weeks postoperatively. **Conclusions:** Patients undergoing FSS demonstrate improved olfactory outcomes, QOL and endoscopic evaluations both 6-9 weeks and 12-24 weeks postoperatively. Although there was no statistically significant improvement in these measures between the short and long term, this study shows that the benefits of FSS are sustained in the long term.

11:39 Chronic Rhinosinusitis Outcomes of Patients with Aspirin Exacerbated Respiratory Disease Treated with Saline Irrigation and Intranasal Corticosteroids

Rehab Talat, MD, Cincinnati, OH; Katie M. Phillips, MD, Stanford, CA; David S. Caradonna, MD DMD, Boston, MA; Stacey T. Gray, MD, Boston, MA; Ahmad R. Sedaghat, MD PhD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to explain evidence supporting the use of intranasal corticosteroids and saline irrigation in improving sinonasal symptomatology in aspirin exacerbated respiratory disease.

Objectives: Pathophysiology targeting treatments exist for aspirin exacerbated respiratory disease (AERD) through aspirin desensitization and biologics, such as dupilumab. With increasing attention paid to these treatments, which may be associated with significant side effects and/or cost, there is little description of chronic rhinosinusitis (CRS) response to treatment with intranasal corticosteroids and saline irrigations in AERD. **Study Design:** This is a prospective longitudinal study of 14 AERD patients presenting to a rhinology clinic for CRS. **Methods:** Study patients were treated with twice daily high volume, low pressure irrigations with 240mL of saline to which a 0.5mg/2mL respule of budesonide was added. Systemic corticosteroids were added on a patient by patient basis. All participants completed a 22 item Sinonasal Outcome Test (SNOT-22) at enrollment and at followup 1 to 6 months later. Polyp scores were also calculated at each time point. **Results:** SNOT-22 scores ranged from 26 to 98 (median: 40.5) at enrollment and 3 to 85 (median: 38.5) at followup. Polyp scores ranged from 2 to 6 (median: 4) at enrollment at 0 to 6 (median: 2) at followup. Over the treatment period, change in SNOT-22 score ranged from -38 to 16 (median: 18) and change in polyp score ranged from -2 to 0 (median: -0.5). 57% of participants experienced at least 1 minimal clinically important difference in SNOT-22 score and 21% of participants had a SNOT-22 score less than 20 at followup. **Conclusions:** Medical management with intranasal corticosteroids and saline irrigations alone leads to significant improvement in sinonasal symptomatology in a subset of AERD.

11:46 Sinonasal Anatomic Variants in Allergic Fungal Rhinosinusitis

Chadi A. Makary, MD, Augusta, GA; Brock Parman, BS, Augusta, GA (Presenter); Brittany J. Gill, BS, Augusta, GA; Thomas Holmes, MD, Augusta, GA; Stilianos E. Kountakis, MD PhD, Augusta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate that concha bullosa is more common on the side of the AFRS.

Objectives: To study the incidence of sinonasal anatomic variants (AVs) in AFRS. **Study Design:** Prospective observational cohort study. **Methods:** All patients with AFRS presenting to our clinic from 2008 to 2018 were reviewed for laterality of the disease. Patients with unilateral involvement were further studied for AV presence by reviewing their preoperative sinus CT scan at original presentation. Each patient's uninvolved side served as its own control. AVs studied include agger nasi (AN), Haller's cells (HC), concha bullosa (CB) and supraorbital ethmoid cells (SOEC). **Results:** A total of 155 patients with AFRS were identified. 30 patients (19.3%) had unilateral disease involvement. Of these, 16 patients had left sided and 14 patients had right sided disease. AV were present in 26 of the 30 AFRS sides (86.7%) and in only 21 of the 30 healthy sides (70%), (chi squared=2.45, p=0.117). CB were present in 12 of 30 AFRS sides (40%) and only in 1 of 30 healthy sides (3%), (chi squared=11.88, p=0.0006). The presence of HC was more common in the AFRS vs healthy sides (7 of 30, 23.3% vs 2 of 30, 6.7%, respectively, p=0.071). AN and SOEC presence was similar in both AFRS and healthy sides (p=0.598 and p=0.718 respectively). **Conclusions:** AV are more common on the sides with AFRS compared to healthy sides, with the presence of CB reaching unquestionable statistical significance. Further study is needed to determine the possible association of AV, especially concha bullosa, with the pathophysiology of AFRS.

11:53 Aspirin Exacerbated Respiratory Disease: Clinical Implications of Elevated Atopic Markers of Inflammation

Mulin Xiong, BA, East Lansing, MI; Rijul S. Kshirsagar, MD, Oakland, CA; David Chou, MD, Oakland, CA; Julia Wei, MPH, Oakland, CA; Jonathan Liang, MD FACS FARS, Oakland, CA

Educational Objective: At the conclusion of this presentation, participants should be able to discuss the clinical implications of elevated inflammatory markers in patients with aspirin exacerbated respiratory disease.

Objectives: Aspirin exacerbated respiratory disease (AERD) is characterized by asthma, chronic rhinosinusitis with nasal polyposis (CRSwNP), and respiratory hypersensitivity to aspirin and nonsteroidal anti-inflammatory drugs (NSAIDs). The exact etiology of the disease remains unclear and the clinical implications of elevated inflammatory markers has yet to be fully explored. **Study Design:** Retrospective cohort. **Methods:** An integrated healthcare system database of patients with a new AERD diagnosis between 2009 and 2016 was assessed for atopic inflammatory markers including complete blood count (CBC) with eosinophils (%EOS), total IgE value, and allergy testing results. Chi-square statistical analysis was used to assess for association. **Results:** Of the 254 database patients, 169 (66.5%) had at least 1 CBC within the defined symptomatic date range. Of these patients, 52% had eosinophilia (%EOS>6%), and 61% of patients with total IgE measurements had 1 or more episodes of elevated total IgE (>130U/mL). There was a significant association between eosinophilia and clinical outcomes of Lund-Mackay score, disease related ER visits, sinus surgeries in 1 year, number of

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steroid courses, and diagnostic delay ($p < 0.05$). Patients with eosinophilia were more likely to have increased numbers of these outcome measures. Elevated total IgE had significant association with diagnostic delay and the number of steroid and antibiotic courses ($p < 0.05$). **Conclusions:** Over half of patients with AERD demonstrate elevated atopic inflammatory markers, which show positive association with outcomes characteristic of poor clinical response. Evaluating the role of eosinophilia and IgE with clinical response may yield further insights into the clinical course and treatment of AERD.

12:00 The Use of Race and Socioeconomic Status Data in Published Otolaryngology Research

Yash Prakash, Boston, MA; Libby M. Ward, MA, Boston, MA; Jennifer J. Liang, MD, Brooklyn, NY; Jessica R. Levi, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain how research on both race and socioeconomic status (SES) is still lacking within the otolaryngology field, demonstrate how to effectively conceptualize and operationalize race and SES as variables in research, and compare the different ways in which race based and SES based data can be handled (from surface level to deeper level analysis).

Objectives: To characterize the use of race and socioeconomic status (SES) variables in published otolaryngology research. **Study Design:** Published research data analysis. **Methods:** Articles reporting original, clinical studies published in five major otolaryngology journals in 2016 were chosen for analysis. 1,140 of 1,553 articles abstracted met the inclusion criteria. **Results:** 21% of the articles specified race as a variable of interest. Four of 14 subspecialties addressed this variable above this rate: thyroid, pediatrics, head and neck (H&N) cancer, and rhinology. 34% of domestic studies addressed race compared to 7% of international studies. Of the papers that studied race as a variable, 91% reported data by race, 59% analyzed the data, and 45% discussed race based results. 8% of the articles specified SES as a variable. Five of 14 subspecialties addressed SES above this rate: infectious disease, thyroid, pediatrics, H&N cancer, and speech and swallow. 11% of domestic studies addressed SES compared to 5% of international studies. Of the articles that operationalized SES, 30% used insurance status, 25% used education level, and 23% used household income. Of the papers that studied SES as a variable, 83% reported data by SES, 75% analyzed the data, and 72% discussed SES based results. **Conclusions:** Few studies specified race; even fewer specified SES. Domestic studies addressed race and SES more often than international studies. Thyroid, pediatrics and H&N cancer subspecialties were more likely to include race and SES variables. SES based data were more often analyzed and discussed compared to race based data.

12:07 Trends in Otolaryngology Consult Volume at an Academic Institution 2014-2018

Erica T. Sher, MD, Syracuse, NY; Brian D. Nicholas, MD, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to describe one academic institution's experience with increasing otolaryngologic consult burden and discuss methods to improve access to care in the community.

Objectives: To evaluate changes in emergency department and inpatient consult volume of an otolaryngology service at an academic medical center from 2014-2018. **Study Design:** Retrospective review. **Methods:** The total number of consults from March 2014 through December 2018 was recorded. The volume was recorded in monthly and six month intervals. Additional parameters were analyzed including volume of weekday, night and weekend, adult, pediatric, emergency department and inpatient consults. **Results:** From March 1, 2014, to December 31, 2018, a total of 9,343 consults were seen by the otolaryngology service. On average a total of 151 consults were seen per month (minimum 56, maximum 234, standard deviation 54). From July 2014 to December 2014 a total of 504 consults were seen while 1,241 consults were seen from July 2018 to December 2018. Similar trends were seen when consults were analyzed by weekday, night and weekend, pediatric, adult and emergency department consults. The volume of inpatient consults remained relatively stable during the same time period. **Conclusions:** This is the first study examining trends in otolaryngology consult volume at an academic medical center. Our data shows that consult volume has more than doubled in a 4 year time period, predominantly due to an increase in emergency department consultations. This study demonstrates the increasing burden of emergency department consultations for an ENT service at an academic medical center and highlights the need for greater otolaryngologic care in the community.

12:14 Long Term Academic Outcomes of Triological Society Research Career Development Award Recipients

Christina Dorismond, MPH, Chapel Hill, NC; Adam M. Zanation, MD, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the long term academic outcomes of Triological Society Research Career Development Award recipients.

Objectives: Each year, the Triological Society awards several research career development awards (CDA) to support early career otolaryngologists in their research endeavors. The objective of this study was to assess the long term academic outcomes of CDA recipients, including practice settings, academic rank, leadership title, NIH funding, and h-index. **Study Design:** Cross-sectional study. **Methods:** The list of CDA recipients was obtained from the Triological Society

website in July 2019. The practice settings, rank, and other leadership title at the time of analysis was determined through review of institutional websites and of academic and private practice profiles. NIH funding and h-index were determined using the NIH-RePORTER and Scopus databases, respectively. **Results:** Since 2004, there have been 65 CDA recipients, of whom 27.7% (18) have been women. Sixty-two recipients (95.4%) are currently in academic practice. Of these, 15 are assistant professors (24.2%), 30 are associate professors (48.4%), and 18 are full professors (27.4%). Several also hold significant leadership titles, including 7 vice chairs (11.3%) and 8 division chiefs (12.9%). Furthermore, 37 CDA recipients (56.9%) have received NIH grants as principle investigators, with a mean grant total of \$1,428,810 (range \$17659 to \$6708788). The mean h-index amongst the awardees is 16.9 (range 3-35). By rank, mean h-indices are 10.8 for assistant professors, 15.8 for associate professors, and 24.1 for full professors. **Conclusions:** Prior CDA recipients are predominantly male and primarily remain in academic practice. Many are promoted to senior faculty and hold noteworthy leadership titles. Moreover, the majority obtain NIH funding and have significant scholarly impact, as measured by h-index.

12:21 Q&A

12:30 *ADJOURN - afternoon activities are listed after Concurrent Session 4B*

**10:30 - 12:30 CONCURRENT SESSION 4B
LARYNGOLOGY/BRONCHESOPHAGOLOGY AND
PEDIATRIC OTOLARYNGOLOGY - EMPRESS/REGENT-GRAND HALL**

Moderator: Sandra L. Ettema, MD PhD, Springfield, IL

10:30 **Diagnosis and Treatment of Paradoxical Vocal Fold Motion Disorder in the Setting of Asthma Leads to Decreased Asthma Medication Use in Children**

Ryan J. Ivancic, BS, Columbus, OH; Laura A. Matrka, MD, Columbus, OH; Gregory J. Wiet, MD, Columbus, OH; Amy S. Puckett, SLP, Columbus, OH; Jennifer L. Haney, SLP, Columbus, OH; Brad W. DeSilva, MD, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss how the diagnosis and treatment of paradoxical vocal fold motion disorder in children leads to a decrease in asthma medication use and symptoms.

Objectives: The primary objective of this study was to determine whether the diagnosis and treatment of pediatric paradoxical vocal fold motion disorder (PVFMD) leads to decreased asthma medication use. Our secondary objective was to determine dyspnea outcomes following diagnosis and treatment for PVFMD. **Study Design:** Prospective observational study. **Methods:** Patients with newly diagnosed PVFMD between the ages of 8 and 17 were recruited at a single pediatric institution. A medication questionnaire and dyspnea index (DI) were completed at the initial visit, at the first return visit, and at greater than 6 months post-diagnosis and therapy treatment. **Results:** Twenty-six patients were recruited to the study. There were 19/26 (73%) patients diagnosed with asthma prior to a diagnosis of PVFMD, and 26/26 (100%) patients were using an inhaler prior to the enrollment visit. Twenty-two (85%) patients completed followup questionnaires. The mean asthma medication use decreased in patients who participated in at least two laryngeal control therapy sessions ($p < 0.05$). Furthermore, symptoms scored by the DI decreased overall from 24 to 19 ($p < 0.05$). Five patients participated in no therapy, seven patients in partial therapy, and 14 patients in full therapy. Significant reduction in asthma medication use was seen only in the full therapy group ($p < 0.05$). **Conclusions:** Diagnosis and treatment of pediatric PVFMD leads to a decline in asthma medication use in those patients who participate in at least two laryngeal control therapy sessions. Laryngeal control therapy for pediatric PVFMD leads to a significant decrease in symptoms as measured by the dyspnea index.

10:37 **Tracheotomy Timing and Outcomes in the Critically Ill: Complexity and Opportunities for Progress**

Tu-Anh N. Ha, MD, Houston, TX; Kenneth W. Altman, MD PhD, Houston, TX; Vaithianathan K. Dorai, PhD MBA, Houston, TX; Babith J. Mankidy, MBBS, Houston, TX; Huirong Zhu, PhD, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to characterize the effects of tracheotomy timing on duration of intensive care unit and overall hospital length of stay.

Objectives: To characterize the effects of tracheotomy timing at our institution on duration of intensive care unit (ICU) and overall hospital length of stay (LOS). **Study Design:** Case series with chart review. **Methods:** A retrospective study was performed for patients at a tertiary care medical center undergoing tracheotomy over 2.5 years from January 1, 2016 through June 30, 2018. Demographics, survival, duration of endotracheal intubation, timing of tracheotomy, ICU and

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overall hospital LOS were assessed. Tracheotomy was considered early (ET) if it was performed by day 7 of mechanical ventilation (MV) and late (LT) thereafter. Readmission, mortality, and costs were also tabulated for each aggregate group. Non-parametric statistics were used to compare results. **Results:** Of the 536 patients included in the analysis, 160 received tracheotomy early and 376 late. Differences between age, sex, and overall survival were not statistically significant. Duration of total ICU stay was shortened by 65% (12.84 ± 17.69 days versus 38.49 ± 26.61 days; $p < 0.0001$), and overall hospital LOS was reduced by 54% (22.71 ± 26.65 days versus 50.37 ± 34.20 days; $p < 0.0001$) in the ET group. Observed/expected (O/E) values standardized results to case mix index, revealing LOS of 1.5 for ET, and 2.5 for LT, mortality of 0.76 for ET and 1.25 for LT, and comparable readmissions of both groups. **Conclusions:** Early tracheotomy in ICU patients is associated with earlier ICU discharge, decreased overall length of hospital stay, and lower mortality when controlling for case mix index. Opportunities exist to optimize patient outcomes and O/E performance.

10:44 Laryngotracheal Mucosal Surface Expression of Candidate Gene and Protein Biomarkers in Idiopathic Subglottic Stenosis

Melissa M. Liu, MD PhD, Baltimore, MD; Kevin M. Motz, MD, Baltimore, MD; Michael K. Murphy, MD, Syracuse, NY; Linda X. Yin, MD, Rochester, MN; Alexander Gelbard, MD, Nashville, TN; Alexander T. Hillel, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to describe potential biomarkers in idiopathic subglottic stenosis.

Objectives: Idiopathic subglottic stenosis (iSGS) is an inflammatory process leading to fibrosis and narrowing of the laryngotracheal airway. There is variability in patient response to surgical intervention, but the mechanisms underlying this variability are unknown. In this pilot study, we measure expression of candidate targets at the mucosal surface of the subglottis in iSGS patients. We aim to identify putative biomarkers for iSGS that provide insights into the molecular basis of disease progression, yield a gene signature for the disease, and/or predict a response to therapy. **Study Design:** Case series. **Methods:** Levels of candidate transcripts and proteins were measured in healthy and stenotic laryngotracheal tissue specimens taken from the mucosal surface in 16 iSGS patients undergoing endoscopic balloon dilation. Pre and post-operative pulmonary function test and patient reported voice and breathing outcomes were also assessed. Unsupervised clustering was used to define patient subgroups based on expression profile. **Results:** Pulmonary function and voice and breathing outcome metrics demonstrated significant postoperative improvement. Transcript levels of \pm SMA, CCL2, COL1A1, COL3A1, FN1, IFNG, and TGFB1 and protein levels of CCL2, IFNG, and IL-6 were significantly upregulated in stenotic as compared to healthy tissues. Marked heterogeneity was observed in the patterns of expression of candidate markers across individuals and tissue types. Patient subgroups defined by expression profile did not show a statistically significant difference in dilation interval. **Conclusions:** Proinflammatory and profibrotic pathways are significantly upregulated along the mucosal surface of stenotic laryngotracheal tissues, and CCL2 and IFNG merit further investigation as potential iSGS biomarkers.

10:51 Development of a Dynamic Synthetic Vocal Fold Model

Steven M. Chau, MD, Irvine, CA; Lily Y. Chen, BS, Irvine, CA; Hannah R. Silos, Irvine, CA; Lauren A. Standiford, Irvine, CA; Brian J.F. Wong, MD PhD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain how a dynamic, multilayered synthetic silicone vocal fold model may be produced and tested.

Objectives: Voice production is a complex phenomenon requiring coordination of several factors including a power source (lungs, chest musculature), vibrator (larynx), and resonator (oropharynx, nasopharynx, nose, oral cavity). A synthetic vocal fold model may help study the physics involved. Additionally, there is potential use in testing imaging technologies such as new optical coherence tomography (OCT) devices and as a surgical training model. **Study Design:** Double layer silicone vocal folds of varying densities were cast from MRI based molds and imaged with OCT and stroboscopy for comparison to in vivo data. **Methods:** Using schematics derived from prior MRI data, computer generated molds were printed in a Formlabs Form 2 3D printer. These molds were used to cast sets of single layer (body only) and double layer (body and cover) vocal folds. The body layers were cast in Ecoflex 00-30 Supersoft Platinum Silicone with Ecoflex Thinner in a 1:1 ratio. The covers were cast in a 1:1.5 ratio. Folds were affixed to a foam frame which was then placed atop a PVC "trachea" with air powered by an electric blower. The folds were then imaged using an OCT device and with 70 rigid stroboscopy. **Results:** Both the single and double layer models produced sound at around 85 Hz. On stroboscopy, the single layer fold exhibited good glottic closure, and the double layer fold had a visible mucosal wave. On OCT, the layer thicknesses were confirmed and correlate well with the molds and prior human data. **Conclusions:** A synthetic vocal fold model with a cover and body can be fabricated and exhibit consistent OCT and stroboscopic findings.

10:58 The Family Impact of Having a Child with a Tracheostomy

Romaine F. Johnson, MD, Dallas, TX; Ashley Brown, MS CCC-SLP, Dallas, TX; Candice H. Bailey, RN, Dallas, TX; Cynthia Whitney, RT, Dallas, TX; Rebecca Brooks, MSN APRN RNC-NIC PCNS-BC, Dallas, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the family impact of having a child with a tracheostomy.

Objectives: 1) Measure the quality of life impact among families with children with tracheostomies; (2) contrast the impact of tracheostomy compared to other medically fragile children. **Study Design:** Prospective survey. **Methods:** We sample a cohort of families with children with tracheostomies utilizing the PedQL Family Impact Module. The PedQL Family Impact Module is a validated quality of life assessment for families with children with health conditions. The score ranges from 0 to 100. A higher score signifies a better quality of life. The tracheostomy sample's scores were compared to a previously published sample of medically fragile children. The scores were tabulated and then analyzed using the Student's t-test and the Cohen's d test. Significance was set $p \leq .005$. **Results:** Ninety-eight families are included in the study. The average (SD) age of tracheostomy placement was 1.6 (3.5) years. The population was 60% (59/98) male and 39% (38/98) Hispanic. The principle reason for tracheostomy was due to respiratory failure (76 out of 98; 78%). The mean (SD) total Family Impact score was 76 (19). The lowest domain score was daily activity problems, mean (SD) = 67 (30) followed by worry (mean = 69, SD = 24). The lowest question score was, "I worry about my child's future," mean (SD) = 52 (37). When compared to the control group of medically fragile children, the scores were statistically similar except for communication totals where tracheostomy patient reported superior scores (78.3 vs. 62.9, 95% CI = -26 to -4.8, $p = .005$, Cohen's $d = -0.66$). **Conclusions:** The presence of a tracheostomy is associated with QOL scores similar to other medically fragile children. Future studies should compare changes over time, different disease states, and social determinants of family health.

11:05 Laryngoscopic Findings as a Predictor of Dysplasia in Patients with Recurrent Respiratory Papillomatosis

Alizabeth K. Weber, BS, Seattle, WA; Molly N. Huston, MD, Seattle, WA; J.P. Smithto, MD, Seattle, WA; Alexander Delidis, MD PhD, Athens, Greece; Albert L. Merati, MD, Seattle, WA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the association between laryngoscopic findings in adults with recurrent respiratory papillomatosis and presence of dysplasia.

Objectives: While the decision to operate on adults with recurrent respiratory papillomatosis (RRP) relies mainly upon symptoms, the risk for malignant potential is another key influence. It is hypothesized that the extent and nature of laryngoscopic findings in adult RRP patients correlates with pathological findings on biopsy. **Study Design:** Retrospective cohort. **Methods:** Adults (>18 yo) with RRP treated between 2008 and 2018 were identified. Patients were included if they underwent flexible laryngoscopy and biopsy within a 3 month interval. Patients with a history of radiation or laryngeal cancer were excluded. Two otolaryngologists rated clinical images with the Derkay score and gave a dichotomous rating of clinical impression of dysplasia. These ratings were compared against pathology results and intra-rater reliability was evaluated. **Results:** Forty-three patients met inclusion criteria. While 30% (13/43) had dysplasia on pathologic specimen, neither the clinical impression of dysplasia nor the Derkay score was predictive of these findings. More specifically, laryngoscopic ratings were not associated with the presence of moderate/severe dysplasia vs mild/no dysplasia. For clinical impression, inter-rater agreement was 77% (Cohen's kappa = 0.43) while mean intra-rater agreement was 84% (Cohen's kappa = 0.61). For Derkay score, inter-rater agreement was 78% (Cohen's kappa = 0.58) while mean intra-rater agreement was 80% (Cohen's kappa = 0.62). **Conclusions:** Overall clinical impression and the laryngoscopic Derkay score are not associated with the presence of dysplasia on final pathology. Though there is no clear consensus on the impact of dysplasia upon clinical management, laryngoscopic findings appear insufficient to determine its presence.

11:12 A Novel Parent Reported Outcome Tool to Assess Swallowing Dysfunction in Otherwise Healthy Infants and Toddlers

Abdulsalam Ali Baqays, MD MSc, Edmonton, AB Canada; Wendy L. Johannsen, MSLP S-LP(C) RSLP, Edmonton, AB Canada; Maraghalara M. Rashid, PhD, Edmonton, AB Canada; Hadi R. Seikaly, MD MA FRCS, Edmoton, AB Canada; Hamdy G. El-Hakim, MD FRCS, Edmonton, AB Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate the method of constructing a parent reported outcome assessment tool.

Objectives: There is limited epidemiological information on swallowing dysfunction (SwD) in otherwise healthy infants and toddlers (OHIT). Cost, invasiveness, expertise and resource related limitations constrain the repeatability and utility for screening of instrumental diagnostic tests. Patient reported outcomes (PRO) tools have the potential to mitigate these disadvantages. Hence, we set to develop and validate a novel PRO tool to assess SwD in OHIT. **Study Design:** A prospective mixed method study was designed. **Methods:** We recruited parents of OHIT with SwD and excluded those

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with a confounding diagnosis (syndromes or related neurological impairments). In-person interviews were conducted and thematically analyzed to extract the relevant domains and items. Similar procedure was performed on the related reports generated from a systematic literature review. The emerging domains and items were examined over expert focus group meetings. A different expert group assessed and established the content validity using a modified Delphi exercise. A separate parents' group meeting examined the wording and relevance. **Results:** We achieved saturation of information after interviewing ten parents and generated seven domains with 72 items. They were reduced to five domains and 62 items by the focus group. These five essential domains inquired about swallowing, breathing, sickness time, level of activity, sleep, and impact on the family. Following the modified Delphi meetings, nineteen items passed a content validity ratio threshold of 0.622. **Conclusions:** We extracted the primary domains and validated the content of a new PRO instrument to assess SwD in OHIT. This tool has the potential to screen and assess management outcomes specifically for this population.

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Pediatric Tympanostomy Procedures in the Otolaryngology Office

Theodore O. Truitt, MD, Saint Cloud, MN; James R. Kosko, MD, Orlando, FL; Grace L. Nimmons, MD, St. Louis Park, MN; Jay D. Raisen, MD, Bismark, ND; Sandra M. Skovlund, MD, St. Louis Park, MN; Shelagh A. Cofer, MD, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the various treatment options to parents of children suffering from chronic otitis media. Also, they should better understand the benefits of having an in office option for ventilating tube placement.

Objectives: Insertion of tympanostomy tubes (TT) is generally accomplished in children in the operating room under general anesthesia. We report on 100 children treated with a novel device designed to better enable TT placement in the office. **Study Design:** Investigators participated in an IRB approved, prospective, single arm multi-site investigation of in office TT placement in young awake children. **Methods:** Topical anesthetic was applied and children were swaddled or papoose. TT placement was then performed with a single pass TT insertion device. Safety was assessed by monitoring procedural adverse events. **Results:** 194 ears were treated in 100 children at seven sites by nine investigators. Children were in age groups 6-24 months (n=91, mean = 12 months) and 5-12 years (n=9, mean = 7.9 years). Ninety-four children received bilateral TT placement and six received unilateral placement. Immediate placement of the TT with the device was successful in 184/194 ears (94.8%). Seven ears were completed with an alligator forceps, and three ears (2 children) were not completed due to anatomical challenges. Median procedure time for bilateral cases was 5 - 20. No adverse events were reported. Based upon clinician assessment and parental survey, the procedure was very well tolerated. **Conclusions:** Performing in office TT placement in awake children using topical anesthetic, enabled by a single pass delivery device, is safe, successful and well tolerated. The AAO recently released a position statement supporting in office placement of TT in appropriate pediatric patients. These results affirm an in office alternative for clinicians and parents who have concerns with the risk, inconvenience and cost of surgery under general anesthesia.

11:26

Q&A

11:30 - 12:25 Laryngology/Bronchoesophagology Panel: Vocal Fold Scar and Glottis Insufficiency

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

Panelists: **Sulcus Vocalis**

Joel H. Blumin, MD, Milwaukee, WI

Surgery for Scar

James A. Burns, MD, Boston, MA

The Role of Injectables

Thomas L. Carroll, MD, Boston, MA

12:25

Q&A

12:30

ADJOURN SESSIONS

AFTERNOON & EVENING - LEISURE OR ACTIVITIES

12:30

GOLF OUTING (pre-registration required) - Coronado Course

12:45 - 1:30

TRIOLOGICAL THESIS SEMINAR (pre-registration required) - Crystal/Continental

1:00 - 2:30

RESIDENT BOWL (pre-registration required) - Crown Room

12:45 - 2:45

NEELY PHYSICIAN/SCIENTIST MEETING (by invitation) - Windsor Complex

2:00 - 6:00 **AMERICAN SOCIETY OF GERIATRIC OTOLARYNGOLOGY SCIENTIFIC SESSION** (*registration required with ASGO*) - *Empress/Regent-Great Hall*

Saturday

SATURDAY, JANUARY 25, 2020

7:00 - 7:50 **Business Meetings (Fellows Only)**
Eastern Section - Windsor Complex
Middle Section - Continental

7:30 *Attendee Breakfast/View Posters - Ballroom*

7:55 - 9:45 GENERAL SESSION - CROWN ROOM

7:55 **Announcements - Albert L. Merati, MD, Seattle, WA**

Introduction of Vice Presidents-Elect by Section Vice Presidents

David E. Eibling, MD, Pittsburgh, PA - Vice President-Elect, Eastern Section
Donald T. Donovan, MD, Houston, TX - Vice President-Elect, Southern Section
Marilene B. Wang, MD, Los Angeles, CA - Vice President-Elect, Western Section
Dana M. Thompson, MD, Chicago, IL - Vice President-Elect, Middle Section

8:05 - 8:45 **Guest Lecture: Patient Safety - How to Avoid Medical Errors**
Captain Ryan Carron (USN), San Diego, CA

8:45 - 9:25 **Panel on Patient Safety: How to Avoid Medical Errors**
Moderator: Ravi N. Samy, MD, Cincinnati, OH
Panelists: Capt. Ryan Carron, San Diego, CA
Chad A. Zender, MD, Cincinnati, OH

9:25 **Q&A**

9:30 - 10:00 *Break/View Posters - Ballroom*

10:00 - 12:00 CONCURRENT SESSION 5A GENERAL AND HEAD & NECK - CROWN ROOM

10:00 - 11:00 **Head & Neck/Plastic & Reconstructive Surgery Panel: Melanoma - Imaging, Surgical Techniques and Outcomes**
Moderator: Mark J. Jameson, MD PhD, Charlottesville, VA
Panelists: Bhuvanesh Singh, MD, New York, NY
Steven J. Wang, MD, Tucson, AZ
Shaun C. Desai, MD FACS

11:00 **Q&A**

Moderator: Douglas J. Van Daele, MD, Iowa City, IA

11:05 **2019 Triological Society Thesis - Honorable Mention Award**
Occlusion Driven and Digitally Based Jaw Reconstruction with Immediate Osseointegrated Implant Installation
Hadi Seikaly, MD, Edmonton, AB Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) understand modern jaw reconstruction techniques; and 2) identify patients that are best suited for an occlusion based jaw reconstruction.

Objectives: The free flap reconstructive protocols of the jaws have been refined over the years and presently are based on bone driven approaches that generally use the lower border of the mandible or the anterior surface of the maxilla as the templates for reconstruction because these contours are deemed important to the eventual cosmetic outcomes of patients. The ultimate goal of functional jaw reconstruction, however, is the reconstruction of the dental occlusion and oral rehabilitation. The purpose of the present study was to evaluate the Alberta reconstructive technique (ART), which is a

new approach of occlusion-driven jaw reconstruction with digitally planned immediate osseointegrated implant installation. **Study Design:** Prospective cohort study. **Methods:** This research study considers the ART's safety, effectiveness, accuracy, timeliness of reconstruction, aesthetic appeal, and cost-effectiveness in comparison with the standard bone-driven and delayed osseointegrated implant installation (BDD) protocol. **Results:** The ART procedures were as safe and more effective at achieving full occlusal reconstruction and oral rehabilitation. The ART cohort of patients achieved oral rehabilitation in 21.4 month as compared to 73.1 months for the BDD cohort. There were no differences in the aesthetic appeal the two groups. The ART cost an average of \$22,004 less than BDD and we calculated the quality adjusted life years gain to be between 2.14 and 4.04 in favor of ART. **Conclusions:** The ART is a good option for patients with jaw defects. It provides a safe, effective, accurate, aesthetic, and cost-effective reconstruction that restores form and function in a timely manner.

11:12 A Vaccine for Skin Cancer? HPV Association with Cutaneous Malignancy

Susan Kurian, MD, Shreveport, LA; Brent A. Chang, MD, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the relevance of HPV to cutaneous malignancies including squamous and basal cell carcinoma and implications for therapy of skin cancer.

Objectives: Infection with high risk human papillomavirus (HPV) serotypes is known to cause oropharyngeal and anogenital cancers. The role of HPV in cutaneous malignancies is not well established, yet recent reports have described lower incidence of cutaneous squamous cell carcinoma (SCC) or regression of disease with HPV immunization. Our objective was to establish whether HPV is more prevalent in cutaneous malignancy as compared to controls. **Study Design:** We performed a systematic review and meta-analysis of relevant articles from PubMed. 41 articles were selected for final analysis and described HPV testing in tissue or serum of 6,427 patients with SCC, 9,255 patients with basal cell carcinoma (BCC) and 10,999 cancer free controls. **Methods:** The prevalence of alpha and beta genus HPV in cases of cutaneous SCC, BCC, or control samples stratified by immunosuppression status was calculated using fixed effects meta-analysis. **Results:** Cutaneous SCC tissue or serum was more likely to be positive for beta HPV than control or BCC samples in immunocompetent patients (pooled prevalence 49.3%, 95% CI 46.6%-51.9%). The prevalence of alpha HPV in immunocompetent patients was lower than the prevalence in immunosuppressed patients and lower than the prevalence of beta HPV in any patients. Samples from non-cancer immunosuppressed patients had more beta HPV than samples from non-cancer immunocompetent patients. **Conclusions:** Studies were varied in the number of HPV types tested and in testing method, however these results corroborate known differences in HPV prevalence based on patient immune status. The results also show that beta HPV may be associated with cutaneous squamous cell carcinoma in immunocompetent patients.

11:19 Head and Neck Injuries Sustained from Watersports: A Ten Year Analysis of Emergency Room Visits

Lauren M. Boeckermann, MPH, Oakland, CA; Rijul S. Kshirsagar, MD, Oakland, CA; Chris C. Xiao, MD, Oakland, CA; Nancy Jiang, MD, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the most common head and neck injuries sustained in different water sports.

Objectives: As the popularity of recreational boating continues to increase, water tubing and waterskiing (including wakeboarding, surfing, and skating) remain common summertime hobbies. This study characterizes the national incidence of head and neck injuries sustained from these activities, describing demographic and anatomic trends. **Study Design:** Retrospective review. **Methods:** The National Electronic Injury Surveillance System (NEISS) was searched for head and neck related emergency room visits due to water tubing and waterskiing injuries. Data was analyzed based on age, gender, diagnoses, and anatomical site. **Results:** From 2009 to 2018, 967 watersport related emergency room visits were reported to the NEISS database, with 44,008 cases estimated nationally. The majority of the patients were male (58.7%). The average age was 21.8 years (interquartile range of 15-26 years). Common injury sites included: head (46.4%), face (24.1%), neck (14.6%), ear (10.5%), and mouth (4.3%). Water tubing caused 52.7% of injuries with the most common being internal injuries (25.5%), lacerations (15.2%), concussions (14.8%), sprains or strains (14.8%), and avulsions (11.3%). The most common waterskiing injuries included a large proportion of lacerations (39.4%) followed by internal injuries (20.3%), concussions (18.9%), and sprains or strains (7.3%). The most common fractures among both sports were facial/unspecified (41.3%), nasal bone (32.6%), skull (10.9%), orbit (6.5%), mandible (4.3%), and vertebra (4.3%). **Conclusions:** Analyses of watersport related injuries in otolaryngology have largely been focused on scuba diving with little attention to others. It is important to understand specific head and neck injuries caused by these watersports to aid in the diagnosis and treatment of these patients.

Saturday

- 11:26** **Rate of Local and Overall Recurrence in Head and Neck Melanoma after Negative SLN Biopsy**
Peter A. Pellionisz, BS, Los Angeles, CA; Kristen A. Echanique, MD, Los Angeles, CA;
Seong S. Moon, BS, Los Angeles, CA; Kera Kwan, BS, Los Angeles, CA; Shabnam Ghazizadeh, MD,
Los Angeles, CA; Maie A. St. John, MD PhD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the rate of local and overall recurrence for melanoma in previously mapped negative sentinel lymph node (SLN) basins as the first site of relapse performed at a single institution during a 27 year period.

Objectives: Analyze the rate of local and overall recurrence in previously mapped negative sentinel lymph node (SLN) basins via the first site of relapse performed at a single institution during a 27 year period. **Study Design:** Retrospective case review. **Methods:** A retrospective review was performed by examining the records and pathology of 415 patients who underwent SLN biopsy and wide local excision for head and neck melanoma from 1991 to 2018. A local failure was defined by local recurrence despite previously negative surgical margins and negative sentinel lymph node biopsy. Clinical variables were examined for the impact on both local and overall (local, regional, or distant) recurrence by univariate and multivariate analysis. **Results:** The median followup via inverse Kaplan-Meier analysis was 92.5 months. Pathologic review of SLNs harvested from these basins found 111 patient cases of successful wide local surgical excision of melanoma following negative SLN biopsy. Univariate analysis suggested the risk of local recurrence in head and neck melanoma is independent of primary site and tumor thickness, yet is correlated for tumors with jugular and parotid lymphatic drainage patterns. Multivariate analysis suggested mitotic rate and angiolymphatic invasion were prognostic for overall disease recurrence. The 10 year disease free survival of patients calculated from date of SLN biopsy was not statistically different based on local, regional, or distant first recurrence of disease. **Conclusions:** There exists a substantial rate of local recurrence despite clean tumor margins and negative SLN biopsy before surgery for head and neck melanoma. Mechanisms other than pathologic SLN sampling error and margin of surgical excision may contribute to the failure of complete tumor resection in these patients.

- 11:33** **Botulinum Toxin for Chronic Sialadenitis Refractory to Sialendoscopy: Case Series and Systematic Review of the Literature**
Madeleine P. Strohl, MD, San Francisco, CA; William R. Ryan, MD, San Francisco, CA;
Jolie L. Chang, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role of botulinum toxin injections in treating chronic sialadenitis and to describe ultrasound guided technique for parotid botulinum toxin injection.

Objectives: To determine if salivary gland chemodenervation with botulinum toxin reduces the frequency and severity of recurrent symptoms for patients with chronic parotid sialadenitis despite treatment with sialendoscopic guided techniques. **Study Design:** Retrospective case series and systematic review of literature. **Methods:** Patients who underwent parotid gland chemodenervation for chronic sialadenitis were retrospectively reviewed. Patient demographics, salivary symptoms, preoperative ultrasound findings, sialendoscopy findings, and botulinum toxin treatment details were reviewed. Technique for botulinum toxin injection with ultrasound guidance is described. Additionally, a systematic review of the literature on this topic was performed. PubMed, EMBASE and Web of Science are searched from 2000 to 2019. English language studies containing original data on botulinum toxin injection for sialadenitis were included. Two investigators independently reviewed all manuscripts and performed quality assessment using validated tools. **Results:** Eight patients with 12 affected parotid glands were included in the study. The mean age was 51.6 years (range 27-68), and the majority were female (75%). Seven patients (87%) had a smoking history. All cases involved parotid duct stenosis diagnosed with sialendoscopy. All patients received at least one round of botulinum toxin injections with a mean dose of 65U (range 40-125U). Three patients received a second round of injections for recurrent symptoms, two patients at two months later, and one at four months later. Five patients reported decreased number of symptomatic episodes and decreased severity of gland swelling and pain. Three patients were lost to followup or reported minimal change in symptoms. No patients underwent parotidectomy. For the systematic review, of the 308 abstracts reviewed, seven studies met the inclusion criteria. All were case series (level 4 evidence). Outcome measures included symptom improvement. Qualitatively, all studies demonstrated a reduction and/or resolution in symptoms. **Conclusions:** Parotid gland chemodenervation alleviates symptoms of recurrent chronic sialadenitis refractory to sialendoscopy. Long term symptom reduction with high dose botulinum needs to be examined further. Chemodenervation is an alternative minimally invasive treatment for recurrent salivary obstruction and may be an alternative to parotidectomy.

- 11:40** **Parotidectomy via Periauricular Incision: A Comparative Analysis to Standard Parotid Approaches**
C. Alessandra Colaianni, MD MPhil, Boston, MA; Allen L. Feng, MD, Boston, MA;
Jeremy L. Richmon, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to compare outcomes for

the periauricular incision approach to parotidectomy to standard approaches such as the modified Blair and facelift style approach.

Objectives: To investigate the safety and feasibility of a minimally invasive approach to the parotid and compare outcomes to those of traditional parotidectomy incisions. **Study Design:** Single surgeon retrospective chart review. **Methods:** We reviewed charts of all patients (n=62) undergoing parotid surgery for benign or suspicious pathology by a single surgeon. After October 2017 all patients were approached via a periauricular incision only (n=38). Prior to this, modified Blair or facelift incisions were used. Outcomes (operative time, pathology, size of neoplasm, and postoperative complications) were analyzed. **Results:** Thirty-eight patients underwent parotidectomy via a periauricular approach. Superficial and deep specimens up to 6.5 cm were removed successfully without incision conversion. Compared to patients with traditional incisions, there was no significant difference in tumor size, length of stay, or pathology. Patients who underwent periauricular incision had 13 minutes less operative time, though this was not statistically significant (p=0.36). Minor postoperative complications (e.g., surgical site infection, seroma) were seen in 18% of periauricular cases and 8% of traditional incisions, which was also not statistically significant (p=0.27). No major postoperative complications or permanent facial nerve injuries occurred in either group. Patients were followed for an average of 121 days after surgery. Patients with the periauricular incision healed with a nearly completely inconspicuous scar, in contrast to those who underwent traditional approaches. **Conclusions:** Though one prior study described the feasibility of the periauricular incision, the authors did not include facial nerve outcomes data. Our analysis demonstrates that the periauricular incision offers a safe and feasible approach to most parotid pathology.

11:47 Neck Dissection May Be of Low Utility in Previously Irradiated N0 Patients with Recurrent Oral Cavity Cancer Regardless of Depth of Invasion

Adeeb Derakhshan, MD, Boston, MA; Mustafa Ghaleb Bulbul, MD, Boston, MA (Presenter); Anuraag Parikh, MD, Boston, MA; Kevin S. Emerick, MD, Boston, MA; Derrick T. Lin, MD, Boston, MA; Daniel G. Deschler, MD, Boston, MA; Mark A. Varvares, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand why the utility of neck dissection should be considered carefully in previously irradiated patients with recurrent oral cavity cancer.

Objectives: To investigate the rate of occult nodal metastasis in previously irradiated patients with recurrent oral cavity cancer and determine the role of depth of invasion in this cohort. **Study Design:** Retrospective assessment using clinical data repository. **Methods:** The institutional cancer registry was used to identify patients in a 10 year span who had received previous radiation (with or without surgical extirpation, without neck dissection) for oral cavity malignancy and then developed recurrence in the oral cavity without clinical neck disease. Patients that underwent neck dissection as part of treatment for their recurrent tumor were included. Demographic data, operative notes, and pathology reports were reviewed. **Results:** Sixteen patients met criteria for inclusion. Patients had an average depth of invasion of 4.1+/-5.7 mm (range 0.2-18.5 mm). No patients had evidence of microscopic nodal disease. A 1 proportion z test analyzing the rate of nodal metastases in our population to the expected value based on the literature found a statistically significant difference (p<0.03) in the predictive value of DOI in previously irradiated patients compared to treatment naïve patients. **Conclusions:** In this study of the incidence of nodal metastasis in previously irradiated recurrent oral cavity cancer patients, we found that the rate of occult nodal disease was lower than expected compared to treatment naïve patients. Unlike treatment naïve patients, depth of invasion was not a strong predictor of nodal metastasis. Although a larger sample size would strengthen our preliminary results, initial findings indicate that neck dissections performed in previously radiated patients with recurrent cN0 oral cavity cancers may be of low utility.

11:54 Q&A

12:00 - 1:00 Lunch/View Posters - Ballroom

**10:00 - 12:00 CONCURRENT SESSION 5B
OTOLOGY/NEUROTOLOGY - EMPRESS/REGENT-GRAND HALL**

Moderator: Fred F. Telischi, MD FACS, Miami, FL

10:00 Postoperative Acquired Cholesteatoma Outcomes in Rural versus Urban Populations
Kenneth L. Kennedy, MD, Louisville, KY; Kevin M. Connolly, MD, Baltimore, MD; Christina L. Albert, BS, Louisville, KY; Julie L. Goldman, MD, Louisville, KY; Elizabeth D. Cash, PhD, Louisville, KY; Mark A. Severtson, MD, Louisville, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the differences in postoperative outcomes among rural versus urban patients who have undergone surgical procedures for cholesteatoma.

Objectives: Chronic ear disease presents a unique challenge to otolaryngologists in both rural and urban settings. Cholesteatoma remains a difficult disease to treat in rural populations due to limited access to care and high risk of recurrence. The purpose of this study was to determine if there are differences in surgical outcomes among patients with acquired cholesteatoma residing in rural versus urban settings. **Study Design:** Single surgeon retrospective case series with chart review. **Methods:** CPT, ICD9, and ICD10 codes were used to identify patients diagnosed with cholesteatomas from January 2011-May 2017. Zip codes were used to determine urban versus rural status based on published population data from the USDA. Surgical outcomes including recurrence rates, air bone gap improvement, ossicular integrity, and complications were reviewed and compared between the rural and urban cohorts. **Results:** Presence of postoperative residual cholesteatoma (OR=8.667, 95% CI=2.022-37.141, p=.008) and number of surgeries per patient (OR=5.185, 95% CI=1.086-24.763, p=.024) were significantly increased among patients living in rural nonmetropolitan areas. No significant differences were found when comparing risk of recurrence, size of cholesteatoma, presence of complications, air bone gap improvement, and ossicular chain integrity. Additionally, there were significantly more second look surgeries performed in privately insured patients (OR=8.582, 95% CI=1.937-38.017, p=.001). **Conclusions:** Patients living in rural communities have an increased number of surgeries and postoperative risk for residual cholesteatoma when compared to patients residing in urban settings. This study provides the basis for future prospective examinations of differences in outcomes among urban versus rural patients.

10:07 Comparative Analysis of Otitis Media Associated Molecular Signaling in Primary and Immortalized Middle Ear Epithelial Cell Culture Models of Pediatric Otitis Media

Caroline A. McCormick, BS, Milwaukee, WI; Mana E. Espahbodi, MD, Milwaukee, WI; Pawjai K. Khampang, MS, Milwaukee, WI; Tina L. Samuels, MS, Milwaukee, WI; Nikki J. Johnston, PhD, Milwaukee, WI; Joseph E. Kerschner, MD, Milwaukee, WI

Educational Objective: At the conclusion of this presentation, the participants will better understand variability in the response of middle ear epithelial cell culture models to otitis media associated stimuli.

Objectives: Cell culture models are a valuable tool for investigation of the molecular pathogenesis of diseases including otitis media (OM). Previous study indicates that age, sex and race associated differences in molecular signaling may impact disease pathophysiology. Currently a singular immortalized middle ear epithelial (MEE) cell line exists, HMEEEC-1, derived from an adult absent of disease. In this study, HMEEEC-1 and MEE cell cultures from pediatric OM patients were stimulated with inflammatory cytokines or OM pathogenic bacterial lysates to examine differences in the response of OM associated gene expressions. **Study Design:** In vitro translational. **Methods:** MEE primary cultures were established from biopsies obtained from recurrent OM (ROM; 1 male (m), 1 female (f) Caucasian with negligible hearing loss) and OM with effusion (OME; 1m/1f African American with >30dB hearing loss) patients <6years. MEE cultures and HMEEEC-1 cells were stimulated with TNF-alpha, IL-1beta or non-typeable haemophilus influenzae lysate. MUC5B, MIR146A and IL6, -8, -10 were assayed via qPCR. IL-8 was assayed by ELISA. **Results:** Baseline and stimulated gene/protein expressions were more similar across MEE cultures of OM patients than between OM cultures and HMEEEC-1. **Conclusions:** These data suggest that HMEEEC-1 may not adequately represent pediatric MEE cells with regard to OM associated molecular signaling, and that OM chronicity or race may be associated with specific molecular phenotypes retained in primary cell culture. Work is underway to immortalize pediatric OM MEE cultures and further evaluate potential differences in MEE cultures associated with age, sex, race and disease chronicity.

10:14 Pediatric Skull Base Fractures: An Analysis of Demographic Risk Factors and Age Related Complications

Jacob S. Mesches, MS, Syracuse, NY; Alex J.F. Tampio, MD, Syracuse, NY; Brian D. Nicholas, MD, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the demographic risk factors for pediatric skull base fractures and compare the differences in otologic complications between younger and older patients.

Objectives: To evaluate the annual trends, associated otologic complications, and baseline demographic predictors of pediatric skull base fractures (SBF). **Study Design:** Retrospective data analysis. **Methods:** Pediatric inpatient admissions were analyzed using the 2000-2012 Kids' Inpatient Database (KID). Multivariable logistic regression analysis was performed to determine trends and associated risk factors for SBF. Secondary analysis of patients with SBF was performed to evaluate age related severity measures and complications. **Results:** From 2000-2012, there were 39,154 admissions for SBF. Of all pediatric inpatient admissions, odds of admission for SBF increased significantly with calendar year (odds ratio [OR]: 1.01, 95% confidence interval [CI]: 1.01-1.02). Significant risk factors included increasing age (OR 1.06, CI 1.05-1.06), maleness (OR 2.42, CI 2.37-2.47), white race vs black race (OR 1.85, CI 1.78-1.92), private insurance vs Medicaid (OR 1.64, CI 1.60-1.68), and median income for zip code 4th quartile vs 1st quartile (OR 1.19, CI 1.12-1.27). Subgroup analysis of SBF indicated that patients 1 year of age and older were significantly more likely to have otologic complications (OR 8.91, CI 6.63-11.96), die during admission (OR 2.00, CI 1.59-2.52), and have a nonroutine discharge (OR 2.25, CI 1.93-2.63). **Conclusions:** Annual trends of pediatric SBF suggest modest changes from 2000 to 2012.

Admitted patients are at greater risk of SBF if they are older, white, male, have private insurance, or live in a zip code with high median income. Of those with SBF, patients 1 year of age and older have greater morbidity and mortality than patients younger than 1 year old.

10:21 Real Time Feedback Control of Voice in Cochlear Implant Recipients

Steven J. Eliades, MD PhD, Philadelphia, PA; Anirudh Guatam, BSc, Dublin, Ireland; Jason A. Brant, MD, Philadelphia, PA; Michael J. Ruckenstein, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the role of auditory feedback in vocal pitch control for patients with cochlear implants.

Objectives: Hearing plays an important role in the development and maintenance of normal speech and voice, a process which is compromised in hearing loss. Cochlear implants (CIs) only partially restore normal control of voice, and it is unclear how well recipients use auditory feedback to help control their voice. **Study Design:** Cross-sectional. **Methods:** Twenty-three CI recipients were enrolled. Voice recordings were performed while subjects repeated the vowel /e/. Feedback of vocal sounds was altered in real time to introduce a pitch shift (-2, 2, 4, 6 or 12 semitones) and presented back to subjects using headphones. Recordings were analyzed to determine voice changes following the pitch shifted feedback, and results compared to feedback shift magnitude and patient demographics. **Results:** Consistent with previous results, CI patients' voices had higher pitches with their implant turned off, a change explainable by increased vocal loudness. CI patients compensated for pitch shifted feedback by changing their produced vocal pitch, but only for 6 and 12 semitone shifts. Consider intersubject variability was present and correlated with duration of implant experience. **Conclusions:** CI patients, like normal hearing individuals, are capable of real time feedback dependent control of their vocal pitch. However, CI patients are less sensitive to small feedback changes, possibly a result of coarser CI frequency precision, and may explain poorer than normal vocal control in these patients.

10:28 Subjective Sudden Hearing Loss in Patients with Vestibular Schwannoma

Kareem O. Tawfik, MD, San Diego, CA; Jason H. Lee, BS, San Diego, CA; Yin Ren, MD PhD, San Diego, CA; Omid Moshtaghi, MD, San Diego, CA; Marc S. Schwartz, MD, San Diego, CA; Rick A. Friedman, MD PhD, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the prevalence of and common treatment regimens for subjective sudden hearing loss in patients with vestibular schwannoma. Participants should also be able to describe how steroid therapy for sudden hearing loss may affect hearing outcomes among these patients.

Objectives: Determine the rate of subjective sudden hearing loss (SHL) among patients with vestibular schwannoma (VS). **Study Design:** Prospective survey study of VS patients evaluated at an academic, quaternary care program. **Methods:** Beginning April 8, 2019, all new VS patients were provided survey questionnaires by electronic mail. Patients were asked about history of subjective SHL, treatment for SHL, and recovery of hearing. **Results:** Of 76 patients, 38 (50%) completed the survey. Twenty-two patients (57.9%) reported a history of subjective SHL. Of these, 16 (72.7%) experienced no subjective recovery of hearing, and six (27.3%) had partial recovery. No patient reported full recovery of hearing. Among patients who had SHL, only 12 (54.5%) reported having had their hearing loss treated with steroid therapy. Eight patients (66.7%) were treated with oral steroids alone, one patient (8.3%) was treated with intratympanic steroids alone, and three patients (25.0%) were treated with combination oral and intratympanic steroids. Of 12 patients treated with steroids, seven (58.3%) had no recovery of hearing, and five (41.7%) had partial recovery. Of 10 patients with untreated SHL, nine (90.0%) had no hearing recovery, and one patient (10.0%) experienced spontaneous partial hearing recovery. **Conclusions:** Subjective SHL is strikingly common among patients presenting for evaluation of VS. It is possible that current strict definitions of sudden sensorineural hearing loss have resulted in underdiagnosis of this clinical entity in patients with VS. Full results of this ongoing study will be presented at the upcoming meeting.

10:35 Assessment of Noise Levels at the Tympanic Membrane during Aural Microsuction Using Cadaveric Temporal Bone Models

Allen H. Young, MD, Las Vegas, NV; Matthew Ng, MD, Las Vegas, NV

Educational Objective: At the conclusion of this presentation, the participants should be able to appreciate how suction caliber, instrument distance from the tympanic membrane, and moisture level of the external auditory canal can affect patient comfort during outpatient aural microsuction and renovate strategies to reduce patient discomfort.

Objectives: Microsuction under otomicroscopy is one of the most common outpatient procedures to remove debris from the external auditory canal (EAC). Uncomfortable noise levels are frequent patient complaints and this study aims to quantify the noise levels produced at the tympanic membrane under varying suction calibers, distances from the TM, and external canal moisture using cadaveric temporal bone models and to develop strategies for alleviating noise intensity. **Study Design:** Quantitative experimental study with cadaveric temporal bone models. **Methods:** Four cadaveric tem-

Saturday

poral bone models with intact external auditory canals and tympanic membranes were chosen. Mastoidectomy and facial canal takedown were performed on each model to access the middle ear space where an endoscopic microphone was placed immediately medial to the TM. Noise levels from microsuction were collected over a period of 10 seconds across a frequency range of 25-20000 Hz for each suction caliber (3Fr, 5Fr, 7Fr), distance from TM (0mm, 5mm, 10mm), and moisture level (dry versus saline-filled EAC) for all four models. **Results:** Noise levels peaked at 87 dB at 3 kHz on one model. Decibels increased with larger external canal volume, larger caliber suction, and shorter distances to the TM. Moisture in the EAC showed a trend towards higher noise levels. **Conclusions:** Microsuction can create discomfort for patients in the outpatient setting. Clinicians can improve patient comfort in clinic by preferentially utilizing dry instrumentation and starting with the smallest caliber suction. When using drops to moisten debris, patients should be warned of increased noise level.

10:42 Performance Measures and Gait Outcomes as a Function of Operative Approach in Acoustic Neuroma Surgical Resection

Omid Moshtaghi, MD, San Diego, CA; Joe Saliba, MD, San Diego, CA; Pasha Mehranpour, San Diego, CA; Kareem Tawfik, MD, San Diego, CA; Marc Schwartz, MD, San Diego, CA; Rick Friedman, MD PhD, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the functional and gait changes in patients undergoing three different approaches to acoustic neuroma resection.

Objectives: To compare the functional and gait disturbance change between the three different surgical approaches to acoustic neuroma (AN) resection. **Study Design:** A prospective review of performance measures were obtained 1 week pre and postoperatively. **Methods:** One week prior to AN resection, patients were evaluated with three different gait and performance measure metrics. The patients were subsequently evaluated with the same three assessments at one week postop. The evaluations included dynamic gait index (DGI), functional gait assessment (FGA), and timed 10 meter walk test. **Results:** A total of 138 AN patients were reviewed, 88 of which completed pre and postoperative assessment. Of this cohort, 70 (79%) demonstrated a worse DGI score postop, while 10 (11%) had no change, and 9 (10%) experienced improvement 1 week after resection. Of the 26 retrosigmoid approaches, 1 improved (3.4%). Of the 35 translabyrinthine approaches, 7 (8.6%) improved. Of the 20 middle fossa approaches, 2 (10%) experienced improvement. However, no difference in change between the three approaches was detected ($p=0.87$). Using FGA testing, no difference in change was detected as well ($p=0.06$). This was confirmed when comparing 10 meter walk test times as well ($p=0.34$). **Conclusions:** Out of a cohort of 88 patients undergoing AN resection, 9 patients who experienced preoperative gait instability experienced a functional improvement 1 week postoperatively. These findings were independent of surgical approach, which suggests there is no difference in functional or gait consequences as a function of the three surgical approaches to AN resection.

10:49 Q&A

10:55 - 12:00 Otolaryngology/Neurotology Panel: Unusual Dizziness

Moderator: Alan A. Micco, MD, Chicago, IL
Panelists: Yuri Agrawal, MD, Baltimore, MD
Michael E. Hoffer, MD, Miami, FL
Peter Weisskopf, MD, Phoenix AZ

11:55 Q&A

12:00 - 1:00 Lunch/View Posters - Ballroom

12:10 - 1:00 *Tips for Peer-Reviewing from the Editors - Open to current and potential reviewers for The Laryngoscope and Laryngoscope Investigative Otolaryngology (attendees should bring lunch from the buffet to the seminar)*
Crystal/Continental

1:10 - 3:05 CONCURRENT SESSION 6A PEDIATRIC OTOLARYNGOLOGY - CROWN ROOM

Moderator: Austin S. Rose, MD, Chapel Hill, NC

- 1:10** **The Use of Bone Conduction Hearing Devices in Children with Unilateral Congenital Aural Atresia**
Nicole L. Alexander, BSA, Houston, TX; Rodrigo C. Silva, MD, Houston, TX; YiChun C. Liu, MD, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the hearing management for children with unilateral aural atresia.

Objectives: To characterize the use of bone conduction hearing devices (BCHD) for the hearing management in children with unilateral congenital aural atresia (CAA) at a tertiary pediatric center while assessing acquisition limitations. BCHD generally provides better audiologic outcomes than atresiaplasty in the pediatric CAA population. BCHD is recommended for bilateral CAA but not in unilateral CAA. **Study Design:** Retrospective case series of patients born between 2016-2018 with unilateral microtia at an urban tertiary care children's hospital. **Methods:** Patients' charts were retrospectively reviewed to collect information on demographics, CAA laterality, hearing loss severity, and management. Statistical analysis aided characterization of BCHD use. **Results:** 63 patients were included in the analysis. The mean age was 2.3 years with 67% males and 19% syndromic. 71% were Hispanic, 25% Caucasian, 2% African-American, and 2% Asian patients. 52 (83%) patients with unilateral microtia were used for further analysis. 67% had right sided microtia, while 33% were left sided. Of the patients with auditory brain response (ABR) testing available, 67% demonstrated conductive hearing loss (HL), 15% mixed HL, 6% no HL secondary to grade 1 microtia, and 12% have pending audiological evaluation. 18 (35%) patients with unilateral microtia were fitted for a BCHD. **Conclusions:** Even with thorough consultation and followup, only 35% of the patients with unilateral CAA received BCHD. Primary reasons cited were missed appointments and parental refusal. Future research on the factors preventing widespread BCHD use in unilateral CAA patients will help standardize management and provide patients with improved hearing within a critical auditory period.

- 1:17** **Validation of the Preschool HEAR-QL Survey**
Cathy Y. Yu, BS, St. Louis, MO; Donna B. Jeffe, PhD, St. Louis, MO; Margaret A. Kenna, MD MPH, Boston, MA; John A. Germiller, MD PhD, Philadelphia, PA; Judith E.C. Lieu, MD MSPH, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to describe factors that contribute to quality of life of preschool aged children with hearing loss and better understand how the parent proxy preschool HEAR-QL captures different and more nuanced information than other generic quality of life or hearing related measures for preschool aged children.

Objectives: No hearing related quality of life (QL) questionnaire currently exists for children <7 years. We aimed to develop a parent proxy assessment of QL in preschool aged children with hearing loss (HL). **Study Design:** Survey study. **Methods:** Using data from parent focus groups, we created questionnaire items, conducted cognitive interviews with a target sample of potential caregivers, and developed a 70 item questionnaire (Preschool HEAR-QL) to be validated against a generic pediatric QL measure (PedsQL), a family impact QL measure, a caregiver evaluation of children's hearing and communication (PEACH), and parental QL measure (NIH PROMIS adult global report). Using ICD-9/ICD-10 diagnosis codes, parents of preschool aged children with HL were recruited from pediatric audiology and otolaryngology clinics of three institutions. Parents completed all surveys, provided demographic information about the child with HL and the family, and repeated the Preschool HEAR-QL after 2 weeks to assess test retest reliability. **Results:** 205 parents participated; 81% were white, 57% of children with HL were male, and 69% of mothers completed at least college. Using principal components analysis, we reduced the number of items to 23, loading on 5 factors: behavior and attention; hearing environments; new social situations; social interactions; and communications. Cronbach's alpha for each factor ranged from 0.80 to 0.91. Test retest reliability was 0.93 with 165 paired responses. Correlations between each Preschool HEAR-QL factor and each of the domains of previously validated measures were weak to moderate. **Conclusions:** The new Preschool HEAR-QL shows excellent construct validity and test retest reliability. Evaluation of the measure in research and clinical settings is ongoing.

- 1:24** **How Long Does It Take to Master Flexible Nasolaryngoscopy in Children?**
Kieran S. Boochoon, BS MS, Bryan, TX; Julina Ongkasuwan, MD FACS, Houston, TX; Wei Zhang, PhD, Houston, TX; Annie K. Ahn, MD, Houston, TX; Mary Frances Musso, DO, Houston, TX; Yi-Chun Carol Liu, MD FACS, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the difference in the quality of pediatric flexible nasolaryngoscopy (FNL) in trainees by year of training.

Saturday

Objectives: Evaluation of the larynx via flexible nasolaryngoscopy (FNL) in children can be challenging due to patient movement and secretions. It is not clear how long it takes to achieve proficiency in pediatric FNL. The primary objective of this study is to evaluate the quality of FNL by year of training. **Study Design:** Prospective cohort study. **Methods:** Ninety-five pediatric FNL's were performed by otolaryngology residents and pediatric otolaryngology fellows (post-graduate year [PGY] 1 - 6). Three pediatric otolaryngologists rated the FNL videos (anonymized and without sound) using the modified Cormack-Lehane scoring system (MCLS). Data analysis was performed using two way ANOVA and Tukey-Kramer adjustment. **Results:** Overall there was a significant difference in the quality of the FNL based on the years of training ($p < 0.0001$). Comparing specific years, there was a statistically significant statistical difference between PGY-1 and PGY-2 ($p = 0.0036$); however, there was no difference between years of training beyond the PGY-2 year. **Conclusions:** The quality of pediatric FNL improves after the PGY-1 year. Current training consists of the traditional "see one, do one, teach one" rubric. Future goals involve the development of a curriculum, including simulation, to shorten the time to achieve proficiency in pediatric FNL.

1:31 Safety of Adenotonsillectomy in Children Younger than 2 Years of Age

Eshita Singh, BS, Cincinnati, OH; John A. Stafford, MD, Cincinnati, OH (Presenter);
Kathleen M. Sarber, MD, Cincinnati, OH; Stacey L. Ishman, MD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to assess the safety of tonsillectomy and adenoidectomy in patients under age 2.

Objectives: To assess the safety of adenotonsillectomy (T&A) in children younger than 2 years of age in an urban tertiary pediatric hospital. **Study Design:** Retrospective case series. **Methods:** All patients younger than 2 years old who underwent T&A from 2010 to 2018 were included. Subgroups of those younger than 1 year of age were compared to those 1 to 2 years of age. Outcomes analyzed included intensive care unit (ICU) admissions, postoperative nursing calls, emergency room visits within 30 days of surgery, 30 day readmissions, unplanned respiratory support, and perioperative complications. **Results:** We identified 771 children who underwent T&A with a median age of 1.7 years (95% CI: 1.61-1.72) and body mass index (BMI) of 17.2 kg/m² (95% CI 17.2-17.7). Sixteen children (2.1%) were younger than 1 year. No significant differences were found for gender, race, or BMI percentile between the two groups ($P > 0.05$). Overall, ER visits within 30 days and 30 day readmission rates were 15.3% and 7.3%, respectively, with no significant difference between groups ($P = 0.083$ and $P = 0.220$). Bleeding and dehydration were the most common reasons for ER visit at 4.3% and 3.6%, respectively. The rate of planned and unplanned ICU admission rate was 3.9% and 2.7%, with no significant difference between groups ($P = 0.471$ and $P = 0.283$). **Conclusions:** In this cohort we found that T&A was a safe procedure when performed in children under the age of 2. Outcomes were similar for the 16 children younger than 1 year of age, suggesting that T&A may be safely performed in the very young.

1:38 Evolving Microbial Patterns of Acute Coalescent Mastoiditis in the Post-Pneumococcal Vaccination Era

Dhruv Sharma, MD, Indianapolis, IN; Daniel R. Romano, BS, Indianapolis, IN; Jerry Chen, BA, Indianapolis, IN; Lindsay Mulinaro, AuD, Indianapolis, IN; Elisa A. Illing, MD, Indianapolis, IN; Sarah J. Burgin, MD, Indianapolis, IN

Educational Objective: At the conclusion of this presentation, the participants should be able to 1) understand the recent developments in pneumococcal vaccination that have likely altered the microbiology and clinical course of acute mastoiditis over the last two decades; 2) know that negative intraoperative cultures were associated with a longer duration of antibiotic administration; and 3) consider the implications of our findings and possible future research directions.

Objectives: To investigate the microbial patterns and clinical outcomes of pediatric patients undergoing mastoidectomy for acute coalescent mastoiditis and to identify factors associated with poor outcomes and/or prolonged treatment. **Study Design:** This study is a retrospective review of all pediatric patients eighteen or younger who underwent mastoidectomy for acute coalescent mastoiditis at our tertiary referral children's hospital in an urban setting from January 2015 to July 2018. **Methods:** Institutional review board approval was obtained from our school of medicine. Twenty-two pediatric patients were identified. Demographic and clinical data were collected from the electronic medical record. Statistics were performed in Excel and Python. **Results:** There is a high rate (27% (6/22)) of negative intraoperative cultures in this population. Patients who had no growth had a longer duration of administered antibiotics ($p = 0.015$) and higher rates of peripherally inserted central catheter placement compared to patients who had culture growth. The most frequently isolated causative organism is *S. pyogenes* (50% (8/16)), followed by *S. pneumoniae* (25% (4/16)). A significant proportion of positive cultures were polymicrobial in growth (38% (6/16)). 86% (19/22) of patients had extracranial complications and 31% (7/22) had intracranial complications. **Conclusions:** There is a high rate of negative cultures in this population. Negative cultures are associated with a longer duration of antibiotic administration. Polymerase chain reaction testing may prove useful for pathogen isolation in cases with negative cultures. Pneumococcal vaccination has likely changed the microbiology of acute coalescent mastoiditis, and *S. pyogenes* may now be the predominant etiologic agent.

1:45 **A Longitudinal Analysis of Outcomes in Tracheostomy Placement Among Preterm Infants**
William Wood, BSA, Dallas, TX; Cynthia S. Wang, MD, Dallas, TX; Gopi B. Shah, MD MPH, Dallas, TX;
Ron B. Mitchell, MD, Dallas, TX; Romaine F. Johnson, MD MPH, Dallas, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the similarities in decannulation and survival rates between premature and extremely premature infants.

Objectives: 1) To study a cohort of preterm infants' decannulation and survival rates after tracheostomy; and (2) to assess the neurocognitive quality of life (QOL) among survivors. **Study Design:** A longitudinal cohort study. **Methods:** We performed a single institution longitudinal study of preterm infants with a tracheostomy. Infants were categorized as premature = born > 28 weeks and < 37 weeks and extremely premature (eprem) (born <28 weeks). Decannulation and survival rates were determined using the Kaplan-Meier method. Neurocognitive QOL was reported as normal, mild/moderately, and severely impaired. Significance was set a $p < .005$. **Results:** This study included 240 patients; 111 were premature, and 129 were eprem. The median age (IQR) at tracheostomy was 4.8 months (0.4). Premature infants were more likely than eprem to have airway obstruction (54% vs. 32%, $p < .001$); while eprem infants were more likely to have bronchopulmonary dysplasia (68% vs. 15%, $p < .001$) and to be ventilation dependent (68% vs. 54%, $p < .001$). The 5 year decannulation rates for premature infants was 46% and for eprem was 64%. The 5 year survival rate post-tracheostomy for prem was 79% and 73% for eprem. The log rank test of equality showed that decannulation and survival were similar ($p > 0.005$) for both groups, even after controlling for potentially confounding factors like race, age, gender, and birth weight. More premature than eprem infants had severe neurocognitive but it was not significant at the .005 level (56% vs. 40%, $p = .03$). **Conclusions:** This study demonstrated that the time to decannulation and likelihood of survival did not vary among premature and extremely premature infants even when controlling for other confounding variables. Neurocognitive ability among survivors was also relatively equal.

1:52 **Effect of Postoperative Steroid Dosing on Complications following Coblation Tonsillectomy**
John A. Stafford, MD, Cincinnati, OH; Andrew J. Redmann, MD, Cincinnati, OH; Eshita Singh, BS,
Cincinnati, OH; Kathleen M. Sarber, MD, Cincinnati, OH; Stacey L. Ishman, MD MPH, Cincinnati, OH

postoperative steroid dosage on postoperative physician contacts, emergency department (ED) visits, and hemorrhage rates following coblation tonsillectomy.

Objectives: To examine the effect of postoperative steroid dosage on postoperative physician contacts, emergency department (ED) visits, and hemorrhage rates following coblation tonsillectomy. **Study Design:** Retrospective chart review. **Methods:** Chart review was performed on patients undergoing consecutive coblation tonsillectomy with trainee assistance between 2014 and 2019. Two postoperative steroid dosing protocols were examined: (A) three postoperative doses of 0.5mg/kg dexamethasone, and (B) three postoperative doses of 4 mg dexamethasone (regardless of weight). All patients received acetaminophen and ibuprofen postoperatively, with rescue oxycodone 0.1mg/kg given for children >6 years of age. Patient phone calls, ED visits, readmission rates, and hemorrhage rates were recorded and analyzed. **Results:** We analyzed 279 patients (for 0.5mg/kg $n=179$ and for 4mg $n=100$). No differences were found between groups in age, gender, race, BMI, or comorbidities ($P > 0.05$). Overall readmission and ED visit rates were 2.8% and 12.2% respectively, with no significant differences between groups (A 2.1%, B 4.0%, $P=0.24$ and A 11.8%, B 13.1%, $P=0.65$, respectively). Overall hemorrhage rate (including patients presenting to the ED with bleeding concerns who did not require intervention) was 6.3%. There was no difference in hemorrhage rates between groups (A 4.0%, B 8.1%, $P=0.22$). The overall hemorrhage rate requiring operative intervention was 1.4% with no difference between groups (A 1.1%, B 2.0%, $P=0.27$). Postoperative patient phone calls occurred in 13.3% of cases without any difference between groups (A 14.4%, B 11.1%, $P=0.41$). **Conclusions:** Both dosing protocols for postoperative steroids resulted in comparable rates of readmission, ED visits, hemorrhage, and patient phone calls following coblation tonsillectomy. This suggests that lower steroid doses may be used to optimize care and minimize side effects.

1:59 **Q&A**

2:05 - 3:00 **Collaborative Panel with American Society of Pediatric Otolaryngology:
Big Problems, Little Patients**

Moderator: J. Paul Willging, MD, Cincinnati, OH

Panelists: **Hard to Understand**

Anna H. Messner, MD, Houston, TX

Important Ways They Are Not Just Like Small Adults

Blake C. Papsin, MD, Toronto, ON Canada

Aspiration and Pneumonia: Myth and Reality

Reza Rahbar, MD, Boston, MA

3:00 **Q&A**

Saturday

3:10 - 3:30 Break/View Posters - Ballroom

1:10 - 3:05 CONCURRENT SESSION 6B GENERAL AND SLEEP MEDICINE - EMPRESS/REGENT-GRAND HALL

1:10 - 2:05 General Panel: State of The Art - Image Guidance

Moderator: Eben L. Rosenthal, MD, Stanford, CA

Panelists: Fluorescence Imaging of Nerves during Surgery

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

Oral Cancer Resections Improved with Fluorescence Guidance

Eben L. Rosenthal, MD, Stanford, CA

Ultrasound Guided Thyroid Biopsy and Ablation

David L. Steward, MD, Cincinnati, OH

2:05 Q&A

Moderator: Bradley J. Goldstein, MD PhD FACS, Durham, NC

2:10 Evaluation of Patient Phenotypes and Sleep Surgery Outcomes

George M. Davies, BS, Memphis, TN; Madhu P. Mamidala, PhD, Memphis, TN; Kimberly K. Coca, BS, Memphis, TN; Marion B. Gillespie, MD MSc, Memphis, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the impact of multi-level sleep surgical procedures on clinical and polysomnographic outcome measures. To discuss the complication rates associated with various multi-level sleep surgical procedures.

Objectives: Determine differences in phenotype and outcome of patients treated with upper airway stimulation (UAS) compared to other multi-level upper airway soft tissue surgery (OSP). **Study Design:** Prospective cohort. **Methods:** Adult patients with moderate to severe OSA who had failed prior CPAP therapy and were candidates for multi-level surgical modification of the upper airway were eligible to participate. The study acquired baseline variables including patient demographics and anatomic phenotype (BMI; tonsil size; nasal anatomy; modified Mallampati; jaw structure). In addition, pre- and post-treatment outcome variables were recorded including sleep study parameters (AHI; oxygen nadir) and patient based clinical outcome measures (Epworth, snoring VAS, global sleep related QOL VAS, dysphagia VAS). **Results:** 20 eligible patients were separated by those who received UAS (N=10) and those receiving OSP (N=10). Mean AHI decrease for the UAS group was 73.90% (SD=19.98); p-value= <0.0001. OSP group having a decrease of 19.53% (SD=45.65); p-value= 0.11. Mean preoperative ESS for the UAS group was 13.40 (SD=3.69) and 5.90 (SD=2.73) postoperatively; p-value= 0.0008. OSP group had pre- and post-treatment ESS values of 10.78 (SD=6.44) and 7.67 (SD=5.45) respectively; p value= 0.11. Univariate analysis of patient demographics and anatomic phenotype demonstrated no statistical significance for either group. Six patients had postoperative complications, 2 in the UAS group and 4 in the OSP. **Conclusions:** Early study findings demonstrate both clinical and polysomnographic benefit for 90% of patients receiving multi-level sleep surgery. UAS appears to provide better outcomes than other surgical procedures for patients who are eligible for implantation. Few patients receiving multi-level sleep surgery complained of chronic complications following surgical intervention.

2:17 Trends in Sleep Disordered Breathing - A Cross-Sectional Analysis

Stuti Desai-Markowski, MD, Dallas, TX; Gopi B. Shah, MD MPH, Dallas, TX; Ron B. Mitchell, MD, Dallas, TX; Romaine F. Johnson, MD MPH, Dallas, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss recent trends in self-reported rates of sleep disordered breathing among US residents.

Objectives: 1) To examine the rates of self-reported sleep problems among national cohort ages 16 years and older; (2) to determine if the prevalence of snoring, apneas, and daytime sleepiness has increased from 2005 to 2015; and (3) to perform a sub-analysis of obese versus non-obese respondents with sleep problems. **Study Design:** National cross-sectional analysis. **Methods:** We analyzed the 2005 and 2015 National Health and Examination Survey (NHANES), Sleep Questionnaire. The NHANES is a cross-sectional survey of US residents. The sleep questionnaire is a subsection of the NHANES that addresses sleep habits and disorders of respondents > 16 years old. The following variables were analyzed and compared: age, gender, race, obesity, snoring, apneas, and daytime sleepiness. The presence of snoring, apneas, and daytime sleepiness were analyzed by logistic regression to predict the probability of sleep problems among the different demographics over ten years. Significance was set at p < .005. **Results:** The estimated study population was 30 million in 2005 and 32 million in 2015. The population's mean age was 37 years old, 51% female, and 64% non-Hispanic

White. The obesity rate was 34% in 2005 and 39% in 2015. Obese respondents were more likely to report snoring (78% vs. 63%, $p < .001$), apneas (28% vs. 17%, $p < .001$), and daytime sleepiness (32% vs. 27%, $p < .001$) when compared to non-obese respondents. The rates of snoring, apneas, and daytime sleepiness significantly increased ($P < .005$) from 2005 to 2015 among obese and non-obese alike. Snoring increased from 67% to 71% (5.9% increase); apneas from 19% to 24% (23% increase); and sleepiness from 52% to 68% (31% increase). Among obese respondents, there was a 3.4% increase (77% to 79%) in snoring, an 18% increase in apnea symptoms (27% to 30%), and a 26% increase in daytime sleepiness (54% to 75%). Although the odds of sleep problems were higher among obese respondents, the probability of having a sleep problem increased more in non-obese respondents from 2005 to 2015 (1.5%, 95% CI - 0.9% to 2.1%). **Conclusions:** The prevalence of self-reported snoring, apnea, and daytime sleepiness have increased among non-obese and obese respondents alike with obese respondents more likely to be affected. These findings suggest that sleep quality may be worsening among US residents.

2:25 The Impact of Mental Disorders on Outcomes in Head and Neck Cancer Surgery

Jeff Gao, BS, Newark, NJ; Christopher C. Tseng, BS, Newark, NJ; Gregory L. Barinsky, PharmD, Newark, NJ; Soly Baredes, MD, Newark, NJ; Richard C. Park, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the impact of mental disorders on complication rates in patients undergoing head and neck cancer surgery.

Objectives: To assess the impact of mental disorders on complication rates in patients undergoing head and neck cancer surgery. **Study Design:** Retrospective database review. **Methods:** The Nationwide Inpatient Sample (NIS) was queried from years 2003-2014 for all patients with a diagnosis of malignant laryngeal, hypopharyngeal, oropharyngeal, or oral cavity neoplasm who underwent ablative surgery ($N=39,600$). Patients were placed into two cohorts based on the presence ($n=3,390$) or absence ($n=36,210$) of a comorbid mental disorder diagnosis. Univariate and binary logistic regression analysis were used to compare demographics, procedure related variables, and postoperative complication rates. **Results:** The most common mental disorder was substance abuse disorder (5.2%), followed by mood disorder (2.5%), anxiety disorder (0.8%), schizophrenia (0.6%), and impulse control disorder (0.1%). Patients with mental disorders were more likely to have a major procedure (54.7% vs. 44.6%) and more likely to have a reconstructive procedure (15.9% vs 12.3%). Following logistic regression, patients with mental disorders had increased risk of both overall medical complications (OR 1.406, $p = <0.001$) and overall surgical complications (OR 1.141, $p = 0.01$). Medical complications with significantly increased risk in the mental disorder cohort were UTI, pulmonary complications, fluid/electrolyte disturbance, and convulsions. Surgical complications with significantly increased risk were wound disruption and wound dehiscence. **Conclusions:** Having a diagnosed mental disorder may increase the risk for both medical and surgical complications in head and neck cancer surgery. Patients with mental disorders may require more comprehensive surgical planning to account for this increased risk.

2:32 Airway Intervention and Specialty Consultation Patterns in Angiotensin Converting Enzyme Inhibitor Induced Angioedema

Navin P. Prasad, BS, Washington, DC; Mark E. Russo, MD, Washington, DC; Kathleen M. Coerdts, BS, Washington, DC; Nazaneen E. Grant, MD, Washington, DC

Educational Objective: At the conclusion of this presentation the participants should be able to compare the severity of ACEi induced angioedema and the frequency of specialty consultation, airway intervention, and outpatient management.

Objectives: To identify the frequency of airway intervention, patient disposition, and otolaryngology consultation based on the extent of oral, oropharyngeal or laryngeal involvement in ACEi induced angioedema. **Study Design:** Retrospective chart review. **Methods:** 142 emergency department encounters were identified for ACEi induced angioedema between 4/1/2017 and 12/21/2018. Demographic information, patient presentation, and clinical outcomes were collected and analyzed. Patients were grouped by type of angioedema with type 1 identified as lips or anterior tongue only, type 2 involving the oropharynx or floor of mouth, and type 3 involving the laryngeal cartilages. **Results:** Of the 142 encounters, 66% had type 1 angioedema, 23% had type 2 angioedema, and 11% had type 3 angioedema. Patients with type 1 were significantly less likely to present with dysphagia (12% vs. 34% and 50%; $p < 0.01$) or voice changes (11% vs. 56% and 63%; $p < 0.01$), have an ENT consultation, (42% vs 91% and 100%, $p < 0.01$) or require airway intervention (1% vs. 16% and 25%; $p < 0.01$) compared to those with type 2 or 3. They were significantly more likely to be treated on an outpatient basis (65% vs 19% and 6%; $p < 0.01$). The only patient that required airway intervention with type 1 angioedema progressed to type 2 within 2 hours. **Conclusions:** Patients with type 1 angioedema are frequently safely treated on an outpatient basis without specialty consultation. A period of observation is vital to ensure that angioedema is not actively progressing prior to discharge.

Saturday

2:39 Characteristics of the Highest and Lowest Cited Articles in Otolaryngology Journals

Nicholas J. Rivers, BS, Birmingham, AL; Carter J. Boyd, BS, Birmingham, AL; Connor G. Koch, BS, Birmingham, AL; Benjamin J. Greene, MD, Birmingham, AL; Do-Yeon Cho, MD, Birmingham, AL

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize certain characteristics of otolaryngology research articles and consider their impact on the future citation rate.

Objectives: To determine what factors of otolaryngology articles are associated with higher citation in the three major otolaryngology journals. **Study Design:** A retrospective review. **Methods:** We generated a list of PubMed identification numbers using iCite, a resource from the National Institute of Health, and organized the articles by their total number of citations. Fifty highest (HC) and lowest (LC) cited articles published between 1998 and 2008 from three comprehensive major otolaryngology journals (Laryngoscope, Otolaryngology-Head & Neck Surgery, Journal of American Medical Association Otolaryngology-Head & Neck Surgery (formerly Archives of Otolaryngology Head & Neck Surgery)) were reviewed. **Results:** Many of the studied variables revealed statistically significant differences between the two groups. The highly cited articles were more likely to be clinical in nature (HC:LC = 46:31, $P < 0.001$), have more authors (HC:LC = 5.3+/-3.0:3.8+/-2.3, $p < 0.01$), higher word counts (HC:LC = 3315.8+/-1456.7:2263.2+/-896.8, $p < 0.0001$), a larger median sample size (HC:LC = 84:31, $p = 0.005$), and increased number of references (HC:LC = 25.4+/-13.9:15.8+/-8.3). Highly cited articles were found more often in the Laryngoscope ($n = 29$, $P < 0.001$). They were also significantly more likely to have a statistically significant primary finding, as well as more tables, and higher word counts. No significant difference was seen with number of figures, study design, or acknowledgment of funding and disclosures. **Conclusions:** A relatively small number of articles published in the three major comprehensive otolaryngology journals accrued 0 or 1 citation over a decade. There were noteworthy differences between the two groups, and certain characteristics are associated with achieving a high citation rate.

2:46 Association of Gastroesophageal Reflux Disease with Head and Neck Cancer: A Systematic Review and Meta-Analysis

Annica C. Eells, BS, Phoenix, AZ; Christopher P. Mackintosh, MLA, Phoenix, AZ; Michael J. Marino, MD, Phoenix, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss associations of gastroesophageal reflux disease with head and neck cancer, particularly in the larynx.

Objectives: Gastroesophageal reflux disease (GERD) has been associated with head and neck cancer (HNC), including laryngeal and pharyngeal subsites. A systematic review and meta-analysis were performed to examine these associations. **Study Design:** Systematic review and meta-analysis. **Methods:** Articles were retrieved from the Medline, Web of Science, Scopus, and Embase databases using keywords "gastroesophageal reflux disease", "laryngopharyngeal reflux", "head and neck cancer", and associated variants. Those included were limited to English language, human subject, case control studies with described development of HNC among individuals with GERD. 13 studies with a total of 39,824 patients were included. **Results:** Overall, presence of GERD was correlated with an increased risk of developing HNC (OR = 1.93, 95% confidence interval [CI] = 1.32-2.81). This correlation remained significant with laryngeal cancers (OR = 2.05, CI = 1.40-2.92), but not pharyngeal cancers (OR = 1.56, CI = 0.86-2.83, $p = 0.14$). Meta-analysis of studies that objectively assessed reflux, such as pH monitor placement, showed statistical significance (OR = 3.29, CI = 1.98-5.46), while studies that used subjective reporting of GERD did not (OR = 1.49, CI = 0.87-2.54). Correlation between H. pylori infection and head and neck cancers was not statistically significant (OR = 2.66, CI = 0.59-11.97). **Conclusions:** A diagnosis of GERD or laryngopharyngeal reflux is associated with a later diagnosis of HNC. There was a statistically significant association with laryngeal cancers, but not with other included HNC anatomical sites. Associations of GERD with HNSCC may be specific to laryngeal cancers.

2:53 An Analysis of Medicare Reimbursement Rates in Otolaryngology: 2000-2019

Johanny Lopez Dominguez, BS, Scottsdale, AZ; Sophia A. Ederaine, BS, Scottsdale, AZ (Presenter); Jack M. Haglin, BS, Scottsdale, AZ; David M. Barrs, MD, Scottsdale, AZ; Ana M. Aragon Sierra, BS, Scottsdale, AZ; David G. Lott, MD, Scottsdale, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the monetary trends in Medicare reimbursement rates for the 20 most common otorhinolaryngology procedures from 2000 to 2019.

Objectives: A comprehensive understanding of financial trends for procedural reimbursements is important as continued progress is made to advance agreeable reimbursement models in otolaryngology. The purpose of this study was to evaluate monetary trends in Medicare reimbursement rates for the 20 most common otolaryngology procedures from 2000 to 2019. **Study Design:** Retrospective analysis of publicly available data. **Methods:** The American Academy of Otolaryngology-Head and Neck Surgery database was queried to determine the 20 most performed procedures. Next, the physician fee schedule look-up tool from the Centers for Medicare & Medicaid Services was queried for each procedure and reimbursement data was extracted. All monetary data was adjusted for inflation to 2019 US dollars (USD) utilizing changes to the consumer price index (CPI). **Results:** After adjusting for inflation, the average reimbursement for

all procedures decreased by 36.3% from 2000 to 2019. The greatest mean decrease was seen in stereotaxis procedures on the skull, meninges, and brain (-59.18%), while the smallest mean decrease was in septoplasty (-2.78%). From 2000 to 2019, the adjusted reimbursement rate for all included procedures decreased by an average of 2.25% each year, with an average R-squared value of 0.71, indicating a stable decline throughout the study period. **Conclusions:** This is the first study to evaluate trends in procedural Medicare reimbursement for ENT procedures. When adjusted for inflation, Medicare reimbursement for included procedures has steadily decreased from 2000 to 2019. Increased awareness and consideration of these trends will be important for policymakers, hospitals, and surgeons in order to assure continued access to meaningful otolaryngology care in the U.S.

3:00 Sialendoscopy for Salivary Duct Stenosis: A Case Control Study
Karolina A. Plonowska, MD, San Francisco, CA; Edgar Ochoa, BS, San Francisco, CA;
Jolie L. Chang, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the temporal variation in therapeutic effect of sialendoscopy assisted salivary duct surgery (SASDS) in patients with chronic obstructive sialadenitis due to idiopathic duct stenosis as compared to patients managed conservatively.

Objectives: To evaluate longitudinal symptoms after sialendoscopy assisted salivary duct surgery (SASDS) in patients with chronic obstructive sialadenitis due to idiopathic duct stenosis. **Study Design:** Prospective longitudinal case control study. **Methods:** Thirty-four patients (55 glands) with salivary duct stenosis and chronic sialadenitis completed the Chronic Obstructive Sialadenitis Symptoms (COSS) questionnaire. Of these, 26 (76%) patients underwent SASDS. Eight (24%) control patients elected for conservative management. Patients were surveyed at 3 month intervals for 1 year after presentation (4 time intervals). **Results:** Longitudinal symptom scores from 38 sialendoscopy treated glands and 17 control glands were analyzed across 1 year. Median baseline scores and scores at the first two followup time points (<4 months) were similar for both groups ($p>0.1$). However, at 6-12 months (mean 8.4 months), cases treated with SASDS had significantly lower scores than controls (SASDS median COSS: 15, range: 0-48; control group median COSS: 44.3, range: 6-54; $p=0.011$). Similarly, ANOVA with repeated measures indicated persistently decreased postoperative scores among SASDS patients ($p<0.005$) but not controls ($p=0.08$) at similar followup times. While at >12 months no significant differences were found in COSS scores between the two groups ($p=0.24$), fewer SASDS patients report subjective worsening in overall sialadenitis symptoms, pain, and swelling than among controls ($p=0.027$, 0.047 and 0.004 , respectively). **Conclusions:** SASDS reduces the severity of sialadenitis symptoms in patients with idiopathic salivary duct stenosis compared to control patients who elected for conservative management. Evaluation at multiple time intervals is required due to the intermittent and cyclic nature of symptoms in chronic sialadenitis.

3:05 Q&A

3:10 - 3:30 Break/View Posters - Ballroom

3:30 - 4:40 - GENERAL SESSION - CROWN ROOM

3:30 - 4:30 Wellness: How to Identify and Address the Person at Risk
Moderator: Sonya Malekzadeh, MD, Washington, DC
Panelists: **Department Chair Perspective**
Alexander G. Chiu, MD, Kansas City, KS
Using the EHR for Wellness Initiatives
J.P. Giliberto, MD, Seattle, WA
Personal Strategies for Balance and Health
Michael D. Seidman, MD, Celebration, FL
Hospital Wellbeing Initiatives
Julie L. Wei, MD, Orlando, FL

4:30 Q&A

4:45 ADJOURN SESSION

5:00 - 6:30 pm MEET THE AUTHORS POSTER RECEPTION - for all attendees - Ballroom

POSTER PROGRAM

Allergy/Rhinology

1. Influence of Adjuvant Immunotherapy in Survival following Surgical Resection of Sinonasal Mucosal Melanoma

Arash Abiri, BS, Irvine, CA; Tyler Yasaka, BS, Irvine, CA; Khodayar Goshtasbi, BS, Irvine, CA; Michael Berger, MD, Irvine, CA; Edward C. Kuan, MD MBA, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the benefits of adjuvant immunotherapy in treating sinonasal mucosal melanoma and be able to discuss notable prognostic factors for patient survival.

Objectives: To analyze associations between treatment modalities and patient survival in sinonasal mucosal melanoma (SMM). **Study Design:** Retrospective analysis of the National Cancer Database (NCDB). **Methods:** Patients diagnosed with SMM in 2004-2015 were identified from NCDB. Those who did not undergo surgical resection or immunotherapy were excluded. Log rank tests evaluated the relationship between overall survival (OS) and different treatment methods or insurance providers. Hazard ratios (HRs) of various demographic and clinical factors were assessed using a Cox proportional hazards model. **Results:** Of 815 patients with SMM, 89% underwent surgery only (SO), 3% immunotherapy only (IO), and 8% adjuvant immunotherapy (SI). The 5 year OS was 23%, with a mean of 29 ± 28 months. There was no significant difference ($p=0.63$) in OS between SO (22%), IO (24%), and SR (29%). Additionally, patients with private insurance were found to have higher OS than those with government insurance ($p=0.003$). Multivariate analysis demonstrated that females had higher OS than males ($HR=0.84$, $p=0.04$). Moreover, a Charlson/Deyo (CD) score of 1 was associated with greater OS ($HR=0.75$, $p=0.02$), while a CD score greater than 2 ($HR=2.53$, $p=0.02$), positive surgical margins ($HR=1.40$, $p=0.001$) and melanomas originating from the paranasal sinuses ($HR=1.62$, $p<0.001$) were negative prognostic factors for OS. **Conclusions:** Supplementing surgery with adjuvant immunotherapy does not significantly improve OS in SMM patients when compared to surgery or immunotherapy alone. Certain demographic and clinical factors such as sex, tumor origin, surgical margin, CD score, and insurance were associated with differences in OS of SMM.

2. Comparison of Socioeconomic and Demographic Factors in Patients with Chronic Rhinosinusitis and Fungus Ball of the Paranasal Sinuses

Lee M. Bauter, BS, Syracuse, NY; Mark A. Arnold, MD, Syracuse, NY; Mitchell R. Gore, MD PhD, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the theory of fungus ball as a distinct subtype of chronic rhinosinusitis by comparing differences between two distinct patient populations.

Objectives: To compare socioeconomic, demographic, and symptomatic differences between patients with fungus ball of the paranasal sinuses and chronic rhinosinusitis without nasal polyps (CRSsNP) who underwent functional endoscopic sinus surgery (FESS). **Study Design:** Retrospective cohort analysis. **Methods:** A total of 80 patients, 40 with fungus ball and 40 with CRSsNP, were included, between 2005 and 2018, with all patients being age 18 or above at presentation. Demographic and clinical information was gathered from chart review, while income data by zip code was obtained from the U.S. Census Bureau's 2017 American Community Survey. Associations between the two groups were analyzed with Fisher's exact, univariate analysis, and Wilcoxon rank sum test. **Results:** In comparison to patients with CRSsNP, patients with fungus ball were more likely to be older ($p=0.0002$), women ($p=0.026$), and to present with pain ($p=0.008$). Furthermore, patients with fungus ball had a lower zip base income per capita ($p<0.0001$). Both groups had similar access to primary care. **Conclusions:** In this cohort of patients, those with fungus ball of the paranasal sinuses represented a distinct population, and support the theory that fungus ball is a distinct subtype of CRS. Further studies, including prospective studies with validated instruments may clarify these differences.

3. Nasal Cavity Mass as First Manifestation of Metastatic Breast Cancer

Andrey Filimonov, MD PharmD, New York City, NY; Katherine Liu, BA, New York, NY; Sen Ninan, BA, New York City, NY; Todd Spock, MD, New York City, NY; Madeleine Schaberg, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the presentation and differential diagnosis of cancer that has metastasized to the nasal cavity. There is specific focus on metastatic breast cancer.

Objectives: Sinonasal malignancies are rare, accounting for approximately 3% of cancers in the head and neck and 1% of all cancers overall. Metastatic cancers with involvement of the nasal cavity and paranasal sinuses are even more uncommon. We present a unique case of an elderly female with no history of breast cancer who was found to have a nasal cavity mass consistent with metastatic breast cancer. **Study Design:** Case report and literature review. **Methods:** The case report describes the presentation, workup, and diagnosis of a patient seen at our institution. **Results:** Metastatic

cancers with involvement of the nasal cavity have been most commonly associated with renal cell carcinoma. Symptoms of metastatic involvement of the nasal cavity are usually nonspecific and can involve nasal obstruction, rhinorrhea, epistaxis, facial pain, and facial swelling. Further involvement of the paranasal sinuses and the orbit can result in proptosis and cranial nerve deficits such as diplopia, decreased vision, and ptosis. Although breast cancer is common, affecting over 150,000 women each year with metastasis found in over half of all patients, breast cancer metastasis to the nasal cavity is incredibly rare. Our patient presented with sinus congestion and epistaxis of six months duration. She was found to have a right sided nasal cavity mass and underwent endoscopic surgical resection. The final pathology was consistent with metastatic breast cancer. **Conclusions:** Cancer with metastasis to the nasal cavity is an uncommon occurrence. Clinicians should be aware that nasal masses can be the first presenting symptom of metastatic disease.

4. Endoscopic Extrasellar Skull Base Reconstruction Using Bioabsorbable Plates

Mckay J. Moline, MD, Iowa City, IA; Scott C. Seaman, MD, Iowa City, IA; Jeremy D. Greenlee, MD, Iowa City, IA; Scott M. Graham, MD, Iowa City, IA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand and discuss the utility of bioabsorbable plates in anterior skull base reconstruction outside of the sella.

Objectives: Many techniques have been utilized for reconstruction of the anterior skull base. Each method has advantages and disadvantages concerning effectiveness, morbidity, strength, and cost. Rigid reconstruction may have advantages in certain patients. We evaluate all patients who had placement of rigid absorbable plates in the anterior skull base in a variety of extrasellar locations. **Study Design:** A retrospective review was conducted of consecutive patients at a tertiary referral institution who underwent endoscopic extrasellar skull base reconstruction 2012-2019 for a variety of indications using resorbable poly(D,L)lactide acid plates (Resorb-X Sellar Wall Plate; KLS Martin; Jacksonville, FL). The plate retains strength to 10 weeks, with 97% resorption at 32 weeks. **Methods:** Data reviewed included indication for surgery, location and size of defect, pathology, postoperative complications, recurrent CSF leak, demographic information, adjuvant therapy, and length of followup. **Results:** 24 subjects and 25 cases met inclusion criteria. Indications for surgery were CSF rhinorrhea (spontaneous, post-traumatic, or iatrogenic) or reconstruction after tumor resection. Four cases were revision procedures. None of the patients had a postoperative CSF leak. There was no mortality and no morbidity related to the implanted material. BMI range was 23.3 to 61.8 (average 34). Followup range was 0-58 months (average 19.4). Age range was 11 to 77 (average 52). **Conclusions:** The Resorb-X plate provides an effective, customizable, easy to use, rigid bioabsorbable option for skull base reconstruction for CSF leaks in a variety of locations. This plate provides an alternative to the morbidity associated with harvesting autologous grafts.

5. Survival Outcomes in Gross Total Resection versus Subtotal Resection of Skull Base and Clival Chordoma

Ethan G. Muhonen, MD, Irvine, CA; Tyler Yasaka, BS, Irvine, CA; Khodayar Goshtasbi, BS, Irvine, CA; Brandon M. Lehrich, BS, Irvine, CA; Ronald Sahyouni, PhD, Irvine, CA; Edward C. Kuan, MD MBA, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to (1) understand current surgical and adjuvant therapies for skull base/clival chordoma; (2) evaluate the survival benefit conferred by these treatment modalities including gross total resection (GTR), subtotal resection (STR), and radiation therapy (XRT); and (3) describe a generalizable surgical paradigm for this patient population.

Objectives: Analysis of a national cancer epidemiology and outcomes database was performed to evaluate the survival benefit of various treatment options and extent of surgical treatment. **Study Design:** Retrospective, population based cohort study of patients diagnosed with clival/skull base chordoma between 2004-2015 within the national cancer database (NCDB). **Methods:** The main outcome measure was overall survival (OS) assessed with log rank p values and Cox proportional hazards. **Results:** 792 cases of clival/skull base chordoma were found. 49% of patients received surgery, and 55% had positive margins. Mean age at diagnosis was 44.5 years in the surgical cohort, and 56% were male. Of the surgical cohort, 23% received GTR+XRT, 21% received GTR alone, 16% received STR+XRT, and 38% received STR alone. Mean 5 year OS for XRT alone, surgery alone, and surgery with XRT were 30%, 83%, and 85%, respectively. Age greater than or equal to 65 (HR 3.00, 95% CI 1.75-5.30, p<0.001) and positive margin status (HR 1.84, 95% CI 1.03-3.30, p=0.038) were independent predictors of worse OS. **Conclusions:** Surgery remains the mainstay of treatment for skull base and clival chordomas. Advanced age and positive margin status were predictors of worse survival.

6. Sinonasal Large Cell Neuroendocrine Carcinoma: Case Report and Literature Review

Nathaniel H. Reeve, MD, Las Vegas, NV; Albert Yang, MD, Las Vegas, NV; Ikenna M. Obilor, BS, Las Vegas, NV; Robert C.Y. Wang, MD, Las Vegas, NV

Educational Objective: At the conclusion of this presentation, the participants should be able to have a greater understanding of a particularly rare and potentially deadly disease, sinonasal neuroendocrine carcinoma.

Objectives: Large cell neuroendocrine carcinoma (LCNEC) is a rare, high grade epithelial neuroendocrine malignancy.

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Fewer than 50 head and neck cases have been reported, and those of sinonasal origin are extremely rare. We present a case of sinonasal LCNEC and review the current literature pertaining to this aggressive disease. **Study Design:** Case report and literature review. **Methods:** A 29 year old female with a history of left nasal cavity esthesioneuroblastoma resection followed by adjuvant radiation at the age of 15 presented due to recurrent epistaxis. She was found to have a mass of the left nasal cavity and ethmoid sinus that grew rapidly to involve both nasal cavities and the anterior skull base. Biopsy showed poorly differentiated LCNEC. She underwent transnasal endoscopic resection, however clear margins were unable to be achieved. Prior to beginning chemoradiotherapy she developed a recurrence with intracranial extension as well as a vertebral metastasis. At last followup she had completed chemotherapy and reirradiation with no evidence of disease on exam. **Results:** This represents the first reported case consistent with esthesioneuroblastoma transformation into LCNEC. Sinonasal neuroendocrine tumors are rare neoplasms with a high recurrence potential, and sinonasal LCNEC appears to be particularly aggressive with rapid growth potential. Presenting symptoms are often vague and lead to a delay in diagnosis. Due to the rarity of these tumors there are no robust protocols for their treatment at this time, however trimodality therapy appears to be the most effective approach. **Conclusions:** This case highlights the need for early, accurate diagnosis of these tumors, prolonged postoperative surveillance, and the need for future research to establish evidence based treatment protocols.

7. Barotraumatic Sneeze Causing Cavernous Sinus Syndrome: A Case Report

Zaahir A. Turfe, MD, Detroit, MI; Nancy A. Saleh, BS, East Lansing, MI; John R. Craig, MD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss a case of unilateral cavernous sinus syndrome (CSS) resulting from barotraumatic sneeze.

Objectives: Report a case of CSS secondary to barotrauma. Clinical features and management of this unique case are discussed. **Study Design:** Case report. **Methods:** Case report with review of relevant literature. **Results:** A 75 year old female presented with a two day history of left sided retrobulbar pain, cheek and forehead hypesthesia, and blurred vision after a sneezing episode. Exam revealed hypesthesia in left CN V1 and V2 distributions, CN VI paralysis, and CN III and IV paresis. There was no visual acuity loss. Sinus and head CT scans demonstrated no stroke or mass, and no sphenoid sinus mucosal thickening or opacification. However, the left sphenoid sinus was hypoplastic, with dehiscence of the lateral wall including the cavernous portion of the internal carotid artery. Additionally, two foci of air were noted in the left cavernous sinus. MRI demonstrated decreased enhancement of the left cavernous sinus and enhancement of the left intraorbital orbital apex. Left sided endoscopic sinus surgery was performed 48 hours after admission and no pathology was encountered, and all sinonasal mucosa well vascularized. Mucosa along the lateral wall of the hypoplastic left sphenoid sinus was intact, though bone over the carotid artery was dehiscent. She was discharged on 10 days of doxycycline. At two months postoperatively, hypesthesia and diplopia had resolved. **Conclusions:** Barotrauma from sneezing caused a unilateral CSS, which resolved gradually over two months. Once ruling out more common and potentially life threatening causes of CSS, barotrauma should be considered.

8. The Impact of Surgical Cryoablation on Symptoms and Quality of Life in Patients with Chronic Rhinitis

Farrukh R. Virani, MD, Sacramento, CA; Amarbir S. Gill, MD, Sacramento, CA; Angela M. Beliveau, MPH
CTRP, Sacramento, CA; Toby O. Steele, MD, Sacramento, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss posterior nasal nerve cryoablation as a treatment option for patients with allergic and nonallergic rhinitis.

Objectives: Posterior nasal nerve (PNN) cryoablation is a novel surgical technique to address allergic rhinitis (AR) and nonallergic rhinitis (NAR) via targeted destruction of the posterior nasal nerve parasympathetic fibers. Preliminary data have demonstrated long term efficacy at reducing rhinitis symptoms. We sought to evaluate the impact of procedural cryoablation of the PNN on quality of life in patients with AR and NAR. **Study Design:** Prospective, single institution case series. **Methods:** Adult patients undergoing PNN cryoablation for AR or NAR were enrolled. Demographics, medical therapies, baseline rhinitis symptom (TNSS) and disease specific quality of life (mini-RQLQ) questionnaires were recorded. The Wilcoxon two sample test was used to test for differences among non-normally distributed continuous and ordinal variables. Absolute relative improvement in outcomes was determined for each participant. **Results:** Fourteen patients were enrolled with an average of 16.5 weeks followup. TNSS and mini-RQLQ scores significantly improved after PNN cryoablation among all patients (delta: -3.43, -1.38 respectively; p=0.001). Relative mean percentage (%) improvement was 40.7% and 40.5% for AR and NAR patients. NAR patients (n=10) reported mean improvement of 41.3% as measured by the TNSS and 49.6% by mini-RQLQ. AR patients reported mean percentage improvement in TNSS and mini-RQLQ scores of 39.5% and 24.6% respectively. The minimal clinically important difference for the TNSS and mini-RQLQ was obtained in 92.9% and 78.6% of patients respectively. **Conclusions:** Surgical cryoablation of the PNN significantly improves symptoms and disease specific QOL in majority of patients with AR and NAR.

9. Synergism of Upper Respiratory Allergy and Infection

Claire S. Wilson, , Rockville, MD; Michael S. Morris, MD, Rockville, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to explain how allergies

might create greater susceptibility to infection and discuss the occurrence of diverse infections in patients with allergic disease. Participants will be able to explain how treating allergic disease could diminish incidence of upper respiratory infection.

Objectives: Respiratory infectious disease is often difficult to differentiate from allergic disease due to similar symptomatology. Prior study in our clinic demonstrated that allergy significantly correlated with bacterial infection, particularly with staphylococcus aureus. In followup we review 200 patients presenting with upper respiratory symptoms to determine the influence of allergy on pathogen susceptibility. **Study Design:** Retrospective cohort study. **Methods:** 200 patients were selected who had history of either allergy, infection, or both. Their history of allergic and infectious diseases was recorded and tabulated. Allergic diseases were documented with patient history and ImmunoCAP specific IgE blood tests. Infectious disease testing consisted of upper respiratory cultures for bacterial and fungal infection, as well as blood antibody testing for viral disease and difficult to culture bacterial disease. **Results:** Thus far, 70/200 patients have been analyzed. Of the 63 patients with allergies, 85% tested positive for infections. Of the patients with infection, 60% tested positive for allergies. Regarding specific pathogens, 57% of patients with Epstein-Barr virus tested positive for allergies. 69% of patients with staphylococcus aureus were allergic, 55% of patients with mycoplasma pneumoniae were allergic, 72% of patients with legionella pneumophila were allergic, and 52% of patients with candida albicans were allergic. **Conclusions:** Patients with indoor and outdoor allergies are a population at high risk for chronic infection. With screening and treatment of allergic disease using techniques such as immunotherapy, clinicians could potentially diminish incidence of recurrent upper respiratory infection. It is also important to recognize the diversity of pathogens which may cause upper respiratory symptoms since patients so often had multiple kinds of infection.

Facial Plastic & Reconstructive

10. The Use Custom Polyetherketoneketone (PEKK) Implants in the Reconstruction of Traumatic Midface Defects

Amishav Y. Bresler, MD, Newark, NJ; Paul Langer, MD, Newark, NJ; Boris Paskhover, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the possible roles PEKK implants can have in their reconstructive algorithm.

Objectives: 3D printed implants fashioned out polyetherketoneketone (PEKK) and other synthetics have revolutionized reconstructive surgery through customizing the implant to the patient. Here, we describe the application of 3D printing technology to reconstruct the midface where traditional open reduction and internal fixation (ORIF) had failed. **Study Design:** Case report. **Methods:** The patient is a 56 year old male who presented to our institution with a 6 month old right of zygomaticomaxillary (ZMC) complex fracture involving the nasomaxillary buttress, zygomaticofrontal buttress, inferior orbital rim, orbital floor, and medial orbital wall. He underwent traditional open reduction internal fixation (ORIF) of the above facial fractures in a combined case with oculoplastics via a transconjunctival and gingivobuccal approaches with good anatomic reduction. However, over the following year and a half, he developed a right unaesthetic midface depression secondary to poor bony union. A customized 3D PEKK implant was devised using "mirroring" computational technology utilizing the left side as a template with subtracting of preexisting right sided hardware. The previously placed titanium plates were explanted and two interlocking customized 3D PEKK implants were placed via a transconjunctival and gingivobuccal approaches. No postproduction alterations of the implant were required for placement. **Results:** The patient did well postoperatively with good projection and no evidence of infection or extrusion. Postoperative imaging demonstrated good contouring of the PEKK implant to the maxilla. **Conclusions:** PEKK and other synthetic implants may have a promising future in midface reconstruction. Further studies are required to investigate the long term effects of their use as well as their cost analysis.

11. Facial Feminization Surgery Results in Improved Self-Perceived Quality of Life Based on a Standardized Patient Survey

David W. Chou, MD, Oakland, CA; Nizar Tejani, MD, Shreveport, LA; Charles W. Shih, MD, Oakland, CA; Andrew J. Kleinberger, MD, Walnut Creek, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to compare quality of life scores before and after facial feminization surgery and recognize the benefits of surgery in this patient population.

Objectives: To compare pre and postoperative responses to a quality of life survey in patients undergoing facial feminization surgery (FFS). **Study Design:** Retrospective cohort study. **Methods:** We administered a standardized nine question survey to compare quality of life scores in patients pre- and post-FFS at our institution. The questions were: (1) I like the appearance of my face; (2) the appearance of my face is feminine; (3) my friends and loved ones perceive my face as feminine; (4) my current facial appearance limits my social activities; (5) my current facial appearance limits my professional activities; (6) in public I am confident my facial appearance is perceived as feminine; (7) I would like to alter the appearance of my face (new surgery?); (8) facial feminization surgery is/was important to my ability to live as a woman; (9) body surgery is/was important to my ability to live as a woman. Responses were scored on a 5 point scale with 1 correlating with least agreement and 5 correlating with most agreement. **Results:** Among 121 patients undergoing

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FFS, 14 completed a pre and postoperative survey. The mean time of postoperative survey response was 173.5 +/- 99.4 days. Pre- and post-FFS survey responses were as follows: (1) 2.4 vs 4.4 (p<0.001); (2) 2.4 vs 4.1 (p<0.001); (3) 2.6 vs. 4.3 (p<0.001); (4) 3.1 vs 1.9 (p=0.02); (5) 2.6 vs 1.9 (p=0.08); (6) 2.2 vs 4.1 (p<0.001); (7) 4.7 vs 2.9 (p<0.001); (8) 4.9 vs 4.9 (p=1.00); (9) 4.7 vs 4.8 (p=0.83). **Conclusions:** Overall, quality of life scores were improved after FFS.

12. Interest and Trends in Facial Plastic Surgery Procedures: A Ten Year Analysis

Lindsey K. Goyal, MD, Pittsburgh, PA; Parul Goyal, MD MBA, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the ability of Google Trends search density data in predicting changes in facial plastics surgical procedure volumes.

Objectives: This study assesses interest in plastic surgery procedures over a ten year period using data from online search trends and nationwide procedure volumes. Correlation between search interest and procedure volumes was also assessed. **Study Design:** Database review of surgical procedure volumes and online search trends in the United States. **Methods:** Annual volumes for the most commonly performed facial plastic surgery procedures were extracted from the American Society of Plastic Surgery database from 2009 - 2018. Data for internet searches were obtained using the Google Trends tools. Annual procedure volumes and search density were calculated for rhinoplasty, blepharoplasty, rhytidectomy, forehead lift, and hair transplantation. Linear regression analysis was performed to analyze the relationship between these measures. **Results:** Aggregate procedure volumes for these procedures decreased from 632,058 to 604,293. The number of blepharoplasty, facelift, and hair transplant procedures increased, while rhinoplasty and forehead lift decreased. Online searches increased consistently each year for an aggregate increase of 28%. The largest increases in searches were for blepharoplasty, facelift, and hair transplantation. A statistically significant relationship was found between "facelift" internet searches and facelift procedure volumes (R² = 0.75, p<0.001). Regression analysis for other procedure types did not reveal statistically significant relationships. **Conclusions:** The volume of common facial plastics procedures decreased from 2009-2018. Online searches, however, showed a consistent increase over the same time period. There is a strong correlation between internet searches for facelifts and facelift procedure volumes. This information helps improve understanding of patient behavior and may be useful in helping surgeons meet patient needs.

13. A Novel Low Cost Design for Point of View Ultra High Definition Intraoperative Videography

Amir A. Hakimi, BS, Irvine, CA; Karthik R. Prasad, BS, Irvine, CA; Edward J. Chang, BS, Irvine, CA; Lauren T. Standiford, Irvine, CA; Brian J.F. Wong, MD PhD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to replicate and implement the intraoperative video recording method outlined here in their own operating rooms.

Objectives: Intraoperative videography has become increasingly popular for surgical training and education. To capture surgical procedures, various recording devices, including camcorders, the GoPro series, and smartphones, have been integrated with operating room light handles, mounted to tripods, and head mounted to surgeons. However, these setups can be costly, obstructive, or ergonomically unfavorable. The purpose of this investigation was to introduce a low cost design for obtaining surgical video using an IV pole mounted smartphone outfitted with a telephoto lens. **Study Design:** An exploratory study evaluating the feasibility of using an IV pole mounted smartphone and a telephoto lens for surgical videography. **Methods:** A Samsung Galaxy S7 was coupled with a telephoto lens (\$60, Moment Lens) and mounted to an IV pole using a gooseneck mount (\$17.99, Fantaseal). The lens was positioned over the surgical field of view to record the surgeon's perspective. Videos using the STORZ Vitom HD camera system were also obtained for comparison purposes. All videos were shown to a blinded focus group and graded for quality. **Results:** A rhinoplasty was recorded at 4K pixel resolution at 30 frames per second. The design was unobtrusive and videos were high quality. The presented design was found to be comparable in quality to the STORZ Vitom HD system and was found to be sufficient for evaluating operative skill and surgical education. **Conclusions:** This hands free, point of view design can effectively capture fine anatomical detail of a rhinoplasty using commercially available hardware at a cost threshold factor of 50 less than commercial surgical systems.

14. Optimizing Late Craniosynostosis Reconstruction with Virtual Surgical Planning

Jennifer L. Harb, MD, Boston, MA; Andrew R. Scott, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the cranial sutures, recognize the clinical and radiographic features of unicoronal craniosynostosis, and describe the benefits of virtual surgical planning for planning fronto-orbital reconstruction in an older child.

Objectives: Craniosynostosis is the premature fusion of one or more cranial sutures and can be found in both syndromic and nonsyndromic forms. Early recognition of this condition can be critical to neurodevelopmental growth and aesthetic outcomes. In our report, we describe the late diagnosis and subsequent repair of nonsyndromic unicoronal craniosynostosis in an adolescent patient. **Study Design:** An otherwise healthy 11 year old girl presented to the pediatric otolaryngology clinic with the chief complaint of a right forehead "bump". She was ultimately diagnosed with nonsyndromic left unicoronal synostosis, which had gone unrecognized since birth. Her case presented a unique reconstructive challenge

as unicoronal craniosynostosis, generally identified and treated in infancy, involves a repair that typically leaves large areas of exposed dura. **Methods:** Case report and literature review. **Results:** The patient underwent bilateral frontal-orbital advancement using virtual surgical planning (VSP) technology. The use of VSP allowed for multiple trial and error simulated attempts at repair until the optimal reconstruction (one which optimized aesthetics while limiting dural exposure) was identified. The patient and her family remain pleased with her outcome one year postoperatively. **Conclusions:** Craniosynostosis presents in infancy but sometimes is diagnosed in a delayed fashion. Reconstruction options are limited in older individuals, however virtual surgical planning may improve surgical precision, thereby decreasing operative time and potentially optimizing surgical outcomes. More data are needed to determine the cost effectiveness of this method.

15. Effects of Keloid Exosomes on Normal Fibroblast Migration

Joanna Kam, MD, Detroit, MI; Edward Walton, MD, Detroit, MI; Xiang Guo Dai, PhD, Detroit, MI; Kevin R. Bobbitt, PhD, Detroit, MI; Lamont R. Jones, MD PhD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss how keloid derived exosomes impact normal fibroblast migration in vitro.

Objectives: Keloids are fibroproliferative tumors that can develop during wound healing. Exosomes are extracellular vesicles whose cargo, mainly microRNA, promote cell to cell signaling during tumorigenesis and wound healing. The role of exosomes in keloid pathogenesis is not well described. The objective of this study is to describe the impact of keloid derived exosomes on normal fibroblasts using a scratch assay. **Study Design:** Prospective controlled in vitro study. **Methods:** Keloid tissue samples from the head and neck were excised and exosomes were extracted using ultracentrifugation. Exosomes were confirmed by transmission electron microscopy, then quantified using the Pierce BCA protein assay kit and Western Blotting for exosome markers (Alix and CD63). Cultures of a normal human dermal fibroblast cell line were treated with exosomes (20 µg/mL). PBS and media without exosomes were included as negative controls. Culture slides were seeded with 25,000 fibroblasts and incubated to form monolayers. Scratches were made in each monolayer using 200 µl pipette tips. Slides were incubated and representative light microscopy images were taken at 12, 24 and 48 hours using 40x magnification. Gap distances were measured using ImageJ software. Measurements were performed in sextuplicate. At 48 hours the slides were fixed and stained for Ki67 to differentiate between proliferation and migration. **Results:** The distances between the migrating cells was measured and subtracted from the measured distances between the edges of the scratches, to give the migrated distance for each sample. After 48 hours, the average migrated distance for the PBS, media and exosome treated groups were 0mm, 0mm and 137µm respectively. Ki67 staining suggests decreased proliferation in the exosome treated groups compared to the negative control groups. **Conclusions:** Increased migration distances and decreased proliferation rates were seen for normal dermal fibroblasts treated with 20 µg/mL of keloid tissue derived exosomes, compared to negative controls. This suggests that keloid tissue derived exosomes promote normal fibroblast migration.

16. Impact of Virtual Surgical Planning on Margin Status in Cases of Mandibular Reconstruction

Nayel I. Khan, MD, Pittsburgh, PA; Dorothy W. Bird, MD MS, Camden, NJ; Erin E. Anstadt, MD, Pittsburgh, PA; Irene T. Ma, MD, Pittsburgh, PA; Seungwon Kim, MD, Pittsburgh, PA; Mario G. Solari, MD, Pittsburgh, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the impact of virtual surgical planning on obtaining negative bony margins in cases of head and neck cancer resections.

Objectives: The osteocutaneous fibula free flap (OCFFF) is the gold standard for mandibular reconstruction after oncologic resection. Virtual surgical planning (VSP) has been shown to decrease ischemia time, operative time, and hospital stay while improving bony consolidation, symmetry, and occlusion. However, a significant concern of VSP is the potential impact on margin status. **Study Design:** Retrospective chart review. **Methods:** A retrospective review of patients who underwent mandibular reconstruction with OCFFF for oral cavity squamous cell carcinoma between 2012 and 2018 was performed. The primary outcome was the incidence of positive bony margin (PBM). Secondary outcomes included time from imaging to surgery and reasons for deviation from VSP. **Results:** 101 patients were identified (VSP, n=57; non-VSP, n=55). PBM were present in 1.7% (n=1) and 6.8% (n=3) of the VSP and non-VSP groups, respectively (p-value=0.20). The average time from CT to surgery was 20 and 23 days in the VSP and non-VSP group, respectively (p-value=0.25). Time from CT to surgery was 27 days in the 1 patient with PBM in the VSP group and averaged 33 days in the 3 patients with PBM in the non-VSP group. VSP was altered intraoperatively in 5% (n=3) of the cases. **Conclusions:** We have shown that the rate of positive bony margins is not compromised with VSP. Furthermore, the rate of deviation from VSP is low at our institution. Our data suggests that surgeons may anticipate a higher risk of either deviation from the VSP or positive bony margins as the time from imaging to surgery is delayed.

17. The Effect of Serial Alar Base Reduction on Nostril Size in a Cadaveric Model

Jee-Hong Kim, MD, Los Angeles, CA; Oliver Gantz, MD, Los Angeles, CA; Tymon Tai, MD, Los Angeles, CA; Amy K. Hsu, MD, Los Angeles, CA; Alexander Markarian, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the math-

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emational relationship between the amount of tissue removed during alar base wedge excision and the resultant change in nostril size.

Objectives: The goal of this study is to understand the mathematical relationship between the amount of tissue removed during alar base wedge excision and the resultant change in nostril size. **Study Design:** Cadaveric study. **Methods:** 11 cadavers and 22 nostrils were evaluated. The base nostril area was calculated as an oval shape. The long and short axis of the nostril was measured on the base view ($S = \text{long axis} * \text{short-axis} * \pi$). Alar base wedge excision was performed by excising a wedge of the base of the nostrils without violating nasal sill. The nose edge was pulled in to narrow the base of the nose and then secured with sutures. Serial base excisions of 4mm and 8mm (height) were performed with measurements taken after each excision. Paired T-test was used for statistical comparison. **Results:** The mean baseline nostril area followed normal distribution (mean 1.23cm², std=0.4). Initial alar base wedge resection of 4mm height yielded an average 20% reduction of nostril area (std =0.18, p=0.0001) and 8mm height wedge resection yielded 40% reduction (std=0.15, p=0.0001) compared to baseline. **Conclusions:** The serial alar base reduction is an effective and predictable means of decreasing nostril size. Excessive excision of the alar base might result in external valve obstruction. Resultant nasal base width and height and tip projection will be further analyzed. A further in vivo study is warranted.

18. Postoperative Opioid Use in Rhinoplasty Procedures a Standardized Regimen

Ryan V. Marshall, MD, Birmingham, AL; Nick J. Rivers, BA, Birmingham, AL; Sudhair M. Manickavel, MD, Birmingham, AL; Artemus J. Cox, MD, Birmingham, AL

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss postoperative opioid prescription patterns following rhinoplasty.

Objectives: To evaluate postoperative opioid use in rhinoplasty procedures and create a standardized postoperative analgesic prescription algorithm. **Study Design:** An observational study of patients undergoing rhinoplasty performed by one surgeon. **Methods:** Twenty-seven patients undergoing rhinoplasty by a senior facial plastics surgeon have enrolled in our study. Prior to surgery, patients were provided with medication diaries to record daily opioid use from postoperative days 0-14. The diaries consisted of the following questions: postoperative pain scores, daily NSAID use, and quantity of opioid use. Pain was assessed using the visual analog pain scale using a Likert grading system. The pain scale was based on a range from "no pain at all" to "severe" with corresponding numbers 0 -10. Written supplemental materials containing prescription opioid facts from the CDC were distributed to the patients prior to surgery. **Results:** We found patients undergoing turbinoplasty or spreader grafts had a higher rate of opioid use the first five days after surgery (p 0.018). Patients who underwent revision rhinoplasty or had spreader grafts with a columellar strut were more likely to use NSAIDs (p 0.001). Opioid use was the highest in patients undergoing revision surgery or turbinoplasty. Majority of our patients used less than seven total opioid pills throughout the postoperative healing period. **Conclusions:** Our findings suggest patients undergoing revision surgery or turbinoplasty will be expected to have more pain. With our experience we are able to prescribe a limited standardized amount of opioid pills to help keep patients comfortable in the postoperative period.

19. The Spiral Flap: A Novel Approach to Vertex Scalp Closure in a Toddler

Nicole C. Mastacouris, MS, Boston, MA; Rebecca A. Compton, MD, Boston, MA; Andrew R. Scott, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the advantages of using a spiral rotational advancement flap for the reconstruction of scalp defects involving the vertex.

Objectives: The objective of this report is to present a case of vertex scalp reconstruction using a spiral rotation advancement flap in a toddler with aplasia cutis congenital (ACC) in order to review the challenges of pediatric scalp reconstruction. **Study Design:** Not applicable. **Methods:** Case report and literature review. **Results:** A 15 month old child with ACC presented with a 3.0 cm by 3.5 cm area of hypertrophic scarring and alopecia on the vertex of his scalp that extended to the pericranium. A spiral rotational advancement flap was conceived for multiple layer repair. The spiral shaped incision resulted in closure of the apex of the defect to itself and created a whorl pattern within the hair bearing scalp that optimized scar camouflage. **Conclusions:** We report a satisfactory result using a spiral rotation advancement flap to address scarring alopecia related to ACC in a child. Although this flap has previously been used in adults involving locations of the nasal ala, knee, and elbow, we feel that this technique is ideally suited for scalp reconstruction, particularly in young children with highly elastic tissues in areas with decreased pliability. This approach has the added advantage of simulating the natural hair whorl in a cosmetically sensitive region and may serve as an effective alternative to geometric reconstruction methods.

20. Pediatric Mandible Fractures: Characteristics and Treatment Stratified by Age

Megan V. Morisada, MD, Sacramento, CA; Mena Said, MD, San Diego, CA; Tsung Yen Hsieh, MD, Minneapolis, MN; Jamie L. Funamura, MD MPH, Sacramento, CA; Travis T. Tollefson, MD MPH, Sacramento, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe (1) the common presentations of mandible fractures in children; (2) the differences in treatment strategies employed from infants to teenagers; and (3) the outcomes and complications.

Objectives: Examine pediatric mandible fracture patterns, management, and outcomes based on patient age in a tertiary trauma center over a period of 14 years. **Study Design:** Retrospective chart review. **Methods:** Pediatric patients (<15 years old) who were treated for traumatic mandible fractures at a level 1 trauma center between 2003 and 2017 were identified through a search query using CPT and ICD codes. Demographic characteristics, fracture site(s), mechanism, antibiotics, and treatment were analyzed with negative treatment outcomes as measured by trismus, malocclusion, wound dehiscence, bony nonunion, and infection. Management strategies were subdivided and analyzed by age group (0 to 5-years, 5 to 9 years, 9 to 12 years, and 12 to 15 years). **Results:** The patients identified (n=130) were mostly male (male, n=92, female, n=38). The majority were under the age of 12 years (87/130). The mean patient age was 8.45 years (range 0.3-14.9 years). Overall the most frequent fracture sites were symphyseal (51.5%), followed by condylar (31.5%), subcondylar (28.5%), body (16.2%), angle (15.4%), ramus (8.5%), and coronoid (3.1%). 71 patients were managed nonoperatively, whereas 56 patients were managed with open reduction internal fixation (ORIF) with rigid (23 of 56) or nonrigid (33 of 56) maxillomandibular fixation (MMF). The average duration of MMF was lower for patients in the 0 to 5 years old age group, and the trend toward operative management increased as patients were older. Nonrigid fixation was utilized more often than rigid fixation in the 12 to 15 year old age group. **Conclusions:** In this series of pediatric patients (<15 years old) with mandible fractures, fracture characteristics management strategies were significantly different in the older age groups with similar fractures. Our findings highlight the differences in treatment based on age and dental development.

21. Virtual Surgical Planning in the Management of Mandibular Intraosseous Mucoepidermoid Carcinoma

Emily S. Pascal, BA, Boston, MA; Steven B. Micucci, MD, Oakland, CA; Deepak Gurushanthaiah, MD, Oakland, CA; Brian P. Fong, MD, Oakland, CA; William B. Williams, MD, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to have increased awareness of the utilization of virtual surgical planning (VSP) in the management of intraosseous mucoepidermoid carcinoma of the mandible.

Objectives: To describe and review the literature for the application of VSP in the surgical approach and reconstruction of intraosseous mucoepidermoid carcinoma. **Study Design:** Scholarly websites and databases were reviewed to compile an assessment of the current literature regarding VSP in head and neck surgical oncology and oral maxillofacial surgery for the rare condition of intraosseous mucoepidermoid carcinoma. Our study prospectively follows the preoperative planning, intraoperative technique, and postoperative outcome of such a patient. **Methods:** PubMed and Google Scholar databases were queried for keywords "VSP", "intraosseous mucoepidermoid carcinoma", and "mandibular reconstruction". One article detailed the digital design for surgical approach with this condition, though it omitted surgical implantation. Here, the clinical course of our patient's workup, treatment, and reconstruction is chronicled. **Results:** We present the case of a 41 year old man who presented with sinus pressure and pain radiating to left lower molars who was diagnosed with intraosseous mucoepidermoid carcinoma. VSP involving digital, high resolution computerized tomographic (CT) imaging were used in planning for surgical resection and subsequent reconstruction. **Conclusions:** Although VSP has been widely used in the planning of mandibular reconstruction, it has yet to be thoroughly described in the management of intraosseous mucoepidermoid carcinoma. Our report supports the use of VSP technology for management of a broader range of head and neck malignancies than conventionally used. Our case highlights the value of VSP in maximizing outcomes for patients with craniofacial malignancies requiring multistage surgical treatment to achieve a cancer free outcome with optimal cosmetic results.

22. Predictive Modeling of Free Flap Volume Loss in Head and Neck Reconstruction in Patients Receiving Adjuvant Radiation

Christopher R. Razavi, MD, Baltimore, MD; Jason M. Hostetter, MD, Baltimore, MD; Aishwarya Shukla, MPH, Baltimore, MD; Zhi Cheng, MD, Baltimore, MD; Harry Quon, MD, Baltimore, MD; Shaun C. Desai, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to (1) understand how adequate volume of free tissue transfer maximizes form and function in head and neck reconstruction; (2) recognize which factors may significantly contribute to postoperative free flap volume loss; and (3) consider patient specific characteristics when determining appropriate free flap bulk and volume at the time of reconstruction of oral cavity/oropharyngeal defects.

Objectives: Free tissue reconstruction of the head and neck must be initially overcorrected due to expected postopera-

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tive free flap volume loss. We aim to identify patient specific factors that may significantly contribute to this phenomenon and translate these characteristics into a predictive model for expected percent free flap volume loss in a given patient.

Study Design: Retrospective case series. **Methods:** Cases of oral cavity/oropharyngeal oncologic reconstruction using free tissue transfer were reviewed between 1/2009-11/2018 at a tertiary care center. Demographics/characteristics, total radiation dose, radiation fractionation (RF), and pre/6 month post-radiation free flap volume as evaluated by CT imaging were collected. Free flap volume was measured by a single fellowship trained neuroradiologist in all cases. Only patients receiving adjuvant radiotherapy with available pre/post-radiation imaging were included. Multivariable linear regression modeling for prediction of free flap volume loss was performed with optimization via stepwise elimination. **Results:** 30 patients were included for analysis. Mean flap volume loss was 42.7 +/- 17.4%. The model predicted flap volume loss in a significant fashion ($p=0.004$, $R^2=0.49$) with a mean magnitude of error of 9.8 +/- 7.5%. Age ($\beta=0.01$, $p=0.003$) and RF ($\beta=-0.01$, $p=0.009$) were individual predictors of flap volume loss, with age a positive predictor and RF a negative predictor of volume loss. **Conclusions:** Our model significantly predicts percent free flap volume loss to within an average of 9.8 +/- 7.5%. Age and RF are individual predictors of free flap volume loss. Evaluation of this model in a prospective manner may optimize initial volume overcorrection and subsequently functional outcomes in this patient population.

23. Assessment of Facial Injury by “Slock” in Incarcerated Patients

Charles D. Rees, BS, Shreveport, LA; Adam J. Blancher, MD, Shreveport, LA; Tara N. Moore-Medlin, BS, Shreveport, LA; Cherie-Ann O. Nathan, MD FACS, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the severity of facial injuries caused by slock, an improvised weapon involving placing a padlock within a sock used increasingly in correctional facilities by inmates, and how bringing attention to this now common mechanism of injury will hopefully lead to restrictions on padlock availability in the commissary to reduce the burden of trauma in this population and the associated medical costs to society for treatment.

Objectives: A “slock” is a padlock in a sock used as an improvised weapon in correctional facilities to induce trauma. Although assault and head injury rates are high in this setting, this is the first study to analyze facial fracture patterns by mechanism. The purpose of this assessment was to examine the seemingly increasing prevalence of “slock” induced facial fractures and the pattern and degree of injury caused by this ad hoc device. **Study Design:** This quality assessment initiative was performed through retrospective analysis of incarcerated patients treated surgically for facial fractures at an academic medical center from 2011-2019. **Methods:** Data collected included the cause of injury, prevalence of padlock induced facial fractures, anatomical locations of fractures repaired surgically and demographic information. **Results:** Over an 8 year period, 435 inmates required surgical treatment for facial fractures. Of those, 366 reported injury by an intentional mechanism. 57 patients (16%) described involvement of a padlock and 23 (6%) reported specific use of a slock. Padlocks were the second most common cause of fracture after fist. Of 57 patients with a padlock/slock injury, the most common fracture sites involved the mandible (53%), zygomatic arch (15%) and the nasal bone (13%). An average of 2.28 fractures per patient occurred with padlocks. **Conclusions:** We found the slock weapon is the most common cause of facial fracture besides fist. Future aims include analyzing the cost to society for treatment. We hope to contribute to better control of the commissary padlock supply available to inmates to reduce the burden and severity of facial trauma.

24. Ability to Identify External Ear Deformities Based on Year and Specialty of Medical Training

Kaylee B. Schrader, BS, Lubbock, TX; Joshua C. Demke, MD, Lubbock, TX; Rahul M. Varman, MD, Lubbock, TX; Callie L. Fort, MS, Lubbock, TX; Mhd Hasan Almekdash, PhD, Lubbock, TX; Hannah A. Daniel, MBA, Lubbock, TX

Educational Objective: At the conclusion of this presentation, participants should be able to identify normal external ear anatomy and external ear deformities such as Stahl ear, cryptotia, Darwin’s tubercle, Mozart’s ear, lop ear, shell ear, question mark ear, grade 3 microtia, polyotia, and anotia. Participants should also understand the importance of early identification of external ear deformities, allowing for appropriate and timely measures for correction and helping to avoid excessive medical intervention.

Objectives: The objectives of this study are to measure resident physician performance on an external ear deformity and ear anatomy Qualtrics survey, as well as measure the correlation between performance on the survey and year/specialty of medical training. **Study Design:** Survey design. **Methods:** A survey was distributed to resident physicians of plastic surgery, otolaryngology, and pediatrics. Type and level of training was determined by survey response. A pre-assessment gauged survey takers’ confidence in identifying the ear deformities that were included in the survey. Survey takers were then asked to identify images of Stahl’s ear, cryptotia, Darwin’s tubercle, Mozart’s ear, lop ear, shell ear, question mark ear, grade 3 microtia, polyotia, and anotia. In addition, survey takers were asked to identify features of external ear anatomy. The survey was completed electronically via Qualtrics and required less than 15 minutes to complete. Answers to survey questions were provided to survey takers post-quiz. A post-assessment gauged survey takers’ confidence in identifying the ear deformities that were included in the survey. **Results:** Currently, the investigation is still in progress and is thus incomplete. At this time, results have not yet been analyzed. Projected completion date for the investigation is November of 2019. **Conclusions:** Conclusion pending with completion of quantitative data collection in November of 2019.

25. **Trends in Maxillofacial Trauma: A 17 Year Study at a Level 1 Trauma Center in a Large Urban Setting**
Peiyi Su, MD, Los Angeles, CA; Christian Paquet, MD, Phoenix, AZ; Karla O'Dell, MD, Los Angeles, CA;
Niels C. Kokot, MD, Los Angeles, CA; Tamara B. Chambers, MD, Los Angeles, CA; Amit Kochhar, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss unique trends in distribution and etiology of operative facial trauma at a US based level I trauma center over nearly two decades.

Objectives: To determine trends in operative facial trauma in one of the largest cities in the United States over nearly two decades. **Study Design:** Retrospective chart review of all operative facial trauma from July 1993 to July 2010 presenting to a level I trauma center in a large urban setting. **Methods:** Analysis was performed for a total of 4,299 patients and 5,549 facial fractures. Data included demographics, mechanism of injury, and fracture characteristics. **Results:** Mean patient age was 34.6, and most patients were male (88%). Between the two 8.5 year periods (1993-2001 and 2002-2010), there was a 42% reduction in total operative maxillofacial trauma (3,510 to 2,039). Orbital floor and zygomaticomaxillary complex fractures were the most prevalent types of operative fractures. Panfacial fractures had the largest reduction in percentage of overall fractures (9% vs. 0%, p-value=0.00). Motor vehicle accidents (MVA) and assault were the two most common mechanisms of injury. Operative fractures due to MVAs decreased over time, while percentage of fractures due to assault increased (27% to 53%, p<0.00). Patients with fractures due to gunshot wounds (GSW) decreased by 50% (120 to 60). Compared to adults, pediatric facial trauma (age < 18) were caused by a higher percentage of MVAs (27% vs. 13%), auto vs. pedestrian (9% vs. 5%), and GSWs (8% vs. 4%) (p-value<0.00). **Conclusions:** Public health interventions, particularly involving motor vehicle safety, have likely contributed to a reduction in operative facial trauma. This study evaluates important trends in mechanisms and distribution of operative facial trauma, which will hopefully aid in effective prevention and treatment strategies.

26. **Extended Abbe and Estlander Flaps for Reconstruction of Complex Lip and Cheek Defects**
James C. Wang, MD PhD, Cincinnati, OH; Eshita Singh, BS, Cincinnati, OH; Ryan M. Collar, MD MBA, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the role of extended Abbe and Estlander flaps in the reconstruction of large defects involving the lip and cheek.

Objectives: To describe the use of extended Abbe and Estlander flaps beyond conventional use and their associated aesthetic and functional outcomes. **Study Design:** Single institutional case series. **Methods:** This is a case series of three patients, ages ranging (54-63) with basal cell carcinoma who underwent micrographic surgery or wide local excision followed by facial reconstruction by the senior author in 2014. Facial reconstructions involved upper or lower lip defects ranging from 50-70% where extended Abbe and Estlander flaps were utilized. Two of the three cases had extensive cheek defects. In both Estlander cases, commissuroplasty was performed 6 months after initial surgery secondary to radiation and showed improved oral competency and sharpness of commissure. **Results:** All flaps (n=3) survived without major perioperative complications. One subject developed a fistula, which resolved 2 months after surgery. A reasonable aesthetic and functional outcome was obtained in all patients. **Conclusions:** Traditionally, Abbe and Estlander flaps are used for defects ranging from one-third to two-thirds of the lip, which are limited to the lip aesthetic unit defined superiorly by the melolabial folds and inferiorly by the labiomental crease. Extended Abbe and Estlander flaps can be utilized for patients with significantly larger lip defects with cheek involvement to create good functional and cosmetic outcomes. When combined with commissuroplasty as an adjunct surgery, these flaps can minimize development of microstomia while preserving oral competence in patients.

27. **Review of Literature of Saddle Nose Deformity Autogenous Reconstruction and Presentation of a New Method: Vomer Onlay Graft**
Rachel E. Weitzman, MS, Boston, MA; Shekhar K. Gadkaree, MD, Boston, MA; Jennifer C. Fuller, MD, Boston, MA; Natalie Justicz, MD, Boston, MA; Richard E. Gliklich, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss options for autogenous reconstruction of saddle nose deformity and explain a new method, the vomerian bone onlay graft.

Objectives: Saddle nose deformity is a well described condition that most commonly results from trauma or prior surgery. We aim to provide a review of literature on autogenous repair of saddle nose deformity, as well as introduce a new technique in which the vomer bone is used as an onlay bone graft. **Study Design:** Literature review and case series. **Methods:** A literature review was conducted to identify methods of autogenous reconstruction of saddle nose deformity. Five cases in which vomer onlay grafts were used for repair of saddle nose deformity were reviewed between January 2013 and December 2015. **Results:** In all cases where vomer bone was harvested, the vomer onlay graft provided adequate structure to traverse the saddle nose deformity. No postoperative complications were observed in an eighteen month followup period. **Conclusions:** Vomerian bone onlay grafts are a reconstructive option for saddle nose deformity and nasal dorsum defects. While septal cartilage is commonly used, and ethmoidal bone has been previously described

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as an option for composite graft reconstruction, vomer bone onlay grafting has not been well described in the literature. This method may be of use when previous nasal surgery has been performed and standard septal cartilage is not possible to harvest. The aesthetic outcomes following nasal dorsum reconstruction using onlay grafts are favorable, but long term outcomes of these grafts require further study.

General

28. **Medical Malpractice in Idiopathic Intracranial Hypertension: A Review of the United States Legal Databases**

Mehdi Abouzari, MD PhD, Irvine, CA; Tyler Yasaka, BS, Irvine, CA; Erica M. Parker, BS, Irvine, CA; Khodayar Goshtasbi, BS, Irvine, CA; Catherine Merna, MD, Irvine, CA; Hamid R. Djalilian, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be aware of the IIH as an unusual presentation in some patients with pulsatile tinnitus, asymmetric hearing loss or vertigo and help facilitate referral to prevent medical malpractice lawsuits.

Objectives: To analyze medical malpractice lawsuit trends pertaining to cases of idiopathic intracranial hypertension (IIH). **Study Design:** A retrospective cohort of the United States legal databases. **Methods:** A search was conducted in two computerized legal databases (Lexis-Nexis and Westlaw) for all US state and federal court cases pertaining to medical malpractice in the diagnosis and treatment of IIH between the years 1979-2018. Cases settled prior to trial are not included in the databases. **Results:** Our search yielded a total of 13 cases that met the criteria of this study. Of these cases, 2 were federal cases and the remaining 11 were state cases. The alleged injuries in each case were as follows: death (23%), total vision loss (31%), partial vision loss (15%), and other/unspecified (31%). We placed each case into one or more of the following categories: misdiagnosis/delayed diagnosis (62%), negligent treatment (38%), failure of informed consent (15%), and postoperative complications (8%). The specialists involved included, neurology (23%), ophthalmology (23%), neurosurgery (15%), neuro-ophthalmology (8%), emergency medicine (8%), and internal medicine (8%). **Conclusions:** IIH can have severe outcomes (such as loss of vision and death) and lead to medical malpractice lawsuits. Since some patients with IIH present with pulsatile tinnitus or have MRI findings obtained for asymmetric hearing loss or vertigo, otolaryngologists should become familiar with signs and symptoms of the disorder and help facilitate referral. Awareness of IIH, as well as timely diagnosis and treatment, may minimize the risk of negative patient outcomes and subsequent medical malpractice lawsuits.

29. **Do Online Patient Ratings Correlate with Surgical Outcomes among Otolaryngologists?**

Jay Agarwal, MD, New York, NY; Enrique Gorbea, MD, New York, NY (Presenter); David Goldrich, BS, New York, NY; Roshan U. Nayak, BS, New York, NY; Jay Gandhi, BS, New York, NY; Alfred M. Illoreta, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to determine whether otolaryngologist ratings on public physician rating websites correlate with surgeon specific outcomes for common otolaryngological procedures. Our statewide database study of suggests that these two variables are not related within our field.

Objectives: To determine whether otolaryngologist ratings on public physician rating websites correlate with surgeon specific outcomes for common otolaryngological procedures. **Study Design:** Retrospective database cohort study. **Methods:** The Statewide Planning and Research Cooperative System (SPARCS) database was queried to search for surgeons who had performed inpatient tonsillectomy and adenoidectomy, total thyroidectomy, parotidectomy and uvulopalatopharyngoplasty from 1995-2015. Online surgeon ratings from healthgrades.com were then gathered and correlated to surgeon specific outcomes. Statistical analysis employed Spearman correlation coefficient and Kruskal-Wallis testing. **Results:** Overall, 547 otolaryngologists were identified in our query with at least 1 online review. For our data analysis, we excluded the bottom quartile of surgeons in volume and number of ratings. The remaining 313 surgeons were analyzed. Overall complication rate for all procedures was 6.29%. Providers had an average of 25 reviews with a 3.93 star rating. We found no significant correlation between surgeon complication rates and star rating ($\Delta = -0.09$, $p = 0.12$; KW $p = 0.67$). For each procedure, no statistically significant difference in complication rate was noted between surgeons across different star ratings. **Conclusions:** No correlation was seen between surgeon specific outcomes for common otolaryngology surgeries and online patient ratings. Due to lack of clinical outcomes association, patients should exercise caution when interpreting ratings on these websites.

30. **Epidemiology of Gunshot Injuries to the Head and Neck**

Richard D. Bavier, BA, Newark, NJ; Roman Povolotskiy, BA, Newark, NJ; Dominick V. Congiusta, MPH, Newark, NJ; Soly Baredes, MD, Newark, NJ; Richard Chan Woo Park, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the epidemiology of gunshot injuries to the head and neck within the United States population.

Objectives: To describe the epidemiology of firearm injuries to the head and neck within the United States population. **Study Design:** Retrospective review of National Inpatient Sample. **Methods:** The National Inpatient Sample (NIS) 2001-2013 was queried for patients with ICD-9 external cause of injury codes specific to gunshot injuries (N = 69,895). Patients were then selected for a concomitant injury to head and neck structures as well as primary diagnosis of injury to head and neck structures. A frequency analysis of demographic, geographic, and mechanism of injury is reported. **Results:** 14.6% (N=10,217) of all gunshot injuries involved the head and neck. Of those patients, 44.3% (N=4,523) were hospitalized for a primary diagnosis of head and neck injury (H&N GSI). 52.7% of patients with H&N GSI had concomitant facial bone fractures. 86.2% of H&N GSI patients were male, 63.3% were between the ages of 19-39. The largest racial group was Black Americans who comprised 34.6% of all H&N GSI. H&N GSI disproportionately occurred in the summer months (27.4%) and on the weekends (36.1%). 58.1% were result of assault/homicide, 19.2% were accidental, 15.5% were attempted suicide. 1.5% of H&N GSI involved law enforcement. Handguns (32.9%) were the most commonly used weapon. Overall mortality during hospitalization was 4.5%. **Conclusions:** Black, young (19-39) and low income Americans are most commonly the victims of gun violence to the head and neck. Surgeons and public health officials should use this information to guide clinical practice and better allocate resources.

31. Examining the Medical Student Otolaryngology Experience: Limited Understanding and the Lack of Early Exposure

Yi Cai, MD, San Francisco, CA; Rahul K. Sharma, BS, New York, NY (Presenter); Alexandria L. Irace, BA, New York, NY; Kyle B. Zuniga, BS, New York, NY; David A. Gudis, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the extent of medical student exposure to the field of otolaryngology, and possible strategies to improve interest and exposure to the field.

Objectives: Efforts should be made to understand the medical student otolaryngology-head & neck surgery (OHNS) experience. This study seeks to understand whether exposure to OHNS is limited at our institution, and if preclinical interest groups effectively improve interest. **Study Design:** Cross-sectional survey study. **Methods:** Two anonymous surveys were emailed to medical students at a single institution. One was sent after OR shadowing and informational sessions hosted by the OHNS interest group, and one was sent to students of all academic levels to assess exposure. **Results:** Respondents included 212 students for the exposure survey (37.8% response rate). Sixteen percent reported that first exposure to OHNS was through the preclinical curriculum. Fifty-three percent of students reported that first exposure to OHNS was through the otolaryngology student interest group. Despite a required OHNS elective, 49% of upperclassmen associated OHNS with facial plastics; 44% with thyroid/parathyroid surgery; 32% with skull base surgery; and 32% with ocular surgery. Exposure in the curriculum (45%) and faculty interaction (21%) were the most suggested areas of improvement to increase interest. Of students that responded to informational session surveys (N = 46), 50% reported that sessions increased their interest in OHNS. For shadowing surveys (N = 63), 64% reported that OR shadowing increased their interest in OHNS. **Conclusions:** Most medical student exposure to OHNS is after the preclinical years and is limited based on narrow understanding of the scope of OHNS. Increased early exposure through interest groups, faculty interaction, and preclinical lectures may contribute to increased interest/understanding of OHNS.

32. Risk Factors for Electromyographic Endotracheal Tube Migration during Recurrent Laryngeal Nerve Monitoring

Betty Y. Chen, MD, Springfield, IL; Eric A. Boakye, PhD, Springfield, IL; Pardis Javadi, MD, Springfield, IL; Dana L. Crosby, MD, Springfield, IL; Arun Sharma, MD, Springfield, IL

Educational Objective: At the conclusion of this presentation, the participants should be able to (1) explain the clinical importance of change in positioning of electromyographic endotracheal tube during intraoperative recurrent laryngeal nerve monitoring; (2) implement protocol for ensuring proper positioning of electromyographic endotracheal tube; and (3) recognize patient specific factors that may be associated with endotracheal tube displacement after patient positioning on the operative bed.

Objectives: This study intends to investigate the patient specific factors associated with intraoperative endotracheal tube (ETT) displacement. **Study Design:** This study assessed ETT migration among adult patients (18 years and older) who underwent thyroidectomy, parathyroidectomy, and/or central neck dissections at a single institution between 01/01/2017 to 04/01/2019. Demographic and clinical data were abstracted from the medical record. Dependent variables included depth of ETT before and after patient positioning, change in ETT depth after patient positioning, any manipulation of endotracheal tube (advancement, withdrawal, and rotation) that was required after patient positioning to maintain the position of the tube relative to the true vocal folds, and loss of electromyographic (EMG) signal. **Methods:** Associations between demographic and clinical factors, and dependent variables were examined using Pearson correlation, t-test and chi square, where appropriate. Statistical analyses were performed using SAS version 9.4, with significance set at $p < 0.05$. **Results:** Eighty-two subjects with a mean age of 52 years old met study criteria. BMI (body mass index) was significantly correlated with absolute change in ETT depth ($r=0.223$; $p=0.0003$), tube withdrawal ($p=0.0101$), tube rotation ($p=0.0458$), and loss of EMG signal ($p=0.0042$). Race was significantly associated with change in ETT depth ($p=0.0129$), tube withdrawal ($p=0.0217$), and change in tube positioning ($p=0.0261$). Age was significantly associated with tube advancement

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($p=0.0224$). In addition, thyroid size on ultrasound ($p=0.0100$) and thyroid volume on ultrasound ($p=0.0004$) had significant associated with loss of EMG signal. There was no significant correlation between BMI and other factors such as race ($p=0.4303$), age ($p=0.1893$), thyroid size on ultrasound ($p=0.1264$) or thyroid volume on ultrasound ($p=0.0755$). **Conclusions:** Patient specific factors such as BMI, race, age, thyroid size, and thyroid volume may play a role in change in positioning of the ETT and the reliability of the EMG signal intraoperatively. It is important to recognize these factors preoperatively. Patients with high risk of ETT displacement can be identified and measures taken to optimize integrity of the neuromonitoring system.

33. Training Master Surgeons in a Virtual Environment -- A Systematic Review

Aaron J. Done, PhD, Tucson, AZ; Eugene H. Chang, MD, Tucson, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the necessity of incorporating direct, personalized feedback to virtual reality surgical training.

Objectives: Multiple studies have determined that personalized expert feedback in real time is the gold standard in surgical training. However, real surgical experiences with patients are challenging in this training era. Virtual reality (VR) simulators provide an opportunity to train surgeons in a high fidelity environment that can incorporate surgical planning, simulation of the procedure, and assess performance. The goal of this systematic review is to compare the use of added feedback to standard performance measures alone in VR environments. **Study Design:** Systematic review. **Methods:** We performed a comprehensive SR encompassing 449 articles using PubMed and Medline databases with a boolean search term generated from the following keywords: virtual reality, surg*, feedback, coach*, train*, and simulat*. These were narrowed to 12 articles which reported simulator vs. simulator plus feedback outside of standard objective performance metrics. **Results:** We identified 12 studies that compared direct feedback plus objective measures to measures alone in VR environments. These were based in the surgical fields of OB/GYN ($n=2$), general surgery ($n=9$), and otolaryngology ($n=1$). The average sample size of these studies was $n=29$. 8% of studies found no difference between groups while 92% of studies found that direct feedback improved performance relative to controls. **Conclusions:** Objective measures of surgical skill are standard in nearly all VR simulators, yet alone provide limited benefit with early plateaus in surgical training. Current methods for direct feedback have not evolved with modern simulation trainers. Incorporation of machine learning may augment surgical education by providing personalized feedback.

34. Surgical Tray Optimization as a Simple Means of Reducing Perioperative Costs: A Quality Improvement Initiative

Terence S. Fu, MD MBA, Toronto, ON Canada; Haytham Msallak, BSc, Toronto, ON Canada; Amirpouyan Namavarian, BMS, Toronto, ON Canada; Eric Monteiro, MD MSc, Toronto, ON Canada; Antoine Eskander, MD MSc, Toronto, ON Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the impact and quality improvement implications of surgical tray redundancy on perioperative costs, operating room efficiency, and patient safety.

Objectives: Surgical trays contain unused instruments which generate wasted resources from unnecessary reprocessing/replacement costs and nursing burden. We implemented a quality improvement initiative aimed at optimizing surgical trays for common otolaryngology procedures, and examined the impact on costs, operating room (OR) efficiency, and patient safety. **Study Design:** Prospective quality improvement initiative and institutional cost analysis. **Methods:** We recorded instrument utilization for five common otolaryngology procedures over a 10 month period at a single community hospital. Stakeholders were engaged in multiple iterative cycles of instrument reduction. Tray setup and rebuilding time were compared pre- and post-tray optimization. Balancing measures included total operative time, instrument recall, and stakeholder perceived impact on patient safety. We estimated cost savings from an institutional perspective over 1 and 10 year time horizons. Costs were expressed in 2017 Canadian dollars and modeled as a function of surgical volume, labor costs, instrument depreciation, and indirect costs. **Results:** A total of 238 procedures by six surgeons was observed. At baseline, only 35% of instruments were utilized. We achieved an average instrument reduction of 26%, yielding 1 year cost savings of \$9,010 CDN and 10 year cost savings of \$69,576 CDN. Tray optimization reduced average OR tray setup time by 2.5 ± 0.4 min ($p=0.03$) and average tray rebuilding time by 1.4 ± 0.2 min ($p=0.06$). Balancing measures were minimally impacted, with a single case of instrument recall and no significant impact on OR time. The majority of stakeholders (92%) reported no significant impact on operating time, trainee education, or patient safety. **Conclusions:** Surgical tray optimization is a simple, effective, and scalable strategy for reducing costs and improving OR efficiency without compromising patient safety.

35. National Trends in Daily Ambulatory Electronic Health Record Use by Otolaryngologists

John Paul Giliberto, MD, Seattle, WA; Thomas L. Carroll, MD, Boston, MA; Teresa V. Chan, MD, Dallas, TX; Andrew M. Vahabzadeh-Hagh, MD, San Diego, CA

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

age daily interactions of the otolaryngologist with the electronic medical record.

Objectives: Since their development in the 1970s electronic health records (EHRs) are now nearly ubiquitous. This study aims characterize the daily interactions of otolaryngology providers with EHRs. **Study Design:** Cross-sectional - descriptive. **Methods:** This study was a cross-sectional review provider efficiency profile (PEP) data, as collected by a major EHR vendor. Participating institutions had 6 months of deidentified PEP data reviewed starting January 1, 2019. PEP data is generated for providers with scheduled patients, both attendings and advanced practice providers (APPs). Time metrics are recorded when a provider is interacting with the EHR including a five second timeout for inactivity. **Results:** Data on 266 otolaryngologists and 32 APPs from 10 institutions were evaluated. On scheduled ambulatory clinic days attendings spent 70 ± 36 (mean \pm standard deviation) minutes (mins) interacting in the EHR versus 108 ± 46 mins for APPs - a mean difference of 38 mins (95% CI 24-51, $p < 0.0001$). Of the daily EHR time, mean time in notes/letters, clinical review, in basket, orders and schedule were 30.1 ± 19.4 , 9.6 ± 6.1 , 7.3 ± 5.8 , and 5.8 ± 7.6 mins respectively. Per patient visit, median (interquartile range) time in notes/letters, clinical review and orders were 3.19 (2.2 - 4.9), 1.14 (0.63 - 1.8) and 0.70 (0.47-1.05) mins, respectively. Mean progress note length was 4638 ± 2143 characters. **Conclusions:** Otolaryngology providers spend a portion of their clinic day interacting with the EHR. PEP data may provide means to target interventions and a metric to measure the impact of those interventions on provider EHR efficiency.

36. The Impact of Surgeon Volume on Thyroidectomy Outcomes among Otolaryngologists

Enrique Gorbea, MD, New York, NY; David Goldrich, BS, New York, NY; Jay Agarwal, MD, New York, NY; Roshan U. Nayak, BS, New York, NY; Alfred M. Iloretta, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand how surgeon volume in thyroidectomy affects thyroid complication rates and outcomes among otolaryngologists.

Objectives: The goal of this study was to evaluate the impact of surgical volume on total thyroidectomy complications among otolaryngologists. **Study Design:** Retrospective database cohort. **Methods:** The Statewide Planning and Research Cooperative System (SPARCS) was used to identify patients who underwent total thyroidectomy (TT) (ICD9-06.4) by otolaryngologists in our state between 1995 to 2015. Surgeons were categorized into high (>100), medium (10-99), and low (<10) volume groups and differences in complication rates were analyzed. Statistical analysis employed Spearman's rank correlation, Kruskal-Wallis testing, and chi squared testing. **Results:** 32,133 procedures were identified performed by 1,202 otolaryngologists. Overall complication rate in our cohort was 10.6%. The most common complication identified overall was hypocalcemia occurring in 3.85% of cases. The high volume group had a complication rate of 9.6%, compared to 10.0% and 11.6% in the medium and low volume groups. This represents a moderate, but statistically significant difference ($\rho: -0.4$, $p < 0.0001$; KW $p = < 0.0001$). When looking at individual complications, temporary tracheostomy rate was higher in the low volume group (5.1%, $p = 0.001$). Other variables such as advanced age, sex, non-white race, or thyroid malignancy were not predictors of increased complication rates for TT. **Conclusions:** Otolaryngologists who perform a high volume of total thyroidectomy were found to have overall less perioperative complications than those with less volume. In particular, the risk of temporary tracheostomy is higher among low volume surgeons. These findings are consistent with previous studies of the effect of thyroidectomy volume on surgical complications.

37. Postural Orthostatic Tachycardia Syndrome with Baroreceptor Glossopharyngeal Dysautonomia from Cervical Fusion

Camille M. Huwyler, MD, Oakland, CA; Christopher G. Tang, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the pathophysiology and anatomic underpinnings of iatrogenic POTS following ACDF.

Objectives: To review a case of postural orthostatic tachycardia syndrome (POTS) with baroreceptor glossopharyngeal dysautonomia from cervical fusion. **Study Design:** A case report with review of literature. **Methods:** Retrospective chart review was performed after a 53 year old female presented to head and neck surgery clinic with dysphagia and blood pressure lability two years after anterior cervical discectomy and fusion (ACDF). There was concern that the glossopharyngeal nerve was cut during surgery and patient had been struggling with dysphagia, odynophagia, and aspiration since surgery in addition to episodic hypertension and tachycardia. **Results:** Nasopharyngoscopy was performed and sensation was tested throughout the larynx. The hemilarynx ipsilateral to the injured glossopharyngeal nerve was insensate with no gag reflex upon palpation of the base of tongue, hypopharynx, pyriform sinus, or arytenoid. **Conclusions:** Postural orthostatic tachycardia syndrome with baroreceptor glossopharyngeal dysautonomia is a rare disorder characterized by severe hypertension and elevated heart rate. Injury to the glossopharyngeal nerve causes afferent dysfunction of the baroreflex. This is the first described case after ACDF in the head and neck literature.

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- 38. The Use of Text Messaging for Telecommunications with Patients in Otolaryngology: A Narrative Review**
Syed Z. Kaleem, BS, Philadelphia, PA; Sammy Othman, BA, Philadelphia, PA; Brian J. McKinnon, MD MBA MPH, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the methods and contexts that have been studied for implementation of text messaging to communicate with patients in otolaryngology and determine the most thoroughly investigated uses of text messaging in this setting.

Objectives: To compile and analyze the available literature regarding the use of text messaging for communicating with patients in otolaryngology. **Study Design:** Narrative review. **Methods:** Using the PubMed, Web of Science, CINAHL, and PsychINFO databases, we searched the following keywords: text messaging otolaryngology, text messaging ENT, mobile communication otolaryngology, mobile communication ENT, texting otolaryngology, texting ENT, text messaging tonsillectomy, smartphone otolaryngology, smartphone oral and maxillofacial surgery, mobile technology otolaryngology, mobile telemedicine otolaryngology, and smartphone ENT. For categorization, included studies were qualitatively coded based on their content. Codes included: access, engagement, expert model, monitoring, no-show, and triage. **Results:** From 402 search results, we obtained 59 results that met inclusion criteria, from which there were 11 distinct studies included in this review. All studies found that the use of smartphones in otolaryngology is feasible and can lead to improved outcomes and increased patient engagement in their treatment. The study which was coded "expert model" provided a framework for creating a text message based platform for application in otolaryngology. **Conclusions:** The current literature suggests that using mobile text messaging is a feasible method of increasing patient engagement in treatment, improving outcomes, and monitoring patients' treatment progress and concerns over time. However, further research is required to quantify the benefits of the varied uses of text messaging for different patient populations.

- 39. Iodide Induced Sialadenitis of the Sublingual Glands**
Christine M. Kim, MD, Los Angeles, CA; Albert Y. Han, MD, Los Angeles, CA; Kenric Tam, MD, Los Angeles, CA; Dinesh K. Chhetri, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss manifestations of iodide induced sialadenitis.

Objectives: At the conclusion of this presentation, the participants should be able to discuss manifestations of iodide induced sialadenitis. **Study Design:** Iodide induced sialadenitis, iodide mumps, is a rare complication of iodide contrast administration that results in swelling of the salivary glands. The pathogenesis is unknown but postulated to be a result of a pseudoallergic reaction and deposition of contrast in the salivary glands. The incidence is estimated to be 1-2%. In a recent meta-analysis of 77 cases of iodide mumps, 100% of cases involved either the parotid, submandibular, or both glands. **Methods:** To date, there have been no reports of iodide mumps with sole involvement of the sublingual glands. **Results:** We report a 60 year old male with a history of liver transplant who developed iodide induced sialadenitis of the sublingual gland hours after undergoing percutaneous coronary angioplasty for non-ST elevation myocardial infarction. The patient developed painless swelling of the floor of mouth without airway compromise. CT neck and flexible nasolaryngoscopy were unremarkable for floor of mouth or deep neck abscess. Over the course of the postoperative days one through three, the edema, localized solely to the sublingual glands, resolved after diphenhydramine and close monitoring. **Conclusions:** We report the first case of iodide induced sialadenitis of the sublingual glands. It is an important clinical entity to recognize to avoid unnecessary imaging and intravenous antibiotics.

- 40. Disparities in Access to Otolaryngologic Care Using Multilayered Granular Geocoding Analysis**
Neil S. Kondamuri, BA, Providence, RI; Rory J. Lubner, BS, Providence, RI; Vinay K. Rathi, MD, Boston, MA; Aaron K. Remenschneider, MD MPH, Boston, MA; Elliott D. Kozin, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain disparities in access to otolaryngologic care, compare variables across America that enhance access, and discuss strategies to provide additional resources to areas lacking access to care.

Objectives: Lack of healthcare access has been associated with poor health outcomes. To measure otolaryngologic access, researchers require granular geographic data that accounts for spatial access of patients. The primary aim of this study is to determine the feasibility to calculate travel distances for otolaryngologic care. **Study Design:** Retrospective cross-sectional analysis. **Methods:** Using the 2016 Medicare National Physician Compare database, unique professional ID numbers for otolaryngologist offices were geocoded. Using rural-urban continuum codes, otolaryngologists were categorized by urbanicity. The estimated travel times (ETT) for all Americans to their nearest otolaryngologist office were determined. As case examples, ETTs in states with the highest (Maryland) and lowest (Mississippi) median household income were determined. **Results:** In 2016, 9,208 practicing otolaryngologists were identified. Otolaryngologists concentrated in urban settings with a mean of 2.3 otolaryngologists per 100,000 people compared to 0.9 otolaryngologists per 100,000 people in rural settings ($P < 0.001$). In Maryland, a higher percentage (95.1%; $P < 0.001$) of the population lived within ETTs of 10/20/30 minutes (66.4%/20.5%/8.2%) to the nearest otolaryngologist office compared to Mississippi

(65.5%; 28.2%/21.0%/16.4%). **Conclusions:** Using a novel geocoding analysis, our study finds disparities in access to otolaryngologic care amongst rural populations and low income states. Findings have implications for access to otolaryngology care, residency complements, and federal workforce reform.

41. **Head over Wheels: Traumatic Head and Neck Injuries Secondary to Mountain Biking**

Rijul S. Kshirsagar, MD, Oakland, CA; Chris Xiao, MD, Oakland, CA; Srikanth Krishnan, MD, Los Angeles, CA; Ashton Christian, MD, Irvine, CA; Kevin P. Labadie, MD, Seattle, WA; Jonathan Liang, MD, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the number, demographics, and injury distribution of mountain biking related head and neck injuries in the United States over the last 10 years.

Objectives: The popularity of mountain biking (MTB) has surged in the United States in recent years. The aim of this study was to estimate the nationwide incidence of emergency department (ED) visits for MTB related injuries occurring in the head and neck and to analyze demographics, injury distribution, and anatomic data. **Study Design:** Retrospective analysis. **Methods:** The National Electronic Injury Surveillance System (NEISS) was searched for MTB related injuries in the head and neck, with analysis for incidence, age, gender, anatomic site, and diagnoses. **Results:** A total of 486 cases were identified, corresponding to an estimated 18,952 head and neck MTB related ED visits from 2009 to 2018. Patients were predominantly male (80.7%), white (59.9%) with a median age of 33.5 years (interquartile range, 21-47 years). A majority (88.8%) of patients were released from the ED, but a large proportion (11.2%) of patients were admitted. The most common injuries were internal head injury (27.8%), concussion (22.3%), laceration (25.5%), fracture (13.3%), and contusion/abrasion (11%). The most common facial fractures were facial/not specified (35.9%), nasal bone (28.2%), mandible (12.8%), orbit (10.3%), zygomaxillary complex (10.3%) and maxillary (2.6%). **Conclusions:** Mountain biking results in a significant number of traumatic head and neck injuries nationwide. Patients are primarily adult white males, reflecting the typical MTB participant. Most injuries resulted in discharge from the ED, however many result in significant morbidity to the patient and admission. Understanding the distribution of MTB head and neck injuries may aid in the clinical evaluation of these patients.

42. **Operating under the Influence: Caffeine Intake and the Effect on Microsurgical Performance**

David R. Lee, MD, Cincinnati, OH; Nathan D. Wiebracht, MD, Fort Thomas, KY; Scott B. Shapiro, MD, Cincinnati, OH; James C. Wang, MD PhD, Cincinnati, OH; Charles M. Myer IV, MD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the differences in time to completion and GBRS score before and after caffeine intake for microsurgical performance.

Objectives: Microsurgery is a challenging technical endeavor that requires precision and focus. Caffeine is a well known neurologic stimulant enjoyed by many surgeons. Our objective was to evaluate changes on time to completion and global rating score (GBRS) using a microsurgical model after the intake of an 8 oz cup of coffee. **Study Design:** Single institution prospective blinded study. **Methods:** Otolaryngology resident and fellow volunteers underwent recorded performance of the myringotomy and tympanostomy tube placement simulator before and after caffeine intake. An 8 oz cup of national chain coffee was utilized, and procedure was repeated 30 minutes after coffee ingestion. The videos were then randomized and reviewed by a blinded judge for rating using the previously validated GBRS from the objective structured assessment of technical skills (OSATS). **Results:** 16 right handed volunteers (19% female) were recruited. Average age was 31 (range 27-37), volunteers ranged from PGY1 to PGY7 in the otolaryngology department. Average time to completion was 63 seconds (SD 51.1) before caffeine compared to 48 seconds (SD 20.5) after. Mean GBRS scores were 21.1 (SD 3.61) before ingestion, while after caffeine they increased to 22.3 (SD 2.61). Neither difference in time nor GBRS was significant. **Conclusions:** Caffeine is near ubiquitous in hospitals across the country. This preliminary data may show an actual improvement in microsurgical skills and efficiency after the ingestion of caffeine. Further investigation is warranted.

43. **Safety of Outpatient Parotidectomy in Elderly Populations**

Valerie L. Lim, MBS, Newark, NJ; Rose S. Maisner, BS, Newark, NJ; Chris B. Choi, BS, Newark, NJ; Soly S. Baredes, MD FACS, Newark, NJ; Richard C. Park, MD FACS, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the importance of advancing age and its association with rates of complications following outpatient parotidectomy surgeries.

Objectives: To investigate the association between age and rates of postoperative complications in outpatient parotidectomy in order to evaluate the safety of geriatric outpatient parotidectomy. **Study Design:** Retrospective database review. **Methods:** The 2005-2015 National Surgical Quality Improvement Program (NSQIP) database was utilized. Patients were divided into subgroups: youthful control (age 21-40, n=474), elderly (aged 65-79, n=959), and super elderly (aged \geq 80, n=166). Exact Test analysis and multivariate logistic regression were conducted to determine the independent effect of covariates age, gender, race, and medical complications on postoperative complication rates. **Results:** 3,107 outpatient parotidectomy cases were identified. 49.8% were female and 50.2% were male. The elderly had a statistically higher mean

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BMI than the youthful control (30.12 vs 28.99, $p = 0.009$). Exact Test analysis showed a significant association between age and medical complication rates (control 0.2%, elderly 0.9%, and super elderly 3.0%, $p=0.006$) as well as age and all complication rates (2.3%, 2.6%, 6.0%, $p=0.035$). Rates of readmission ($p=0.318$), surgical complications ($p=0.607$), and individual complications ($p>0.05$) were not found to be significantly different between age groups. However, on multivariate logistic regression, age, sex, and race were not found to be significant factors on postoperative complication rates.

Conclusions: This analysis affirms that outpatient parotidectomy surgery is as safe in elderly and super elderly patients as it is in youthful patients. Therefore, age should not serve as a contraindication in performing parotidectomy on older patients in an ambulatory setting.

44. 2C and 2T: Exploring Subpopulations of Upper Airway Obstruction at the Velum and Oropharynx on DISE in Adult OSA Patients

Martha E. Luitje, MD, Rochester, NY; Stephanie J. Wong, MD, Rochester, NY; Sveta Karelsky, MD, Rochester, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to compare different subsets of upper airway obstruction at the velum and oropharynx and apply these results to clinical practice in the evaluation of OSA.

Objectives: To identify clinical correlates for patterns of obstruction at the velum and oropharynx on drug induced sleep endoscopy (DISE). **Study Design:** Single institution retrospective review. **Methods:** 111 adult subjects with obstructive sleep apnea (OSA) who underwent DISE with dexmedetomidine as part of their clinical care for OSA were identified. DISE recordings were reviewed and graded with a score of 0, 1, 2 at the velum, oropharynx, tongue base, and epiglottis. The velum was graded with the modifiers anterior-posterior (AP) or concentric (C). The oropharynx was graded with "T" if obstruction was due to exophytic tonsil tissue rather than lateral oropharyngeal walls. Subject characteristics were compared between grade 2AP versus 2C obstruction at the velum and between grade 2 versus "2T" obstruction at the oropharynx. **Results:** Grade 2C velum obstruction was significantly associated with greater BMI and greater neck circumference (in males). Subjects with severe oropharyngeal obstruction without significant tonsils (grade 2) had more severe concurrent velum obstruction compared to subjects with severe oropharyngeal obstruction due to tonsils (grade 2T). Subjects with 2T obstruction were significantly younger, 34 ± 11 vs 52 ± 15 (mean \pm sd, $p<0.001$), and trended towards lower BMI. **Conclusions:** This is the first study to demonstrate a correlation of the clinically significant grade 2 circumferential velum obstruction with increased neck circumference in males. We also show that patients with obstruction by palatine tonsil tissue at the oropharynx may represent a different subpopulation than those who have obstruction by the muscular lateral pharyngeal wall in terms of age, BMI and degree of concurrent velum obstruction.

45. The Longitudinal Boot Camp: Needs Assessment and Pilot of Novel Otolaryngology Residency Curriculum

Scott E. Mann, MD, Aurora, CO; Farshad N. Chowdhury, MD, Aurora, CO; Anne E. Getz, MD, Aurora, CO; Cristina E. Cabrera-Muffly, MD, Aurora, CO

Educational Objective: At the conclusion of this presentation, the participants should be able to explain how simulation based otolaryngology boot camps can be a high value educational experience, not just for novice trainees, but for more experienced residents as well.

Objectives: Simulation based boot camps are increasingly utilized to prepare novice trainees for residency. However in subsequent years of training residents may receive little preparation for new responsibilities. We endeavored to expand our boot camp and include year specific activities for trainees of all levels, guiding transitions for the duration of residency. **Study Design:** Educational needs assessment and curriculum design were followed by a pilot experience and program evaluation. **Methods:** We performed a needs assessment with both a focus group and survey. Skill deficiencies were identified and a curriculum with level specific activities was designed. This included sessions in procedures, communication, leadership, teaching, administration, and clinical decision making. Following the pilot experience attendees were given a program evaluation survey to identify further curriculum needs. **Results:** Response rates for the needs assessment and evaluation surveys were 89% (17/19) and 83% (15/17) respectively. All respondents to the needs assessment reported year specific boot camp training would be "valuable" or "highly valuable". Afterward all respondents reported the curriculum was "useful" or "very useful" and rated the experience highly. Junior residents (R1-R3) were less prepared ($P = 0.006$) for procedures in the needs assessment but rose to the level of seniors following the boot camp. Senior residents had improved preparedness for teaching and in administrative duties ($p<0.05$) and trended toward statistical improvement in leadership and clinical decision making. **Conclusions:** Residents undergo transitions at the beginning of each year of clinical training. Our needs assessment and pilot experience support the expansion of boot camp curricula to include more than the novice trainee.

46. Peri-Interview Communication in the Otolaryngology Match: The Applicant Perspective

Maria C. Masciello, MS, Washington, DC; Sonya Malekzadeh, MD FACS, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss otolaryngology residency applicants' perspectives regarding peri-interview communication during the match process.

Objectives: To evaluate peri-interview communication (PIC) in the otolaryngology match from the applicant's perspective. **Study Design:** Cross sectional survey. **Methods:** A survey link was emailed to 401 otolaryngology residency applicants from the 2019 match cycle. Survey items queried PIC practices and applicants' attitudes toward PIC. Data was collected anonymously. Qualitative analysis was performed for descriptive statistics. Responses from female and male participants were compared using Fisher's Exact tests. **Results:** The survey yielded a 44% (56% male, 44% female) response rate and a 100% completion rate. Most (82%) applicants were not told they were ranked to match and 81% were not asked how highly they planned to rank a given program. Most applicants were never asked about marital status or plans to have children (62% and 88%, respectively). Responses between male and female participants regarding illegal questioning (interview invites, marital status and children) did not differ significantly. Seventy-five percent of applicants believe that PIC should be allowed. Most (65%) participants felt obligated to inform top program(s) of their high rank and 70% found this stressful. Most (63%) applicants do not believe PIC alters their own rank lists and 96% create final rank lists based on where they want to match rather than where they would likely match. **Conclusions:** Our study demonstrates that, while PIC can cause significant stress, the majority of otolaryngology residency applicants believe PIC should be allowed, do not believe it alters applicants' rank lists, and do not report illegal questioning and/or persuasion from programs.

47. Changes in OSA Pathophysiology over the Age Spectrum

Peter G. Nagy, BS, Memphis, TN; Tyler M. Bone, MD, Memphis, TN; Marion B. Gillespie, MD, Memphis, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the anatomy and pathophysiology of obstructive sleep apnea (OSA), demonstrate an understanding of common OSA patient characteristics, and recognize the role of aging in the presentation and management of this disease.

Objectives: To evaluate and contrast the characteristics of patients with obstructive sleep apnea (OSA) at or below the age of 50 with those above the age of 50 to uncover the role of aging in the pathophysiology of OSA with respect to obesity, tissue hypertrophy, airway collapsibility, and neuromuscular laxity. **Study Design:** Retrospective cohort study. **Methods:** The medical records of 211 adult OSA patients presenting to our tertiary referral academic practice between October 2016 and March 2019 were reviewed and characteristics such as tonsil size (1, 2, 3, 4), Mallampati scores (1, 2, 3, 4), neck circumference, BMI, surgery type, AHI scores, and low O₂ saturation scores were compared between the two cohorts (<=50 years of age, >50 years of age). Two sample t-test was performed to test for significance of age on these characteristics. **Results:** The average tonsil size in the younger cohort was 1.6 (SD: 1.3) and the older cohort had an average tonsil size of 0.9 (SD: 1.0) (p=0.00002). Average Mallampati score for the younger cohort was 2.5 (SD:0.8) and 2.6 (SD: 0.7) for the older cohort (p=0.40). BMI for the younger cohort was, on average, 36.3 (SD: 8.4) versus 32.8 (SD: 6.5) for the older cohort (p=0.002). There was no significant difference between the younger and older cohorts with regard to preop AHI (35.6 v. 36.2) and preop lowest O₂ saturation (78.7% v. 76.5%). Average postop AHI for the younger cohort was 25.2 (SD: 21.1) and 20.3 (SD: 18.6) for the older cohort (p=0.35). Average postop low O₂ sat for the younger cohort was 81.4 (SD: 7.9) and 81.5 (SD: 9.8) for the older cohort (p=0.75). Tissue removal surgery was performed in 35/68 (51.4%) of patients in the younger cohort and 45/143 (31.5%) of patients in the older cohort (p=0.007). **Conclusions:** In patients with OSA, there is some evidence that the effect of age involved significantly lower values in markers of tissue hypertrophy, namely tonsil size, BMI, and the need for tissue removal surgery. Mallampati scores were not shown to be significant and the severity of OSA between the two cohorts showed no significance.

48. The Effect of Topical Nasal Treatment on Obstructive Sleep Apnea Severity: A Systematic Review and Meta-Analysis

Dang-Khoa Nguyen, MS, Orlando, FL; Jonathan Liang, MD, Oakland, CA; Megan L. Durr, MD, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the efficacy of topical nasal treatments on obstructive sleep apnea severity in terms of objective and subjective measures.

Objectives: Nasal obstruction is commonly seen in patients with sleep disordered breathing and obstructive sleep apnea (OSA). While topical nasal treatments (TNTs) have been shown to reduce nasal resistance and improve nasal obstruction, there is conflicting evidence regarding the role of TNTs on adult OSA. This systematic review and meta-analysis aim to evaluate the role of TNTs in adult patients with obstructive sleep apnea. **Study Design:** Systematic review and meta-analysis. **Methods:** Inclusion criteria included English language studies containing original data on TNTs in adult patients (>= 18 years) with OSA (AHI >= 5). Exclusion criteria included case reports, studies without outcome measures, and concurrent non-TNT treatment for OSA. Two investigators independently reviewed all manuscripts and performed quality assessment using validated tools. Meta-analysis was performed. Quality assessment was performed. **Results:** Of the 2180 abstracts identified, eight studies met inclusion criteria. TNTs include decongestants (4/8 studies), corticosteroids (3/8), and antihistamines (1/8). Outcome measures included AHI (8/8), RDI (1/8), ODI (3/8), MinO₂ (4/8), nasal

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resistance (4/8), ESS (4/8) and RQLQ-S scores (1/8). Qualitatively, all studies showed trends toward improving objective and subjective measures of OSA, although the significance of these improvements remains varied across studies. A meta-analysis was performed on four studies, but TNTs did not reveal a significant change in AHI ($p > 0.05$). **Conclusions:** TNTs do not improve AHI in adult OSA patients, but they can be beneficial adjunctive treatments particularly for those with concurrent OSA and allergic rhinitis.

49. Atypical Mycobacterium Infection after Deoxycholic Acid Injectable Treatment

Emily S. Nguyen, BS, Irvine, CA; Catherine M. Merna, MD, Irvine, CA; Tjosen Tjoa, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize and discuss potential adverse side effects that can occur from using Kybella injections to reduce submental fat.

Objectives: Deoxycholic acid (Kybella) is the only FDA approved injectable treatment for reduction of submental fat. Commonly reported adverse events are mild to moderate in severity and include pain, swelling, bruising, numbness, erythema, and induration. Although generally regarded as a safe outpatient treatment, rare serious complications can occur. Here, we report a case of atypical mycobacterium abscess formation after Kybella injection. **Study Design:** Case report and literature review. **Methods:** Patient chart analysis and literature review. **Results:** A 24 year old healthy female presented with a painful, soft, violaceous left submental swelling approximately 2 months after Kybella injection by her primary physician. CT scan revealed a 3.4 x 1.3cm left submental fluid collection. This cavity was found to be immediately subdermal on in office ultrasound. The collection was drained and cultures revealed atypical mycobacterium. Her pain initially improved but the collection quickly reaccumulated. The infectious disease service was consulted and recommended surgical reexcision with long term antibiotics. Surgical excision with advancement flap closure was performed, with final cultures positive for atypical, rapidly growing mycobacterium. She was treated with a 4 month course of moxifloxacin 400mg and azithromycin 500mg, with resolution of symptoms. **Conclusions:** Kybella injection is generally regarded as a safe and effective minimally invasive procedure for eliminating small areas of fat, with rare severe adverse events reported such as vascular occlusion or skin necrosis. We report, to the best of our knowledge, the first case of non-tuberculosis mycobacterial abscess formation after Kybella injection, highlighting the importance of monitoring for serious complications that can occur with Kybella injections.

50. Immediate Postoperative Outcomes of Tracheostomy in Adults and Children and Its Implications for a Quality Initiative

Prayag S. Patel, MD, Brooklyn, NY; Samantha G. Hinds, BA, Brooklyn, NY; Jin Kyun Oh, BA, Brooklyn, NY; Ann W. Plum, MD, Brooklyn, NY; Sydney C. Butts, MD FACS, Brooklyn, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss common tracheostomy complications in adults and determine patient and clinical factors that predict complications.

Objectives: The objective of this study is to determine immediate clinical outcomes, complications and predisposing risk factors in patients undergoing a tracheostomy to help identify targets for quality improvement initiatives. **Study Design:** Retrospective chart review. **Methods:** Patients at a tertiary care teaching hospital who underwent a tracheostomy procedure from 2013 to 2018 were identified using CPT code 31600 for planned tracheotomy. Demographic data collected included age, sex, BMI, length of procedure, history of prior tracheostomy, length of stay prior to tracheostomy and active comorbidities. Post-tracheostomy bleeding, accidental decannulation, mucus plugging, peristomal skin breakdown and false passage were complications reviewed. **Results:** 189 adults and 12 children met inclusion criteria. 55.6% of all adults were females and the mean age of all adults was 64.1 years. Adults were admitted for an average of 26.8 days while children were admitted for 55.1 days before the procedure. The otolaryngology service performed 40.2% of all tracheostomies. Of the 41 total complications seen in adults, bleeding from the tracheostomy site (13.2%) was the most common. Meanwhile, 33.3% of all children had a mucus plugging complication. On statistical analysis, diabetes was found to be significantly associated with any complication or with bleeding ($p < 0.05$) while OSA was found to be significantly associated with bleeding ($p < 0.05$). **Conclusions:** Healthcare providers should be more vigilant when taking care of patients with diabetes and OSA as these patients are more likely to have a post-tracheostomy complication. The results of this study emphasize the future need for an institution specific quality initiative to prospectively track post-tracheostomy complications and implement measures to reduce them.

51. Midline Destructive Nasal Lesion in a Patient with Melkersson-Rosenthal Syndrome

Tejasvi Peesay, MSc, Washington, DC; Caroline C. Rieger, MD, Washington, DC; Jessica H. Maxwell, MD MPH, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the differential for midline destructive nasal lesions and recognize this as a potential and rare manifestation of Melkersson-Rosenthal syndrome.

Objectives: (1) Review a case of midline destructive nasal lesion in a patient with long standing Melkersson-Rosenthal

syndrome (MRS); and (2) review the differential diagnosis of midline destructive nasal lesions. **Study Design:** Case report and literature review. **Methods:** We conducted a literature review of midline destructive nasal lesions and reported nasal manifestations of Melkersson-Rosenthal syndrome. **Results:** The patient is a seventy eight year old male with a history of diabetes and MRS diagnosed ten years prior who presented to the ENT clinic with a four month history of progressive nasal obstruction and external nasal deformity. His MRS was treated with methotrexate and low dose prednisone for several years, however he continued to have fluctuating oral swelling and a fissured tongue. On exam, he had a bulbous nasal tip with erosion of the columella and upper lip edema. On nasal endoscopy, the caudal cartilaginous septum was absent with normal appearing mucosa overlying the bony septum. Computed tomography was negative for bony destruction. Biopsies on two separate occasions demonstrated inflammation, ulceration and a rare granuloma. There was no evidence of malignancy or vasculitis and workup was negative for bacterial, viral or fungal organisms. His erythrocyte sedimentation rate and immunoglobulin E were elevated, however results for antinuclear antibodies and immunoglobulin G4 were within normal limits. Aside from ENT, he was evaluated by infectious disease, rheumatology, and hematology. His nasal lesion was considered a late manifestation of MRS and ultimately progressed to the loss of all nasal cartilage with erosion of the skin. He underwent completion rhinectomy to be fitted for a nasal prosthesis. **Conclusions:** We propose that midline destructive nasal lesions are a potential and rare manifestation of MRS. Despite a negative workup and empiric treatment, our patient's nasal symptoms progressed to significant disfigurement with auto-rhinectomy. Therefore, in patients with longstanding MRS, we recommend close surveillance for nasal manifestations.

52. Impact of a Specialty Trained Billing Team on Efficiency, Revenue, and Physician Satisfaction in an Academic Otolaryngology Practice

Andrea M. Plawecki, MD, Detroit, MI; Michael C. Singer, MD, Detroit, MI; Edward L. Peterson, PhD, Detroit, MI; Kathleen L. Yaremchuk, MD, Detroit, MI; Robert H. Deeb, MD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of multiple factors involved in the billing system for surgical procedures and discuss how incorporating coders with additional specialty specific training improves the efficiency of the billing cycle and physician satisfaction.

Objectives: To determine how the incorporation of specialty trained coders within a focused billing team affects revenue, billing efficiency, and physician satisfaction. **Study Design:** Retrospective review. **Methods:** Our institution recently implemented a new billing system, which incorporated coders with additional training in otolaryngology surgical procedures. We used a mixed model ANOVA analysis to compare billing outcomes for the 6 months before and 6 months after this new approach was initiated. The following metrics were analyzed: CPT codes, total charges, time between services rendered and billing submission, and time to reimbursement. Department physicians also completed a survey to assess satisfaction with the system. **Results:** 4087 CPT codes were included in the analysis. In comparing the periods before and after implementation of the new system, statistically significant decreases were found in the mean number of days to coding completion (19.3 to 12.0, respectively, $p < 0.001$), days to posting of charges (27.0 to 15.2, $p < 0.001$), days to final reimbursement (54.5 to 27.2, $p < 0.001$), and days to closure of form (179.2 to 76.6, $p < 0.001$). Physician satisfaction with communication and coder feedback increased from 36% to 64% after initiation of the new program. **Conclusions:** With the introduction of specialty trained coders for surgical procedures in otolaryngology, the billing cycle was more efficient. While there was no significant difference in the average charge per CPT code or overall revenue, this improved efficiency provides significant potential value to the department and health system. Importantly, the new approach also improved physician satisfaction with the coding system.

53. Snapshot of Public Academic Otolaryngology Compensation, What Does the Database Tell Us?

Karthik R. Prasad, BS, Irvine, CA; Edward J. Chang, BS, Irvine, CA; Lauren T. Standiford, BS, Irvine, CA; William B. Armstrong, MD, Irvine, CA; Brian J.F. Wong, MD PhD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss otolaryngology salaries with respect to gender, academic seniority, and geography at US public institutions.

Objectives: To identify compensation characteristics among academic otolaryngology at US public institutions. **Study Design:** Systematic search of internet databases. **Methods:** Public salary information was gathered from participating institutions. Statistical analyses looked for pay differences based on US regions, gender, and academic seniority. An additional adjusted analysis, where salaries \leq \$100,000 were removed, was performed to limit the influence of salary underrepresentation. **Results:** Among 549 academic otolaryngologists at 41 public institutions, the unadjusted average salary was \$255,510 [95% CI, \$236,581-\$274,440]. After adjustment, among 373 academic otolaryngologists at 37 public institutions the salary average was \$353,788 [95% CI, \$332,296-\$375,279]. Kruskal-Wallis analysis found statistically significant ($p < 0.001$) differences in pay based on academic seniority and region. Adjusted salary averages based on seniority: assistant prof. (\$301,230 [95% CI, \$273,299-\$329,162]), associate prof. (\$320,610 [95% CI, \$278,001-\$363,219]), professors (\$438,822 [95% CI, \$385,635-\$492,009]), chairs (\$461,913 [95% CI, \$376,850-\$546,976]). Adjusted salary averages for each region: West ($\mu_W =$ \$424,939), Northeast ($\mu_{NE} =$ \$409,222), Midwest ($\mu_{MW} =$ \$343,063), and South ($\mu_S =$ \$291,329). Mann-Whitney tests for gender found pay differences ($\mu_f =$ \$294,629, $\mu_m =$ \$372,878, $p < 0.05$). Although statistical significance was lost once academic seniority was considered, disparities in pay remained between genders across all academic ranks. **Conclusions:** Public databases underreport otolaryngology salaries. As expected, pay increases with

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rising academic seniority. The West and South regions have the highest and lowest adjusted salaries, respectively. This study found no statistically significant pay difference based on gender within similar academic seniority.

54. A Team Based Learning Approach to General Otolaryngology in Undergraduate Medical Education

Fatemeh Ramazani, MD, Edmonton, AB Canada; Jill Querney, MD, Edmonton, AB Canada;
Caroline C. Jeffery, MD, Edmonton, AB Canada; David W.J. Côté, MD, Edmonton, AB Canada

Educational Objective: At the conclusion of this presentation, participants should be able to identify the role of team based learning in teaching otolaryngology at the level of undergraduate medical education.

Objectives: Otolaryngology (OHNS) teaching is known to be deficient in undergraduate medical education (UGME). Team based learning (TBL) is a whole class interactive teaching approach using cooperative learning, real time feedback, and reciprocal teaching. It encourages students to discuss challenging objectives in small groups, followed by large class discussions, and allows for immediate application and assimilation of knowledge. The objective of this study was to develop a TBL session for UGME, aimed at providing students with an approach to common OHNS presentations. **Study Design:** This study employed mixed qualitative and quantitative methodologies. **Methods:** In phase I, one on one interviews were conducted with family physicians, tasked with identifying common primary care OHNS presentations and clinical scenarios. These interviews helped inform a preliminary framework of session objectives, with subsequent content development by means of literature review and consultation with two staff otolaryngologists. Finalized session content was reassessed by family physicians for clarity and relevance. Phase II involved piloting the TBL session with 162 pre-clinical medical students with pre and post-session questionnaires assessing students' level of comfort with the sessions' objectives. **Results:** Development of a 2 hour TBL session, facilitated by two content experts and one process expert. Introduction of this TBL teaching session improved students' self-reported confidence with approaching common primary care OHNS presentations. **Conclusions:** TBL is an easily reproducible tool that's proven to help address deficiencies in OHNS competencies at the UGME level.

55. ERAS Protocol Does not Affect PACU Stay

Michele H. Schewe, BA, New York, NY; Matthew H. Kim, MD, New York, NY; David G. Stein, MD, New York, NY; Ashutosh Kacker, MBBS MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the effects of ERAS on recovery room stay of ambulatory surgical otolaryngology patients.

Objectives: Enhanced recovery after surgery (ERAS) is a philosophy for perioperative care that marries multidisciplinary and evidenced based approaches to improve care for the surgical patient. The utilization of this approach has led to a reduction in patients' postoperative length of stay and surgical complications. Within otolaryngology, preoperative administration of acetaminophen and pregabalin has been studied previously. We sought to examine their role in decreasing length of stay (LOS) in ambulatory surgical patients. **Study Design:** We retrospectively reviewed the perioperative data for 138 otolaryngology patients who underwent ambulatory surgery at a standalone ambulatory surgery center and an academic hospital. **Methods:** Preoperative pregabalin and acetaminophen were administered to 76 out of 138 patients (ERAS arm). Average and median lengths of stay in the recovery room were assessed for both patient groups. **Results:** LOS was significantly less in the surgery center patients. Surgery center patients had no difference in LOS between groups - 160 minutes in the ERAS arm versus 157 minutes in the standard group. Hospital patients in the ERAS arm had significantly shorter LOS - 185 minutes versus 223 minutes. **Conclusions:** ERAS protocols do not lengthen postoperative stay among surgical otolaryngology patients. The longer LOS for patients at the hospital could be because of residents' involvement in anesthesia or because of patients' more complicated medical histories.

56. Efficacy Evaluation of Wellness Program for Reducing Resident Burnout

Jamie A. Schlacter, , Los Angeles, CA; Tamara N. Chambers, MD, Los Angeles, CA; Lia K. Jacobson, MD, Los Angeles, CA; Niels C. Kokot, MD, Los Angeles, CA; Michael M. Johns, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to apply strategies to improve wellness in residency education.

Objectives: To investigate the effect of a resident wellness program on burnout in otolaryngology residents. **Study Design:** Retrospective review of effects of implementation of a resident wellness program on burnout. **Methods:** A program designed to improve resident wellness was implemented in July 2018. The Maslach Burnout Inventory (MBI) was used to measure burnout before and after the first year cycle. Residents evaluated each component of the program's effects on burnout. Results were anonymized with graduating year as an identifier and the data was evaluated. **Results:** Overall MBI scores were in the moderate burnout range across all 5 PGY levels and did not change significantly after 1 year of program implementation. However, the following program components were rated by residents as improving their overall sense of burnout: annual wellness retreat, resident initiated bonding events, once per month scheduled afternoons free, wellness dinners at faculty homes, chairman and program directors' dinner, and a physical activity program.

Provision of optional wellness resources/toolboxes scored neutral. Mandatory completion of an online wellness program was rated to worsen burnout. **Conclusions:** A resident wellness program was implemented and rated favorably but did not change MBI scores in its first year. The most highly rated strategies for improving otolaryngology residents' wellness can be grouped into themes to help guide others in initiatives to improve resident wellness: time away from work, faculty engaging with residents outside of the hospital environment, efforts to enhance residents' self-efficacy, fostering a positive culture among residents, and providing easy access to physical activity.

57. Not Again: Consecutive Cases of Pseudocholinesterase Deficiency Presenting as Failure of Nerve Monitoring During Thyroid and Parathyroid Surgery

Haley C. Sibley, MD, Detroit, MI; Ayaka J. Iwata, MD MS, Detroit, MI; Michael C. Singer, MD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize pseudocholinesterase deficiency as a rare but potential confounding factor when using nerve monitoring for thyroid and parathyroid surgery.

Objectives: Pseudocholinesterase deficiency (PD) is a condition characterized by prolongation of choline ester induced neuromuscular blockade. This inherited disease often manifests as prolonged recovery of muscular twitches after use of these agents, including succinylcholine. While widely recognized, it only occurs in 3 out of 5,000 people. We present two consecutive cases of patients undergoing thyroid surgery diagnosed with PD, after their recurrent laryngeal nerve (RLN) failed to stimulate with neuromonitoring. **Study Design:** Case report. **Methods:** Chart review. **Results:** A 53 year old woman with a toxic thyroid nodule underwent a left hemithyroidectomy. Intraoperatively, the left RLN was identified and preserved. At no point did it stimulate nerve monitoring. Upon emergence from anesthesia, the patient had no twitches on train of four and was suspected of having PD. After regaining muscular function, she was extubated two hours later in the recovery room. Testing for serum pseudocholinesterase revealed a level of 75 units per liter (normal range 2900-7100 U/L). Normal vocal cord function was seen on laryngoscopy postoperatively. In the next case, a 71 year old female underwent a four gland parathyroid gland exploration. After exploring the first side, vagal nerve stimulation did not elicit a response. Given the prior case, PD was immediately considered and confirmed by absent train of four assessment. She too was extubated two hours later and found to have normal laryngeal function. Her pseudocholinesterase level was 959 U/L. **Conclusions:** In both cases, neuromonitoring was ineffective due to PD. Although a rare condition, it is important to recognize PD as a potential confounding factor when using nerve monitoring in thyroid and parathyroid surgery.

58. What Do Otolaryngology Residency Applicants Want? Results from a Survey of Applicant Perspectives on Rotations, Interviews and Rank List Decisions

Brian P. Swendseid, MD, Philadelphia, PA; Richard A. Goldman, MD, Philadelphia, PA; Colin T. Huntley, MD, Philadelphia, PA; Maurits S. Boon, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, participants will understand the residency applicant perspective on rotations, interviews and rank list decisions. This information can potentially be used by participants to alter the design of their program's offerings to better suit the needs of residency candidates.

Objectives: The preferences and perspectives of otolaryngology residency applicants regarding the design of sub-internship rotations and residency interview days has not been studied. Our goal was to explore and describe residency applicants' opinions on these matters as well as what influences their final rank list. **Study Design:** Online survey. **Methods:** A survey was distributed to all otolaryngology applicants who interviewed at our institution over one interview year. The survey was distributed after rank lists were submitted to minimize bias. An 11 point Likert scale was used to assess applicant preferences on aspects of sub-internships, interview days and the ranking process. **Results:** There were 32 responses for a 64% response rate. During sub-internships, most applicants want to present a topic in front of faculty and to see patients independently in attending clinic rather than shadow. They strongly prefer to work with a few attendings multiple days rather than work with everyone at least once. If they are not to be ranked, they prefer not to be invited back for a courtesy interview. During interview day, applicants prefer longer days with the opportunity to meet more faculty, and almost unanimously desire a resident interview room. Stressful interviews create a negative perception of the program. For their rank list, clinical and operative experience are the most important factor, followed closely by connection to staff and location. Post-interview communication rarely influences rank list decisions. **Conclusions:** Better understanding of residency applicant perspectives can aid in the design of rotations and interview days and help programs attract their preferred candidates.

59. Creation and Initial Experience with a Hospital Wide Tracheostomy Care Team

William S. Tierney, MD MS, Cleveland Heights, OH; Catherine Skowronsky, CMSRN, Cleveland, OH; Amy Calhoun-Rosneck, MA CCC-SLP, Cleveland, OH; Emily S. Zhang, BS, Cleveland, OH; Paul C. Bryson, MD, Cleveland, OH; Brandon Hopkins, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to (1) describe the role of a tracheostomy care team in patient care and the evidence supporting multidisciplinary tracheostomy care; (2) explain the

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challenges in tracheostomy care at a large hospital and how a centralized team is able to overcome them; (3) describe the process of creating a tracheostomy care team and reproduce this process at their institution; and (4) discuss specific examples of instances when tracheostomy care was improved by tracheostomy care team activity at our hospital.

Objectives: Inpatient tracheostomy care is often conducted by multiple subspecialty teams without institutional guidelines for many management specifics. The implementation of multidisciplinary tracheostomy care teams (TCT) in specific hospital units has been shown to decrease instances of tube blockage, instances of respiratory distress, length of stay, and health care costs. However, no such team has been described for an entire hospital system. This research reports the creation of a hospital wide TCT and initial qualitative impact. **Study Design:** Sequential case series. **Methods:** Multidisciplinary interviews were conducted to identify needs and determine current tracheostomy care practices. Tracheostomy care team protocols and documentation templates were developed and refined during a pilot period confined to 6 hospital units. Following pilot implementation TCT providers began seeing patients in the entire institution. Medical records were reviewed after 3 months and TCT interventions were recorded along with relevant medically history. **Results:** At the time of submission 143 patients had been seen by the TCT. Initial qualitative data show instances of accelerated decannulation, improved vocal function, and optimization of tracheostomy hygiene to prevent plugging. Instances of patient/family education were common as were wound care recommendations. Several patients were referred to surgical teams for advanced wound breakdown or stoma granulation tissue resistant to bedside interventions. **Conclusions:** This research presents the framework for a hospital wide TCT and reports initial experience with inpatient care. Qualitative data show many instances of improved care for patients with tracheostomies. Further research will focus on quantitative impact of the implementation of the TCT.

60. The Hearing of Erastus Deaf Smith, Hero of the Texas Revolution

Norman Wendell Todd, MD MPH, Atlanta, GA; Steve D. Beck, MEEng, Austin, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the relationship of what a person hears, to how that person speaks.

Objectives: To describe the hearing and speech abilities of "Deaf" Smith, the first Texas Ranger, and speculate on the etiology of his hearing loss. **Study Design:** Case study. **Methods:** Review of credible historic data of what Erastus could and could not hear and descriptions of his voice and loudness tolerance. Study of modern acoustical physics data generated by 0.69 inch diameter balls fired from a Brown Bess musket. **Results:** The onset of Erastus' bilateral hearing loss was early childhood. He could hear some and was intolerant of very loud sounds. His speech was squeaky high pitched. He did not use manual communication. He could not hear the whizzing of musket balls passing near his head. In contrast to most bilateral childhood sensorineural hearing losses that are worse in high and mid frequencies, Erastus' hearing loss was worse in the low and mid frequencies--preserving at least some high frequency hearing. **Conclusions:** Erastus' hearing problem may well have been incomplete partition type III, originally termed "X linked mixed deafness with congenital fixation of the stapedial footplate and perilymphatic gusher".

61. Cannabis and ENT: State Certification

William L. Valentino, MD MS, Philadelphia, PA; Brian J. McKinnon, MD MBA MPH FACS, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to compare and contrast some of the many differences that exist between each state's medical marijuana regulations, discuss the low prevalence of otolaryngologists that are registered to certify patients for the use of medical cannabis, and discuss future research endeavors that can be undertaken in order to learn more about this illicit, yet popular substance.

Objectives: 1) Ascertain the status of cannabis legalization by state; 2) explore the process required to obtain cannabis credentials for both the patient and the physician; 3) determine the level of interest of otolaryngologists in the medicinal cannabis; and 4) explore possible research directions into efficacy and potential complications. **Study Design:** Descriptive study. **Methods:** Internet searches were conducted to identify each state's medical cannabis program website. The qualifying conditions, list of approved practitioners, process required for both practitioners and patients for approval were noted. Lists of approved practitioners were analyzed to determine the prevalence of board certified otolaryngologists. **Results:** Of the 33 states that authorize medicinal cannabis, eight provide lists of approved practitioners, six of which provide specialty information. A total of 24 otolaryngologists can be found of the 5,944 physicians on these six lists. All otolaryngologists were located in highly populated metropolitan areas with a mean number of 29.9 years in practice. Significant variations exist between each state including legal definitions and qualifying conditions. **Conclusions:** Lack of consistent regulation across the country drives uncertainty regarding the adoption of medicinal cannabis. Very few otolaryngologists in the country are registered to certify patients for medical cannabis. While the medicinal use of cannabis may currently have limited applications within otolaryngology, many areas have yet to be explored.

62. Educational Quality of Thyroidectomy YouTube Videos

Daniel B. Vinh, MD, Houston, TX; Amy L. Dimachkieh, MD, Houston, TX; Daniel C. Chelius, MD, Houston, TX; Nelson E. Liou, MD, Houston, TX; Elton M. Lambert, MD, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role of online YouTube videos as an educational tool for surgical trainees.

Objectives: Surgical videos have proliferated in the public domain. This study seeks to survey trainee use of online videos in preparation for thyroidectomies and evaluate their educational quality. **Study Design:** Cross-sectional study. **Methods:** 20 thyroidectomy videos were reviewed from YouTube searches. The video length, views, likes and publish date were noted. Videos were rated on the global score for educational value (GSEV) (1-5 poor to excellent), VAS for video quality (1-10 poor to excellent), and modified hemithyroid specific scale (HSS) (1-5 unacceptable to excellent). Utilization of YouTube as an educational resource was polled among trainees of our institution and among the section for residents and fellows. **Results:** Average length for videos was 15:27 (+12:09), time published was 4.04 years, with 9410 views/year with a 0.89 like rate. The average GSEV was 3.4 (+1.3), average VAS was 6.7 (+1.27), while average HSS was 3.1 (+0.93). GSEV was positively correlated with HSS ($R=0.8856$ $P=.00001$). There was no correlation between GSEV and video length, like rate or views/year. Videos were more likely to show dissection of recurrent laryngeal nerve (95%) than dissection of both parathyroids (60%), skin closure (60%) and anesthetic considerations (15%) ($p < 0.05$). Of 17 respondents, 6 (35%) listed YouTube as a source in preparation for thyroid surgery. **Conclusions:** On average YouTube videos for thyroidectomy showed adequate technique and were moderate in educational quality. YouTube videos may be helpful in thyroid surgery education with clear utilization among trainees. However, faculty should vet resources due to variability in quality.

63. Adoption of Telemedicine and Telehealth in Otolaryngology: What Are the Barriers?

James C. Wang, MD PhD, Cincinnati, OH; Madison V. Epperson, BA, Cincinnati, OH; Charles R. Doarn, MBA, Cincinnati, OH; Mekabib Altaye, PhD, Cincinnati, OH; Meredith E. Tabangin, MPH, Cincinnati, OH; Yash J. Patil, MD MPH, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the barriers to use of telemedicine in otolaryngology.

Objectives: To investigate the use of telemedicine and telehealth via survey to all members of the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS). **Study Design:** Survey study. **Methods:** A questionnaire was developed and distributed to all current AAO-HNS members in the spring of 2019. Our institutional review board approved the study. We examined the utilization of telemedicine and telehealth and identified barriers for adoption of this innovation in the field of otolaryngology. **Results:** The questionnaire was sent to ~11,000 physicians in training and practicing otolaryngologists with a 1.7% response rate. The largest group of survey responders were 46-55 years of age (30%). 51% of survey participants were in private practice and 65% have been practicing for over 15 years. Participants had heard the term telemedicine, but were uncertain of what it entails at 17%. More participants had heard the term telehealth, but were uncertain of what it entails at 42%. Interestingly, 50% of participants are using telemedicine/telehealth in their practice. 33% selected legal issues as a hindrance to acceptance of telemedicine/telehealth with 65% choosing reimbursement as the main hindrance to utilization. 46% of participants were not satisfied with their current use of electronic medical records (EMR) with 59% selecting that EMR has not improved outcomes of patient care. Specifically, 67% of survey responders said typing is a hindrance to EMR; however, 71% were comfortable with smart devices. **Conclusions:** Adoption of telehealth technology is still limited in the field of otolaryngology. In this study, we assessed the use of telemedicine/telehealth and identified barriers to its use.

64. Do You Hear What I See: A 10 Year Analysis of Pediatric Ear Foreign Bodies

Christopher C. Xiao, MD, Oakland, CA; Rijul S. Kshirsagar, MD, Oakland, CA; Alexander Rivero, MD, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the most common objects found in ears in pediatric patients and discuss the demographic trends.

Objectives: (1) To estimate the incidence of emergency department visits for pediatric ear foreign bodies (FB); (2) to identify the most common objects encountered and investigate demographic variations. **Study Design:** Retrospective. **Methods:** The Nationwide Electronic Injury Surveillance System (NEISS) was queried for emergency department (ED) visits involving the diagnosis of FB in the location of the ear in patients 18 years or younger over the most recent 10 year span available. National incidence estimates and demographic data were extracted from the database. **Results:** There were 16,414 cases of ear FB over the last 10 years, which extrapolates to 445,668 ED visits nationwide. The mean age of presentation was 6.8 years with a slight female preponderance (56.3%). Blacks and Whites represent 61.4% of the presenting population (30.8 and 30.6% respectively). The most common class of objects found was jewelry, primarily embedded earrings and beads, accounting for 57% of visits, followed by desk supplies (pencils, erasers) at 8.4%, paper

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products at 8%, crayons at 2.6%, BBs or pellets at 2.6%, and first aid supplies (Q-tips) at 2.2%. Females were significantly more likely to have jewelry foreign bodies ($p < 0.01$). There were no significant differences in gender for first aid supplies. Males were significantly more likely to have foreign bodies from all other categories ($p < 0.01$). The majority (98.5%) of patients were discharged without admission. **Conclusions:** Foreign bodies of the ear are a common reason for emergency department visits. An understanding of commonly encountered objects can aid in both prompt recognition of unknown items as well as guide clinician extraction and patient counseling.

65. Morbidity, Mortality, and Improvement Conference: A Springboard for Quality Improvement

Sonia N. Yuen, MD, Cincinnati, OH; Andrew J. Redmann, MD, Cincinnati, OH; Catherine K. Hart, MD MS, Cincinnati, OH; Ryan M. Collar, MD MBA, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss how M&M conferences can drive quality improvement.

Objectives: (1) Determine faculty/resident satisfaction with a morbidity, mortality and improvement (MMI) conference paradigm; and (2) provide examples of quality improvement (QI) projects developed out of MMI conference. **Study Design:** Cross-sectional survey. **Methods:** Our institution's morbidity and mortality conference format was redesigned to focus on actionable opportunities for improvement. An 11 question survey (on 5 point Likert scale) regarding engagement, educational value and quality improvement value of the reformatted morbidity, mortality and improvement (MMI) conference was administered to residents, fellows and faculty. Specific projects generated out of the MMI conference were gathered and summarized. **Results:** Survey response rate was 93% (25/27). Educational and engagement value of the conference was similar to previous literature, with no differences based on demographics. When asked "how effective is the new format in driving QI?", an additional five years of practice increased satisfaction scores by 0.53 points ($p = 0.01$), and response to "how well are opportunities for QI discussed and recommendations made" had a similar trend, with an increase of 0.66 points per five years of practice ($p = 0.03$). Five QI projects were developed out of MMI discussions. **Conclusions:** The change of focus in our morbidity and mortality conferences towards quality improvement has led to discrete improvement projects that resulted in both improved patient care and publications. Less experienced physicians view the current quality improvement practices as less satisfactory, perhaps indicating the recent trend in medicine to emphasize more quality improvement in healthcare, and indicating their desire for more quality improvement within the department.

Head & Neck

66. Needlestick Injuries in Otolaryngology Residency

Emily N. Ahadzadeh, MD, Portland, OR; Lourdes Quintanilla-Dieck, MD, Portland, OR; Mark K. Wax, MD, Portland, OR

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the primary situations causing needlestick injuries in residents. They should be able to explain how the year of residency affects the probability that any trainee will seek medical attention after an injury, and discuss what can be done to improve their access to care. They should be able to explain the consequences of these injuries.

Objectives: Up to 800,000 percutaneous injuries involving healthcare workers occur each year. The morbidity of a needlestick may range from nothing to death. The incidence of these injuries in otolaryngology residency is deemed to be high based on prior studies. This study aimed to further define the reporting trends and knowledge in otolaryngology residents regarding sharp exposures. **Study Design:** Survey data was collected from 242 otolaryngology residents (25 programs) to assess needlestick injuries. **Methods:** Factors assessed included: training year, number and etiology of injuries, resident response, and perceived risk of acquiring a bloodborne infection. **Results:** There were 450 needlesticks (mean 2 sticks/resident, $\bar{A}^2 = 2$, range 0-14) the majority involving junior residents (PGY1-3, 81.1%). Junior residents also reported these injuries to their institutions less often than senior residents (60% of PGY5 reported getting tested >50% of sticks, versus 31% of PGY1-3), the most common reason being the time commitment of testing. In regard to HIV and HBV transmission probability, 63% and 58% respectively perceived the risk to be lower than the actual estimated risk with increased risk dependent on depth of injuries, volume of inoculated blood, viral load, and hollow needle injuries. **Conclusions:** This study demonstrates that needlestick injuries are commonly encountered during otolaryngology residency but frequently not reported. There is also a lack of understanding of the risks associated with needlesticks involving patients infected with bloodborne pathogens like HIV and hepatitis. These findings highlight the importance of providing education regarding needlestick injuries during otolaryngology residency training.

67. A Novel High Risk HPV Detection Panel for the Minimally Invasive Diagnosis of Oropharyngeal Squamous Cell Carcinoma

Abdulrahman F. Alenazi, MD MSc, Edmonton, AB Canada; Morris A. Kostiuk, PhD, Edmonton, AB Canada; Daniel A. O'Connell, MD MSc, Edmonton, AB Canada; Jeffrey R. Harris, MD MPH, Edmonton, AB Canada; Hadi R. Seikaly, MD, Edmonton, AB Canada; Vincent L. Biron, MD PhD, Edmonton, AB Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to (1) explain the use of droplet digital PCR swabs (ddPCR) as a diagnostic tool for the detection of HPV positive OPSCC; and (2) compare the diagnostic accuracy of hrHPV ddPCR to the conventional method of P16 immunohistochemistry in diagnosing HPV positive OPSCC.

Objectives: This study aimed to analytically and clinically validate a novel high risk HPV detection panel using droplet digital PCR (ddPCR) for the diagnosis of oropharyngeal squamous cell carcinoma (OPSCC). **Study Design:** Prospective cohort study. **Methods:** Oropharyngeal tissue swabs from patients with OPSCC and negative controls were prospectively collected from January 2015 to June 2019 at tertiary referral center for head and neck oncology. A novel 12 probe panel was experimentally validated for all high risk HPV types (hrHPV-ddPCR). Samples were processed and analyzed for hrHPV-ddPCR, hrHPV copy number, CDKN2A (p16 gene) and EEF2 (RNA expression control). HrHPV-ddPCR results were compared to p16 to determine level of concordance. The proportion of high risk HPV types, diagnostic accuracy and association of hrHPV-ddPCR with survival outcomes were examined in the study. **Results:** Oropharyngeal swabs were obtained from 145 OPSCCs, of which 78.8% were p16 positive and 76.9% positive for hrHPV-ddPCR (70% HPV-16, 5.4% HPV-18, and 26.6% distributed among 31, 33, 35, 39, 45, 51, 52, 56, 58 and 59). All 60 negative controls were negative for hrHPV-ddPCR. In OPSCCs, the diagnostic accuracy of hrHPV-ddPCR is 93.85% with sensitivity and specificity of 95% and 89%, respectively, when compared to p16. **Conclusions:** The use of hrHPV-ddPCR swabs can provide a minimally invasive molecular test to assist with the accurate diagnosis of HPV related OPSCC.

68. Transoral Robotic Surgery (TORS) in the Treatment of Oropharyngeal Carcinomas of Unknown Primary

Matthew B. Studer, BA, Atlanta, GA; Kareem M. Al-Mulki, BA, Atlanta, GA; Annie N. Farrell, MD, Atlanta, GA; James M. Hamilton, MD, Atlanta, GA; Brian J. Boyce, MD, Atlanta, GA; Mihir R. Patel, MD, Atlanta, GA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the utility of TORS in the treatment of oropharyngeal carcinomas of unknown primary and explain its utility in workup when combined with the traditional standard of care.

Objectives: Our purpose was to retrospectively analyze the role of TORS as a complementary surgical approach for the detection and treatment of oropharyngeal carcinomas of unknown primary (CUP). **Study Design:** This was a retrospective chart review. **Methods:** A retrospective review of patients treated with TORS presenting between March 2016 and 2019 was performed. Data related to patient demographics, radiographic findings, tumor pathology, and adjuvant chemotherapy treatment were collected and analyzed. **Results:** Twenty-nine consecutive patients presented as CUP between 2016 and March 2019, 11 of which had no smoking history. Final pathologic stages among all patients varied from T0-T2, N1-N2 (AJCC 8th edition) oropharyngeal squamous cell carcinoma with an average patient age of 61.4 years. All tumors were found to be HPV positive (via p16 surrogate staining). 23 of 29 CUP were successfully identified with TORS following a negative traditional workup, 16 were located in the base of tongue and 7 in the tonsil. 4 of the 23 identified carcinomas had positive cut through margins postoperatively. Lymphovascular invasion was present in 8 tumors and extranodal extension was found in 3 tumors. Adjuvant therapy was utilized in 23 of 29 patients. **Conclusions:** TORS is emerging as an important diagnostic tool in the detection of CUP. Our sample represents one of the largest single institution studies of CUP performed at a major academic tertiary care hospital, helping to support the role of TORS in its treatment.

69. Comparison of Perceived Swallow Impairment to Quantitative Videofluoroscopic Swallow Measurements in Head and Neck Cancer

Michael Armaneous, BS, La Jolla, CA; Liza S. Blumenfeld, MA CCC-SLP BCS-S, La Jolla, CA; Kayva L. Crawford, MD, La Jolla, CA; Kristen E. Linnemeyer, MA CCC-SLP, La Jolla, CA; Julie M. Bykowski, MD, La Jolla, CA; Andrew M. Vahabzadeh-Hagh, MD, La Jolla, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinical relevance of using quantitative measurements to assess head and neck cancer patients.

Objectives: The aim of this study is to examine the relationship between head and neck cancer patients' perception of their swallow impairment with quantitative measurements from their videofluoroscopic swallow study (VFSS). **Study Design:** We compare outcomes across varying demographics, disease stage, presence of gastrostomy tube, and administration of immunotherapy. **Methods:** A total of 21 patients with head and neck cancer who completed an Eating Assessment Tool-10 (EAT-10) survey within 30 days of their VFSS were analyzed for: bolus transit time, hyoid displacement at maximum constriction (Hm), hyoid larynx distances (HL), bolus clearance ratio (BCR), pharyngeal constriction ratio (PCR), and pharyngoesophageal segment distances (PESm). Linear regression analysis was performed. **Results:**

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Patient population included 18 males and 3 females. Average patient age was 65.3 years with a standard deviation of 11.4 years. Cancer sites included: oral cavity, oropharynx, larynx, esophagus, parotid, and unknown. Fourteen percent of patients had overall stage I disease, 14% had stage II, 14% had stage III, and 43% of patients had stage IV. Fifty-two percent of patients underwent surgery, 76% radiation therapy, 62% chemotherapy, and 19% immunotherapy. There was a statistically significant correlation between EAT-10 scores and pharyngeal constriction ratio (Pearson correlation coefficient 0.40, $p < 0.05$). **Conclusions:** Higher PCR correlated with greater perceived swallow impairment as captured by the EAT-10 assessment. No other significant correlations were observed. Future research should investigate the clinical utility and significance of quantitative videofluoroscopic swallow measures in targeted head and neck cancer populations.

70. Natural History of Thyroglobulin after Hemithyroidectomy for Well Differentiated Thyroid Cancer

Alana N. Aylward, MD, Salt Lake City, UT; Brent J. Geffen, MD, Salt Lake City, UT; Olivia A. Do, BS, Seattle, WA; Devaprabu D. Abraham, MD, Salt Lake City, UT; Marcus M. Monroe, MD, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should understand normal thyroglobulin levels after hemithyroidectomy and what factors affect these.

Objectives: To observe levels of thyroglobulin after hemithyroidectomy over time and how these levels correlate with various clinical factors. **Study Design:** Retrospective cohort. **Methods:** Our cancer institute's database was used to identify all patients with well differentiated thyroid cancer undergoing lobectomy between 2003 and 2016 based on diagnosis codes as well as all patients with thyroid cancer diagnosis seen by the endocrinology department between 2008 and 2018. Patients undergoing other surgeries and those without available thyroglobulin levels based on our chart review were excluded. **Results:** 93 patients were identified with available thyroglobulin levels after lobectomy alone. Mean followup time after surgery was 2.78 years. Mean thyroglobulin level between surgery and 1 year was 9.1, between 1 and 2 years was 8.6, from 2 to 5 years was 7.1 and at 5 or more year was 5.7. Of note, no patients had confirmed recurrence, therefore we were unable to compare levels with and without recurrence. **Conclusions:** Thyroglobulin levels appear to be low after resection of well differentiated thyroid cancer, even when lobectomy alone is performed.

71. Minimum Fascia Tumor Distance for Selection of Extracapsular Dissection for Benign Parotid Tumors

Christopher D. Badger, MD, Washington, DC; Joseph F. Goodman, MD, Washington, DC; Punam G. Thakkar, MD, Washington, DC; Arjun S. Joshi, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should understand the utility of the minimum fascia tumor distance (MFTD) in the selection of candidates for extracapsular dissection of benign parotid tumors.

Objectives: There is a growing body of literature supporting the use of extracapsular dissection (ECD) for the treatment of benign superficial lobe parotid tumors. Prior studies have suggested the minimum distance between the parotidomasseteric fascia and the tumor edge or minimum fascia tumor distance (MFTD) as a useful measurement in the identification of superficial parotid tumors. The objective of this study is to demonstrate the utility of the MFTD in selecting candidates for extracapsular dissection of benign parotid tumors. **Study Design:** A retrospective case control study. **Methods:** Twenty patients with prior surgical excision of benign parotid tumors were identified. All patients identified underwent pre-operative ultrasonography. Ultrasound images were reviewed and the MFTD was recorded. Tumors with an MFTD less than 3mm were considered superficial and good candidates for ECD. The primary outcome recorded was the successful completion of ECD versus more extensive resection, such as superficial parotidectomy or total parotidectomy. **Results:** Thirteen patients (65%) had an MFTD less than 3mm. Of these patients, 10 successfully underwent ECD. The remaining 7 patients with an MFTD of 3 mm or greater had 6 patients that required conversion to superficial parotidectomy or total parotidectomy. An MFTD less than 3 mm had a sensitivity and specificity for successful ECD of 76.9% and 85.7% respectively. These results were found to be significant (OR 20.0, 95% CI 2.06 - 246.0). **Conclusions:** ECD is an important technique in selected benign parotid tumors. MFTD is a useful measurement in the selection of candidates for ECD benign tumor removal.

72. Predictive Value of Comorbidity Measures in Laryngeal Cancer Resection

Richard D. Bavier, BA, Newark, NJ; Gregory Barinsky, BA, Newark, NJ; Joanna Kim, BS, Sacramento, CA; Soly Baredes, MD, Newark, NJ; Rachel Kaye, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the predictive value of the Elixhauser Comorbidity Measure and Charlson Deyo Comorbidity Index at predicting outcomes following laryngeal cancer resection.

Objectives: Our analysis aims to compare the prognostic value of Elixhauser Comorbidity Measure (ECM) and Charlson Deyo Comorbidity Index (CDCI) in predicting in-hospital morbidity, in-hospital mortality, increased length of stay (LOS), increased total hospital costs, and non-home discharge for patients undergoing laryngeal cancer resection. **Study Design:** Retrospective review of national database. **Methods:** The 2001-2013 National Inpatient Sample was queried for all patients undergoing resection for laryngeal malignancy (N = 10,172). The concordance statistic (c-statistic) was

used to determine and compare the prognostic ability of the ECM and CDCI in predicting morbidity, mortality, non-home discharge, increased LOS (defined as LOS > 75th percentile) and increased total hospital costs (defined as hospital charges > 75th percentile). Models with c-statistic < 0.70 are considered to lack prognostic value. **Results:** Within the study cohort, ECM offered a better predictive model than CDCI for all studied outcomes: in-hospital morbidity c-statistic: 0.608; 95% CI: [0.596-0.620] vs. c-statistic: 0.574; 95% CI: [0.562-0.587], in-hospital mortality c-statistic 0.709; [0.659-0.758] vs. c-statistic: 0.671; [0.621-0.721], prolonged hospital stay c-statistic: 0.635; [0.622-0.647] vs. c-statistic: 0.606; [0.593-0.618], increased hospital charges c-statistic: 0.640; [0.627-0.652] vs. c-statistic: 0.590; [0.577-0.603], non-home discharge c-statistic: 0.608; [0.592-0.625] vs. c-statistic: 0.591; [0.574-0.609]. Only ECM's prediction of mortality reached prognostic significance, c-statistic > 0.70. **Conclusions:** ECM outperforms CDCI in predicting all metrics, however, both methods have poor prognostic value. A novel risk adjustment method is needed to predict outcomes within this at risk patient population.

73. Eccrine Porocarcinoma of the Head and Neck: A Rare Skin Cancer

Sara Behbahani, MS, Newark, NJ; Roman Povolotskiy, BA, Newark, NJ; Salma Ahsanuddin, BBA BS, Newark, NJ; Soly Baredes, MD, Newark, NJ; Richard Chan Woo Park, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate knowledge of the basic demographics of eccrine porocarcinomas of the head and neck. Participants should be able to discuss and compare the most effective treatment options and their effects on overall survival.

Objectives: Eccrine porocarcinoma (EP) is a rare skin cancer of eccrine sweat glands. The head and neck is one of the most common locations of these tumors. However, due to limited number of cases, its clinical course and management are not well understood. **Study Design:** The National Cancer Database (NCDB) was queried for all cases of EP diagnosed from 2004-2016. Cases with primary sites of the skin of the head and neck confirmed histologically were selected for (n=163). Those with missing treatment data and survival information were excluded. **Methods:** Frequency functions, Kaplan-Meier and Cox proportional hazards models were used to analyze clinicopathological factors, treatment status, and survival outcomes. **Results:** The most common primary sites were the scalp and neck (38.2%). The average age of diagnosis was 66.3 years. Mean overall survival was 8.7 years. Men (54.6%) and women (45.4%) were affected equally (p>0.05). The most common treatment was surgery alone (88.8%) followed by surgery and radiation (6.3%). The 5 year and 10 year overall survival (OS) was 65.8% and 57.5%, respectively. On Kaplan-Meier analysis, younger age, surgery, radiation, private insurance, and income status were associated with increased OS (p<0.05). Cox proportional hazards analysis revealed that patients with private insurance had a significantly decreased hazard of death. **Conclusions:** This study represents the largest cohort of head and neck eccrine porocarcinoma studied to date. Due to the rarity of this cancer, more evidence is needed to create treatment guidelines for this rare condition.

74. Insurance Status as a Predictor of Treatment Modality in Human Papillomavirus Positive Oropharyngeal Cancer

Michael H. Berger, MD, Irvine, CA; Tyler Yasaka, BS, Irvine, CA; Yarah M. Haidar, MD, Irvine, CA; Edward C. Kuan, MD MBA, Irvine, CA; Tjosen Tjoa, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the link between insurance status and treatment modality used in HPV positive oropharyngeal cancer.

Objectives: The link between human papillomavirus (HPV) and oropharyngeal cancer (OPC) is well known. Locally advanced, HPV positive OPC can be treated with either chemoradiation or primary surgery with or without adjuvant therapy. Head and neck cancer patients, including those with OPC, with government insurance or uninsured have been shown to have worse prognosis than similar patients with private insurance. In this study, we aimed to determine if insurance status would predict treatment modality. **Study Design:** Retrospective chart review using large national database. **Methods:** The National Cancer Database (NCDB) was used to identify patients with HPV (types 16 and 18) positive OPC who underwent primary surgery or primary chemoradiation from the years 2010-2015. Insurance status was categorized based on government, private, or no insurance. The relationship between insurance status and treatment was investigated using chi square and multivariate regression models. Kaplan-Meier analyses were performed comparing overall survival (OS) by insurance status. **Results:** There were 10,606 patients were included. There was a statistically significant correlation between insurance status and primary treatment modality for HPV positive OPC (p<0.001). Patients with government insurance were 19.3% less likely to undergo surgery and uninsured patients were 36.9% less likely to undergo primary surgery when compared to those with private insurance (p< 0.001). There was an improved 5 year OS for patients with private insurance (86.6%) versus both government insurance (68.4%) and no insurance (69.9%) (p<0.001). **Conclusions:** Patients with private insurance are more likely to undergo primary surgery in HPV positive OPC and have improved overall survival.

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75. Clival Osteomyelitis with Prevertebral Abscess Presenting as a Nasopharyngeal Mass

Lindsay C. Boven, MD, Shreveport, LA; Shehanez K. Ellika, MD, Shreveport, LA; Cherie-Ann O. Nathan, MD, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of an atypical presentation for clival osteomyelitis.

Objectives: Skull base osteomyelitis (SBO) can be life threatening commonly in elderly immunocompromised patients. Usually it is a complication of otitis externa; however, atypical presentations are reported. **Study Design:** Case Report. **Methods:** We report an atypical presentation of clival osteomyelitis presenting as a nasopharyngeal mass with associated prevertebral abscess formation. **Results:** An 85 year old African American female with type II diabetes presented with right sided otalgia and debilitating headaches for several months. Nasal endoscopy noted a right sided nasopharyngeal submucosal mass. CT neck with contrast showed an enhancing mass with central necrosis in the right fossa of Rosenmuller extending to the right carotid and prevertebral space. There was erosion of the basilar segment of the occipital bone along the right petrooccipital fissure. Sedimentation rate was elevated at 87. Endoscopic nasopharyngeal biopsy showed squamous metaplasia with inflammation. MRI revealed bony erosions involving the clivus, body of sphenoid and right middle cranial fossa floor with ring enhancement in the right prevertebral region. Gallium and technetium scans confirmed clival osteomyelitis with prevertebral abscess. IV vancomycin and meropenem were administered for 6 weeks resulting in significant symptomatic improvement. **Conclusions:** Headaches, unilateral otalgia and nasopharyngeal mass in the elderly immunocompromised patient in the absence of otitis externa or cranial neuropathies can suggest malignancy more so than SBO. Imaging findings can frequently mimic malignancy, and the greatest challenge remains in differentiating the two. Awareness of atypical presentations, as in this case, with no clear source of infection, helps prevent against misdiagnosis and leads to prompt initiation of correct treatment to lower the risk of fatal complications.

76. Meeting Quality Metrics in the Surgical Treatment of Head and Neck Cancer: How Well Are We Doing?

Floyd M. Buen, MD, Los Angeles, CA; Eden R. Brauer, PHD, Los Angeles, CA; Patricia A. Ganz, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the current proposed quality metrics for treatment of head and neck cancer patients which have demonstrated improved overall survival.

Objectives: There are few established quality metrics for treatment of head and neck cancer (HNC) patients. Cramer, et al. (2017) identified 5 quality metrics linked to overall survival: (1) negative margins; (2) neck dissection lymph node yield greater than or equal to 18; (3) adjuvant radiation or; (4) chemotherapy when indicated; and (5) adjuvant therapy within 6 weeks of surgery. The objective is to assess a single institution's ability to meet these metrics. **Study Design:** NA. **Methods:** We conducted a retrospective chart review of patients treated for squamous cell HNC between 2013-2017 identified through the institution's tumor registry. Of 860 patients identified, half met study inclusion criteria: being newly diagnosed and treated with primary surgery (with or without adjuvant therapy). **Results:** In results from the first 200 patients meeting study inclusion, only 20% of cases met all 5 metrics. The criteria not met in descending order include insufficient nodal count (62%), adjuvant therapy not given within 6 weeks (56%), adjuvant radiation (14%) and adjuvant chemotherapy (8%) not given when indicated and positive margins (6%). Cancer recurrence was 45% and 59% in those who did and did not meet all criteria, respectively. Finally, of the patients receiving adjuvant therapy with known recurrence, 41% were treated at the home academic institution versus 59% treated at an outside institution. Results will be updated at the time of meeting presentation when the chart review will be complete. **Conclusions:** These preliminary results suggest that there are substantial opportunities for improvement in meeting quality metrics, especially in relationship to nodal dissection and receipt of timely adjuvant therapy.

77. Pedicled Buccal Fat Pad for Early Reconstruction after Transoral Radical Tonsillectomy

Ho Erika, MD, New York, NY; Yew Song Cheng, MD, New York, NY; Stephanie Teng, MD, New York, NY; Gady Har-El, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the potential of the buccal fat pad as a reconstructive option after radical tonsillectomy.

Objectives: Transoral radical tonsillectomy (TORT) or base of tongue resection is increasingly utilized as primary treatment for oropharyngeal malignancies. These resections can still leave defects that impact on oropharyngeal functions leading to significant postoperative morbidity. Reconstruction options include no reconstruction, allowing defects to heal by secondary intent, regional flaps or microvascular free tissue transfer. We present our experience with primary reconstruction of oropharyngeal defects after TORT resection using a pedicled buccal fat pad (BFP). **Study Design:** Retrospective chart review. **Methods:** Four patients underwent TORT for squamous cell carcinoma (SCC) with primary reconstruction with a pedicled BFP. All patients had concurrent neck dissection. BFP was harvested and inset under direct visualization. **Results:** All 4 patients were male, 64 - 70 years of age. Tumour staging were: T1N2b in 2 patients and T2N2b in

2 patients. Patients were able to resume oral feeding at postoperative day 3 - 14 and were discharged on postoperative day 5 - 8. None of the 4 patients required gastric feeding tubes. Three patients received postoperative chemotherapy and radiation for extensive neck disease. **Conclusions:** The buccal fat pad is an easily accessible, robust, vascularized flap, which has been used for oral cavity reconstruction. Our experience shows that it is also an excellent reconstructive option for small to medium sized oropharyngeal/parapharyngeal defects. It allows for early healing of the primary surgical site, protects the wound bed against desiccation, and avoids the need for more complicated free flaps. In our small series, BFP resulted in early recovery of oral feeding.

78. Treatment Specific Survival Outcomes in Advanced Oropharyngeal Squamous Cell Carcinoma Comparing Smoking Status, p16 and Ki67 Expression

Dustin J. Conrad, MD MSc, Edmonton, AB Canada; Morris A. Kostiuk, PhD, Edmonton, AB Canada; Jeffrey R. Harris, MD MHA, Edmonton, AB Canada; Daniel A. O'Connell, MD MSc, Edmonton, AB Canada; Hadi R. Seikaly, MD, Edmonton, AB Canada; Vincent L. Biron, MD PhD, Edmonton, AB Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to (1) discuss the role of Ki-67 and p16 as biomarkers of oropharyngeal squamous cell carcinoma; and (2) explain the potential utility of Ki-67 as a biomarker of survival outcomes in a subset of patients with oropharyngeal squamous cell carcinoma.

Objectives: Examine treatment specific survival outcomes in advanced stage oropharyngeal squamous cell carcinoma (OPSCC) stratified to p16, Ki67 expression and smoking status (>10 pack years). **Study Design:** Combined retrospective and prospective cohort study. **Methods:** Demographic, pathologic, staging, and survival data was obtained for 149 OPSCC patients retrospectively, and 145 patients prospectively. In the retrospective arm, tissues were obtained from formalin fixed paraffin embedded tumor specimen and used for tissue microarray (TMA) construction. TMAs were stained for p16, Ki67, DAPI and pancytokeratin. Tissues from salivary swabs were used for analysis of prospectively enrolled patients. Univariate and multivariate estimates of survival were calculated according to smoking status, p16 positivity and Ki67 expression in patients treated with primary surgery and adjuvant radiation or chemoradiation (CRT) versus patients treated with CRT. **Results:** OPSCC patients analyzed retrospectively with p16 positive tumors had higher 5 year overall (OS) and disease specific (DSS) survival in both surgical and nonsurgical cohorts ($p < 0.05$). Reduced Ki67 expression in the primary CRT cohort showed a reduction in DSS ($p = 0.02$). Patients who smoked had favorable survival outcomes when treated surgically regardless of p16 status or Ki67 expression. Prospective data from patient salivary swab samples showed similar survival trends as the retrospective analysis from FFPE specimen. **Conclusions:** In both p16 positive and negative OPSCC, our data suggests primary surgery may provide a survival advantage for patients with a significant smoking history or those with low Ki67 tumor expression.

79. BRCA2 Mutation and Hypopharyngeal Squamous Cell Carcinoma

Tatiana Correa, MD MPH, Iowa City, IA; Henry T. Hoffman, MD, Iowa City, IA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss implications of an association between BRCA2 mutation and hypopharyngeal squamous cell carcinoma through understanding of molecular behavior within a clinical context.

Objectives: We present a case of hypopharyngeal squamous cell carcinoma (SCC) with a concurrent germline BRCA2 mutation to assess for clinically relevant disease mutation associations and potential management implications. **Study Design:** Case report. **Methods:** We reviewed literature for cases of hypopharyngeal SCC in patients with BRCA2 mutations. We then reviewed literature on molecular biology of BRCA2 mutations, molecular biology of head and neck SCCs in genetically predisposed populations and effects of BRCA2 mutation impaired DNA repair on treatment response. **Results:** We report the first case of a patient with germline BRCA2 mutation presenting with hypopharyngeal SCC. Additionally, we discuss a potential molecular basis for this association and corresponding diagnostic and management implications. **Conclusions:** Increased intensity in addressing hypopharyngeal cancer symptoms may be warranted in patients with BRCA2 mutation. Hypopharyngeal cancers arising in BRCA2 mutated cells with compromised double strand repair may show increased responsiveness to cisplatin based chemoradiation.

80. Development of an Operative Competency Instrument for Select Neck Dissection

Eric M. Dowling, MD, Rochester, MN; David P. Larson, MD, Rochester, MN; Matthew L. Carlson, MD, Rochester, MN; Dan L. Price, MD, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to facilitate appropriate advancement of trainees in the OR setting while performing select neck dissection and identify specific deficiencies for targeted skill development.

Objectives: The objective of this study is to develop, implement, and validate an operative competency instrument for select neck dissection. **Study Design:** This is a prospective one year long pilot study for development and validation of an operative competency instrument. **Methods:** A modified Delphi technique was used to develop an instrument for level

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II-IV select neck dissection by a panel of head and neck surgeons. After extensive review the items, considered the critical, specific, and assessable items for achieving the goals of the procedure were included. Twelve otolaryngology residents, ranging from postgraduate year 1 to 5 performed a level II-IV select neck dissection on a cadaveric specimen in an anatomy lab setting. Video documentation was obtained by use of a head mounted camera. The video was evaluated using the newly developed assessment instrument by one faculty member of the division of head and neck surgery and a senior level trainee. Construct validity was evaluated for each component of the tool by comparing trainees' mean percentage scores across advancing postgraduate levels and number of previous head and neck rotations completed. **Results:** The tool's internal consistency, inter-rater reliability, and construct validity will be reported at the conclusion of data collection. **Conclusions:** This select neck dissection surgical assessment tool is a feasible, reliable, and valid instrument for the assessment of surgical competency. It allows for specific and objective documentation of trainee skills. It is intended to facilitate appropriate advancement in the OR setting and identify specific deficiencies for targeted skill development.

81. Impact of Sciatic Nerve Block on Postoperative Opioid Consumption in Head and Neck Cancer Patients following Fibula Free Flap Reconstruction

Scott N. Fassas, MS, Washington, DC; Muhammed F. Shand, BS, Washington, DC; Collin F. Mulcahy, MD, Washington, DC; Adam T. Greenwood, MD, Washington, DC; Rachel G. Lubran, RN, Washington, DC; Punam G. Thakkar, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the utility of sciatic nerve blocks for the management of postoperative pain in patients undergoing head and neck cancer ablation with fibula free flap reconstruction.

Objectives: Head and neck cancer patients often undergo prolonged postoperative courses requiring high opioid requirements. The utilization of regional analgesia is not well studied in this population. Our objectives were to determine if the use of sciatic nerve blocks in patients undergoing head and neck cancer ablation with fibula free flap reconstruction (1) decreased consumption of total opioids in oral morphine equivalents (OME); and (2) decreased postoperative pain levels at distinct timepoints. **Study Design:** Retrospective case control. **Methods:** Subjects included head and neck cancer patients over the age of 18 who underwent ablative surgery with fibula free flap reconstruction at a tertiary care institution between 01/2017 and 05/2019. Patients that received a postoperative sciatic nerve block were compared to a control group for the first 7 postoperative days. The primary outcome examined was total oral morphine equivalents and the secondary outcome was average pain score. **Results:** 12 patients were included in the study; 5 with postoperative sciatic nerve blocks and 7 in the control group. When comparing mean OME between the two groups, no difference was found in the total OME (347.0 ± 295.4 vs. 301.4 ± 177.1 , $p=0.768$), POD 1 pain scores (4.040 ± 2.289 vs. 3.361 ± 2.584 , $p=0.643$), or POD 7 pain scores (3.260 ± 0.819 vs. 1.929 ± 2.378 , $p=0.208$). **Conclusions:** Sciatic nerve blocks were not associated with reduced opioid consumption or postoperative pain scores in patients who underwent fibula free flap reconstruction after ablative head and neck cancer resections. Further analysis with a standardized postoperative pain control regimen after free flap reconstruction is warranted.

82. Duplicated Facial Nerve Trunk: Case Series and Review of the Literature

Juliette O. Flam, MD, New Hyde Park, NY; Lucio M. Pereira, MD, New Hyde Park, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss (1) variations in facial nerve trunk anatomy; (2) the intraoperative findings that should raise suspicion for the possibility of a duplicated trunk; and (3) a strategy to avoid injury to a duplicated facial nerve trunk.

Objectives: Precise knowledge of facial nerve anatomy is critical to preserve facial nerve function during parotidectomy. Many papers in the literature have described the anatomy and variation of the extratemporal course of the facial nerve, but descriptions of duplicated facial nerve trunks are uncommon. **Study Design:** A case series and a literature review of duplicated facial nerve trunks are presented. **Methods:** A case series is described for three patients found to have a duplicated facial nerve trunk during parotidectomy. While the nerve was not traced back to the stylomastoid foramen in either case due to the risk for increased morbidity, preoperative imaging was reviewed to gain insight into where the bifurcation occurred. A PubMed search was performed to gain insight into similar cases. **Results:** Three case reports and two case series altogether describing a total of 14 patients with duplicated facial nerve trunks were identified. One case report and one case series were findings from cadaver dissections while the other studies were findings from parotidectomy in live patients. In all but one case, a minor and a major trunk were found, each emerging either from the stylomastoid foramen or a separate skull base foramen. In one case, the facial nerve trunk split briefly after its exit from the stylomastoid foramen and rejoined prior to penetrating the parotid gland and bifurcating. The case series herein described is unique in that the trunk bifurcation seemed to occur after the nerve emerged from the stylomastoid foramen based on imaging. In one case the minor trunk stimulated the upper and lower divisions, while in the other case the minor trunk stimulated only the upper division. In both cases, the major trunk was found embedded in parotid tissue about 1cm inferior to the minor trunk. **Conclusions:** Duplication of the facial nerve trunk ranges between 3 and 27% according to case series and the finding of a seemingly small facial nerve trunk during parotid surgery should raise suspicion for the possibility of a duplicated trunk. Surgeons should not feel confident that they found the facial nerve trunk and start blindly cutting into parotid tissue inferior to a suspected trunk as it could potentially lead to injury to the main trunk. The best strategy would be to keep following the

small trunk anteriorly to the bifurcation where an abnormal branch will be found going in the posterior direction towards the stylomastoid foramen. Stimulation of only the upper division when associated with a small trunk should also be considered a sign of duplication of the trunk, but does not happen in all cases.

83. Can Positron Emission Tomography with Computed Tomography (PET/CT) Accurately Predict AJCC 8th Edition Pathologic Staging in Surgically Treated Patients with Human Papilloma Virus Associated (HPV+) Oropharyngeal Squamous Cell Carcinoma (OPSCC)?

Lindsey K. Goyal, MD, Pittsburgh, PA; Tanya J. Rath, MD, Phoenix, AZ; Barton F. Branstetter, MD, Pittsburgh, PA; William E. Gooding, MS, Pittsburgh, PA; Umamaheswar Duvvuri, MD PhD, Pittsburgh, PA; Shaum S. Sridharan, MD, Pittsburgh, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role of PET/CT in the clinical staging paradigm of the AJCC 8th edition for HPV+ oropharyngeal squamous cell carcinoma. They should also be able to discuss the accuracy of PET/CT in accurately predicting pathologic staging.

Objectives: The American Joint Committee on Cancer (AJCC) 8th edition introduced distinct clinical and pathological staging paradigms for human papilloma virus associated (HPV+) oropharyngeal squamous cell carcinoma (OPSCC). Treatment planning for OPSCC often utilizes PET/CT to assess clinical stage. We hypothesize PET/CT will accurately predict final pathologic AJCC 8th ed. staging in patients with HPV+ OPSCC. **Study Design:** Retrospective review. **Methods:** All patients with primary HPV+ OPSCC with preoperative PET/CT who underwent transoral robotic surgery and neck dissection between 2011 and 2017 were identified. Pathologic data was collected via chart review. Two senior neuroradiologists performed blinded reevaluation of all scans. Primary tumor size and cervical nodal disease characteristics were recorded and TNM staging was extrapolated. Cohen's kappa statistic was used to assess interrater reliability. Test for symmetry was performed when there was discordance between radiologic and pathologic staging. **Results:** 49 patients met inclusion criteria. Interrater reliability was substantial between radiologists (A and B) for nodal (N) and overall staging (OS) ($\kappa = 0.715$ and 0.715). Radiologist A review resulted in identical OS for 67% of patients, over-staging for 31%, and under-staging for 2%. Radiologist B review resulted in 61% identical OS, 39% over-staging, and 0% under-staging. In misclassified cases, test of symmetry shows strong bias toward over-staging N stage and OS ($p < 0.001$). Radiologic interpretation of extracapsular extension showed poor interrater reliability ($\kappa = 0.403$) and poor accuracy. **Conclusions:** PET/CT correctly predicts AJCC 8th edition pathologic staging in most patients, with good interrater reliability. In the patients who were misclassified, false positive assessment of nodal disease was the most frequent error.

84. The Rising Incidence of the Rare and Aggressive Sinonasal Melanoma

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Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of sinonasal melanoma with regards to its incidence, demographics, and predictors of survival of this rare and aggressive head and neck cancer.

Objectives: Sinonasal melanoma represents a rare and aggressive head and neck cancer with a limited number of comprehensive studies to understand the burden of this disease. We present the largest review of sinonasal melanoma using the largest cancer database in the United States. **Study Design:** Retrospective population based database analysis. **Methods:** The Survival Epidemiology, and End Results (SEER) database was queried for cases of sinonasal melanoma from 1975 to 2016. The incidence, percentage change (PC), annual percentage change (APC), hazard ratio, overall survival (OS), and disease specific survival (DSS) at 1, 2, and 5 year intervals were calculated. A P value < 0.05 was considered to be statistically significant. **Results:** Of the 1,119 cases identified, the majority of patients were Caucasian (979, 87.5%) and female (618, 55.2%). The incidence of sinonasal melanoma increased by 1,244% from 1975 to 2016 (0.048 to 0.644 per 1,000,000, APC 2.55, 95% CI [1.68 to 3.43], $P < 0.001$). The nasal cavity was the most common site of involvement (771, 68.9%), followed by the maxillary (181, 16.2%) and ethmoid (68, 6.1%) sinuses. The DSS of sinonasal melanoma was 76.9%, 59.2%, and 39.9% at 1, 2, and 5 year intervals, respectively. On multivariate regression of DSS by site, maxillary and accessory sinus involvement were found to be predictors of decreased survival ($P < 0.05$). **Conclusions:** The incidence of sinonasal melanoma is continually increasing, and paranasal sinus involvement represents a poorer prognosis. Further evidence based research should be conducted to confirm the rising incidence of this rare and aggressive malignancy.

85. Synovitis Acne Pustulosis Hyperostosis Osteitis (SAPHO) Syndrome Presenting as an Expansile Neck Mass

Asad A. Haider, BA, Houston, TX; Nathan R. Lindquist, MD BS, Houston, TX; Ann M. Gillenwater, MD, Houston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to explain why bacterial infections may mimic the presentation of tumors and discuss the extensive differential diagnosis of an expansile neck

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mass.

Objectives: Herein, we present a case of synovitis acne pustulosis hyperostosis osteitis (SAPHO) syndrome with suspicious bony destruction and diffuse involvement of soft tissue of the neck presenting to our quaternary cancer referral center. **Study Design:** Case report. **Methods:** A review of the patient's medical history along with a literature search on SAPHO syndrome was performed to gather information for this case report. **Results:** A 23 year old male presented with a rapidly expansile mass and swelling of the right clavicle with bony involvement from the surrounding soft tissues of the neck. Fine needle aspiration (FNA) was indeterminate, while imaging demonstrated a right supraclavicular 3.9 cm avascular lesion. Given the high suspicion for malignant process, the patient was referred to our institution for definitive tissue sampling and treatment. Operative cultures yielded only propionibacterium acnes (P acnes), while tissue cultures were negative for malignancy but did suggest likely osteomyelitis. As a result, the patient was diagnosed with atypical SAPHO syndrome. The patient's disease was treated with clindamycin with no signs of recurrence on one month followup. **Conclusions:** SAPHO syndrome in the head and neck may present as a rapidly growing neck mass with bony invasion. While malignant processes may lead the differential diagnosis, SAPHO syndrome should be considered when tissue sampling and cultures are consistent with a bacterial infection due to P acnes.

86. Is Lobectomy Sufficient for Multifocal Papillary Thyroid Microcarcinoma?

Albert Y. Han, MD PhD, Los Angeles, CA; Ki Wan Park, BS, Los Angeles, CA; Christine M. Kim, MD, Los Angeles, CA; Edward C. Kuan, MD MBA, Irvine, CA; Marilene B. Wang, MD, Los Angeles, CA; Chau T. Nguyen, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the differences in outcomes in patients with papillary thyroid microcarcinoma who received lobectomy and total thyroidectomy.

Objectives: To describe the incidence and determinants of survival of patients with papillary thyroid microcarcinoma (PTMC) using the Surveillance, Epidemiology, and End Result (SEER) database. **Study Design:** Retrospective cohort study using a national database. **Methods:** The SEER registry was utilized to calculate survival trends for patients with PTMC between 2010 and 2015. Patient data was then analyzed with respect to age, sex, race, multifocality, and types of surgery rendered. **Results:** A total of 22,283 cases of papillary thyroid microcarcinoma (T1a N0 M0) were identified. The cohort was composed of 82.6% females and 17.4% males. The mean age at diagnosis was 51.9 years. 81.9% of patients were of white race. Most PTMC presented as solitary tumors (67.8%, n=15,097). Multifocal PTMC was present in 32.2% of the tumors (n=7186). 73.9% of patients underwent total thyroidectomy, 23.0% received lobectomy, and 3.1% received subtotal/near total thyroidectomy. Overall survival (OS) at 2 and 5 years was 98% and 95%, respectively. Multivariate analysis revealed that age, sex, and multifocality were determinants of OS. Only age was a determinant of disease specific survival DSS. Kaplan-Meier survival analysis revealed that multifocal PTMC had similar OS between lobectomy and total thyroidectomy patients (69.55 months versus 69.82 months; p = 0.72). **Conclusions:** PTMC has a relatively good prognosis. Our analysis revealed that age was a determinant of OS and DSS; sex and multifocality were also prognosticators for OS. The type of surgery, whether lobectomy or total thyroidectomy, was not a determinant of survival in multifocal PTMC.

87. The Relationship between Glycogen Storage Disease and Laryngeal Cancer

Tania Hassanzadeh, MD, Boston, MA; Rebecca A. Compton, MD, Boston, MA; Richard O. Wein, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss available literature on head and neck abnormalities in patients with glycogen storage disease. They should also be able to identify the leading hypotheses behind the risk of malignancy in patients with glycogen storage disease.

Objectives: There are no cases in the literature describing the association between glycogen storage disease and head and neck cancer. Our objective was to highlight an atypical presentation of laryngeal squamous cell carcinoma in a 33 year old man with glycogen storage disease and to provide further information for otolaryngologists treating this patient population. **Study Design:** Case report. **Methods:** Records were reviewed from presentation through first postoperative followup for the patient. A literature review was then performed to identify all known associations between glycogen storage disease, head and neck cancer, and malignancy overall. **Results:** Only 1 case of a child with glycogen storage disease is discussed in the literature, who experienced laryngeal and pharyngeal edema from nephrotic syndrome. Macroglossia is a known finding in patients with Pompe disease (GSD II). There are no cases discussing head and neck malignancy in children or adults with glycogen storage disease. However, the biochemical mechanisms that predispose this population to developing cancer are well described. **Conclusions:** Otolaryngologists should have a low threshold for suspecting malignancy in patients with glycogen storage diseases, despite young age, and pursuing appropriate intervention. There are a variety of mechanisms that are thought to increase this risk, including aberrant cell cycle regulation, loss of normal enzymes, and chronic neutropenia. Awareness of this risk will help guide earlier intervention in patients with glycogen storage diseases and allow for a better chance of total cure for those with confirmed malignancy.

88. Concentration of High Cost Head and Neck Cancer Surgical Patients

Matthew E. Herberg, MD, Baltimore, MD; Peter S. Vosler, MD PhD, Baltimore, MD; Rajarsi Mandal, MD, Baltimore, MD; Carole Fakhry, MD MPH, Baltimore, MD; David W. Eisele, MD, Baltimore, MD; Christine G. Gourin, MD MPH, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to identify variables associated with high hospital concentration of high cost patients and examine associations with short term outcomes in head and neck cancer surgery.

Objectives: Healthcare costs are disproportionately concentrated among a small number of patients. We sought to identify variables associated with high cost patients and high hospital concentration of high cost patients and to examine associations with short term outcomes in head and neck cancer (HNCA) surgery. **Study Design:** The Nationwide Inpatient Sample was used to identify 170,577 patients who underwent surgery for a malignant upper aerodigestive tract neoplasm in 2001-2011. High cost patients were defined as patients whose costs of care were in the top decile, and high concentration hospitals were defined as those whose percentage of high cost patients was in the top decile. **Methods:** Multivariable regression was used to evaluate associations between costs, patient and hospital variables, postoperative complications, and in-hospital mortality. **Results:** Costs associated with high cost patients were 4.47 fold greater than the remaining 90% of patients. High concentration hospitals treated 36% of all high cost patients. High cost patients were more likely to be Hispanic (OR=1.88 [1.44-2.46]), Asian/Pacific Islander (OR=2.08 [1.45-2.97]), have oral cavity cancer (OR=1.21 [1.05-1.39]), advanced comorbidity (OR=1.53 [1.31-1.77]), Medicaid (OR=1.93 [1.62-2.31]), self-pay payor status (OR=1.72 [1.38-2.14]), income >50th percentile (OR=1.25 [1.05-1.51]) and nonroutine discharge (OR=2.66 [2.14-3.31]). High concentration hospitals were more likely to be teaching hospitals (OR=3.14 [1.64-6.05]) and less likely to be urban (OR=0.20 [0.04-0.93]). On multivariable analysis, high cost patients were associated with an increased odds of in-hospital mortality (OR=8.00 [5.89-10.85]) and postoperative complications (OR=5.69 [5.01-6.06]). High concentration hospitals were associated with an increased odds of postoperative complications (OR=1.31 [1.08-1.61]) but were not associated with increased in-hospital mortality (OR=0.98 [0.67-1.44]). **Conclusions:** High cost HNCA surgical patients are associated with increased postoperative morbidity and mortality and are disproportionately concentrated at teaching hospitals.

89. Determining Neck Lymph Node Level Patterns in Different Subtypes of Head and Neck Cancer

Brianna C. Hope, MS3, Lubbock, TX; Rahul Varman, MD, Lubbock, TX; Hannah Daniel, BS, Lubbock, TX; Neil Jain, MS1, Lubbock, TX; Tam Nguyen, MD, Lubbock, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss how the current guidelines for neck dissections are or are not reducing the risk of morbidity and mortality in patients with head and neck cancer.

Objectives: The objective of this study is to identify a specific lymph node density value for different head and neck cancers that corresponds with a statistically significant chance of recurrence. The study will also aim to establish a relationship between different types of head and neck cancers and their respective neck lymph node levels that are most likely to be involved. **Study Design:** This will be a retrospective cohort study. **Methods:** A chart review will be performed on head and neck cancer patients at a local facility to identify which neck lymph node levels contained positive lymph nodes after neck dissections. Factors that will be evaluated include grade and stage of the cancer, site of cancer, location of positive lymph nodes, lymph node density in those locations, and whether or not chemotherapy and radiation have been initiated prior to surgery. Exclusion criteria will include patients that have been lost to followup. **Results:** Results will be released pending full statistical analysis. **Conclusions:** Based on study results and the results of other similar studies that have previously been published, recommendations for neck dissections could be made based on the subtype of cancer being treated. The ultimate goal would be to evaluate ways in which we can provide fewer repeat procedures by ensuring that patients have a more complete and thorough treatment at a single time.

90. Change in Parathyroid Hormone Levels from Baseline Predicts Postoperative Hypocalcemia following Total or Completion Thyroidectomy

Caitlin B. Iorio, MD, Charlottesville, VA; William M. Swift, BS, Charlottesville, VA; Nolan A. Wages, PhD, Charlottesville, VA; Indika V. Mallawaarachchi, MS, Charlottesville, VA; David C. Shonka, MD, Charlottesville, VA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the strongest predictor of postoperative hypocalcemia following thyroid surgery.

Objectives: The goal of this study is to identify the strongest predictor of postoperative hypocalcemia following thyroid surgery. **Study Design:** Single institution, single surgeon, case series. **Methods:** This is a cohort study of patients who underwent total/completion thyroidectomy. No patients received postoperative calcium supplementation. Demographic and perioperative data were collected including but not limited to, preoperative baseline PTH levels, PTH levels at 30

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minutes and 6 hours post-excision, and 18 hour post-excision calcium levels. **Results:** Of 124 patients studied, 24% developed temporary hypocalcemia ($\text{Ca} < 8.5 \text{ mg/dL}$), which is within the reported median incidence (19-38%). On multivariate analysis, absolute PTH levels at 30 minutes and 6 hours post-excision as well as change in PTH from baseline at 30 minutes and 6 hours post-excision were statistically significantly correlated with postoperative hypocalcemia. No other variables (body mass index, preoperative vitamin D levels, parathyroid glands identified intraoperatively, extent of surgery, thyroid pathology) were found to be significantly associated with increased risk of hypocalcemia. In a comparative analysis, change in PTH from baseline to 30 minutes or 6 hours post-excision outperformed absolute PTH levels at these time points for predicting hypocalcemia although this was not statistically significant. Per unit decrease in PTH from baseline at 30 minutes post-excision, the risk of developing temporary hypocalcemia increases by 1.6%. **Conclusions:** Absolute PTH levels and change in PTH from baseline at 30 minutes and 6 hours post-excision predict hypocalcemia after total or completion thyroidectomy. While not statistically significant, change in PTH levels from baseline outperformed absolute postoperative PTH levels at predicting hypocalcemia.

91. Prevention of Unplanned Pharyngocutaneous Fistula in Salvage Laryngectomy: Fistula Formula Update

Rachel T. Irizarry, MD, Brooklyn, NY; Daniel C. Sukato, MD, Brooklyn, NY; Krishnamurthi Sundaram, MD, Brooklyn, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to critically evaluate the existing literature regarding prevention of pharyngocutaneous fistula formation following salvage laryngectomy. Understand the potential risk factors and how these are preemptively addressed by the multi-pronged our fistula formula.

Objectives: Widespread use of laryngeal preservation protocols has amplified the need for salvage total laryngectomy despite the increased risk for postoperative complications. Pharyngocutaneous fistula (PCF) remains the most common complication with increased frequency, severity, and duration observed following salvage surgeries. Several recent meta-analyses demonstrate decreased rates of PCF with standardized use of vascularized flaps. Yet, overall PCF incidence in the literature remains unchanged at 30% suggesting other contributing factors exist and must be addressed as demonstrated in this study. **Study Design:** Our fistula formula (FF) is a multi-pronged approach to prophylactically address risk factors contributing to PCF formation by incorporating a vascularized flap, antibiotic prophylaxis, delayed oral intake, and salivary diversion. **Methods:** Initial results published in 2009 demonstrate a decrease in post-salvage total laryngectomy PCF rates from 67% to 0% in the first 11 patients treated with FF. Followup outcomes are described in this study. **Results:** Consistently using all components of FF enabled senior author to develop zero PCF in salvage total laryngectomy patients over the past 10 years. **Conclusions:** Our experience highlights the importance of a multi-prong approach. Appropriate antibiotic prophylaxis must reflect changes in the current microbiome. Incorporation of salivary diversion and delayed oral intake appear critical to success of the FF and enable the formula to successfully be applied to failed free flap reconstruction.

92. Sarcopenia Is Associated with Increased Blood Transfusions in Oncologic Head and Neck Free Flap Reconstruction

Alexander J. Jones, MD, Indianapolis, IN; Mohamedkazim K. Alwani, MD, Indianapolis, IN; Leah J. Novinger, MD PhD, Indianapolis, IN; Andrea F. Bonetto, PhD, Indianapolis, IN; Michael G. Moore, MD, Indianapolis, IN; Avinash V. Mantravadi, MD, Indianapolis, IN

Educational Objective: At the conclusion of this presentation, the participants should be able to understand sarcopenia and its impact on transfusion requirements in head and neck cancer patients undergoing free flap reconstruction.

Objectives: Determine if sarcopenia is a predictor of blood transfusion requirements in head and neck cancer free flap reconstruction. **Study Design:** Retrospective, single tertiary referral center. **Methods:** Head and neck cancer patients with preoperative abdominal imaging receiving free flap reconstruction between 2014 and 2019 were included. Preoperative comorbidities, skeletal muscle index (SMI, cm^2/m^2) oncologic history, and intraoperative data were collected. Sarcopenia was defined as $\text{SMI} \leq 41.6 \text{ cm}^2/\text{m}^2$ for males and $\leq 32.0 \text{ cm}^2/\text{m}^2$ for females. Linear regression was used to determine predictors of transfusion. **Results:** Fifty (28.7%) of 174 total patients had sarcopenia. Sarcopenic patients had: older age (63.5 vs. 58.0 years, $p = 0.011$), lower body mass index (BMI, 21.5 vs. 27.1 kg/m^2 , $p < 0.001$), higher alcoholism rates (56.0% vs. 25.0%, $p < 0.001$), greater modified Charlson Comorbidity Index (mCCI, 1.6 vs. 0.7, $p < 0.001$), higher frequency of aerodigestive tract cancer (88.0% vs. 71.8%, $p = 0.022$), reconstruction with flaps other than forearm (90.0% vs. 68.5% $p = 0.033$), and more frequent transfusions (68.0% vs. 29.8%, $p < 0.001$). Simple linear regression identified BMI, sarcopenia, mCCI, stage IV disease, preoperative hemoglobin, free flap type, operative time, estimated blood loss (EBL), and administered intravenous crystalloid as significant predictors. Multivariate regression of these factors determined sarcopenia ($p = 0.009$), mCCI ≥ 1 ($p = 0.022$), preoperative hemoglobin ($p < 0.001$), operative time ($p = 0.002$), and EBL ($p < 0.001$) as independent predictors of intraoperative transfusion requirements. **Conclusions:** Sarcopenia is associated with increased blood transfusions in head and neck cancer free flap reconstruction patients.

93. A Retrospective Review of the Effects of Parathyroidectomy on Essential Hypertension

Mia Jusufbegovic, MD, Louisville, KY; Shawn C. Jones, MS, Louisville, KY; Elizabeth D. Cash, PhD, Louisville, KY; Amy R. Quillo, MD, Louisville, KY; Michael B. Flynn, MD, Louisville, KY; Jeffrey M. Bumpous, MD, Louisville, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss what effects parathyroidectomy has on essential hypertension in patients with primary hyperparathyroidism due to a solitary adenoma, and if there is a role for consideration of uncontrolled hypertension as inclusion criteria for surgical intervention in this population.

Objectives: To determine how surgical treatment of primary hyperparathyroidism affects the presence, severity, and incidence of essential hypertension (HTN). To determine if the weight or parathyroid hormone (PTH) levels of a hyperactive adenoma have an effect on blood pressure (BP) trends after parathyroidectomy. **Study Design:** Retrospective chart review. **Methods:** Charts were obtained by searching CPT codes for parathyroidectomy. Patients with primary hyperparathyroidism secondary to a solitary adenoma (N=116) were included. To help account for white coat hypertension, change scores were calculated for systolic and diastolic BP (SBP, DPB), and mean arterial pressure (MAP). Treatment parameters, surgical specimen characteristics, and medical comorbidities were evaluated. **Results:** SBP and MAP, but not DBP, decreased significantly over the course of followup, particularly among patients who presented with poorly controlled hypertension ($p < .030$). Adenoma weight and perioperative change in PTH were not associated with change in SBP, DBP, or MAP. Higher preop PTH on the day of surgery (DOS) was significantly correlated with being classified as hypertensive on initial visit ($p = .006$) and on DOS ($p = .001$) irrespective of prior diagnosis or home medications. The incidence of hypertension, number of BP medications taken, and doses of BP medications recorded did not change significantly over the course of the study. **Conclusions:** In patients with primary hyperparathyroidism, parathyroidectomy may be associated with a decrease in SBP and MAP, and there is a positive correlation between PTH and BP values. However, surgical intervention does not appear to decrease the severity of, or improve control of, essential hypertension long term.

94. Prophylactic versus Reactive Feeding Tube Placement for Squamous Cell Carcinoma of the Head and Neck

Derek D. Kao, BS, New York, NY; Rocco M. Ferrandino, MD MSCR, New York, NY; Susan E. Bates, MD, New York, NY; Yeun-Hee A. Park, MD, Bronx, NY; Joshua M. Bauml, MD, Philadelphia, PA; Keith M. Sigel, MD PhD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the merits of prophylactic versus reactive feeding tube placement with respect to overall survival, cancer specific survival, and body mass index.

Objectives: To compare survival and body mass trends for prophylactic feeding tube (PFT; prior to radiotherapy) versus reactive feeding tube (RFT; after radiotherapy initiation) placements in veterans with advanced head and neck cancer. **Study Design:** We conducted a retrospective cohort study of 5,060 patients in the Veterans Health Affairs system with stages III-IVB head and neck squamous cell carcinoma treated with chemoradiotherapy for curative intent. **Methods:** Patients with a PEG tube placed within 30 days prior to treatment initiation were included in the PFT group while patients with a PEG tube placed within 3 months after treatment initiation were included in the RFT group. To minimize ascertainment bias we propensity score matched the two treatment arms and compared outcomes using Cox proportional hazards methods. **Results:** A total of 5,060 patients were included in this study with 3,210 receiving PFT and 1,888 receiving RFT. Within each group, 60% of primary sites were oropharynx, 33% hypopharynx/larynx, and 7% oral cavity. There were no significant differences in overall survival (HR 0.96, 95% CI 0.89 - 1.04, $p = 0.36$), head and neck cancer specific survival (HR 1.01, 95% CI 0.93 - 1.11, $p = 0.75$), and change in BMI after 6 months ($p = 0.28$). Mean survival time was 54.4 months (SD 45.9 months) for overall survival and 57.1 months (SD 46.5 months) for head and neck cancer specific survival. **Conclusions:** These results suggest that the timing of PEG placement for advanced head and neck cancer does not appear to provide any significant survival or body mass advantage.

95. A Case of Mammary Analogue Secretory Carcinoma of the Submandibular Gland with Negative Mammaglobin Staining

Alexander D. Karabachev, BS, Burlington, VT; Ricardo M. Aulet, MD, Burlington, VT; Allison L. Ciolino, MD, Burlington, VT; Mirabelle B. Sajisevi, MD, Burlington, VT

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the unique features of mammary analogue secretory carcinoma and its diagnosis.

Objectives: Mammary analogue secretory carcinoma (MASC) is a tumor of salivary gland origin first described in 2010 by Skálová et al. with histologic resemblance to secretory breast cancer. Prior to discovery, it was frequently diagnosed as zymogen poor acinic cell carcinoma; however, it may be distinguished by positive immunohistochemical staining for mammaglobin and S-100 as well as ETV6-NTRK3 translocation. Mammaglobin is highly sensitive for MASC demonstrat-

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ing up to 100% sensitivity. We present a patient with a submandibular MASC tumor with negative mammaglobin staining. **Study Design:** Case report and literature review. **Methods:** We reviewed a case of mammaglobin negative MASC and performed a relevant literature review. **Results:** An 18 year old male presented with an asymptomatic left submandibular mass. Ultrasound revealed a solid 1.6 cm nodule in the left submandibular gland. FNA demonstrated atypical cells. Patient underwent excision of the left submandibular gland. Final pathology demonstrated characteristic MASC histology with diffuse S-100 staining, but negative staining for mammaglobin. FISH confirmed the histologic impression of MASC with detection of ETV6-NTRK3 translocation. Given low grade histology with complete excision, recommendations were made for close observation with no additional treatment. **Conclusions:** It has been suggested that diagnosis of MASC may be rendered in the presence of classic histomorphology with dual positivity for mammaglobin and S-100 immunostains, independent of testing for ETV6 rearrangement. Mammaglobin is highly sensitive for MASC, however, our case demonstrates mammaglobin negativity. Genetic targeted therapy has shown potential for the treatment of MASC. Our report aims to enhance awareness of mammaglobin negative MASC to improve diagnoses and ensure appropriate management.

96. Outcomes in Patients with and without Intraoperative PTH in the Setting of Co-Localizing Studies for Primary Hyperparathyroidism

Alexander D. Karabachev, BS, Burlington, VT; Ricardo M. Aulet, MD, Burlington, VT; William J. Brundage, MD, Burlington, VT; Damon A. Silverman, MD, Burlington, VT; Mirabelle B. Sajisevi, MD, Burlington, VT

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss how intraoperative parathyroid hormone testing influences outcomes in patients with co-localizing studies as well as the operative time and cost.

Objectives: Focused parathyroidectomy is performed when a single adenoma is identified on preoperative imaging. There is controversy whether intraoperative parathyroid hormone (iPTH) testing influences outcomes in patients with co-localizing studies. **Study Design:** Retrospective chart review. **Methods:** Retrospective review was conducted of patients undergoing surgery for nonfamilial primary hyperparathyroidism at a single institution from 1/2013-7/2018. Patients with a suspected single adenoma that co-localized on sestamibi and ultrasound were included resulting in 137 patients, of which 111 (81.0%) had iPTH (group 1) while 27 (19.7%) did not (group 2). Time driven activity based cost (TDABC) analysis was performed incorporating physician compensation and anesthetic usage to determine the cost differential between groups. **Results:** In group 1, use of iPTH prompted reexploration in 2 patients (1.8%). In both cases, the initial gland identified was normal parathyroid and persistent elevation of iPTH resulted in additional dissection and removal of the adenoma. All patients had normal postoperative calcium levels. All group 2 patients were eucalcemic at initial postoperative followup. One patient (3.7%) developed recurrent adenoma at the initial surgical site and was re-resected 33 months later. The average time for the procedure in group 1 was 92.2 ± 29.3 minutes compared to 52.9 ± 17.4 minutes in group 2 ($p < 0.001$). The mean TDABC for group 1 was $\$943.98 \pm 285.41$ compared to $\$514.81 \pm 169.23$ for group 2 ($p < 0.001$). **Conclusions:** In our patients with sestamibi and ultrasound that co-localized a single adenoma, use of iPTH did not identify unsuspected additional disease. Patients without iPTH testing had shorter operative times and lower operative costs.

97. Core Needle Biopsy of Head and Neck Lesions: High Rates of Efficacy and Safety at a Single Institution

Paul A. Lambert, MD, Rochester, NY; Alexander T. Kessler, MD, Buffalo, NY; Matthew C. Miller, MD, Rochester, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the expected yield, adverse effects, and clinical utility of core biopsies for head and neck lesions for multiple subsites and kinds of pathology.

Objectives: Core needle biopsy of lesions of the head and neck, which may be guided with ultrasound (US) or computed tomography (CT) imaging, has demonstrated high diagnostic yield with rare complications. The aim of this study was to review an institutional series of core biopsies of the head and neck, including samples taken with larger (14 gauge) needles with CT guidance. **Study Design:** Retrospective analysis. **Methods:** Sequential patients from 2015 - 2017 who underwent core biopsy of head and neck lesions through the department of imaging sciences at our medical center were included for analysis via chart review. Patient factors, biopsy technique, pathologic diagnosis, and outcomes were described. **Results:** There were 47 patients identified. Biopsies were CT guided in 15 cases, and US guided in 32. Needle gauge ranged from 14 - 20. One case of delayed hematoma and one case of temporary numbness were identified. A pathologic diagnosis or malignancy was reported in 28 cases, whereas a descriptive diagnosis of tissue or benignity was reported in 19. Fourteen patients underwent surgical excision of the lesion. In 13 cases, the surgical pathologic diagnosis corresponded to the core biopsy. In one case, malignancy was identified when the core biopsy found rare atypical cells only. **Conclusions:** Core biopsy is a useful and safe diagnostic tool in workup of head and neck lesions. Consultation with interventional radiology can assist in selection of appropriate image guidance, biopsy location, and needle size. Biopsies with up to 14 gauge needle resulted in no permanent morbidity. Results guided management regarding further surgical or diagnostic interventions.

98. Readability of Patient Reported Outcome Measures for Head and Neck Oncology

Saangyoung E. Lee, BS, Chapel Hill, NC; Zainab Farzal, MD MPH, Chapel Hill, NC; Charles S. Ebert Jr., MD MPH, Chapel Hill, NC; Adam M. Zanation, MD, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the use of patient reported outcome measures in head and neck oncology and discuss the readability levels of these questionnaires.

Objectives: Patient reported outcome measures (PROMs) are communication tools to help patients convey their disease experience to medical providers and guide management decisions. However, the utility of healthcare outcome measures is dependent on patient literacy and readability of PROMs. If written for a more advanced literacy level, they can mis-estimate symptoms and add significant barriers to care, especially in the underserved. However, readability of head and neck oncology (H&N) PROMs has not been assessed. The aim of this study is to evaluate the readability of H&N PROMs to assess whether they meet recommended readability levels. **Study Design:** Case series comparing patient reported outcome measures in head and neck oncology. **Methods:** Three readability measures: Gunning Fog, Simple Measure of Gobbledygook (SMOG), and FORCAST were used to evaluate the readability level of commonly used H&N PROMs. PROMs with 6th grade readability level or lower were considered to meet the recommendations of health literacy experts. **Results:** Eight H&N PROMs were reviewed. 100% of H&N PROMs were above health literacy experts' and National Institutes of Health recommended reading levels. Gunning Fog consistently estimated easiest readability and FORCAST the most difficult. **Conclusions:** PROMs are important clinical tools that drive patient centric care in H&N oncology. All H&N PROMs are written above recommended reading levels. Future PROMs should be written with easier readability to accurately convey patients' H&N disease experiences.

99. Anatomical Subsite Is Associated with Altered Immune Tumor Microenvironments in HPV Negative Head and Neck Cancer

Christopher A. Maroun, MD, Baltimore, MD; Gangcai Zhu, MD PhD, Baltimore, MD; Margueritta El Asmar, MD, Baltimore, MD; Christine G. Gourin, MD MPH, Baltimore, MD; Peter S. Vosler, MD PhD, Baltimore, MD; Rajarsi Mandal, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, participants should be able to compare differences in immune infiltration and expression of immunomodulatory markers in HPV negative head and neck squamous cell carcinoma within different anatomical subsites.

Objectives: To investigate differences in immune infiltration, immunomodulatory marker expression, and associated survival in HPV negative HNSCC within different anatomical subsites, which has not been investigated in this cohort. **Study Design:** Retrospective analysis. **Methods:** Normalized mRNA expression data were downloaded from the Cancer Genome Atlas (TCGA) database. Deconvoluted immune cell population data using the CIBERSORT algorithm were retrieved from Thorsson et al (2018). Cell fractions and marker expression were compared between subsites using the Kruskal-Wallis test. Patients were categorized into high and low fraction groups using the 30th percentile for each subsite. Groups were used to calculate overall (OS) and progression free (PFS) survival for laryngeal and oral cavity tumors separately. Adjustment for multiple comparisons was performed using the Benjamini-Hochberg method, with false discovery rate of 0.05. **Results:** 382 HPV negative HNSCC patients were included; 247 (64.7%) oral cavity, 106 (27.7%) larynx, 23 (6.0%) oropharynx, and 6 (1.6%) hypopharynx. There were significantly different fractions of naïve B cells ($p < 0.0001$), plasma cells ($p < 0.0001$), lymphocytes ($p < 0.0001$) and macrophages ($p < 0.001$) between subsites. Subsites showed differential expression of immunomodulatory markers PVRIG ($p = 0.0033$), ICOSLG ($p < 0.0001$), and GITR ($p < 0.0001$). A low lymphocyte/macrophage ratio resulted in significantly worse OS (HR=2.39, $p = 0.0025$) and PFS (HR=2.13, $p = 0.0155$) exclusively within laryngeal tumors, but not oral cavity tumors (OS HR=1.25, $p = 0.253$; PFS HR=0.93, $p = 0.729$). **Conclusions:** Different subsites within the head and neck appear to harbor altered immune tumor microenvironments that are independent from the effects of HPV related oncogenesis. These differences appear to have differential consequences on survival, providing rationale for subsite stratification in the development of future immune based clinical trials.

100. The Prognostic Implications of Viral DNA Degradation Pathways in HPV Positive Head and Neck Cancer

Christopher A. Maroun, MD, Baltimore, MD; Margueritta El Asmar, MD, Baltimore, MD; Carole Fakhry, MD MPH, Baltimore, MD; Christine G. Gourin, MD MPH, Baltimore, MD; Drew M. Pardoll, MD PhD, Baltimore, MD; Rajarsi Mandal, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, participants should be able understand the differential effect of viral DNA degradation pathways on survival in HPV positive and negative head and neck cancers.

Objectives: To investigate differences in viral DNA degradation pathways and related downstream effectors within the cGAS-STING innate immune pathway between HPV positive and HPV negative HNSCC, to create rational targets for patients in this cohort. **Study Design:** Retrospective analysis. **Methods:** Clinical and normalized mRNA expression data were downloaded from the Cancer Genome Atlas (TCGA) database. Fold change (FC) median expression between HPV positive and HPV negative tumors was calculated for genes of interest. Patients were categorized into high and low

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expression groups using median expression for HPV positive and HPV negative patients separately. Overall (OS) and progression free (PFS) survival between high and low expression groups for HPV positive and HPV negative patients was calculated separately. Adjustment for multiple comparisons was performed using the Benjamini-Hochberg method with false discovery rate of 0.05. **Results:** 382 HPV negative and 60 HPV positive head and neck cancer patients were included. The HPV positive group was significantly younger on average (57.9 vs. 61.7 years, $p=0.010$) and had a higher proportion of males (91.7% vs. 70.9%, $p=0.005$). HPV positive tumors showed significantly higher median expression of DNA degradation genes DNASE2 ($FC=1.49$, $p<0.0001$) and TREX1 ($FC=2.04$, $p<0.0001$), as well as downstream effectors MB21D1 (cGAS), TMEM173 (STING), TBK1, IRF3, and STAT6. Within the HPV positive group, low DNASE2 expression resulted in significantly worse OS ($HR=3.54$, $p=0.0384$), and low TREX1 expression trended towards worse OS ($HR=2.79$, $p=0.084$). Neither DNASE2 nor TREX1 expression was associated with survival in the HPV group. **Conclusions:** Expression of viral DNA degradation enzymes may have prognostic implications exclusively in virally driven HPV positive cancers. Further research is required to elucidate the mechanism behind this observation.

101. Successful Resection of a Symptomatic Substernal Goiter Presenting with Superior Vena Cava Syndrome, Necessitating Cardiopulmonary Bypass: Case Report and Review of Literature

Mathew K. Marsee, MA, South Bend, IN; David J. Isaacson, MD, South Bend, IN; Michael F. Steinberg, MD, South Bend, IN; John M. Arnold, MD, South Bend, IN

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the application of cardiopulmonary bypass for the management of massive symptomatic substernal goiter.

Objectives: Describe the use of cardiopulmonary bypass under local anesthesia for the management of substernal goiter with superior vena cava (SVC) syndrome and airway compromise. **Study Design:** A case report with comprehensive review of literature. **Methods:** A literature search was performed to identify previously described cases of thyroidectomies requiring cardiopulmonary bypass and to discuss current indications for cardiopulmonary bypass in thyroid surgery. **Results:** A 77 year old African American male was referred to the otolaryngology clinic for management of previously diagnosed substernal goiter. Patient presented with symptoms of right upper extremity plethora, tongue swelling, dysphagia, and increased neck circumference. He was found to have a mass in the anterior mediastinum extending to the level of the carina, consistent with mass of substernal goiter. The mass measured 11cm x 7cm, replacing the right thyroid lobe and isthmus. The patient underwent successful resection of this mass after being placed on cardiopulmonary bypass under local anesthesia. Final pathology confirmed a benign goiter. The process was well tolerated and the patient had an uneventful recovery with relief of his presenting symptoms. **Conclusions:** Cardiopulmonary bypass done under local anesthesia provides a safe method to approach a massive substernal goiter with SVC syndrome and airway distortion. We present a unique case and discuss indications for cardiopulmonary bypass under local anesthesia.

102. Assessing Patient Understanding of the Human Papilloma Virus and Barriers to Vaccination

Erica E. Mayland, MD, New Orleans, LA; Larissa Sweeny, MD, Baton Rouge, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify gaps in HPV education and barriers to HPV vaccination to help facilitate discussions with patients regarding vaccination.

Objectives: In the United States (US), HPV vaccination rates are as low as 53%. Although HPV infection is known to cause cervical and oropharyngeal cancers, knowledge of HPV is low or nonexistent among many patients. This is particularly true among certain ethnicities and patients of lower socioeconomic status. Our objective was to identify baseline levels of understanding and self-identified barriers to vaccination in order to improve communication strategies and effectiveness of HPV education. **Study Design:** Cross-sectional survey. **Methods:** Adults, 18-45, in a low income clinic were administered pre- and post-education surveys ($n=30$). Questionnaires assessed knowledge of factors such as route of spread, risk of cancer and intention to be vaccinated. Educational handouts were provided and modeled off the Health Belief Model. Changes in perceptions and intentions were then analyzed. **Results:** 50% stated they had never heard of the HPV vaccine ($n=15$). Majority of individuals were aware of HPV infections link to cervical cancer (68%). Only 37% of individuals were aware of an association with oropharyngeal cancer ($n=11$). 33% felt HPV was rare and would not affect them personally ($n=10$). Majority of patients stated they were interested in getting vaccinated following education (58%) and 41% individuals made an appointment for vaccination. The most common barrier was concern over vaccine safety. **Conclusions:** Although cervical cancer's link to HPV is well known, additional education is needed regarding HPV's association with oropharyngeal cancers. Further studies such as this one will help identify knowledge gaps and the methods that provide the greatest education and vaccine compliance.

103. Accelerated Surgical Stay Program for Head and Neck Surgical Oncology Patients

Hilary C. McCrary, MD MPH, Salt Lake City, UT; Kristin Jeong, MSBA, Salt Lake City, UT; Marcus M. Monroe, MD, Salt Lake City, UT; Luke O. Buchmann, MD, Salt Lake City, UT; Jason P. Hunt, MD, Salt Lake City, UT; Richard B. Cannon, MD, Salt Lake City, UT

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the cost

benefits of accelerated surgical stay programs within head and neck surgery.

Objectives: Increasing healthcare costs requires providers to create cost containment strategies that do not compromise patient care. One method to reduce healthcare costs are accelerated surgical stay programs (ASSPs). Our aim was to implement an ASSP to reduce cost of stay (COS). **Study Design:** Retrospective chart review. **Methods:** An ASSP was implemented at an academic cancer hospital, with a protocol to discharge patients with surgical drains. Patients who underwent neck dissection, thyroidectomy, and parotidectomy from September 2018-July 2019 were identified. Free flap patients were excluded. Patients were divided into groups: 1) drain pulled during admission, 2) discharge with drain. The percent change in COS between groups was determined and a t-test was used to compare means. **Results:** 122 patients were included, of which 39.3% were discharged with a drain. The average LOS for patients discharged with a drain was 1.43 days (CI 1.0-1.78), while it was 2.32 days (CI 1.8-2.7) when drains were pulled during admission ($p=0.007$). The average COS was decreased 26.7% among all patients discharged with a drain. Among thyroidectomy patients ($n=62$), 27.4% were discharged with a drain, with a 17.1% decrease in COS. Among neck dissection patients ($n=50$), 50% were discharged with a drain, with a 38.1% decrease in COS. Among parotidectomy patients ($n=10$), 60% were discharged with a drain, with a 5.3% decrease in COS. **Conclusions:** ASSPs within head and neck surgery are associated with cost reduction. The largest savings were appreciated among neck dissection patients, with a 38.1% decrease in COS. Use of this protocol among patients without significant comorbidities can improve healthcare value.

104. Blunt Laryngeal Fracture Caused by Falling from Standing and Landing on a Wooden Box: A Case Report

Sina Mehraban-Far, BSc, Stony Brook, NY; James Alrassi, BA, Stony Brook, NY (Presenter);
Melissa M. Mortensen, MD, Stony Brook, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the risk of laryngeal fracture in cases involving minor blunt trauma to the neck.

Objectives: Laryngeal fracture is rare, potentially life threatening and usually caused by major blunt trauma from car accidents, assaults or sports injuries. Here is an unusual case of laryngeal fracture caused by seemingly minor blunt trauma from falling onto a box. **Study Design:** Descriptive. **Methods:** Chart review. **Results:** A 66 year old female presented to emergency department (ED) after falling from a standing position while carrying a wooden box, landing onto her left arm and hitting her neck on the handle of the box. On physical examination, her neck was edematous and tender to palpation around the thyroid and cricoid cartilage. No hematomas, subcutaneous emphysema, or lacerations were found. She suddenly became cyanotic and hypoxic and was intubated. Computed tomography (CT) of her neck revealed a displaced midline thyroid cartilage fracture and a comminuted cricoid cartilage fracture (Schaefer Fuhrman's Group IV). The patient was taken to the operating room for diagnostic laryngoscopy, tracheostomy, open reduction and internal fixation of her fractures. On laryngoscopy, the vocal folds were edematous bilaterally with copious bleeding seen in the anterior larynx, and the subglottis was an ovoid shape. On surgical exploration of the neck, bleeding and ecchymosis were noted around the infrahyoid muscles. The thyroid fracture was repaired with a low profile plate, while the cricoid cartilage was sutured and stented with a modified T tube. Patient was successfully decannulated and discharged 3 weeks postoperatively. **Conclusions:** Laryngeal fractures require a high degree of suspicion and should be considered even in cases involving only seemingly minor trauma to the neck such as the one described here.

105. Primary Extranodal Oropharyngeal Lymphoma: Case Report

Sina Mehraban-Far, BSc, Stony Brook, NY; Robert Hutnik, BSc, Stony Brook, NY; James Alrassi, BA, Stony Brook, NY; Melissa M. Mortensen, MD, Stony Brook, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the importance of considering primary lymphoma in the differential diagnosis for patients with lesions in the oropharynx.

Objectives: Lymphomas represent the second most common malignancy of the head and neck; however, primary extranodal lymphomas rarely arise from the oropharynx and hypopharynx. Here, we present a patient with a primary diffuse large B cell lymphoma arising from the oropharynx. **Study Design:** Descriptive. **Methods:** Chart review. **Results:** A 76 year old Caucasian female was referred to the emergency department (ED) from an outpatient otolaryngology office for airway management of a mass seen on laryngoscopy. The patient was complaining of worsening dysphagia, odynophagia, globus sensation, and hoarseness for three months, accompanied by an unintentional 12 pound weight loss. She had a 15 pack year smoking history and a family history significant for lung carcinoma. Upon nasopharyngoscopic exam, a parapharyngeal mass was seen. A head and neck computed tomography (CT) with intravenous contrast revealed a 2.5 x 4.3 x 2.5 cm lobular soft tissue mass residing within the right oropharynx involving the fossa of Rosenmuller, extending inferiorly to the right hemithyroid and hyoid bone. The patient's airway was successfully managed nonsurgically. An ultrasound guided fine needle aspiration biopsy of the right parapharyngeal mass revealed predominantly large atypical lymphoid cells in the background of mixed large and small lymphocytes. Cell cytology was consistent with a CD5 positive diffuse large B cell lymphoma with high Ki67, a large cell transformation of chronic lymphocytic leukemia/small lymphocytic lymphoma (CLL/SLL). The patient's condition is stable, she will be undergoing chemoradiation with oncology. **Conclusions:** Primary extranodal lymphoma should be considered in the differential diagnosis for patients with lesions in the

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oro hypopharynx, even in light of risk factors for squamous cell carcinoma.

106. The “Bowtie” Reconstruction Flap: A Unique Solution to Cervical Esophageal Discontinuity Repair

Joseph B. Meleca, MD, Cleveland, OH; Patrick Tassone, MD, Cleveland, OH; Usman Ahmad, MD, Cleveland, OH; Brandon L. Prendes, MD, Cleveland, OH; Eric Lamarre, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should acquire a new surgical approach in their arsenal for cervical esophageal discontinuity repair.

Objectives: Describe a novel technique for repair of cervical esophageal discontinuity. **Study Design:** A 66 year old female underwent hiatal hernia repair with a Nissen fundoplication. This was complicated by ischemic necrosis of the proximal stomach requiring urgent return to the operative suite for partial gastrectomy, esophageal diversion and subsequent esophagectomy repaired with a colonic interposition graft by thoracic surgery. This was further complicated by a cervical esophageal colonic anastomotic leak maturing to a cervical esophageal fistula and necessitating jejunostomy tube placement and consultation to head and neck surgery. **Methods:** Case report. **Results:** In a team approach with otolaryngology and thoracic surgery, she underwent a unique, multilevel repair with a salivary bypass stent bridging the gap between the proximal esophagus and distal colonic conduit. Bilateral local advancement flaps were elevated using the skin lateral to the fistula on each side with a random blood supply pedicled medially. Each flap was rotated medially over the stent and imbricated at midline. Next, a left myogenous pectoralis flap was raised and rotated over the site of imbrication. Lastly, a split thickness skin graft from the thigh was harvested and sutured over the pectoralis flap. Three months postoperatively, the salivary bypass stent was removed and by five months, the fistula was completely closed. With cervical esophageal dilations bimonthly, the patient has graduated to an oral diet without need of her jejunostomy tube for nearly four months. **Conclusions:** This case report describes a novel and efficacious solution to cervical esophageal discontinuity.

107. Evaluating the Effect of Daily Clinical Pathway Checklists on Outcomes following Head and Neck Free Flap Reconstruction

Catherine M. Merna, MD, Irvine, CA; Monica S. Trent, BS, Irvine, CA; Tjason Tjoa, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the utility of systematic, consistent use of daily clinical pathway checklists on patient care following head and neck free flap reconstruction.

Objectives: To evaluate the effect of a postoperative pathway daily checklist on patient satisfaction and safety outcomes following head and neck free flap reconstruction. **Study Design:** Non-randomized, historically controlled study. **Methods:** A postoperative pathway checklist, completed with each daily progress note during the postoperative admission, was implemented for all patients receiving free flap reconstruction of head and neck defects at a single academic institution. The electronic medical records of all patients one year prior to and one year following implementation were reviewed for markers of patient care and satisfaction upon discharge via review of daily progress notes, telephone correspondence notes, and documented concerns at first outpatient followup. **Results:** Data was collected for 33 patients from 2017-2018 and 26 patients from 2018-2019 that had undergone free flap reconstruction. Groups were similar in gender (76% vs 77% male), age (64, SD 19 vs 64, SD 13 years), need for tracheostomy (48% vs 54%), and distribution of flap types (radial forearm, fibula, anterolateral thigh, iliac crest, and latissimus dorsi). Difference in length of stay were not statistically significant (avg 13.1 vs 13.3, $p = 0.47$), nor were differences in telephone correspondences (24% vs 19%), failure to schedule postoperative drain appointments (12% vs 12%), insufficient wound care instructions on discharge (12% vs 7.7%), and outpatient surgical site infections (4.5% vs 3.8%). **Conclusions:** Implementation of a postoperative pathway checklist for patients requiring free flap reconstruction of head and neck ablative defects does not inherently improve the transition from inpatient to outpatient care. Future directions in systematizing postoperative care to facilitate continuity of care and increase patient satisfaction upon discharge are worth exploring.

108. Dysphagia Severity and Outcomes following Iatrogenic High Vagal Nerve Injury

Ethan R. Miles, BS, Loma Linda, CA; Brianna K. Crawley, MD, Loma Linda, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss dysphagia outcomes following iatrogenic high vagal nerve injury and subsequent interventions to address swallowing deficits.

Objectives: To examine severity of dysphagia and outcomes following iatrogenic high vagal nerve injury. **Study Design:** Retrospective chart review. **Methods:** A retrospective review of patients who had iatrogenic high vagal nerve injury and were seen at a tertiary referral center from 2012 to 2019. Demographic, pathological, surgical, interventional, and imaging data was collected from patient records and analyzed. **Results:** Of 1,304 patients who met criteria for initial screening, 18 patients were identified with iatrogenic high vagal nerve injury. All 18 required interventions to address swallowing. Eleven required enteral feeding tubes though 6 were eventually able to advance to exclusively per oral diets. Twelve underwent vocal fold injection and 5 underwent medialization laryngoplasty. Thirteen underwent swallowing therapy with

speech language pathology. Patients lost an average of 8.6 kg of weight in the 6 months following the injury. Swallowing function on the Functional Outcome Swallowing Scale (FOSS) and Functional Oral Intake Scale (FOIS) was 4.4 and 2.4 respectively immediately following the injury and improved to 2.1 and 5.1 at the last followup. No patients had return of preoperative swallowing function at last followup. **Conclusions:** Iatrogenic high vagal injury causes significant dysphagia which improves with intervention but does not return to baseline. Interventions such as vocal fold injection, medialization laryngoplasty, or swallowing therapy may be required in order to reestablish safe swallowing in these patients.

109. Sociodemographic Disparities in HPV Negative Head and Neck Cancer

Erik R. Nakken, BS BA, St. Louis, MO; Smrithi Chidambaram, BS, St. Louis, MO; Wade L. Thorstad, MD, St. Louis, MO; Jose P. Zevallos, MD MPH, St. Louis, MO; Angela L. Mazul, PhD MPH, St. Louis, MO

Educational Objective: At the conclusion of this presentation, the participants should be able to (1) discuss the importance of racial and gender disparities in their community; and (2) understand that these disparities can be minimized with proper care.

Objectives: To determine if disparities in race and sex exist at a single tertiary institution and to determine the drivers of these disparities among patients diagnosed with head and neck cancer. **Study Design:** Retrospective cohort study. **Methods:** We formed a retrospective cohort with data from 667 head and neck cancer cases, excluding HPV positive oropharyngeal cancer, from 1997-2017. We calculated 5 year overall survival (OS) with Kaplan-Meier curves and adjusted hazard ratios (HR) to explore potential clinical drivers--stage, site, smoking, and age--in disparities by using Cox proportional hazard regression. **Results:** Analysis showed no difference in 5 year OS between races (black: 54.8%, 95% CI: 46.9-64.0%; white: 57.2%, 95% CI: 52.6-62.2%) and adjusted HR (HR=1.03, 95% CI: 0.74-1.419). Although nonsignificant, females tended to have better 5 year OS (female: 62.5%, 95% CI: 55.2-70.8%; male: 54.4%, 95% CI: 49.7-59.6%) and adjusted HR (HR=1.22, 95%CI=0.85-1.74). Furthermore, female larynx cases had significantly better survival with an unadjusted HR of 1.69 (95% CI=1.01-2.83) and still trended towards a disparity even after adjustment for stage, smoking and treatment (HR=1.57, 95%CI=0.84-2.91). **Conclusions:** Similar to results in other single institutions, we did not see racial survival disparities in head and neck cancer cases. The disparity seen in larynx cancer could be the result of a biologic difference in sex or other mediating factors we did not control for and further studies are needed. When provided the proper standard of care, both racial and sex disparities can be overcome. However, sociodemographic disparity trends persist. Therefore, institutional changes and future qualitative studies will assist in determining interventions.

110. Examining Complication Rates Using Surgeon and Medical Center Volume for Parotidectomies with SPARCS Dataset

Roshan U. Nayak, BS, New York, NY; Enrique Gorbea, MD, New York, NY; David Y. Goldrich, BA, New York, NY; Jay J. Agarwal, MD, New York, NY; Alfred M.C. Illoreta, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the associations between volume and parotidectomy perioperative complication rates at both an individual and medical center level. Participants may be able to hypothesize reasons as to why discrepancies may exist and what clinical practices could help address the discrepancies.

Objectives: To evaluate the impact of surgeon and medical center volume on parotidectomy perioperative complications. **Study Design:** The Statewide Planning and Research Cooperative System database was used to identify patients who underwent parotidectomy (1995-2015). Surgeons were categorized into high (>100), medium (11-100), and low volume groups (1-10). Medical centers were also categorized by volume of parotidectomies and separated into thirds. **Methods:** This data was used to examine the effect of surgeon volume and medical center volume on total complications and various perioperative complications (ICD9: 998.11-998.13, 995.91, 951.4). Statistical analysis used Spearman-Rho and Kruskal-Wallis. **Results:** 12,202 procedures were identified, with no significant difference in Charlson Comorbidity Index. Total complication rate was 1.705%. A positive correlation between surgeon volume and total complications was identified (0.40 ± 0.02) and was significant across the three surgeon volume groups ($p < 0.0001$). There was no difference in complication rates for facial nerve injury (FNI). Higher medical center volumes correlated with higher complications (0.49 ± 0.05), which was significant between medical center volume groups ($p < 0.0001$). **Conclusions:** High volume surgeons had a higher total complication rate in our cohort when compared to medium or low volume surgeons. Case complexity may be a confounding factor, as high volume surgeons may perform more complex cases. Additionally, FNI may be underreported in the immediate postoperative period and confused as temporary postoperative weakness. The differences in perioperative complications between medical center volumes could indicate that high volume centers have more complications, which could also be due to more complex cases.

111. Inducing Metabolic Oxidative Stress Leads to Radio-Chemosensitization in Head and Neck Cancer Cells

Amanda L. Ngouajio, MD, Iowa City, IA; Collin D. Heer, BS, Iowa City, IA; David B. Riffe, MD, Iowa City, IA; Douglas R. Spitz, PhD, Iowa City, IA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the differ-

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ent enzymes important for redox homeostasis and how targeting these enzymes can lead to oxidative stress.

Objectives: Cancer cells exist in a state of increased metabolic oxidative stress compared to normal cells. This is known to yield a subpopulation of cancer cells that are radio- and chemoresistant. By utilizing redox active drugs to disrupt redox homeostasis and by taking advantage of these fundamental metabolic differences, new cancer therapies can be developed. **Study Design:** Head and neck cell lines were cultured and were treated with various doses of redox active drugs and cell death was measured. **Methods:** Head and neck cancer cell lines Cal-27, SQ20B, SCC-25, and FaDu were cultured using standard cell culture techniques. Clonogenic survival assay was used to determine reproductive cell death after drug treatment and results were normalized to control group. NAMPT inhibitors (GMX-1778, FK866), GPX-4 inhibitor (ML-162), Cisplatin (Cis), ionizing radiation (IR). **Results:** Head and neck cancer cell lines are sensitive to NAMPT inhibition using GMX-1778 at nanomolar concentrations and are also sensitive to GPX-4 inhibition utilizing ML-162. NAMPT inhibitor FK866 sensitizes cells to ionizing radiation and cisplatin in a greater than additive fashion. ML-162 and ascorbic acid sensitizes cells to cisplatin in a greater than additive fashion. **Conclusions:** By inducing oxidative stress using redox active drugs, head and neck cells are susceptible to enhanced and greater than additive clonogenic cell killing when combined with standard of care cisplatin and ionizing radiation. This is promising because it may allow for better response to therapy and a decrease in cisplatin and radiation doses leading to fewer toxic side effects.

112. Prevalence of Cancer Cachexia in Head and Neck Cancer Patients Undergoing Free Flap Reconstruction

Leah J. Novinger, MD PhD, Indianapolis, IN; Alexander J. Jones, MD, Indianapolis, IN; Fabrizio Pin, PhD, Indianapolis, IN; Joshua Huot, PhD, Indianapolis, IN; Andrea Bonetto, PhD, Indianapolis, IN; Michael G. Moore, MD, Indianapolis, IN

Educational Objective: At the conclusion of this presentation, the participants should be able to identify clinical features of cachexia, define the prevalence of cachexia in head and neck cancer patients undergoing free flap reconstruction, explain imaging and laboratory data that support the diagnosis of cachexia, and describe possible procedures for preserving tissue in patients with cachexia for research analysis.

Objectives: To describe the prevalence and characterize features of cancer cachexia in patients with head and neck cancer undergoing surgery with free flap reconstruction. **Study Design:** Prospective, single tertiary referral center. **Methods:** A prospective study was conducted after obtaining regulatory approval of consenting adults with head and neck cancer who underwent head and neck surgery with reconstructive free tissue transfer and had appropriate imaging. CT scans were reviewed at the third lumbar (L3) vertebra to calculate skeletal muscle index (SMI). Sarcopenia was defined as SMI \leq 41.6 cm²/m²/for males and \leq 32.0 cm²/m²/for females. Perioperative laboratory data (C reactive protein and albumin) and clinical factors were collected and compared between patients with and without cachexia. Tissue (e.g., muscle, bone, fat) that would normally be discarded from the free flap during reconstruction was collected in the operating room and saved to compare differences in histology and activation of cachexia associated pathways. **Results:** Of the subjects enrolled, the majority were older male tobacco users who presented with late stage oral cavity tumors. Roughly half or 43.75% (confidence interval 23.10 - 66.82) had a history of chemoradiation and half (confidence interval 28-72%) of subjects had cancer cachexia. Subjects with cancer cachexia had significantly lower BMIs ($p < 0.05$), but exhibited differences in preoperative albumin, C reactive protein, or malnutrition screening tool score were not observed in this initial population. **Conclusions:** The results of this study are the first in depth characterization of cachexia in head and neck cancer patients and demonstrate that it is common in patients with head and neck cancer undergoing free flap reconstruction.

113. Patterns of Lymph Node Metastases and Predictors of Occult Nodal Disease in Human Papillomavirus Associated Oropharyngeal Cancer: A National Cancer Database Study

Edgar Ochoa, BS, San Francisco, CA; Mary Han, BA, San Francisco, CA; Gaelen B. Stanford-Moore, MD, San Francisco, CA; Andrew R. Larson, MD, San Francisco, CA; Kathryn R. Hoppe, MD, San Francisco, CA; William R. Ryan, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe neck level distributions of metastatic nodal disease and risk factors for occult nodal disease in human papilloma virus associated oropharynx squamous cell carcinoma.

Objectives: For human papilloma virus associated oropharynx squamous cell carcinoma (HPV+OPSCC), we evaluated the neck level lymph node (LN) metastasis distribution based on postsurgical histopathology and the incidence of and risk factors for occult LN metastases as these patterns need specific clarification for this newer cancer subset. **Study Design:** Retrospective National Cancer Database (NCDB) review. **Methods:** We analyzed 2,364 NCDB HPV+OPSCC patients who underwent neck dissection (ND) from 2010-2015. Incidence and distribution of LN metastases were calculated for neck levels 1-5. Variables associated with occult LN metastasis were assessed by multivariate logistic regression. **Results:** Positive LNs in therapeutic NDs were found in level 1: 9.0% (175/1940), level 2: 81.1% (1573/1940), level 3: 29.6% (575/1940), level 4: 11.9% (230/1940), and level 5: 5.0% (97/1940). Occult LNs were identified in 35.8% (152/424) of cN0 patients. Occult LN metastases in elective NDs were found in level 1: 3.3% (14/424), level 2: 26.9% (114/424), level 3: 8.7% (37/424), level 4: 4.0% (17/424), and level 5: 0.2% (1/424). The presence of occult LNs was independently

associated with lymphovascular invasion (OR, 6.94; 95% CI, 3.65-13.72; $p < 0.001$) and positive surgical margins (OR, 1.51; 95% CI, 1.05-2.24; $p = 0.019$). Occult LN metastases were not significantly associated with: cT stage, pT stage, primary site (tonsil vs base of tongue), nor the number of LNs resected. **Conclusions:** For HPV+OPSCC, occult nodal disease is common. Therapeutic NDs should encompass at least levels 2, 3, and 4, and possibly 1, whereas elective NDs should at least encompass levels 2 and 3.

114. Patient Reported Quality of Life Outcomes for Early Stage Oral Tongue Cancers Treated by Resection with Primary Closure

Edgar Ochoa, BS, San Francisco, CA; Andrew R. Larson, MD, San Francisco, CA; Ivan H. El-Sayed, MD, San Francisco, CA; Jonathan R. George, MD, San Francisco, CA; Patrick K. Ha, MD, San Francisco, CA; William R. Ryan, MD, San Francisco, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe patient reported quality of life outcomes in early stage oral tongue cancer following resection with primary closure.

Objectives: For early stage oral tongue cancer (OTC), we evaluated patient reported quality of life (QOL) outcomes following resection with primary closure (R-PC) to better establish expectations of long term functional impact. **Study Design:** Retrospective review at an academic cancer center. **Methods:** 43 OTC patients (Tis, T1, T2) who underwent R-PC without radiation and without recurrence completed the University of Washington Quality of Life Questionnaire Version 4 (UW-QOL) at least 6 months since R-PC at a mean of 2.6 years (range: 0.5-9.2). We calculated domain scores for swallowing, chewing, speech, taste, and pain based on questionnaire specific guidelines and compared them to established normative population scores. **Results:** OTC patients who underwent R-PC in comparison to the normative population had no significant differences in mean scores for swallowing (99.3 vs 98, $p = 0.08$), chewing (95.4 vs 94, $p = 0.55$), and pain (90.9 vs. 86, $p = 0.13$), significantly better overall QOL (75.8 vs 67.3, $p = 0.004$), and significantly worse speech (87.4 vs 98, $p < 0.001$) and taste (87.9 vs 95, $p = 0.009$). For speech, 58% (25/43) reported no change from baseline while 42% (18/43) reported mild impairment. For taste, 63% (27/43) reported no change while 35% (15/43) reported mild impairment. **Conclusions:** OTC patients who undergo R-PC without radiation can expect long term swallowing, chewing, pain, and overall QOL outcomes to be in the normative range. While a majority of patients can expect to achieve normative speech and taste outcomes, there are risks of mild speech and/or taste impairments. These data can inform patient QOL expectations following R-PC for OTC.

115. The Effect of Immunosuppression Secondary to Leukemia and Lymphoma on Head and Neck Cutaneous Squamous Cell Carcinoma

Zachary E. Pflum, MD, Indianapolis, IN; Alhasan N. Elghouche, MD MS, Indianapolis, IN; Cecelia E. Schmalbach, MD MSc FACS, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate that chronic lymphocytic leukemia portends a worse prognosis with respect to cutaneous head and neck squamous cell cancer. Participants will be prompted to discuss how increased surveillance and more aggressive treatment in this population may improve the prognosis.

Objectives: To determine prognostic impact of immunosuppression secondary to leukemia and lymphoma (LL), on head and neck cutaneous squamous cell carcinoma (H&N cSCC). **Study Design:** H&N cSCC patients treated at a tertiary care cancer center were identified (1967 - 2017) and stratified by immunocompetence (IC) and immunosuppression secondary to leukemia and lymphoma. Subgroup analysis was conducted for the chronic lymphocytic leukemia (CLL) group. **Methods:** Immunocompetent and immunosuppressed patients were compared on demographic data and tumor stage. Primary outcome measures included: locoregional recurrence (LRR), disease free survival (DFS) and overall survival (OS) (analyzed with Kaplan-Meier method). Secondary outcome measures included: number of cancers, recurrence, and anatomic site; analyzed using the Mann-Whitney U test. **Results:** 142 patients met inclusion criteria: 33 patients (30%) LL; 109 (70%) IC. The LL cohort demonstrated an increased incidence ($p = 0.03$) and worse LRR ($p = 0.001$) compared to IC patients but no difference in DFS or OS. Subgroup analysis of 8 CLL patients demonstrated no difference in H&N cSCC incidence, however increased recurrence rate ($p = 0.02$) and worse LRR compared to the remainder of the LL cohort ($p = 0.002$). While OS was not significantly different, DFS was decreased among those with CLL compared to IC ($p < 0.001$) and remainder of LL patients ($p < 0.05$). **Conclusions:** Overall, immunosuppressed LL patients are at increased risk for H&N cSCC and have a worse LRR compared to their IC counterparts. Specifically, CLL is associated with an increased incidence and recurrence rates. Earlier surveillance of cSCCs is warranted in this group.

116. Intrathyroidal Parathyroid Carcinoma: A Case Report and Comprehensive Literature Review

Pranati Pillutla, BS, Lubbock, TX; Cynthia M. Schwartz, MD, Lubbock, TX; Tam Nguyen, MD, Lubbock, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to identify what features of a thyroid lesion in a hypercalcemic patient increase the risk of the lesion being an intrathyroidal parathyroid carcinoma.

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Objectives: Intrathyroidal parathyroid carcinoma is a rare parathyroid malignancy. While it may be asymptomatic, it often presents with signs and symptoms of hypercalcemia. Our goal is to describe the characterizing features of intrathyroidal parathyroid carcinomas. **Study Design:** Case report and systematic literature review. **Methods:** A 31 year old man with a history of hyperparathyroidism managed with subtotal thyroidectomy and subtotal parathyroidectomy had persistent hypercalcemia and elevated parathyroid hormone. Abnormal radiotracer uptake was noted in the left thyroid gland. Neck exploration with left parathyroidectomy and revision thyroidectomy was performed. A candidate left inferior parathyroid was found within the left thyroid lobe remnant and identified as parathyroid carcinoma. Immunostains determined an intrathyroidal parathyroid carcinoma with lymphatic space invasion. Calcium and parathyroid hormone levels normalized postoperatively. A systematic literature review identified 19 cases. 20 cases were analyzed, including our report. **Results:** Average presenting age was 48 years (range: 14-76). 65% (95% CI 43-82%) of patients were female. Intrathyroidal parathyroid carcinomas were found on the right thyroid lobe in 55% (95% CI 34-74%) of cases. The majority occur in the inferior aspect of the thyroid (95% CI 53-89%). Only one reported case was associated with a MEN syndrome. **Conclusions:** Intrathyroidal parathyroid carcinoma is a rare and challenging diagnosis due to similarities with more common endocrine abnormalities. This review suggests the new finding that intrathyroidal parathyroid carcinoma is more common in the inferior parathyroids than the superior parathyroids, possibly due to the greater distance migrated during embryological development. An inferior intrathyroidal lesion presenting with hypercalcemia may raise suspicion for intrathyroidal parathyroid carcinoma.

117. Functional and Quality of Life Outcomes of Total Glossectomy with Laryngeal Preservation and Free Flap Reconstruction

Justin M. Pyne, MD, Edmonton, AB Canada; Gabriela Constantinescu, MSc PhD, Edmonton, AB Canada; Dan O'Connell, MD MSc FRCSC, Edmonton, AB Canada; Jeffrey Harris, MD MHA FRCSC, Edmonton, AB Canada; Vincent L. Biron, MD PhD FRCSC, Edmonton, AB Canada; Hadi Seikaly, MD FRCSC, Edmonton, AB Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to (1) apply methods used to subjectively evaluate quality of life in individuals who have undergone total glossectomy with laryngeal preservation and reconstruction; (2) reconsider factors effecting the balance of aggressive treatment for survival and the eventual quality of life outcome when counseling patients suffering from cancer of the tongue; and (3) demonstrate the importance of adequate reconstruction as it relates to cancer of the tongue.

Objectives: Background: The tongue is an essential organ for human interaction, communication and survival. To date, there is a paucity of objective functional, patient reported, or quality of life outcomes of patients undergoing a total glossectomy with preservation of the larynx (TGLP). Objective: To examine prospectively collected objective, self-reported functional and quality of life (QOL) data in patients undergoing TGLP and free flap reconstruction. **Study Design:** Prospective cohort study. **Methods:** Sixteen TGLP patients were identified in the prospective head and neck cancer and functional outcomes database between January of 2009 and December 2017. Data collection included patient age, sex, performance status, TNM staging, diagnosis, and adjuvant treatment. Swallowing and speech functions were measured and prospectively recorded preoperatively and postoperatively. Patient reported outcomes were with the Speech Handicap Index (SHI) and the M.D. Anderson Dysphagia Inventory (MDADI). **Results:** All patients had a significant reduction in their objective swallowing ($p=0.048$), sentence ($p<0.001$) and word intelligibility ($p<0.001$) scores. There was no significant reduction in SHI or global MDADI scores. All patients maintained their QOL in the post-treatment time frame. **Conclusions:** Total glossectomy with laryngeal sparing and free flap reconstruction results in significant reduction in objective functional measurements, but patients report good and stable functional and quality of life outcomes after treatment.

118. The Variable Direct Cost of Transoral Endoscopic Thyroidectomy Vestibular Approach

Christopher R. Razavi, MD, Baltimore, MD; Alexander S. Kim, MTM, Baltimore, MD; Mohammad Shaeer, MD, Baltimore, MD; Ralph P. Tufano, MD, Baltimore, MD; Jonathon O. Russell, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to understand whether there is a difference in variable direct cost between the transoral endoscopic approach to the thyroid and the transcervical approach to the thyroid.

Objectives: To compare the variable direct cost of the transoral endoscopic thyroidectomy vestibular approach (TOETVA) and the transcervical approach (TCA) to the thyroid at a tertiary care medical center. **Study Design:** Retrospective review. **Methods:** Patients undergoing thyroid lobectomy and total thyroidectomy that met inclusion criteria for TOETVA, including those patients that opted for management via the transcervical approach (TCA) between 8/2016 and 4/2019 were reviewed. The variable direct cost (VDC) for the surgical encounter was collected and medians were compared between the TOETVA and TCA cohorts for lobectomy and total thyroidectomy respectively. The operative time independent VDC (OIVDC) was similarly compared between cohorts. **Results:** 242 patients were included in the analysis, 119 (49%) were managed via TOETVA, while the other 123 (51%) were managed via TCA. Mean VDC for TOETVA was \$4505 +/- 1118 for lobectomy and \$4866 +/- 844 for total thyroidectomy compared to \$3258 +/- 742 and \$3718 +/- 865 in the TCA cohort for the same respective values ($p < 0.0001$ in both cases). The mean OIVDC for TOETVA was \$3416 +/- 969 and \$3494 +/- 821 for lobectomy and total thyroidectomy compared to \$2482 +/- 585 and \$2708 +/- 717 for the same respective values in the TCA cohort ($p < 0.0001$ in both cases). **Conclusions:** The differences in mean VDC between TOETVA

and TCA for lobectomy and total thyroidectomy were \$1246 and \$1148 respectively. This information may be valuable to patients and providers.

119. Application of 2-Octyl Cyanoacrylate (Dermabond) to Prevent Postoperative Salivary Fistula following Head and Neck Microvascular Reconstruction: A Prospective Trial

Scott Allan Roof, MD, New York City, NY; Enrique Perez, MD, New York, NY; Rocco M. Ferrandino, MD, New York, NY; Marita S. Teng, MD, New York, NY; Eric M. Genden, MD, New York, NY; Brett A. Miles, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to (1) explain the role of different surgical sealants in surgery and in prevention of salivary fistulas; (2) recognize the complexities of salivary fistula formation and current evidence based practices for prevention; and (3) implement strategies to prevent salivary fistulas following microvascular reconstruction.

Objectives: The purpose of this study was to determine the efficacy of a surgical sealant, 2-octyl cyanoacrylate (2-OCA, Dermabond), in the prevention of salivary fistulas following free flap reconstruction of the head and neck. **Study Design:** Non-randomized, single arm prospective trial. **Methods:** In this non-randomized, single arm prospective trial, patients undergoing free flap reconstruction of gravity dependent oral cavity and oropharyngeal defects were recruited. Application of 2-OCA was performed along flap inset suture lines at the time of surgery. Trial data was compared to an archive of historical controls to compare outcomes. Data collected include demographics, medical comorbidities, primary tumor site, and type of reconstruction. The primary outcome measure was rate of salivary fistula formation. Secondary outcomes were time to development of leak and percent tolerating oral feeding at one month postoperatively. **Results:** Thirteen (26%) out of 50 patients in the 2-OCA prospective group and twelve (24%) out of 51 patients in the historical cohort developed postoperative salivary leaks within the one month study interval ($p = 0.954$). The average time to postoperative leak in the 2-OCA group was 9 days versus 7 days in the historical cohort ($p = 0.20$). In the 2-OCA group, 31 (62.0%) patients were tolerating regular diet at one month postoperatively compared to 36 (70.6%) in the historical cohort ($p = 0.48$). **Conclusions:** Salivary fistula rates after application of a 2-OCA surgical sealant were not improved compared to historical controls in a single institutional trial.

120. A Unique Case of Spontaneous Hemorrhage in Advanced Head and Neck Cancer

Sam D. Schild, MD, Brooklyn, NY; Avanti Verma, MD, New York, NY; Rafael Alexander Ortiz, MD, New York, NY; Jessica Lim, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to compare options for control or hemorrhage in advanced head and neck cancer and demonstrate the value of angiography in rapid diagnosis and control.

Objectives: Carotid blowout commonly occurs in advanced head and neck cancer patients and is managed with either surgical ligation or endovascular intervention of the carotid artery and its branches. This case report demonstrates successful embolization of an arterial branch of a prior pectoralis flap reconstruction after total laryngectomy as the source of hemorrhage in a recurrent base of tongue tumor. **Study Design:** This is a case report with review of the literature. **Methods:** Case report. **Results:** We report a case of a 76 year old male with extensive oncologic history including RT for hypopharyngeal carcinoma, multiple resections of recurrent oral tongue SCC with adjuvant RT, and total laryngectomy with right pectoralis myofascial flap reconstruction for laryngeal SCC. The patient then developed bilateral neck and base of tongue recurrence for which he completed palliative RT. He presented to the emergency room after an episode of brisk oropharyngeal bleeding and required urgent packing prior to embolization. Angiography identified the source of bleeding from a right subclavian artery branch emanating from the right pectoralis flap, which supplied the left base of tongue tumor. Endovascular embolization with NBCA glue successfully obliterated the abnormal blush. After removal of the packing, he did not have any further bleeding and was discharged to inpatient hospice care. **Conclusions:** Endovascular embolization is well described in carotid blowout syndrome. However, this case describes spontaneous hemorrhage from a reconstructive arterial branch, which supplied recurrent tumor through angiogenesis. This case highlights both the importance of angiography in localizing the source of hemorrhage and the role of palliative medicine in advanced head and neck cancer patients.

121. Assessment of Outcomes of Submental Island Pedicled Flap and Radial Forearm Free Flap in Oral Reconstruction

Derek W. Scott, AB, Scottsdale, AZ; Jake G. Besch-Stokes, BS, Scottsdale, AZ; Thomas H. Nagel, MD, Phoenix, AZ; Michael J. Marino, MD, Phoenix, AZ

Educational Objective: At the conclusion of this presentation, the participants should be able to compare outcomes and complications associated with SPIF and RFFF procedures when used in oral reconstruction.

Objectives: Submental island pedicled flap (SIPF) and radial forearm free flap (RFFF) have both been used for recon-

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struction following resection of oral cavity and oropharyngeal squamous cell carcinoma. The purpose of this study was to compare operative outcomes and complications for patients having SIPF versus RFFF. **Study Design:** Forty-two patients having oral and oropharyngeal reconstruction with SIPF were compared to 51 patients who had RFFF reconstruction. Demographic and clinical characteristics of the patient population were recorded from the medical record. **Methods:** Measured outcomes included operative time, flap area, concurrent tracheotomy, lip split procedure, and hospital length of stay. Complications that were investigated included orocutaneous fistula formation, flap death, gastrostomy tube dependence, and donor site complications. Multivariate regression models were used to control for patient age, gender, and T-stage. **Results:** Mean operative time using RFFF (670.8 minutes, 95% confidence interval [CI] 638.78-702.87 minutes) was significantly longer than SIPF (553.83 minutes, 95% CI 516.47-591.20 minutes). Tracheotomy ($p<0.001$) and lip split ($p<0.001$) procedures were more frequently performed with RFFF, while mean flap area was not significantly different ($p=0.184$). Length of hospital stay was significantly longer in RFFF patients than SIPF patients ($p<0.001$). Overall complications were more frequent in the RFFF group ($p<0.001$), and specifically orocutaneous fistula ($p=0.010$) and gastrostomy tube dependence ($p=0.011$). **Conclusions:** SIPF reconstruction of oral and oropharyngeal defects resulted in decreased operative time, concurrent tracheotomy, and length of hospital stay compared to RFFF. Overall complications, and specifically orocutaneous fistula and gastrostomy tube dependence, were less frequent when SIPF reconstruction was performed.

122. Frailty, Treatment Related Outcomes, and Costs Associated with Head and Neck Cancer Care in Commercially Insured Patients

Nicholas R. Scott-Wittenborn, MD, Baltimore, MD; Peter S. Vosler, MD PhD, Baltimore, MD; Rajarsi Mandal, MD, Baltimore, MD; David W. Eisele, MD, Baltimore, MD; Christine G. Gourin, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss frailty and its relationships with costs and treatment related outcomes.

Objectives: To examine associations between frailty, treatment related complications, and costs in patients with head and neck cancer. **Study Design:** Retrospective cross-sectional analysis of MarketScan Commercial Claims and Encounters data. **Methods:** We evaluated 61,550 patients diagnosed with oral cavity, oropharyngeal, laryngeal, and hypopharyngeal cancer from 2010-2012 using cross-tabulations and multivariable regression. **Results:** Frailty was identified in 26.3% of patients and was associated with tobacco use (OR=1.42 [1.29-1.55]), alcohol abuse (OR=1.83 [1.49-2.24]), advanced comorbidity (OR=2.03 [1.63-2.53]), pretreatment tracheostomy (OR=2.38 [1.98-2.86]), discharge to a short term facility (OR=7.29 [2.84-18.75]) or other facility (OR=7.26 [4.72-11.16]), and home healthcare (OR=2.07 [1.72-2.48]). Frailty was a significant predictor of acute medical complications (OR=3.70 [3.38-4.05]), surgical complications (OR=1.63 [1.33-1.99]), and readmission (OR=1.78 [1.50-2.13]). Frailty was also associated with increased treatment related (\$53,260) and one year (\$68,178) costs. There was an interaction between frailty and comorbidity for acute medical complications and costs, with a synergistic effect on the odds of medical complications in patients with comorbidity who were also frail. Frailty was associated with additional cancer directed treatment (OR=1.12 [1.03-1.15]) with a greater odds of hospice after initial treatment (OR=1.39 [1.13-1.71]) but lower odds of salvage surgery (OR=0.81 [0.67-0.98]) or palliative chemotherapy (OR=0.74 [0.62-0.89]). Both frailty and comorbidity were associated with an increased odds of dysphagia, gastrostomy use, tracheostomy, airway obstruction, and pneumonia in the initial treatment period; at 1 year, frailty was a greater predictor of dysphagia, gastrostomy, and tracheostomy dependence than comorbidity. **Conclusions:** In commercially insured patients <65 years with head and neck cancer, frailty is an important prognostic factor and is associated with an increased likelihood of treatment related complications, recurrence, and increased costs.

123. Impact of Travel Distance on Survival in Oropharyngeal Squamous Cell Carcinoma Patients

Yash M. Shah, BS, Newark, NJ; Janmejy Hingu, BS, Newark, NJ; Roman Povolotskiy, BA, Newark, NJ; Soly Baredes, MD FACS, Newark, NJ; Richard Chan Woo Park, MD FACS, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to ascertain the advantages or disadvantages of long distance travel in oropharyngeal squamous cell carcinoma treatment.

Objectives: Prior studies have demonstrated that patients traveling long distances for head and neck cancer treatment have improved survival, as they often travel to high volume facilities in urban centers for care. This study aims to assess the prevalence of long distance travel (LDT) for invasive oropharyngeal squamous cell carcinoma (OPSCC) care and its impact on overall survival (OS). **Study Design:** The National Cancer Database 2004-2016 datasets were queried for patients with OPSCC undergoing definitive treatment. Travel distance was categorized as short (≤ 100 miles) and long (>100 miles). **Methods:** Chi-square analyses were used to compare clinicopathologic and treatment characteristics. Logistic regression was used to determine predictors of LDT. Survival was compared using Kaplan-Meier (KM) and Cox Proportional Hazards model (CR). **Results:** Among 196,916 patients treated for OPSCC, 11,166 (5.7%) patients traveled long distances (>100 miles). Logistic regression showed later stage cancer, private/government insurance, positive HPV status, living in rural communities, and treatment at academic centers to be significant predictors of LDT ($P<0.001$). Black race, higher income, greater comorbidities, and nonsurgical treatment reduced the odds of LDT ($P<0.001$). LDT was associated with improved OS on KM (5 year: 0.668 vs. 0.624; $P<0.001$) and decreased hazard of death on CR (adjusted HR: 0.869; 95% CI: 0.830-0.910; $P<0.001$) when accounting for other covariates, compared with short distance. **Conclusions:**

LDT for OPSCC treatment is associated with a slightly improved rate of survival. Various disparities in travel for OPSCC treatment exist, and patients should not be discouraged from traveling long distances to receive OPSCC treatment.

124. A 27-Year-Old Female with Sclerosing Epithelioid Fibrosarcoma of the Left Ethmoid Sinus

Dhruv S. Shankar, BS, New York, NY; Noel M. Phan, MD, New York, NY; Patrick M. Colley, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the clinical presentation, diagnosis, surgical treatment, and postoperative course of sclerosing epithelioid fibrosarcoma (SEF) of the maxillary sinus.

Objectives: Sclerosing epithelioid fibrosarcoma (SEF) is a rare and poorly recognized variant of low grade fibrosarcoma. SEF most often occurs in the soft tissue of the extremities and trunk. Treatment results and therapeutic options are poorly characterized. **Study Design:** The head and neck is a rare site of occurrence and no study to date has described a case of SEF occurring in the paranasal sinuses. **Methods:** We report the case of a 27 year old woman who presented with worsening left sided nasal congestion. **Results:** CT revealed a low density mass occupying most of the left maxillary sinus and protruding into the left nasal cavity and nasopharynx. Left nasal mass excision with pathology showed tumor with bland proliferation of ovoid to slightly spindle cells in a uniform distribution in collagenous stroma, indicative of SEF. SEF of the left maxillary sinus was treated by surgical excision followed by adjuvant radiotherapy. **Conclusions:** Morphological characteristics played a greater role in diagnosing SEF than immunohistochemistry findings. While rare, SEF should be considered in the differential diagnosis of nasal cavity masses.

125. Impact of Frailty on Postoperative Morbidity and Mortality among Head and Neck Cancer Patients: A Prospective Cohort Study

Shanmugappiriya U. Sivarajah, MD, Edmonton, AB Canada; Franco Datillo, MD, Edmonton, AB Canada; Cheryl Mack, MD MA PhD, Edmonton, AB Canada; Caroline Jeffery, MD MPH FRCSC, Edmonton, AB Canada; Daniel Deschler, MD FACS, Boston, MA; Hadi Seikaly, MD MA FRCSC, Edmonton, AB Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate understanding in the following concepts (1) the importance of the role of frailty status in postoperative outcomes in head and neck surgery; (2) identifying frailty scales that are suitable for predicting post-surgical outcomes in head and neck cancer patients; and (3) accurately analyze different domains of frailty for preoperative risk stratification and optimization before surgery.

Objectives: To determine the association between frailty, modifiable risk factors, and treatment outcomes after head and neck surgery, using the three most widely used and validated frailty scales. **Study Design:** This is a prospective cohort study, conducted at an academic tertiary care center. **Methods:** Adult patients with a biopsy proven diagnosis of non-thyroid, head and neck cancer were recruited. All patients were treated with primary surgery. Preoperative frailty status was measured using the Fried Frailty Index, the Clinical Frailty Scale and the Edmonton Frail Scale. Patient age, sex, education, number of prescription medications, and prior hospitalizations were measured as independent variables. Data on mortality outcomes, complications, institutional discharge and readmission were measured as dependent variables. **Results:** 79 patients were recruited to the study. A univariate analysis on preoperative patient factors found age ($p=0.03$), polypharmacy ($p=0.0001$) and Elixhauser comorbidity index ($p=0.001$) as consistent predictors of patient frailty. For postoperative outcomes, prolonged length of hospitalization ($p=0.0001$) and readmission ($p=0.04$) were significantly associated with frailty status. Frail patients were on average hospitalized for 38 days longer than those who were not frail. Overall survival was similar for frail and non-frail patients. **Conclusions:** To our knowledge, this is the first study to prospectively examine the impact of frailty on postoperative outcomes. The results indicate that patient age, comorbidity and polypharmacy predict frailty status, which in turn is a significant predictor of postoperative length of hospitalization and hospital readmission. This has significant implications for implementing early prevention and rehabilitation strategies to improve post-surgical outcomes in the elderly.

126. Examining the Mechanism of mTOR Inhibition in HPV Negative/P53 Mutant HNSCC Patients

Patrick T. Spiller, MD, Shreveport, LA; Channing E. Dorr, BS, Shreveport, LA (Presenter); M.D. M. Alam, PhD, Shreveport, LA; Cherie-Ann O. Nathan, MD, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to determine why mTOR inhibitors may play a role in the treatment of p53 mutated head and neck squamous cell carcinoma (HNSCC).

Objectives: Patients with p53 mutated HNSCC have a poor prognosis and could benefit from adjuvant therapy to treat residual cancer cells. We wanted to understand how mutant p53 inhibits autophagy through the activation of the mTOR pathway, which promotes HNSCC cancer progression. **Study Design:** Wildtype p53 and mutant p53 HNSCC cell lines were treated with an mTOR inhibitor (rapamycin). The proteins involved in autophagy and mTOR signaling were analyzed using western blot and real time PCR. **Methods:** HNSCC cell lines containing wildtype p53 and mutant p53 were grown in regular culture conditions, treated with rapamycin for 24 hours, and had their proteins and RNA isolated. Western blot,

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qPCR, and immunofluorescence were employed to see the changes in proteins involved in autophagy and mTOR signaling. **Results:** Mutant p53 cell lines show lower levels of autophagy determined by western blot analysis of LC3. mTOR inhibits autophagy by phosphorylating the autophagy initiating protein ULK1 at Ser757. This Ser757 phosphorylation of ULK1 is increased in mutant p53 compared to wildtype p53 cell lines. Rapamycin treatment reverses the inhibitory phosphorylation of ULK1 and induces autophagy more effectively in mutant p53 HNSCC. **Conclusions:** Our data suggests that rapamycin induces autophagy in mutant p53 cell lines by reversing inhibition of ULK1. Preliminary data suggests that mTOR inhibitors have potential as adjuvant therapy for high risk HNSCC patients with p53 mutations.

127. Free Flap Complications and End to Side Microvascular Anastomoses: A Multi-Institutional Study in Head and Neck Surgery

Matthew J. Stewart, BS, Philadelphia, PA; Ishani Khatiwala, BS, Philadelphia, PA; Farshid Taghizadeh, BS, Portland, OR; Larissa Sweeny, MD, Baton Rouge, LA; Mark K. Wax, MD, Portland, OR; Joseph M. Curry, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the factors that predict the complications or failure of ETS only free flaps.

Objectives: There is limited data on the microsurgical characteristics of end to side (ETS) and end to end (ETE) anastomoses in head and neck free flap reconstruction. Our objective was to analyze the operative factors that may predict the complications or failure of ETS only free flaps by using a large, representative cohort. **Study Design:** Retrospective observational study across two tertiary academic medical centers. **Methods:** Free flap failure and complications for operative metrics were compared. **Results:** Of 2,685 patients undergoing free flap reconstruction, 230 were identified who underwent ETS venous anastomoses. Patients who received one ETS venous anastomosis experienced a flap failure rate of 12.95% (n=25/193) versus 0.0% (n=0/37) in those with two (p=0.0022). Using the internal jugular vein (IJV) as recipient vessel was associated with a 10.1% failure rate (n=23/227) and a 34.8% complication rate (n=79/227) versus 3.8% (n=2/53) and 17.0% (n=9/53) for an alternative vein (p=0.003, p=0.033, respectively). Using couplers ≤ 2.0 mm correlated with a failure rate 2.2% higher (7.5%; n=3/40) than using couplers > 2.0 mm (5.3%; n=8/151; p = 0.014). Receiving a suture anastomosis instead of a coupler anastomosis was associated with an increased rate of flap failure by 11.8% (17.6%, n=15/8 vs. 5.8%, n=11/191; p=0.005). **Conclusions:** Patients who undergo ETS can have varied success and complication rates based on number of venous anastomoses, recipient vessel, and coupler utilization. The use of smaller couplers and suture anastomoses may be associated with increased rate of flap failure. Performing a second ETS correlated with improved outcomes. This may be due several factors (e.g., vessel depleted neck) and further work is required to define these relationships.

128. Understanding Treatment Delays in Head and Neck Cancer Patients

Brooke M. Su, MD MPH, 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 identify the most likely periods of delay in cancer treatment initiation and the best areas for intervention.

Objectives: Delays in diagnosis and treatment for patients with head and neck malignancies can result in poorer outcomes and are associated with race and socioeconomic status. In this study we examine treatment delays in an underserved setting and identify areas for targeted interventions. **Study Design:** Retrospective study. **Methods:** 55 patients who had presented to a public tertiary care hospital between June and August 2018 with any type of head and neck cancer treated between 2015-2018 (excluding thyroid malignancies) were identified by chart review. Outcome measures were time elapsed between first presentation to workup, diagnosis (diagnosis/biopsy to treatment initiation, DTI), treatment, adjuvant therapy, and treatment completion. **Results:** The median DTI was 43 days, while time from first presentation to treatment was 49 days. Time to obtain full imaging was a median of 16 days. Adjuvant chemoradiation was delayed by a median of 58.5 days from first treatment initiation. The full treatment course was a median of 102.5 days. There was no significant difference in DTI by tumor stage or patient primary language. DTI was significantly different for patients primarily treated with surgery (34.5 days) versus chemotherapy or radiation (56 days, p<0.001). 28% of patients undergoing primary chemoradiation had delays attributed to issues with dental clearance. **Conclusions:** In a public hospital setting, patient and tumor factors do not contribute to prolonged DTI, though it is longer than published DTIs for private and academic centers. Efforts should be focused on reducing time for imaging workup and time for initiation and clearance for primary chemoradiation.

129. Association of Perioperative Complications with Serum Vitamin D Levels in Major Head and Neck Surgery

John Symms, MD, Tucson, AZ; Matthew J. Groysman, BS, Tucson, AZ; Sheethal Bearely, MD, Tucson, AZ

Educational Objective: At the conclusion of this presentation, the participants should demonstrate an understanding of the mechanistic roles of 1,25-OH-D3 in wound healing, inflammation and antibiotics. New insights should be gained on the impact of vitamin D status in patients undergoing major head and neck surgery.

Objectives: The biologically active form of vitamin D (1,25-OH-D3) is a membrane soluble hormone. Recent biomedical research has demonstrated multiple roles in wound healing. Clinical studies have suggested significant effects of vitamin D status on healing of chronic cutaneous wounds and long bone fractures. The role of vitamin D status in patients undergoing major head and neck surgery has not been reported in the literature. We report outcomes of patients undergoing major head and neck surgery attempt to elucidate potential significance of vitamin D status in this population. **Study Design:** Retrospective chart review. **Methods:** Charts were reviewed for adult patients undergoing major head and neck surgery (n=39) in a single tertiary care institution. Patients with serum 25-OH-D3 levels reported within 10 days of surgery were included in the analysis. Patient demographics, clinical presentation, treatment, and hospital course were recorded. Outcomes reported include flap failure or revision, wound fistula, donor site complications, tracheostomy and enteral feeding status, length of hospital stay, and perioperative complications. **Results:** Average age at surgery was 63 years. Seventy-six percent of patients were male. Average serum 25-OH-D3 level was 19.8 ng/mL. 28 patients resumed oral diet postoperatively with average time to resumption of 20.3 days. **Conclusions:** Patient undergoing major head and neck study present initially deficient in 25-OH-D3 level. Further associations of vitamin D and postoperative outcomes will be described.

130. Comparison of Primary and Second Primary Head and Neck Squamous Cell Carcinoma

Christopher C. Tseng, BS, Newark, NJ; Jeff Gao, BS, Newark, NJ; Gregory L. Barinsky, PharmD, Newark, NJ; Soly Baredes, MD, Newark, NJ; Richard C. Park, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss significant patient and treatment differences between primary and second primary head and neck squamous cell carcinomas (SCC).

Objectives: Characterize significant patient and treatment differences between primary and second primary head and neck squamous cell carcinomas (SCC). **Study Design:** Retrospective database review. **Methods:** The National Cancer Database (NCDB) was queried for all head and neck SCC between 2004-2016 (614,482 cases), with cases further divided into primary (n=508,548) and second primary cancers (n=105,934). Using SPSS statistical software, univariate and multivariate analyses were performed to compare primary and second primary cancer patients. **Results:** The most common treatment modality was radiation and/or chemotherapy (47.9%). On multivariate analysis, patients with second primary head and neck SCC were more likely to have smaller, higher grade, and lower staged tumors ($p < 0.001$), with >12 weeks elapsed between diagnosis and treatment compared to patients with primary (OR=1.190 $p < 0.001$). Patients with second primary cancer were less likely to receive radiation and/or chemotherapy with or without surgery ($p < 0.001$). When stratified by treatment modality, second primary cancer patients' 5 year survival rates were lower than primary when receiving no treatment (15.26% vs 28.36%), radiation and/or chemotherapy (35.33% vs 51.92%), surgery (46.56% vs 65.95%), or surgery with radiation and/or chemotherapy (47.00% vs 63.77%). After accounting for patient and tumor characteristics, patients receiving any treatment had lower risk of death than patients receiving no treatment ($p < 0.001$). **Conclusions:** Second primary head and neck SCC were associated with lower survival compared to primary, though receiving any treatment improves survival. Patients with second primary cancer were less likely to receive treatment involving radiation and/or chemotherapy and more likely to have longer time elapsed between diagnosis and treatment than primary.

131. Primary Clear Cell Carcinoma of the Larynx: A Case Report and Review of the Literature

Ghayoor S. Mir, DO, Newark, NJ; Mayand Vakil, MD, Newark, NJ; Tapan Patel, MD, Newark, NJ; Soly Baredes, MD, Newark, NJ; Evelyne Kalyoussef, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the incidence, prognosis, and treatment options available for laryngeal clear cell carcinoma.

Objectives: Primary clear cell carcinoma (CCC) of the larynx is an exceedingly rare malignancy with only 10 reported cases. We describe a case of this disease and review the existing literature. **Study Design:** Case report and review of literature. **Methods:** N/A. **Results:** An 82 year old male presenting with complaints of progressive shortness of breath was found to have a large ball valving obstructing glottic mass. Excisional biopsy revealed it to be a CCC based on histology and immunomarker staining. A CT of the neck did not show cartilaginous invasion and laryngoscopy revealed bilaterally mobile true vocal cords. PET/CT was negative for metastatic disease or local lymphatic involvement at presentation. The patient was taken to the OR for tracheostomy and subtotal resection of the mass prior to definitive treatment with adjuvant radiation therapy. On post-treatment imaging, there was progression of the residual disease with involvement of the anterior commissure and bilateral vocal cords, as well as a new lung nodule. Wedge resection was attempted, but negative margins were not attainable. Pathology confirmed metastatic CCC. The vast majority of CCCs occur in the kidneys, with extrarenal abdominal CCCs following. CCCs of the larynx are extremely rare but very aggressive with a high rate of local recurrence and distant metastasis, 67% and 22% respectively in 2 years. Mean survival length is 12 months. **Conclusions:** Effective treatment options are limited for laryngeal CCC. Surgery and radiation are the mainstays for treatment; however, due to the rarity of this disease, there is limited data.

Posters

132. Outcomes of Primary Radiotherapy with or without Chemotherapy for Advanced Oral Cavity Squamous Cell Carcinoma: A Systematic Review

Petra Vitova, MD, Memphis, TN; Jordan B. Luttrell, BS, Memphis, TN; Marion B. Gillespie, MD MSc FACS, Memphis, TN; Madhu P. Mamidala, PhD, Memphis, TN; Tyler Speaks, BS, Memphis, TN; David L. Schwartz, MD, Memphis, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the position of radiotherapy in treating squamous cell carcinoma of the oral cavity.

Objectives: To assess the therapeutic value of external radiotherapy (RT) with or without chemotherapy as a primary modality for treating oral cavity squamous cell carcinoma (OCSCC) by reviewing literature published between years 2000-2018. **Study Design:** Systematic review. **Methods:** A systematic search was performed by two independent reviewers in the PubMed, Scopus and CINAHL databases. Studies with more than 10 patients with advanced yet resectable oral cancer treated with RT/CRT were identified. **Results:** 7 studies with a total of 440 patients met inclusion criteria. All 7 studies were retrospective in nature. Overall survival and complications were evaluable for meta-analysis. A total of 23 treatment related deaths were reported out of 347 treatments (6.6%, RR=0.08 95% CI: 0.05-0.11, P<0.00001). A total of 44 osteoradionecrosis was reported out of 239 treatments (14.7%, RR=0.03, 95% CI: 0.01-0.07, P=0.007). A total of 51 treatment related G tube dependencies were reported out of 230 treatments (22%, RR=0.05, 95% CI: 0.00-0.72, P=0.03). Average rate of overall survival in 1, 2, 3 and 5 years was 76%, 59%, 47% and 43% respectively (RR=1.08, 95% CI: 0.64-1.80, P<0.000001). **Conclusions:** From our analysis, we did not find any evidence of increased or decreased overall survival rate due to radiation therapy compared to traditional surgical approaches. Treatment related complications were relatively low. Primary radiotherapy appears to be a viable alternative for the management of advanced oral cavity cancer in patients who are not good candidates for operative management.

133. End of Life Care Practice Patterns in Head and Neck Cancer

Neelaysh Vukkadala, MD, Stanford, CA; Touran Fardeen, BS, Stanford, CA; Kavitha Ramchandran, MD, Stanford, CA; Vasu Divi, MD, Stanford, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe practice patterns in end of life care in head and neck cancer patients and list opportunities for improvement.

Objectives: Despite the importance of symptom management and end of life (EOL) care in head and neck cancers (HNC), there is little literature on care practices in this population. This study examines EOL care practice patterns in these patients using nationally established metrics. **Study Design:** Retrospective chart review. **Methods:** Review of HNC patients who were actively followed and treated (defined as one clinic note within 90 days, two within preceding nine months, and having received treatment at our institution) and died between 1/1/2017 and 12/31/2018. The cohort was reviewed for performance on Quality Oncology Practice Initiative and related metrics. **Results:** Of 133 patients identified, 52 met inclusion criteria. The average age at death was 69.8 years. 59% had distant metastases, 30% had locoregional disease, 11% were undergoing primary treatment. 23% of patients received chemotherapy within the last 14 days of life. 50% of patients were admitted in the last 30 days of life, and 33% died in the hospital. 54% of patients had either a physician orders for life sustaining treatment or advanced directive on file. 81% of patients had any type of goals of care discussion documented. 60% received referrals to palliative care and 46% of patients enrolled in hospice. The median days in hospice was 12. Having a goals of care discussion was significantly associated with utilization of palliative and hospice care. **Conclusions:** Provider documented goals of care discussions were strongly correlated to referrals and enrollment in palliative and hospice care. Areas for improvement include better documentation of treatment directives and reducing low utility treatments.

134. Nasal Eccrine Ductal Carcinoma: A Case Report

Jacqueline A. Wulu, MD MS, Boston, MA; Tiffany Voon, BS, Boston, MA; Henna Malik, Boston, MA; Michael P. Platt, MD, Boston, MA; Waleed H. Ezzat, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to better understand the diagnosis and histopathology of eccrine ductal carcinoma as well as the management options.

Objectives: To discuss the diagnosis and histopathology of eccrine ductal carcinoma as well as the management options. **Study Design:** Case report. **Methods:** Review of a patient case examining diagnosis, histopathology, and treatment. **Results:** 61 year old woman who presented with a mass along the nasal alar groove at site of a cutaneous squamous cell carcinoma excised years prior. A shave biopsy of the mass was performed demonstrating a new primary, eccrine ductal carcinoma. She underwent excision with reconstruction followed by adjuvant therapy. **Conclusions:** Eccrine ductal carcinoma is a rare entity that develops from the eccrine sweat glands of the skin. It can be locally destructive and has a worse prognosis once metastasized. Even more uncommon is the development of eccrine ductal carcinoma at the site of a previously treated squamous cell carcinoma. Management of eccrine ductal carcinoma encompasses a multidisciplinary team with treatment consisting of wide local excision followed by adjuvant radiation therapy. This case highlights

the importance of continued surveillance of cutaneous malignancies postoperatively for recurrence or development of new primaries. Eccrine carcinoma, although rare, should remain on the differential when investigating cutaneous malignancies.

135. Maximal Mandible Preservation Excision Technique of a Pterygoid Space Myofibroma

Allen H. Young, MD, Las Vegas, NV; Jacob B. Kahane, MD, Las Vegas, NV; Oluwafunmilola T. Okuyemi, MD, Las Vegas, NV; T.J. O-Lee, MD, Las Vegas, NV; Jo-Lawrence Bigcas, MD, Las Vegas, NV

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the clinical, radiographic, histopathological, and immunohistochemical details of a myofibroma of the head and neck and appreciate the benefit of a bone preservation surgical excision technique in pediatric patients.

Objectives: Myofibroma is a rare, benign neoplasm originating from myofibroblasts with a predilection for the head and neck region. Tumors of the mandible are unusual and present a unique surgical challenge in pediatric patients. We describe a case where an extensive pterygoid space myofibroma was excised using a maximal bone preservation technique. **Study Design:** Case report. **Methods:** We present a pediatric patient with detailed description of clinical, surgical technique, radiographic, histopathologic, and immunohistochemical findings. **Results:** An 11 year old male presents with a slow growing right jaw mass. CT showed a 5.2 x 4.5 cm lytic bony lesion at the mandibular ramus with erosion of the medial and lateral cortices. Excisional biopsy showed spindle shaped myofibroblasts with eosinophilic cytoplasm suggestive of myofibroma. He underwent excision of the tumor via combined transoral/transcervical approach with mandibulotomy for exposure. There was significant periosteal reaction with the tumor interlaced with bony trabeculations on the lingual surface of the mandibular body. The tumor was meticulous peeled off the ramus. The lingual cortex was drilled away, leaving an outer cortex of the mandibular body and ramus. Bone morphogenic protein was placed on the inner cortex of the remaining mandible. The mandible was internally fixated with a load bearing plate. The patient was discharged in stable condition. **Conclusions:** Myofibroma is a benign, slow growing tumor that rarely affects the mandible. Diagnosis is confirmed with histopathology and immunohistochemistry. Due to its noninvasive nature and tendency to affect children, surgical excision should maximize bone preservation to prevent stunted growth in pediatric patients.

136. Pott's Disease Mimicking Thyroid Carcinoma with Spinal Metastasis

Allen H. Young, MD, Las Vegas, NV; Jacob B. Kahane, MD, Las Vegas, NV; Tina P. Elkins, MD, Las Vegas, NV; Robert C. Wang, MD, Las Vegas, NV

Educational Objective: At the conclusion of this presentation, the participants should be able to acknowledge the similarities between spinal metastasis and tubercular spondylitis and expand their differential diagnosis for patients at high risk for tuberculosis.

Objectives: The most common causes of lytic vertebral bony lesions are metastatic disease, myeloma, and lymphoproliferative disorders. However, clinicians should be attentive to patients from tuberculosis (TB) endemic regions who may present with Pott's disease or tubercular spondylitis, a rare form of extrapulmonary tuberculosis that mimic spinal metastasis. **Study Design:** Case Report. **Methods:** We present a patient from our clinic with initial concern for malignant thyroid carcinoma to the spine. Her ultimate diagnosis and treatment are described. **Results:** A 54 year old Eritrean female with dysphagia and neck pain was found to have massive bilateral thyromegaly with tracheal compression and FNA showing Hurthle cell follicular neoplasm. PET and CT scans demonstrated hypermetabolic thyroid and lytic vertebral body lesions at C7-T1 concerning for metastatic thyroid carcinoma. Palliative or hospice treatment was considered. After total thyroidectomy and cervical corpectomy with spine stabilization, vertebral body tissue showed multinucleated giant cells on frozen section, and mycobacterium tuberculosis complex on PCR (sputum was negative). Permanent sections revealed benign thyroid Hurthle cell adenoma. She was started on antituberculosis therapy and recovered postoperatively uneventfully. **Conclusions:** Tuberculous spondylitis vertebral lesions can be mistaken for metastatic disease. Nonspecific hypermetabolic activity on PET scan cannot differentiate among metastatic disease, myeloma, sarcoidosis and TB infections. Patients are often misdiagnosed as having metastatic disease, which can lead to delayed diagnosis and unnecessary treatment. It is necessary to obtain biopsy confirmation of not only the suspected primary, but also the bony lesions and treat with standard antitubercular drugs with possible vertebral stabilization to prevent neurological complications.

Laryngology/Bronchoesophagology

137. Tensor Fascia Lata Medialization Thyroplasty: A Novel Technique for Improved Biocompatibility and Durable Voice Outcomes

Tiffany N. Chao, MD, Philadelphia, PA; Karthik Rajasekaran, MD, Philadelphia, PA; Natasha Mirza, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the advantages and disadvantages of novel and traditional implant materials for medialization thyroplasty.

Posters

Objectives: Medialization thyroplasty for unilateral vocal fold paralysis improves vocal quality, decreases dyspnea, and prevents aspiration. However, implant extrusion is a rare but life threatening complication. This is more commonly seen in patients who are at higher risk for wound breakdown, as the most commonly used synthetic implant materials, such as Gore-Tex, Silastic, and hydroxyapatite, can induce a local inflammatory response. Our objective was to determine whether a novel autologous implant material can reduce the rate of complications and produce comparable voice outcomes. **Study Design:** A retrospective chart review at a single academic tertiary care institution was performed. **Methods:** Our group has previously described a novel technique for medialization thyroplasty using a ribbon of autologous tensor fascia lata layered in the paraglottic space. **Results:** To date, ten patients have undergone this procedure, all of whom have a history of external beam radiation to the neck or are actively immunosuppressed. All patients have tolerated the procedure well, with an uneventful postoperative course and no surgical complications, including wound infection or implant extrusion. All have been followed postoperatively for as long as three years and have continued to demonstrate excellent medialization with none requiring additional procedures for voice or swallowing issues. The length of the procedure is comparable to thyroplasties using other types of implant materials, as the fascia lata harvest can be performed concomitantly to the paraglottic space approach in the neck by a second surgeon. **Conclusions:** Our experience has shown that tensor fascia lata medialization thyroplasty is a highly effective method for the treatment of unilateral vocal fold paralysis in patients at risk of impaired wound healing.

- 138. Association between BMI and Ideal Voltage in Patients Undergoing Upper Airway Stimulation Surgery**
Kelly E. Daniels, BS, Philadelphia, PA; Ramez Philips, MD, Philadelphia, PA; Jena Patel, BS, Philadelphia, PA; Matthew Stewart, BS, Philadelphia, PA; Maurits S. Boon, MD, Philadelphia, PA; Colin T. Huntley, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of pertinent patient characteristics that contribute to final ideal voltage settings for patients with UAS for OSA. They will be able to discuss how patients with higher ideal voltage settings are more likely to experience discomfort and intolerance to treatment. Finally, they will be able to explain why anticipating voltage scores for patients is helpful to ensure proper screening for discomfort and to optimize followup to enhance compliance.

Objectives: To assess the contribution of body mass index (BMI) to ideal voltage required to minimize apnea hypopnea index (AHI) in patients undergoing upper airway stimulation (UAS) for obstructive sleep apnea (OSA). To assess factors associated with ideal voltage required to control OSA in these patients. **Study Design:** A retrospective chart review in a tertiary academic center. **Methods:** A retrospective review was conducted on patients undergoing UAS for OSA between January 2015 and April 2019. The outcome variable of interest was ideal voltage at which AHI was at its minimum during postoperative titration polysomnography study. The independent variable of interest was BMI. A univariable and logistic regression analysis was used to assess predictors of lower ideal voltage. Variables found to be significant at the $\alpha = 0.1$ were included in multivariable model. **Results:** 150 patients undergoing UAS for OSA met inclusion criteria. Median (interquartile range) for ideal voltage was 2.3 (1.8 - 3.0). Median preoperative AHI was 31.0 (21 - 42.9). Median postoperative AHI during titration polysomnography study was 3.4 (0.0 - 10.3). A univariable logistic regression analysis identified male sex, preoperative O₂ nadir, oxygen desaturation index (ODI) as variables to include in the multivariable model. None of these variables were independent predictors of lower ideal voltage. BMI did not significantly correlate with ideal voltage ($p = 0.75$). **Conclusions:** There is no significant correlation between BMI and ideal voltage in patients undergoing UAS for OSA. Male sex, preoperative O₂ nadir, and ODI are important factors to consider when computing ideal voltage.

- 139. Acute Airway Compromise after Recombinant Human TSH Administration**
Eric Michael Dowling, MD, Rochester, MN; Jan L. Kasperbauer, MD, Rochester, MN; John C. Morris, MD, Rochester, MN; Semirra L. Bayan, MD, Rochester, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the importance of exercising caution in patients with large thyroid tumor burden in confined spaces near critical structures receiving radioactive iodine therapy.

Objectives: In this report, we describe a case of rapid airway deterioration requiring intubation in a patient with involvement of the thyroid cartilage by papillary thyroid carcinoma. **Study Design:** Retrospective chart review. **Methods:** A case of rapid airway deterioration requiring intubation in a patient with involvement of the thyroid cartilage by papillary thyroid carcinoma was retrospectively reviewed and discussed in the context of relevant literature. **Results:** An 80 year old male presented with papillary thyroid cancer with laryngeal metastases. On presentation to our facility, a computed tomography (CT) scan of the neck showed an expansile soft tissue mass within the right thyroid cartilage. Decision was made to proceed with rhTSH stimulated radioiodine therapy. The patient returned to clinic one day after receiving the final dose of rhTSH with dyspnea, dysphagia, and throat swelling. Exam was remarkable for significant respiratory distress with biphasic stridor and boggy edema of the postcricoid area. The patient was admitted to the hospital for close respiratory monitoring and intravenous glucocorticoid therapy. Shortly after admission, the patient developed progressive worsening of dyspnea and altered mental status. He was emergently transferred to the operating room and transnasal fiberoptic intubation was performed. Once the airway was secured, direct laryngoscopy was performed, which showed further progression of laryngeal edema. The patient was successfully extubated three days later and discharged the following day.

Conclusions: This case demonstrates an uncommon adverse effect of rhTSH administration resulting in local edema in the region of thyroid neoplasm and resulting airway compromise. This is the only reported case of airway edema secondary to rhTSH in a patient due to laryngeal metastasis. This highlights the importance of exercising caution in patients with large tumor burden in confined spaces near critical structures and consideration glucocorticoid therapy in higher risk patients.

140. The Voice Catastrophization Index Is Associated with the Likelihood of Treatment Success in Voice Patients

Marshall Ge, MD, Los Angeles, CA; Janet S. Choi, MD, Los Angeles, CA; Edie R. Hapner, PhD, Los Angeles, CA; Lindsay S. Reder, MD, Los Angeles, CA; Karla D. O'Dell, MD, Los Angeles, CA; Michael M. Johns, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the association between VCI score and likelihood of clinical improvement in voice disorder patients.

Objectives: Catastrophization is described as a unique type of cognitive distortion characterized by magnification, rumination, and feeling helpless. The Voice Catastrophization Index (VCI) is a recently developed tool to study this phenomenon in patients with voice disorders. This study investigates the role of the VCI in prediction of clinical improvement with intervention. **Study Design:** Prospective cohort study. **Methods:** Consecutive new patients with voice disorders seen at a tertiary care center from January 2017 to 2018 were included (n=93). The VCI and Voice Handicap Index-10 were obtained pre- and post-intervention. Clinical improvement was assessed by clinicians after intervention. Multivariate regressions were performed to examine the relationship between questionnaire score and clinical improvement. **Results:** Clinical improvement was achieved among 71 patients (82.8%) post-intervention. Mean baseline VCI scores for those with and without clinical improvement were 24.6 and 33.9, respectively. In multivariate model, the baseline VCI score was 8.6 points lower [95%CI: 0.4 to 16.9] among those with improvement than those without improvement. Being female was associated with having lower baseline VCI score (beta =-6.7 [95%CI: -13.2 to -0.2]) and more improvement of VCI scores post-intervention (beta =7.6 [95%CI: 0.9 to 14.3]). There were no significant differences in baseline VCI score by diagnosis type. **Conclusions:** Higher baseline VCI score is associated with reduced likelihood of treatment success. The VCI may be useful as a tool to risk stratify voice patients pending intervention.

141. Idiopathic Ulcerative Laryngitis: Results from a Survey of Academic Laryngologists

Celeste S. Kim, BS, Los Angeles, CA; Ido Badash, BA, Los Angeles, CA; William Z. Gao, MD, Los Angeles, CA; Karla O'Dell, MD, Los Angeles, CA; Michael M. Johns III, MD, Los Angeles, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the presentation, disease course and most commonly utilized diagnostic and treatment modalities for the management of idiopathic ulcerative laryngitis.

Objectives: Idiopathic ulcerative laryngitis (IUL) is a rare disorder characterized by chronic ulceration in the mid-membranous portions of vocal folds. Etiology and treatment are poorly understood. We aim to survey laryngologists on IUL in order to better understand diagnosis and treatment of this unusual condition. **Study Design:** Survey of academic laryngologists. **Methods:** A survey was sent to 149 fellowship trained laryngologists at U.S. academic institutions. Questions assessed clinical experiences with IUL. **Results:** Response rate was 68.5%. All had encountered IUL in their practice. 57.8% report having seen 1-10 cases, 22.6% report 11-20 cases, and 19.6% report >20 cases over their career. Dysphonia and severe cough were the two co-occurring primary presenting symptoms reported. Most diagnose based on laryngeal videostroboscopy (94%). Fungal/bacterial cultures and operative biopsy had been performed by approximately 30% of respondents with occasional candidiasis reported but otherwise negative/nonspecific results. Common therapies used were empiric: antireflux therapy (94%), voice/laryngeal rest (93%), and oral steroids (82%). Less commonly used therapies were antiviral and antifungal medication. No specific treatment was reported to be particularly effective. Resolution was reported to occur slowly over weeks to months. While recurrences occurred rarely (52.1%) or never (33.3%), permanent sequelae were reportedly common: vocal cord stiffness (89.6%) and dysphonia (83.9%). **Conclusions:** IUL is a rare disorder of unknown etiology. Diagnosis is typically made with laryngeal videostroboscopy alone. Spontaneous resolution occurs slowly over weeks to months. Laryngologists empirically treat with antireflux therapy, voice rest, cough suppression therapy, and oral steroids. Further research is necessary to improve understanding of IUL.

142. Laryngeal Electromyography Guided Vocal Fold Injections with Hyaluronic Acid

Alice Q. Liu, MD, Vancouver, BC Canada; Amanda C. Hu, MD FRCSC, Vancouver, BC Canada (Presenter); Joel Singer, PhD, Vancouver, BC Canada; Terry Lee, PhD, Vancouver, BC Canada

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the voice outcomes of the novel technique of laryngeal electromyography guided vocal fold injections for glottic insufficiency.

Objectives: To assess the voice outcomes of the novel technique of laryngeal electromyography guided vocal fold injection.

Posters

tions (LEVF) with hyaluronic acid for glottal insufficiency. Secondary objectives were to study the complication/completion rates and to determine if any factors were associated with improved voice outcomes. **Study Design:** Retrospective study. **Methods:** Patients who received LEVF injection from August 2017 to December 2018 were included. Three and six month voice outcomes were assessed. Outcomes included voice handicap index-10 (VHI-10), maximum phonation time (MPT), perceptual analysis of voice (GRBAS), fundamental frequency, and stroboscopy. **Results:** Of the 149 eligible patients (44.6% male, age 63.7 years), 94 (63%) had complete 3 month data and 59 (40%) had complete 6 month data. Data collection is ongoing. VHI-10 significantly improved from 25.7 ± 7.5 to 20.9 ± 10.9 at 3 months ($p < 0.001$) and to 19.1 ± 11.5 at 6 months ($p < 0.001$). MPT improved from 6.2 ± 5.4 seconds to 9.4 ± 7.1 seconds at 3 months ($p < 0.001$) and to 11.3 ± 8.2 seconds at 6 months ($p < 0.001$). GRBAS improved in 74.8% ([65.2, 82.8] 95% CI) of patients at 3 months and in 80.8% ([69.9, 89.1] 95% CI) at 6 months. Stroboscopy showed improvement in glottis gap in 74.8% ([65.8, 82.4] 95% CI) at 3 months and in 80.3% ([65.9, 88.5] 95% CI) at 6 months. Fundamental frequency was unchanged, as expected. Multivariate analysis reported that no demographic factors were associated with better voice outcomes. Overall 221/232 (95.3%) injections were completed with no complications. **Conclusions:** LEVF injection is an effective, novel technique to treat glottis insufficiency with improved voice outcomes, high completion rate, and no complications.

143. Methicillin Resistant Staphylococcus Aureus Laryngitis Effectively Treated with Vancomycin: A Case Study

Amanda L. Lucas, , New Orleans, LA; John M. Carter, MD, New Orleans, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the significance of MRSA in the differential diagnosis of chronic laryngitis with diffuse papillary hyperplasia in the pediatric population.

Objectives: We aim to present the first reported case of MRSA causing chronic laryngitis with diffuse papillary hyperplasia in the pediatric population. **Study Design:** We present a case of a 15 year old boy with trisomy 21 and hoarseness, stridor and sleep disordered breathing secondary to methicillin resistant staphylococcus aureus laryngitis that evolved over a 6 month time period. **Methods:** Initial examination in the operating room demonstrated laryngeal edema with papillomatous changes of the entire larynx. Histopathology demonstrated diffuse papillary hyperplasia with negative HPV staining for high and low risk subtypes. Extensive laboratory blood, urine testing, and cultures were negative for bacterial, fungal, or autoimmune disease. CT scan did not show an underlying laryngocele. The patient's condition worsened over the next several months requiring a repeat visit to the operating room and repeat cultures were positive for MRSA. The patient was then left intubated and treated with IV vancomycin. **Results:** Followup bedside direct laryngoscopy revealed a relatively normal larynx. The patient completed a course of oral vancomycin, and final flexible laryngoscopy confirmed a normal larynx. **Conclusions:** Methicillin resistant staphylococcus aureus (MRSA) should be considered in the differential diagnosis of chronic laryngitis with diffuse papillary hyperplasia in the pediatric population.

144. Pop Goes the Cricoid II: Compliant and Noncompliant Airway Dilation Balloons

Kevin A. Moore, MD, Shreveport, LA; Paul M. Weinberger, MD, Shreveport, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the relative safety of compliant and noncompliant airway dilation balloons as compared using 3D printed models of human cricoid cartilage.

Objectives: (1) Discuss the two main types of airway dilation balloons and thoughts on their relative safety; (2) define our methods and materials; and (3) discuss results, limitations and areas for future investigation. **Study Design:** Comparative analysis of in line pressure required to fracture 3D printed cricoid models using compliant versus noncompliant airway dilation balloons. Alternative: Compliant balloons are more likely to result in fracture of the cricoid model at a lower line pressure than the noncompliant balloons. Null: Compliant and noncompliant balloons fracture the cricoid model at similar line pressures. **Methods:** Using previously validated 3D printed cricoid cartilage models and compliant and noncompliant dilation balloons of multiple sizes, the line pressure at model fracture was recorded. SPSS was used to compare the averages from sets of 5 replicates for burst pressure vs: balloon type/brand; size mismatch; balloon size. **Results:** Line pressure at fracture was significantly lower on average with the compliant balloons than with the noncompliant balloons. Increasing size mismatch between cricoid and balloon correlated significantly with decreasing line pressure at fracture. Both types of balloons were more likely to fracture the model as the size of the balloon used was increased (Mantel-Haenszel chi square $p < .009$). **Conclusions:** Our results suggest that the compliant balloons actually fractured the model at lower line pressures when compared to noncompliant balloons. There was also a strong correlation between cricoid/balloon size mismatch and lower line pressure at fracture. Compliant balloons actually fractured the models at lower line pressures than the noncompliant balloons and also highlight the importance of correct sizing regardless of balloon type.

145. Thyroid Gland and Strap Muscular Interposition Technique to Protect High Riding Innominate Artery during Tracheotomy

Bharat Akhanda Panuganti, MD, San Diego, CA; David B. Hom, MD, San Diego, CA; Andrew Vahabzadeh-Hagh, MD, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants will have demonstrated a strategy to protect an aberrant high riding innominate artery during a tracheostomy procedure in order to mitigate the probability of future catastrophic events.

Objectives: To describe a unique interposition technique, involving thyroid gland and strap muscular elevation and rotation, to manage a high riding innominate artery during tracheostomy procedures. **Study Design:** Case report and literature review. **Methods:** We present the case of a 64 year old male intubated for an acute exacerbation of his chronic obstructive pulmonary disorder (COPD). The patient was transferred to our institution for a tracheostomy procedure, after one was aborted at an outside institution for a high riding innominate artery, which was identified at the inferior border of the thyroid parenchyma. To minimize the probability of tracheoinnominate fistulization, the thyroid gland was mobilized by freeing Berry's ligament and inferiorly displaced. The left sternothyroid and sternohyoid musculature were transected cranially, rotated across midline and sutured to the dorsomedial aspect of the right strap musculature creating a barrier from caudal migration of the tracheostomy tube and providing a well vascularized buffer between the innominate artery and the tracheostomy tube. **Results:** The patient tolerated the procedure without any immediate perioperative complications; there was no report of tracheoinnominate fistula after more than two weeks of followup. **Conclusions:** Thyroid gland and strap muscular interposition to protect an aberrant high riding innominate artery during tracheotomy procedures is an effective and technically simple technique to help reduce the risk of tracheoinnominate fistulization.

146. Factors Affecting Compliance in Patients Undergoing Upper Airway Stimulator Surgery for Obstructive Sleep Apnea

Ramez H. Philips, MD, Philadelphia, PA; Kelly E. Daniels, BS, Philadelphia, PA; Jena Patel, BS, Philadelphia, PA; Matthew Stewart, BS, Philadelphia, PA; Maurits S. Boon, MD, Philadelphia, PA; Colin T. Huntley, MD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of factors contributing to patient compliance with upper airway stimulation for the treatment of obstructive sleep apnea. They will be able to discuss how to screen for and identify these factors in order to optimize patient management.

Objectives: To assess the association between mood disorders and treatment compliance in patients undergoing upper airway stimulation (UAS) for obstructive sleep apnea (OSA). To assess additional factors associated with compliance in these patients. **Study Design:** A retrospective chart review in a tertiary care center. **Methods:** A retrospective chart review was conducted on patients undergoing UAS for OSA between January 2015 and December 2018. The outcome variable of interest was treatment compliance. Compliance was defined as UAS usage for more than 20 hours a week. The independent variable of interest was history of mood disorder including depression, anxiety, and bipolar disorder. A univariable analysis was used to assess predictors of compliance. Variables that were found to be significant at the $\alpha = 0.2$ were included in multivariable model. **Results:** 123 patients undergoing upper airway stimulator for obstructive sleep apnea met inclusion criteria. Ninety-eight (79.7%) patients were compliant with therapy. Thirty-three (26.8%) patients had history of mood disorder. A univariable logistic regression analysis identified complete collapse at level of epiglottis noted during drug induced sleep endoscopy (DISE), postoperative AHI scores, preoperative sleep efficiency scores, preoperative hypnotic medication use, as variables to include in the multivariable model. Complete epiglottic collapse is an independent predictor of postoperative compliance on multivariable analysis. History of mood disorder did not significantly correlate with compliance ($p = 0.88$). **Conclusions:** There is no significant correlation between history of mood disorder and compliance in patients undergoing UAS for OSA. A significant predictor of compliance is worse epiglottic collapse on DISE.

147. Intentional Foreign Body Ingestion: An Unusual Case of Hypopharyngeal Foreign Body not Visualized on CT

Pranati Pillutla, BS, Lubbock, TX; Nadia Tello, BS MBA, Lubbock, TX; Joshua C. Demke, MD, Lubbock, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the next steps in management of a patient presenting with aerodigestive tract disruption after foreign body (FB) ingestion, especially without visualized FBs on imaging.

Objectives: Describe the next steps in management in the setting of FB ingestion with signs of aerodigestive tract disruption and negative imaging. **Study Design:** Case report. **Methods:** A 38 year old schizophrenic male prisoner presented to the ED with shortness of breath after ingesting 8 chip and/or ramen bags and a plastic spoon in attempted suicide. He vomited the spoon prior to arrival, was intubated en route, and self-extubated nearly immediately after arrival. Physical exam showed open mouthed upright posturing and diffuse cervical and upper mediastinal subcutaneous emphysema.

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Results: CT neck/chest revealed extensive free air suggestive of aerodigestive tract disruption; however, no FB was noted. Swallow study showed filling defect of the left piriform sinus without contrast extravasation from the pharynx or esophagus. Micro DL and rigid bronchoscopy were performed, revealing two cephalocaudally oriented posterior pharyngeal wall tears superior to the arytenoids. Plastic ramen wrapper was removed from the left piriform sinus. Bilateral piriform sinuses were diffusely edematous without obvious lacerations. Cervical esophagoscopy was not performed given edema and absence of contrast extravasation on swallow study. He underwent endoscopic orogastric tube placement via the left piriform sinus and remained intubated postoperatively throughout his stabilization in the ICU. Delayed endoscopy showed esophageal avulsion extending from C2-T2. Repeat barium swallow prior to discharge showed contrast extravasation into the posterior pharynx and aspiration, necessitating gastrostomy tube placement. **Conclusions:** Clinical suspicion for retained FBs should remain high in intentional ingestion presenting with signs of aerodigestive tract disruption, even in the absence of visualized FB on imaging.

148. An Unexpected Diagnosis of Supraglottic Squamous Cell Carcinoma in a Patient with Chronic Dysphagia

Christopher A. Rayle, MD, Lexington, KY; Alexandra E. Kejner, MD, Lexington, KY; Mark A. Fritz, MD, Lexington, KY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the importance of having a low threshold for laryngeal biopsy in the setting of atypical symptoms and physical examination findings.

Objectives: To reinforce the importance of histopathological diagnosis in the setting of atypical symptoms and examination findings. **Study Design:** Retrospective case report. **Methods:** A retrospective review of the electronic medical record was performed to analyze the clinical course of a single patient with chronic dysphagia. **Results:** A 65 year old male never smoker presented to our office with complaints of a several month history of dysphagia which did not respond to initial medical management. Diffuse supraglottic edema and erythema was noted on in office laryngoscopy, but no discrete lesions were noted. Operative biopsy was performed, despite no obvious overlying mucosal changes, with pathology demonstrating findings of diffuse submucosal infiltration of p16+ squamous cell carcinoma in all three random specimens. No true mucosal source was identified with further workup. He was ultimately staged as T3N2cM0 squamous cell carcinoma of the supraglottis and treated with definitive chemoradiation therapy. He is currently free of disease. **Conclusions:** Clinicians should have a relatively low threshold for performing laryngeal biopsy when physical examination findings and patient history are concerning, even if there is no definitive finding concerning for malignancy.

149. Endoscopic Airway Surgery Using Supraglottic Jet Ventilation in a Team Based Approach: A Multi-Institutional Analysis of Perioperative Outcomes

Jennifer P. Rodney, MD, Nashville, TN; Robert J. Morrison, MD, Ann Arbor, MI; Shaunak N. Amin, BS, Nashville, TN; Margaret B. Mitchell, BA, Nashville, TN; Andrew B. Rees, BS, Nashville, TN; Catherine G. Garrett, MD, Nashville, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to evaluate risk and characterize sequelae of endoscopic airway surgery using supraglottic jet ventilation.

Objectives: To evaluate risk and characterize sequelae of endoscopic airway surgery using supraglottic jet ventilation. **Study Design:** Retrospective chart review. **Methods:** We reviewed 894 patient encounters from 371 patients with the diagnosis of laryngotracheal stenosis who underwent outpatient endoscopic airway surgery with jet ventilation from January 2008-December 2018 in two academic institutions. Records were reviewed for demographics, intraoperative data, and complications. **Results:** 36 factors were evaluated in relation to perioperative complications. Respiratory related events in PACU requiring intervention and readmission to the hospital within 30 days were rare, occurring in less than 3% of patient encounters. Other complications were extremely rare, occurring in less than 1% of patient encounters, including intraoperative tracheotomy, prolonged hypoxic event, rapid response or intubation in the PACU, return to the emergency department within 24 hours of surgery, and return to the emergency department within 30 days of surgery. Increased OR time (mean 133 versus 80 minutes) was associated with the occurrence of significant perioperative respiratory events ($P < 0.001$). Diabetes mellitus was the only comorbidity that was found to be independently associated with perioperative respiratory events ($P = 0.02$). **Conclusions:** Jet ventilation during endoscopic airway surgery is a safe airway management technique with minimal risk of perioperative complications. A cohesive airway team is essential for successful outpatient endoscopic airway surgery.

150. White Coat Dysphonia: Comparing Office versus Ambulatory VHI10 Patient Reported Outcomes

Amir Taree, BA, New York, NY; Mingyang Gray, MD MPH, New York, NY; Mark Courey, MD, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to identify differences between VHI10 scores obtained in the office versus in an ambulatory setting outside the office. Participants will be able to explain the potential biases of patient reported outcomes measures such as VHI10 obtained in the office setting.

Objectives: The Voice Handicap Index 10 (VHI10) is a patient reported outcomes measure used to evaluate the impact of voice disorders on patients' quality of life. In patients with dysphonia from multiple different causes, the minimal important difference (MID) is a change of 6 points. We sought out to identify potential differences in VHI10 responses based on the situation in which the questionnaire was completed. **Study Design:** Prospective cohort study. **Methods:** Patients with stable chronic moderate dysphonia were recruited and completed the VHI10 during a routine office visit. Participants were then contacted via email to complete a survey that included current level of voice use, setting, and VHI10 questions. Response between situations were compared with paired t-tests with a statistically significant difference of $p < 0.05$. **Results:** 34 patients completed an office VHI10 and an ambulatory VHI10. The difference in VHI10 ranged from 0-19. Twenty-six patients (76.5%) reported a lower ambulatory VHI10 as compared to their office VHI10, and 8 patients (23.5%) reported a higher ambulatory VHI10. Patients with higher ambulatory VHI10 were associated with a statistically significant higher level of voice use ($p = 0.0377$). Five patients with moderate or severe voice disturbance (office VHI10 > 11) reported a difference in ambulatory VHI10 greater than 6. Two patients reported a higher ambulatory difference and three patients reported a lower ambulatory difference. **Conclusions:** VHI10 results may differ based on the situational setting and level of voice use. Most patients have a lower VHI10 outside the office setting. Additional data is necessary to identify trends in situational variation.

151. An Unusual Esophageal Foreign Body Masquerading as Abscess, Removed with Flexible Esophagoscopy

Joseph F. Toth, Syracuse, NY; Mark A. Arnold, MD, Syracuse, NY; Jason M. Wallen, MD, Syracuse, NY; Jacob S. Feldman, MD, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss this case of an esophageal foreign body and explain how it can alter their approach to patients with similar clinical presentations.

Objectives: To illustrate the unique case of a regurgitated foreign body seen in a gastrostomy tube dependent patient presenting as aspiration pneumonia and concern for esophageal abscess. **Study Design:** Case report. **Methods:** A literature review was conducted on PubMed searching keywords including esophageal foreign body, G-tube, pneumomediastinum, Mic-Key button. **Results:** We present a case of an esophageal foreign body in a pediatric patient due to regurgitation of an old Mic-Key button from the stomach. The patient had a past medical history of cerebral palsy with gastrostomy tube placement. She presented with symptoms of cough, dyspnea and fever present for two days. Given her prior history of similar presentations, there was a high clinical suspicion for aspiration pneumonia. A foreign body was incidentally discovered on chest X-ray. A CT scan was concerning for an apparent abscess at the left side of the base of the neck, involving the left common carotid artery and containing a foreign body at the level of the T3 vertebrae. Treatment consisted of intravenous antibiotics and flexible esophagoscopy with the removal of the foreign body followed by an uncomplicated hospital course and eventual discharge. The foreign body was a Mic-Key button that was placed years ago and had not passed the digestive tract. **Conclusions:** We bring to light the unique presentation, complicating factors, and treatment for this rare cause of esophageal foreign body.

152. Bilateral Superior Laryngeal Nerve Block for the Treatment of Chronic Cough

Eve N. Tranchito, BS, Cleveland, OH; William S. Tierney, MD MS, Cleveland, OH; Paul C. Bryson, MD, Cleveland, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of the otolaryngologists' role in the treatment of chronic cough. Furthermore, they should be able to explain the indications for superior laryngeal nerve block and discuss the effectiveness of such in patients with chronic neurogenic cough.

Objectives: Chronic cough is a complex problem that often fails medical management. In this subset of patients, a recent case series demonstrated success with localized nerve block of the internal branch of the superior laryngeal nerve (SLN). In that study 13 out of 18 subjects underwent unilateral nerve block and 83.3% of patients showed improvement in symptoms. The following study was done in an effort to validate those results as well as explore the effect of bilateral nerve block. **Study Design:** This is a single center case series. **Methods:** A retrospective review of charts of patients with chronic refractory cough who underwent in-office SLN block between 2018 and 2019 was conducted. Demographics, comorbidities, indications, and outcomes were measured and analyzed. Descriptive statistics were calculated. **Results:** 18 patients with chronic cough who failed medical management underwent bilateral localized SLN block composed of corticosteroid and local anesthetic. Two were excluded from the study for loss to followup. Patients underwent an average of 2.12 injections. Of these 16 reports, 75% of patients reported some improvement. 7 of these patients had a subjective percent improvement reported, with an average of 75.4%. Half of patients underwent multiple injections. **Conclusions:** Localized nerve block of the SLN for chronic cough refractory to medical management demonstrates subjective improvement in majority of patients. Longer followup, larger sample sizes, and further study is needed to determine the duration of effect and long term outcomes. Furthermore, varying doses of corticosteroids may affect outcomes; a more in depth evaluation of this may help guide clinical practice.

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153. Use of a Transnasal Flexible Laryngoscope Tip for Laryngeal Culturing: A Novel In-Office Technique

Adam S. Vesole, BBA, Iowa City, IA; Henry T. Hoffman, MD, Iowa City, IA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the utilization of a transnasal flexible laryngoscope tip for laryngeal swab and culture and the advantages and limitations to this approach.

Objectives: To demonstrate in-office use of a transnasal flexible laryngoscope tip for laryngeal swab and culture as a novel, accessible technique for providing targeted antimicrobial therapy for infectious laryngitis. **Study Design:** A single surgeon, single institution retrospective case series. **Methods:** Six laryngoscopy tip nonsterile culture swabs were performed among 4 patients presenting with dysphonia or hoarseness. The tip of the laryngoscope was placed onto laryngeal areas of mucous collection, in direct contact with laryngeal mucosa and placed into culture transport tube for aerobic, anaerobic and fungal growth. **Results:** Five of six (83%) swabs grew MSSA and 1/6 (17%) grew candida on culture. The aryepiglottic fold swab in patient 4 growing MSSA was confirmed by an in-office channeled laryngoscope culture biopsy of the larynx, showing the same sensitivities. Of those growing MSSA, 2/5 (40%) were treated with amoxicillin/clavulanic acid and 3/5 (60%) with trimethoprim/sulfamethoxazole. Only 1/5 (20%) of all swab results had no symptomatic improvement with targeted antimicrobial therapy. **Conclusions:** We describe a novel approach of laryngeal swabbing with a laryngoscope tip that has been successful in identifying bacterial and fungal pathogens with appropriate sensitivities.

154. Cervical Esophageal Stenosis: Imaging's Imperfect Prediction of Response to Dilation

Wayanne Watson, BSM, Loma Linda, CA; Ethan Frank, MD, Loma Linda, CA; Sara Yang, MD, Maywood, IL; Jared C. Inman, MD, Loma Linda, CA; Brianna Crawley, MD, Loma Linda, CA; Priya Krishna, MD, Loma Linda, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the accuracy of current imaging in predicting response to esophageal dilation for cervical esophageal stenosis after neck dissection and radiation.

Objectives: To determine the ability of the modified barium swallow (MBS) and esophagram to predict post-dilation improvement of dysphagia in patients with cervical esophageal stenosis. **Study Design:** Retrospective chart review. **Methods:** Patients who had previous neck dissection and radiation who underwent esophageal dilation from 2010 to 2018 were assessed for pre- and post-dilation swallowing function with the functional outcomes swallowing scale (FOSS), functional oral intake scale (FOIS), and subjective patient symptom improvement. Regression analysis was performed to determine correlates of swallow function improvement after dilation. **Results:** A total of 95 patients included in the study. Overall, post-dilation FOSS and FOIS score were significantly improved ($p < 0.001$). Qualitative symptom improvement was reported in 67% of patients. Based on FOSS, FOIS, and subjective improvement, esophagram or MBS for stenosis/stricture had a sensitivity of 45-46%, specificity of 49-50%, and accuracy of 46-47%. MBS aspiration, not stenosis or stricture, had the most predictive ability with a sensitivity of 48%, specificity of 85-93%, and accuracy of 64%. Patient variables, specifically diagnostic stenosis on MBS or esophagram, were found to not correlate significantly with successful dilation; however, aspiration was found to correlate. Time from imaging to dilation was significantly delayed in those who had false negative stenosis on imaging when compared to those who did not (46.8 ± 35.2 days vs. 312.6 ± 244.1 days, $p < 0.001$). **Conclusions:** The MBS and esophagram when interpreted for stenosis appear to be unreliable predictors of response to esophageal dilation in patients who have had neck dissections.

Otology/Neurotology

155. Tympanostomy Tube Placement for Pressure Change Induced Vertigo

Mehdi Abouzari, MD PhD, Irvine, CA; Erica M. Parker, BS, Irvine, CA; Khodayar Goshtasbi, BS, Irvine, CA; Donald Tan, BA, Irvine, CA; Catherine Merna, MD, Irvine, CA; Hamid R. Djalilian, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the benefits of tympanostomy tube placement in patients with vertigo exacerbated by seemingly small changes in atmospheric pressure.

Objectives: To evaluate tympanostomy tube placement in patients with pressure change induced vertigo. **Study Design:** Case series and review of the literature. **Methods:** Five patients with pressure sensitive vertigo underwent placement of tympanostomy tube. The patients most commonly had vertigo before thunderstorms, travel to elevation, or on airplanes. The vertigo episodes lasted between 30 minutes and 6 hours. The main outcome was reported resolution of pressure change induced vertigo. There was no precedent event that triggered the problem (e.g., strong Valsalva, heavy lifting, scuba diving, etc.) and all had a negative fistula test. **Results:** All patients reported resolution of their vertigo and other vestibular symptoms after placement of the tympanostomy tubes. All recurrences of symptoms were due to either extrusion or plugging of the tubes. All patients fulfilled the criteria for vestibular migraine. None of the patients had superior canal dehiscence on imaging. **Conclusions:** Tympanostomy tube placement should be considered in selected patients with vertigo exacerbated by seemingly small changes in atmospheric pressure (e.g., just prior to thunderstorms, air travel,

or driving to the mountains). By eliminating the capability of the tympanic membrane to sense changes in pressure, patients with pressure induced vertigo (in the absence of perilymph fistula or superior canal dehiscence) may have relief of their symptoms.

156. Segmentation of the Temporal Bone Anatomy for Patient Specific Virtual Reality Simulation

Steven A.W. Andersen, MD PhD, Columbus, OH; Kimerly A. Powell, PhD, Columbus, OH; Bradley Hittle, BSc, Columbus, OH; Thomas Kerwin, PhD, Columbus, OH; Don Stredney, MA, Columbus, OH; Gregory J. Wiet, MD, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to compare different approaches to segmentation of clinical imaging of key anatomical structures for patient specific virtual reality simulation of the temporal bone.

Objectives: Virtual reality (VR) simulation for patient specific presurgical planning and rehearsal requires accurate segmentation of critical structures such as the facial nerve, the ossicles, and the cochlea. Manual slice by slice segmentation with identification and outlining of each structure is too time consuming for routine clinical use. The aim of this study was to investigate guided, semiautomated segmentation and computerized, automated segmentation of pediatric temporal bone CT scans. **Study Design:** Retrospective case study. **Methods:** Deidentified, clinical CT imaging of nine pediatric patients aged three months to 12 years were obtained retrospectively. The patients represented normal anatomy and key structures were manually segmented using open source software. The OTOPLAN (CAScination AG, Bern, Switzerland) otological planning software was used for guided, semiautomated segmentation. An atlas based segmentation routine was used for computerized, automated segmentation. Accuracy, reliability, and feasibility was investigated by comparison of the segmentations. **Results:** The atlas based algorithm for automated segmentation accurately segments all temporal bone structures, whereas the current structures included in the OTOPLAN software are limited to the facial nerve, chorda, cochlea, and ossicles. Accuracy was higher for the automated algorithm assessed visually and on calculated parameters. The guided approach was moderately less time consuming than manual segmentation but required substantial post-processing of the segmentation to be used in a VR temporal bone simulation platform. **Conclusions:** Segmentation is fundamental for patient specific VR simulation for presurgical planning and rehearsal. The automated segmentation algorithm currently offers the most flexible and feasible approach and should be implemented for future routine patient specific simulation.

157. A Rare Case of Esophageal Adenocarcinoma Metastasis to the Middle Ear

Ramya Bharathi, MD, Boston, MA; Emily S. Pascal, BA, Boston, MA; Mihaela Mabijs, PA-C, Boston, MA; Jonathan S. Sillman, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to gain awareness of a rare metastatic site of esophageal adenocarcinoma previously unknown in the English medical literature.

Objectives: To present a rare case of metastasis of esophageal adenocarcinoma to the middle ear. **Study Design:** A literature review of metastatic sites of esophageal adenocarcinoma was done, followed by a retrospective chart review of the patient. **Methods:** A literature review of common and uncommon metastatic sites of esophageal adenocarcinoma was done using PubMed and the Cochrane Library. A chart review of the patient was done from the time of the esophageal adenocarcinoma diagnosis to his expiration. **Results:** We present a 39 year old male who had a primary tumor of the distal esophagus that was a well to moderately differentiated adenocarcinoma. He received chemoradiation, underwent resection of the primary tumor, and after 28 months from the time of initial diagnosis and stable disease, he presented to the otology clinic with complaints of left sided otalgia and hearing loss. He was found to have a left polypoid mass in the EAC on exam, and the biopsy was positive for metastatic adenocarcinoma. Imaging studies showed involvement of the left temporal bone and middle ear, without evidence of other metastatic sites. The patient expired 37 days after otologic presentation. **Conclusions:** This case appears to be the first case of esophageal adenocarcinoma metastasis to the middle ear reported in the English medical literature. This was most likely caused by hematogenous spread, and it does follow the pattern of other uncommon metastatic sites. This case reinforces the importance of surveillance after surgery, because even after 28 months of stable disease, the patient was unfortunately diagnosed with stage IV metastatic adenocarcinoma.

158. Blast Injury to the Ear: A Human Otopathologic Study

Melissa Castillo-Bustamante, MD, Boston, MA; Dhrumi Gandhi, MS, Boston, MA; Danielle R. Trakimas, MD, Baltimore, MD; Renata M. Knoll, MD, Boston, MA; Elliott D. Kozin, MD, Boston, MA; Aaron K. Remenschneider, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to identify specific otopathologic changes in the middle and inner ear after blast injuries.

Objectives: Hearing loss, tinnitus and chronic otitis media are common sequelae of blast injury in military and civilian

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populations. While clinical findings have been documented, the mechanisms of otologic injury after blast in humans are not well understood and specific otopathologic changes to the middle and inner ear have not been thoroughly described. Herein, we review human cases of blast injury in a temporal bone collection and perform otopathologic analysis. **Study Design:** Otopathologic analysis. **Methods:** The National Temporal Bone Database was reviewed for cases with exposure to blast trauma. Specimens underwent otopathologic analysis via light microscopy. **Results:** Five patients and nine corresponding ears were identified. Blast etiology included close range gunshot, machine gun, cannon fire and grenade detonation. Average age at death was 83.2 (range 73-95). Mean time between injury and death was 38 years, all patients survived injury. Audiometrically documented sensorineural hearing loss occurred in all ears, tinnitus was reported by 3 patients. Middle ear findings include: fibrillar precipitates and thickening of tympanic membrane (n=2), abnormal fibrous tissue surrounding incus and stapes (n=1), ossicular loss (n=2), and foreign body metallic shrapnel (n=2). Inner ear findings include significant hair cell losses at the basal and middle cochlear turns (n=4), significant cochlear neuronal loss (n=4), atrophy of spiral ligament (n=3) and stria vascularis (n=2), and endolymphatic hydrops (n=2). **Conclusions:** Middle ear pathology is as common as inner ear pathology following blast. In addition to hair cell and neuronal loss, vascular changes to the inner ear occur. Findings have implications for therapeutic strategies in blast related otologic injury.

159. The Value of Minimizing Postoperative Pain and Numbness in Ear Surgery

Alexander Chern, MD, New York, NY; Rahul K. Sharma, BS, New York, NY; Justin S. Golub, MD MS, New York, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to understand which outcomes patients value most when undergoing ear surgery.

Objectives: Transcanal endoscopic ear surgery avoids a postauricular incision, which has been shown to minimize pain and numbness. Our objective is to assess how much patients value minimizing pain and numbness relative to other postoperative otologic outcomes. **Study Design:** Cross-sectional survey. **Methods:** Anonymous surveys were distributed to otolaryngology clinic patients. Patients were instructed to rate how much they value various outcomes when undergoing hypothetical ear surgery on a scale of 0 (not important) to 10 (very important). Linear regression was used to analyze demographic predictors of valued outcomes. **Results:** 102 patients responded (response rate 75%, 50% male). 51% presented for otologic complaints; other represented subspecialties included head and neck surgery, facial plastic surgery and rhinology. 10% of survey respondents were Spanish speaking. Outcomes of highest importance included hearing (mean 9.3; SD 1.9), pain (8.1; 2.5), and numbness (8.3; 2.4). Visibility of scar (6.3; 3.5), time spent under anesthesia (7.0; 3.2) and size of the incision (5.5; 3.4) showed moderate importance. In linear regression analysis, increasing age was associated with decreased value placed on size of incision ($r^2=-0.06$, $p<0.001$) and visibility of scar ($r^2=-0.07$, $p<0.001$). **Conclusions:** Patients placed very high value on minimizing pain and numbness after ear surgery, nearly as much as a good hearing outcome. This has implications for patient driven interest in transcanal endoscopic ear surgery, which has been previously shown to reduce pain and numbness compared to the postauricular approach.

160. Hearing Loss Due to Acute Endolymphatic Hydrops after Lumbar Puncture

Rebecca A. Compton, MD, Boston, MA; Ramya Bharathi, MD, Boston, MA; Andrew R. Scott, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to appreciate this rare complication of lumbar puncture, a procedure performed very commonly in the hospital setting.

Objectives: The objective of this report is to present a case of acute endolymphatic hydrops resulting in temporary hearing loss after an uncomplicated lumbar puncture. **Study Design:** Case report. **Methods:** N/A. **Results:** An 18 year old young man presented with postural headache, bilateral aural fullness, tinnitus and subjective hearing loss following lumbar puncture for intrathecal chemotherapy administration in the setting of recently diagnosed T cell acute lymphocytic leukemia. His physical exam was normal. Audiogram confirmed symmetric bilateral mild low frequency conductive hearing loss rising to normal hearing in the mid frequencies. Tympanometry was negative for middle ear dysfunction. His symptoms improved with bed rest and fluid hydration. Repeat audiogram five days later showed resolution of the hearing loss. Findings were consistent with acute endolymphatic hydrops attributed to a sudden drop in intracranial pressure from cerebrospinal fluid leakage. **Conclusions:** Hearing loss is infrequently associated with lumbar puncture. Here, we present a case of temporary conductive hearing loss attributed to acute endolymphatic hydrops from resultant intracranial hypotension. There are few reports of this occurrence in the literature and in some cases, hearing loss was reported to persist. Clinicians should recognize this as a possible complication of lumbar puncture.

161. The Good, the Bad, and the Cerumen Transplant

Robert G. Hill, BA, Macon, GA; Alexander R. Rivero, MD, Oakland, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the practical and clinical aspects of using cerumen as a therapeutic biofluid to restore the enzymatic and microbial environment of the external ear canal following treatment for recalcitrant otitis externa.

Objectives: To review current academic evidence for the concept of cerumen autotransplantation as a therapeutic treat-

ment option for patients with recurrent acute otitis externa (OE) with bacterial or fungal etiologies. **Study Design:** A systematic review was performed within Cochrane Central, Embase, PubMed, and Ovid Medline databases. In addition, current academic texts were reviewed as they pertained to the study objective. **Methods:** Cochrane Central, Embase, PubMed, and Ovid Medline databases were reviewed. English studies with a level of evidence above VII that aided in the academic discussion of cerumen as a therapeutic agent in the treatment of recalcitrant acute OE were reviewed. Articles were independently reviewed and verified by both authors for quality and pertinent findings. **Results:** Storrs first described the use of cerumen in the management of external ear pathologies in 1981 but followup evidence has not been published. Since that time cerumen has been found to have numerous immunological properties as well as be a medium for normal flora of the external ear. As OE is frequently caused by an overproliferation of pathogenic microbes, such as *Pseudomonas aeruginosa*, we hypothesized that cerumen from the contralateral ear could aid in reestablishing the normal flora following topical therapy and reduce recurrence. Our findings suggest that the innate protective properties of cerumen could be therapeutic in the setting of OE but further research is needed to establish efficacy and safety. **Conclusions:** Cerumen shows promise of being a possible biofluid therapy for patients with recalcitrant OE.

162. Establishing Interrater and Intrarater Reliability of a Novel Chronic Ear Grading System

Sandra H. Ho, MD, Brooklyn, NY; Daniel P. Ballard, MD, Brooklyn, NY; Matthew H. Hanson, MD, Brooklyn, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the need for a standardized grading system for chronic ears given the results of the study.

Objectives: A grading system to standardize the chronic ear exam in the clinic currently does not exist. Our objectives were to determine the interrater reliability and test-retest reliability of a novel chronic ear grading system designed by the principal investigator. **Study Design:** Observational study. **Methods:** A questionnaire assessing chronic ear disease (COACH score) was distributed to a convenience sample of otolaryngologists that diagnose ear conditions. There were 8 chronic ear pictures, each assessing five categories - hearing (C), otorrhea (O), aeration (A), cholesteatoma (Ch) and happiness (H). Each category was graded from 0 to 2, with the maximum total being 10. The questions in the questionnaire were then rearranged in a different order and redistributed a week later to the same otolaryngologists to determine test-retest reliability. Physician agreement and test-retest reliability was calculated using the intraclass correlation coefficient. **Results:** Seven otolaryngologists responded to the initial questionnaire. Five of the seven were neurotologists/otologists. Two were pediatric otolaryngologists. The intraclass correlation coefficient (ICC) between physicians for the overall COACH score was 0.76, demonstrating good interrater reliability. The ICCs for the initial questionnaire were 0.39, 0.85, 0.54, 0.66, 0.49 for the hearing, otorrhea, aeration, cholesteatoma and happiness categories, respectively. For each of the above categories respectively, the test-retest reliability had ICCs ranging from moderate to excellent (0.48-1), poor to good (0.28-0.88), poor to good (0.26-0.78), poor to excellent (0.18-0.91) and good (0.68-0.89). **Conclusions:** The COACH score shows good overall interrater reliability but ranged from poor to good within each category. The test-retest reliability also varied from poor to excellent. The results show considerable variability when assessing chronic ears and the potential a grading system can have for standardizing an ear exam.

163. Comparison of Endoscopic Assisted Approaches for Auditory Brainstem Implantation in Human and Rhesus Macaque: A Cadaveric Study

Vivek V. Kanumuri, MD, Boston, MA; Divya A. Chari, MD, Boston, MA; Osama Tarabichi, MD, Boston, MA; Ahad Qureshi, MD, Boston, MA; M. Christian Brown, PhD, Boston, MA; Daniel J. Lee, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to compare the brainstem anatomy of the human and rhesus macaque as it pertains to auditory brainstem implantation and the potential utility of endoscopic assisted approaches.

Objectives: The auditory brainstem implant (ABI) provides auditory sensation for patients who are not candidates for cochlear implants due to a damaged or absent cochlear nerve. However, outcomes lag behind those for cochlear implants with most patients achieving some sound perception but only a few achieving speech comprehension. There is thus significant interest in developing new technologies to help improve outcomes. Macaque monkeys have previously been used as an animal model to study ABIs but implantation can be challenging due to small cranial size. Herein, we compare human and macaque endoscopic assisted approaches to enhance visualization of ABI placement. **Study Design:** Cadaveric study. **Methods:** Fresh adult cadaveric heads and fixed macaca mulatta specimens were utilized. Retrosigmoid and translabyrinthine approaches to the lateral recess were performed. ABI placement was simulated using the microscope, 0 degree and 30 degree 14 cm Hopkins rod endoscopes following completion of the surgical approach. **Results:** The lateral recess of the IVth ventricle was successfully visualized in all available specimens. An extended retrosigmoid approach in the macaca provided visualization of key anatomic landmarks including the cochlear nerve, choroid plexus and lower cranial nerves that was comparable to the human cadaveric dissection. The 30 degree endoscope in particular provided significantly enhanced visualization for ABI array placement; however, the surgical corridor and lateral recess remained too small for human sized arrays. **Conclusions:** In this cadaveric study, the endoscope improves visual access to the lateral recess of the IVth ventricle to enable ABI array placement in the rhesus macaque.

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164. Automated Classification of Otoloscopic Endoscopic Findings Using Convolutional Neural Networks

Keonho A. Kong, MD, New Orleans, LA; Michael E. Dunham, MD, New Orleans, LA; Rahul Mehta, MD, Baton Rouge, LA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the use of artificial intelligence for classification of endoscopic otoscopy images.

Objectives: Develop a neural network to classify tympanic membrane findings during otoscopy. **Study Design:** Program design and analysis of tympanic membrane images. **Methods:** Normal and abnormal tympanic membrane images were obtained from the outpatient and intraoperative photo documentation database of an academic tertiary care otology practice and through an internet search. The designated classifications were normal, perforation, and cholesteatoma. All images were labeled by a board certified, fellowship trained otologist at the time of acquisition. Test images were randomly withheld from each class prior to network training. The remaining images were used to train and validate a convolutional neural network for classifying tympanic membrane lesions in the three categories. The network was developed in the Python programming language. **Results:** The overall validation accuracy of the multiclass tympanic membrane classifier was 78%. Test image recall values for cholesteatoma, normal, and perforation were 60%, 100% and 80%, respectively. **Conclusions:** Autonomous classification of endoscopic images with artificial intelligence technology is possible. Increasing the number of categories would improve classifier utility. Better network implementation and a larger dataset will increase accuracy.

165. Focus Bracketing Photography in Otolgic Surgery

Yoseph A. Kram, MD, Honolulu, HI; Brian S. Chen, MD, Honolulu, HI

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate how to obtain high quality focus bracketed photographs from otologic surgery and discuss the pros and cons of the commercial focus bracketing software available.

Objectives: Focus bracketing is a method of extended depth of field photography where in focus aspects of each image are compiled into a single image. This presentation aims to show how to implement this tool to improve image documentation in otology and analyzes the commercially available focus bracketing software with regards to cost and quality. Limitations of focus bracketing are also described. **Study Design:** Qualitative review of a novel integration of a photography technique into otologic surgery. **Methods:** When the desired surgical field view is achieved, serial photographs are taken from proximal to distal focal lengths. The camera and surgical field are kept stable. The software automatically compiles these images to create an image with an extended depth of field. Available software, including Photoshop, ZereneStacker and HeliconFocus, are compared. **Results:** The focus bracketed images are easily acquired without additional operative set up required. The focus bracketed surgical photographs are easier to orient and understand. Although standard photographs of operative fields with microscopes may adequately show in focus subjects, other elements of the surgical field may be out of focus which inhibits reviewers from quick anatomic localization and assessment. Some photographic subjects that span distance proximally to distally may not be able to be captured in focus without this technology. Photoshop, ZereneStacker and HeliconFocus all provide relatively adequate results at a similar price point. Institutional access, program familiarity, and desire for either simplicity or customizability could factor into the choice of software. **Conclusions:** Focus bracketing is a photography tool that can be easily adapted into the otologist's toolbox to improve photodocumentation and education without substantial cost.

166. Evaluating Surgical Skills in Mastoidectomy

Joshua A. Lee, BA, Charleston, SC; Michaela F. Close, BS, Charleston, SC; M. Andrew Rowley, BS, Charleston, SC; Yuan F. Liu, MD, Charleston, SC; Mark S. Costello, MD, Charleston, SC; Ted A. Meyer, MD PhD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss physical measures used in performing mastoidectomy that correlate with the level of surgical training.

Objectives: To assess whether physical measures of techniques used in mastoidectomy correlate with surgical level. **Study Design:** Prospective analysis of retrospectively collected intraoperative videos. **Methods:** 24 intraoperative videos of 12 surgeons performing mastoidectomies were sampled during the second minute of drilling. Using 5 second clips, 3 experienced residents assessed surgeon level, drill stroke number, 5 point ratings on drilling efficiency and stroke pattern, and a variety of measures of the use of drill and the suction irrigator (SI). **Results:** Estimated and actual surgeon levels were strongly correlated ($r=0.85$, $p<0.001$). Although average stroke count increased from junior residents (6.5 ± 3.5), to seniors (9.4 ± 5.1), to attendings (11.2 ± 7.3), this was not significant ($p=0.19$). Stroke pattern ratings for junior residents (3.8 ± 0.3), seniors (3.8 ± 0.6), and attendings (4.8 ± 0.3) differed ($p<0.01$), with attendings higher than junior and senior residents (both $p<0.01$). Drilling efficiency ratings for juniors (3.6 ± 0.3), seniors (3.8 ± 0.6), and attendings (4.8 ± 0.2) differed ($p<0.01$), with attendings rated higher than junior and senior residents (both $p<0.01$). Surprisingly, SI proficiency ratings were higher for junior (3.4 ± 0.7) and senior residents (3.8 ± 0.7) than attendings (2.8 ± 0.9), but these

did not differ significantly ($p=0.11$). **Conclusions:** Experienced residents can determine surgeon level by watching intra-operative videos. The number of strokes per unit time and utilization of the SI do not seem to reflect surgical experience. However, stroke pattern and drilling efficiency measures were rated more highly for attendings than for residents, perhaps distinguishing characteristics of advanced surgeons.

167. Indications for the Middle Cranial Fossa Approach: 10 Year Experience in a Single Institution

Noga Lipschitz, MD, Cincinnati, OH; Gavriel D. Kohlberg, MD, Seattle, WA; Scott Shapiro, MD, Cincinnati, OH; Joseph T. Breen, MD, Cincinnati, OH; Myles L. Pensak, MD, Cincinnati, OH; Ravi N. Samy, MD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the indications for the middle cranial fossa (MCF) approach.

Objectives: To review the indications for the middle cranial fossa (MCF) approach based on a 10 year single institution experience. **Study Design:** Retrospective case series. **Methods:** A case series including adult patients who were operated on via the MCF approach between 2007-2017 in a tertiary referral center. The medical charts were reviewed for demographic and clinical data, surgical indications, and surgical outcome. **Results:** During the study period, 182 patients underwent MCF approach for various indications. There were 81 men and 101 women with a mean age of 52.4 years. The 6 main indications for surgery included tumor resection (95 cases, 52.2%), cerebrospinal fluid (CSF) leak repair (51 cases, 28%), superior semicircular canal dehiscence repair (25 cases, 13.7%), vascular lesions (6 cases, 3.3%), facial nerve decompression (3 cases, 1.6%), and auditory brainstem implant insertion (2 cases, 1.6%). Among the tumor resection cases, the standard MCF (sMCF) approach was used in 73 cases while the extended MCF (xMCF) approach was used in 22 cases, including 2 combined xMCF retrosigmoid approaches and 4 combined xMCF translabyrinthine approaches. Tumors included 69 vestibular schwannomas, 14 meningiomas, 7 facial schwannomas, 3 epidermoid cysts, 1 giant cell tumor, and 1 anaplastic hemangiopericytoma. The CSF leak repairs included 4 sMCF approaches and 47 combined MCF transmastoid approaches. **Conclusions:** The indications for the MCF approach have expanded over the past decade to include various neoplastic and non-neoplastic pathologies beyond those traditionally described. Intimate knowledge of skull base anatomy is essential for utilizing this often underused and versatile approach in a variety of disease processes.

168. Repetitive Head Impacts Result in Hearing Threshold Shifts in Mixed Martial Arts Fighters: A Field Study

Rory J. Lubner, BS, Boston, MA; Michael K. Boyajian, BA, Providence, RI; Renata M. Knoll, MD, Boston, MA; Steven D. Rauch, MD, Boston, MA; Aaron K. Remenschneider, MD, Boston, MA; Elliott D. Kozin, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand how head impact may be associated with temporary auditory threshold changes.

Objectives: Auditory symptoms, including hearing loss and tinnitus, have been recognized as a long term consequence of sports related head injuries. To date, no studies have investigated how hearing may acutely change following repetitive sports related head injury, which commonly occurs during combat sports, such as mixed martial arts (MMA) and boxing. The primary aim of this study is to investigate acute hearing threshold shifts in MMA fighters. **Study Design:** Prospective cohort study. **Methods:** Twenty-nine MMA fighters volunteered to have otoscopy and air conduction pure tone audiometry completed immediately prior to and following a 45 minute sparring match. Frequencies tested included 0.5Hz, 1kHz, 2kHz, 3kHz, 4kHz, 6kHz, and 8kHz. Number of blows to the head were recorded. Groups were divided into those with (cases) and without (controls) head blows during sparring. **Results:** All MMA volunteers ($n=29$) had normal otoscopy prior to and immediately following sparring. Cases ($n=21$) demonstrated post-sparring air conduction threshold shifts (1-8kHz) ranging from 2.62 to 7.86 dB ($p<0.05$) in the right ear. The left ear also had increased thresholds at 2 to 4 Hz, ranging from 2.62 to 6.67 dB HL ($p<0.05$). Controls ($n=8$) showed no threshold shifts across all tested frequencies ($p=ns$). There was a positive correlation in mean change in hearing threshold and the number of blows across 1-8kHz, with the strongest correlation at 4kHz ($r=.647$, $p<.0001$). **Conclusions:** This is the first study to detect acute hearing threshold shifts following repetitive head impacts following participation in a contact sport. Additional study is needed to understand the mechanism of the threshold change.

169. The Effect of Osteopathic Manipulative Treatment on Opioid Use and Hospital Length of Stay after Acoustic Neuroma Surgery

Amir A. Mohammadzadeh, BS, La Jolla, CA; Omid Moshtaghi, MD, San Diego, CA; Pasha Mehranpour, , San Diego, CA; Alice I. Chen, DO, San Diego, CA; Marc S. Schwartz, MD, San Diego, CA; Rick A. Friedman, MD PhD, San Diego, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the potential benefits of osteopathic manipulative treatment in reducing postoperative opioid use and hospital length of stay after acoustic neuroma surgery.

Objectives: To determine the impact that supplemental osteopathic manipulative treatment (OMT) has on postoperative

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opioid use and hospital length of stay (LOS) in patients undergoing acoustic neuroma (AN) resection. **Study Design:** Retrospective cohort study of patients undergoing AN resection at a single tertiary referral center. Ten patients from November 2018 who did not receive OMT were compared to ten patients from May to June 2019 who did receive OMT. OMT was given on postoperative day one for patients enrolled. **Methods:** The main outcome measures were opioid consumption in morphine milligram equivalents (MME), acetaminophen (APAP) consumption in milligrams, and LOS in days. Total opioid and APAP consumption were measured beginning on postoperative day one and averaged over LOS. **Results:** Preliminary data demonstrated that patients receiving OMT took an average of almost two times less MME per day than non-OMT patients (64.7 mg and 111.2 mg respectively, $p=0.14$). LOS was also 0.7 days shorter in patients receiving OMT ($p=0.33$). Average daily APAP consumption remained comparable between the OMT and non-OMT cohorts (1895.4 mg and 1987.3 mg respectively, $p=0.74$). **Conclusions:** In the setting of rising national opioid use and healthcare costs, OMT can be a useful adjunct in reducing pain and LOS in postoperative AN patients. Future analyses with greater enrollment will increase the power and sensitivity needed to further delineate the utility of OMT.

170. A Rare Case of Temporal Bone Pneumocephalus Tracking through the Internal Auditory Canal

Erin N. Mulry, BS, Philadelphia, PA; Wayanne B. Watson, BS, Loma Linda, CA; Adam C. Kaufman, MD PhD, Philadelphia, PA; Steven J. Eliades, MD PhD, Philadelphia, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the possible contributing factors, diagnosis, and management of chronic pneumocephalus tracking through the internal auditory canal (IAC).

Objectives: Discuss diagnosis and management of a rare otogenic presentation of pneumocephalus. **Study Design:** Case report and literature review. **Methods:** Case report with review of literature published on PubMed. **Results:** A 39 year old male with a history of optic nerve fibrillary astrocytoma status post-resection complicated by chronic hydrocephalus requiring biventricular shunts presented with chronic progressive pneumocephalus over several years. He showed no improvement following VP shunt revision and anterior skull base repair for a sphenoid dehiscence. Weeks following the anterior skull base repair, the patient's imaging continued to show worsening pneumocephalus with air tracking along the right facial nerve from the geniculate ganglion to the IAC. The patient was then taken to the operating room for tympanomastoidectomy and skull base reconstruction, during which a large air cell tracking superiorly towards the petrous apex was found and packed with bone wax. The middle ear and mastoid were covered with bone cement followed by abdominal fat graft obliteration. Postoperatively, this patient's pneumocephalus progressively improved and his symptoms resolved. **Conclusions:** Based on a search of published literature, this appears to be the first reported case of temporal bone pneumocephalus coursing through the IAC. With this report, we aim to elucidate this rare condition's presentation, pathophysiologic factors, and successful management in order to improve future diagnosis and management.

171. Temporal Bone Histopathology of Neurofibromatosis Type 2 after Treatment with Bevacizumab

Yin Ren, MD PhD, Boston, MA; Jennifer T. O'Malley, MD, Boston, MA; Anat Stemmer-Rachamimov, MD, Boston, MA; Michael J. McKenna, MD, Boston, MA; Joseph B. Nadol, MD, Boston, MA; Alicia M. Auesnel, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize histopathologic changes in the temporal bone in patients with neurofibromatosis type 2 (NF2) and NF2 associated vestibular schwannomas. The participants should also be able to explain the mechanism of sensorineural hearing loss based on temporal bone findings in patients with NF2 vestibular schwannomas.

Objectives: To describe the human temporal bone pathology in a patient with neurofibromatosis type 2 (NF2) treated with bevacizumab. **Study Design:** Postmortem evaluation and literature review. **Methods:** Postmortem histological evaluation of the temporal bones, correlation with clinical and audiometric data, and review of the literature for treatment of NF2 were performed. **Results:** An 18 year old patient with history of NF2, bilateral vestibular schwannomas and other intracranial and spinal tumors, who underwent multiple surgical resections with progressive bilateral hearing loss and bilateral facial paresis, as well as treatment with bevacizumab (Avastin) for 2 years prior to death due to complications related to ventriculoperitoneal shunt. The temporal bones demonstrated multicentric schwannomas involving the internal auditory canals (IAC), as well as the cochlea, vestibule, and semicircular canals. In the right ear, there was direct invasion of the cochlea at the basal turn. Despite initial hearing preservation after surgical resections of schwannomas, the left ear hearing progressed to anacusis and the left cochlea and labyrinthine structures were found to be completely ossified on histopathology. Residual or recurrent schwannomas were seen in both ears despite surgical resections and bevacizumab treatment. Multiple Schwann cell tumorlets as well as degenerative changes were seen within multiple segments of the facial nerves. Meningioma was also present within the internal auditory canal with direct extension onto the posterior fossa dura and the petrous bone. **Conclusions:** The temporal bone histopathologic findings in NF2 after surgical resections include multicentric tumors, involvement of the labyrinth, direct invasion of the cochlea basal turn, bony erosion of the IAC and petrous bone, degenerative changes and tumorlets in the facial nerve, and the presence of multiple residual tumors. These findings could contribute to our understanding of the treatment effects of bevacizumab for NF2.

172. Determinants and Distractors in Gauging Surgical Skill in Mastoidectomy

M. Andrew Rowley, BS, Charleston, SC; Joshua A. Lee, BA, Charleston, SC; Michaela F. Close, BS, Charleston, SC; Yuan F. Liu, MD, Charleston, SC; Mitchell J. Isaac, MD, Charleston, SC; Ted A. Meyer, MD PhD, Charleston, SC

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the feasibility of using animated video representations of mastoidectomies to assess surgical skill.

Objectives: To determine if surgical skill in mastoidectomy can be assessed using animated videos showing only the burr head. **Study Design:** Prospective analysis of retrospectively collected intraoperative videos. **Methods:** 24 intraoperative videos of 12 surgeons performing mastoidectomies were sampled during the second minute of drilling. Using 5 second clips, 3 experts (1 fellow, 2 residents) made quantitative measurements of drill movements, qualitative judgments of surgical technique, and rated the surgeons' training level. The same assessment was then performed using animated videos which showed only the path of the burr head as dots against a white background. **Results:** The estimated level of the surgeon was highly correlated between the original and animated videos ($r=0.60$, $p<0.01$). Ratings of surgeon efficiency in the original videos were significantly correlated with the surgeon's true level ($r=0.63$, $p<0.01$), estimated level on the original video ($r=0.71$, $p<0.001$), and estimated level on the animated videos ($r=0.66$, $p<0.001$). The number of strokes on the original and animated videos were significantly correlated with the surgeon's estimated levels ($r=0.45$, $p<0.03$; $r=0.51$, $p<0.01$). **Conclusions:** Animated videos of the drill head provide similar results as recorded surgical videos when used in making quantitative measurements of drill movements, qualitative judgments of surgical technique, and rating surgeons' training levels. In the future, perhaps a computer program could adequately capture and quantify characteristics of surgical performance, opening the possibility for new objective methods of surgical evaluation.

173. A Proposed Association between Migraine and Meniere's Disease

Brooke L. Sarna, BS, Miami, FL; Mehdi Abouzari, MD PhD, Irvine, CA; Khodayar Goshtasbi, BS, Irvine, CA; Harrison W. Lin, MD, Irvine, CA; Hamid R. Djalilian, MD, Irvine, CA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the association between migraine and Meniere's diseases and how to treat Meniere's disease with migraine medications.

Objectives: To propose the hypothesis that Meniere's disease (MD) is a migraine related phenomenon which may have implications for future treatment options for both diseases. **Study Design:** A hypothetical proposal with review of the literature. **Methods:** An epidemiological review of both phenomena revealed up to 51% of individuals with MD experience migraine too, compared to 12% in general population. In the definite MD population, an additional 20% have chronic headaches but do not fulfill IHS migraine criteria. Endolymphatic hydrops (ELH) has been associated with MD even though studies have found ELH in other pathologies. Stimulation of the ophthalmic division of trigeminal nerve (V1) causes fluid extravasation in the cochlea in animal studies. **Results:** Migraine headaches are theorized to cause symptoms via spreading cortical depression that ultimately results in substance P release, alterations in blood flow, and neurogenic inflammation. Animal studies have shown extensive innervation of the stria vascularis by V1. Hydropic inner ears lose V1 innervation compared to controls in animals. In humans, the same triggering factors are found to cause symptoms in both groups, namely, stress, diet, weather, etc. Migraine prophylaxis and lifestyle changes has been found to help control of symptoms in MD patients. **Conclusions:** Though the etiology of both MD and migraine is likely multifactorial, further exploration of the association between the two conditions may illuminate how to best manage MD in the future.

174. A Novel Repair Method of Temporal Bone Encephalocele with Cerebrospinal Fluid Leak

Cynthia M. Schwartz, MD, Lubbock, TX; Pranati Pillutla, BS, Lubbock, TX; Tam Nguyen, MD, Lubbock, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to explain different management techniques and respective outcomes for temporal bone encephalocele with cerebrospinal fluid (CSF) leak.

Objectives: To present a case of temporal bone encephalocele with CSF leak to demonstrate a novel repair method and compare this method to established methods via comprehensive literature review of other repair techniques. **Study Design:** Case report and comprehensive literature review. **Methods:** A 55 year old female presented with complaints of recurrent ear infections, aural fullness, and hearing loss. Her past surgical history included right canal wall up mastoidectomy and tympanoplasty and sinus surgery. A CT of the right ear showed significant tegmen tympani defects, suspicious for CSF leak. Upon operation, significant temporal lobe herniation into the mastoid cavity was noted, which was amputated. A cortical mastoid bone flap and two cartilage grafts were harvested and layered into the 7 mm by 2.5 cm defect. Norian Drillable (DePuy Synthes, Raynham, MA, USA) bone void filler was used as sealant. No leak was found upon inspection. **Results:** Our patient has no evidence of CSF leak to date, over 6 months postoperatively. The transcranial approach, transmastoid approach, or a combination are the most commonly described procedures to treat temporal bone encephalocele with CSF leak. **Conclusions:** Using bone void filler, temporal lobe herniation and large CSF leak were resolved by a transmastoid approach. A MCF approach requiring cranioplasty, a surgery often needing placement of a lumbar drain, prolonged hospitalization, and the risks of brain retraction, was avoided. This case report, containing a novel

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use of bone void filler, suggests that patients with defects up to 2.5 cm may be able to avoid the MCF approach.

175. A Novel Triage Protocol Utilizing Machine Learning for Tinnitus Patients

Kunal R. Shetty, MA, Boston, MA; Kenneth M. Grundfast, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, participants should know how to use a machine learning tool to efficiently and effectively triage patients complaining of tinnitus to a provider best suited to address the patient's problem. Participants should also be able to develop a system for evaluation and management of tinnitus sufferers that involves an array of providers including audiologists, physical therapists, psychologists, social workers, nurse practitioners.

Objectives: Approximately 45 million Americans suffer with tinnitus and many of the affected people believe that the annoying symptoms of ringing in the ears causes stress, anxiety, sleeplessness, lack of concentration, difficulty hearing. While there is no known cure for tinnitus, those who suffer with tinnitus often need advice on how to cope with problems that they incur related to the tinnitus. Although tinnitus sufferers often are referred to an otolaryngologist, not all people who have tinnitus really need to be evaluated by an otolaryngologist. **Study Design:** Prospective cohort study. **Methods:** Patients in an otolaryngology clinic focused on tinnitus management at a large academic center were recruited into the study. A data collection instrument through the electronic medical record (EMR) was utilized to collect data on patient symptoms prior to contact with otolaryngologist. With advice from a data architect, an algorithm was developed that uses response to a customized questionnaire to determine which member of a multi-disciplinary team is best appropriate for initial assessment of the person seeking help for tinnitus. The algorithm is currently being tested and refined. **Results:** The data collection process is still ongoing with preliminary results anticipated prior to presentation of research. There is utility in triaging patients to the best providers for their specific cause of tinnitus. Active adaptation and refinement of supervised algorithms in real time can potentially increase the efficiency of automated triage for patients. Additionally, a dedicated staff member to help transfer patients to their appropriate provider can help to achieve more cost effective and prompt treatment. **Conclusions:** There is a need for a system to link tinnitus sufferers with care providers best able and most appropriate for assisting those with tinnitus to be able to cope with the tinnitus that is intrusive in their lives. By utilizing both clinician judgment and automated recommendations, it is possible to improve tinnitus triage for patients.

176. Isolated Skull Base Metastasis in Early Stage Cervical Cancer: A Case Report and Literature Review

Kiranya E. Tipirneni, MD, Syracuse, NY; Jason R. Audlin, MD, Syracuse, NY; Susan C. Yanik, MD, Syracuse, NY; Jesse T. Ryan, MD, Syracuse, NY; Charles I. Woods, MD, Syracuse, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to recognize the prognostic implications of skull base metastases and determine the role of palliative surgery on a case by case basis.

Objectives: Skull base metastasis (SBM) is uncommon but has been described in breast or prostate carcinoma, often a sequela of advanced stage disease. However, isolated SBM from early stage cervical carcinoma is rare and carries a poor prognosis with life expectancy less than one year. **Study Design:** Case report. **Methods:** Retrospective chart review and review of literature. **Results:** We report the case of a 27 year old female with FIGO stage IB2 squamous cell carcinoma (SCC) of the cervix treated with concomitant chemoradiation and adjuvant brachytherapy. 6 weeks after completion, she developed headaches and right temporomandibular joint pain. MRI revealed 4cm x 4cm mass within right temporal bone, extending into middle cranial fossa, without radiographic dural invasion. FNA confirmed SCC and she underwent stereotactic radiosurgery and chemotherapy. She later developed osteoradionecrosis and was referred to the otology service for debridement of necrotic bone prior to initiating palliative immunotherapy. The patient subsequently underwent local debridement and temporalis myofascial rotation flap with routine postop course. However, she later developed complete wound dehiscence following first cycle of immunotherapy 6 weeks later. Imaging demonstrated progressive bony destruction and herniation of right temporal lobe through large middle cranial fossa defect. She was discharged to hospice and passed shortly thereafter. **Conclusions:** Isolated SBM is rare and carries a poor prognosis. While prior cases have occurred in late stage disease, this case highlights that SBM may occur at any stage. Moreover, treatment should be palliative and maintain quality of life. Additionally, the role of immunotherapy and its effect on wound healing must also be considered.

177. Prevalence of Occult Radiographic Cochlear Basal Turn Patency

Varun V. Varadarajan, MD, Gainesville, FL; Orrin L. Dayton, MD, Gainesville, FL; Reordan O. Dejesus, MD, Gainesville, FL; Patrick J. Antonelli, MD, Gainesville, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to (1) demonstrate the ability to identify and measure osseous dehiscence (patency) between the internal auditory canal and the cochlea by reformatting high resolution CT images of the temporal bone; and (2) discuss the prevalence of cochlear basal turn patency recognize patients at risk for perilymph gusher secondary to cochlear basal turn patency and differentiate these patients from "normal" patients who have occult radiographic cochlear basal turn patency.

Objectives: Perilymph gusher (PLG) is a rare complication of otologic surgery attributed to a communication between the cochlea and the internal auditory canal (IAC). Subtle osseous patency between the cochlear basal turn and IAC have been recently identified on computed tomography (CT) as a risk factor for PLG, especially when the defect is wider than 0.75 mm. This defect is easily missed, and identification requires oblique plane image reformation. This study aimed to investigate the prevalence of radiographic cochlear basal turn patency. **Study Design:** Retrospective review at a tertiary medical center. **Methods:** Patients undergoing CT of the temporal bones in which the inner ear was interpreted as "normal" were included in the study. An otologist and a radiologist independently reviewed CTs to measure radiographic dehiscence of the cochlea. Patients with PLGs were excluded. **Results:** Two hundred and ten ears were included (88 conductive or mixed hearing loss, 62 sensorineural hearing loss, 41 audiometrically normal ears). 71 ears (33.8%) were radiographically patent. Mean defect width was 0.41 mm (0.15-0.7 mm). Defect width was not associated with type of hearing loss, age, or gender. No defects were wider than 0.75 mm. **Conclusions:** Radiographic patency of the cochlear basal turn may be present in patients with normal hearing. Defects greater than 0.75 mm in width are rare; these patients should be counseled regarding the risk of PLG.

178. Increased Radiosurgery Toxicity Associated with the Treatment of Acoustic Neuroma in Multiple Sclerosis: Case Report

Katherine P. Wallerius, BS, Washington, DC; Jeffrey H. Kim, MD, Washington, DC

Educational Objective: At the conclusion of this presentation, the participants will be aware of the risk of radiation induced neurotoxicity in patients with MS treated with stereotactic radiosurgery (SRS) and will better understand the pathophysiology of radiation induced injury in the central nervous system.

Objectives: Explore the risk of radiation induced toxicity in patients with MS treated with stereotactic radiosurgery (SRS). **Study Design:** A retrospective case report and a comprehensive literature review. **Methods:** We present the clinical course and MRI findings in a 52 year old woman with history of relapsing remitting multiple sclerosis, who developed radiation induced neurotoxicity following CyberKnife SRS (five fractions 85% isodose of 25 Gy) of left sided acoustic neuroma. Thorough literature review of radiation induced toxicity in patients with MS treated with SRS, as well as examination of potential therapies, was conducted. **Results:** This patient developed increased imbalance (grade 2 toxicity) three months after CyberKnife SRS. Brain MRI scan showed FLAIR hyperintensity in the pons and cerebellum. Her imbalance improved with a course of oral steroids and rigorous vestibular therapy. One year followup MRI showed the resolution of the previous abnormal FLAIR hyperintensity. Neurotoxicity from SRS is rare. Literature review showed that 9 of 12 patients with MS who underwent radiation therapy sustained radiation induced toxicity. The potential mechanisms for increased toxicity in MS could be due to either demyelination or inflammatory or vascular changes. Efficacy of treatment such as steroid, hyperbaric oxygen therapy, anticoagulant, and bevacizumab is currently unknown. **Conclusions:** Patients with known MS may be at increased risk for radiation induced damage following SRS to the central nervous system. Careful radiosurgical planning accounting this inherent risk is essential for managing the patients with MS and acoustic neuroma.

179. Hearing Improvement after Resection of Cerebellopontine Angle Tumors: Case Series and Literature Review

James C. Wang, MD PhD, Cincinnati, OH; Noga Lipschitz, MD, Cincinnati, OH; Sarah Ridge, BS, Cincinnati, OH; Gavriel D. Kohlberg, MD, Seattle, WA; Mario Zuccarello, MD, Cincinnati, OH; Ravi N. Samy, MD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss hearing outcomes and the possibility for hearing improvement following CPA tumor resection.

Objectives: Identify patients with hearing improvement following resection of cerebellopontine angle (CPA) tumors and review the current evidence in the literature. **Study Design:** Retrospective case series and literature review. **Methods:** A case series of adult patients undergoing CPA tumor resection in a tertiary referral center between 2007-2017. Patients with documented hearing improvement following tumor resection were identified. The medical charts were reviewed for demographic and clinical characteristics, tumor pathology, audiometric outcome, and surgical outcome. Literature review was then performed to identify previous reports of hearing improvement following CPA tumor resection. **Results:** During the study period, 266 CPA tumor resections were performed. Two cases (0.8%) of hearing improvement after surgery were identified. Both patients were female, 69 years of age, and underwent retrosigmoid approach for tumor resection. Both patients had preoperative severe to profound sensorineural hearing loss with a word recognition score (WRS) of 0%, and both improved postoperatively to a normal WRS. Tumor pathology was jugular foramen schwannoma in one case and meningioma in the other. **Conclusions:** Drastic hearing improvement may occur after resection of CPA tumors, though rare. This is more common with non-vestibular schwannoma pathology. Further research should focus in identifying factors associated with hearing improvement after surgery.

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180. Does the Gender of the Tester and Subject Affect Auditory Function in Mice?

Benjamin Yang, MD, Galveston, TX; Rebecca Aurich, BS, Galveston, TX; Tomoko Makishima, MD PhD, Galveston, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the literature regarding the effects of gender on auditory testing and compare results of auditory testing in mice with relation to gender.

Objectives: To investigate whether there is a gender difference in auditory function in mice. Background: Recent studies in mice have shown differences in neurobehavioral test results based upon both the gender of the tester and the gender of the subject. In humans, it is well established that females have better hearing than males. We hypothesize that the auditory function in mice are similar to human gender patterns but could also be affected by the gender of the tester. **Study Design:** Basic science research. **Methods:** One male and one female tester tested auditory function in male (n=10) and female (n=10) C57BL/6J mice at ages 6-8 weeks. ABR thresholds (click stimulus, tone pip at 8-, 16-, 24-, and 32kHz) and DPOAE (F2 at 8kHz - 16kHz) were measured. The results were compared between male and female mice as well as between the male and female tester. **Results:** When tested by the male tester, DPOAE of male mice showed an 11.7% larger response (p=0.38) than when tested by the female tester. Male mice had lower ABR thresholds at 32kHz (p=0.008) than female mice. There was a trend toward shorter wave I-V latency in male mice. **Conclusions:** We observed a trend towards better auditory performance when the male tester tested male mice and the female tester tested female mice. This is the first study examining the gender effects of both the tester and the subject on auditory function in mice and has implications for future auditory experiments.

Pediatrics

181. A Life Threatening Case of Congenital Nasal Glioma

Nathan I. Ackerman, MD, Detroit, MI; Sheela Madipelli, MD, Clinton Township, MI; Christian E. Keller, MD, Detroit, MI; Ilaaf Darrat, MD, Detroit, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to identify the features of a nasal glioma clinically, radiographically and pathologically, as well as be able to manage and recognize the importance of congenital nasal obstruction.

Objectives: To discuss a case of congenital nasal glioma presenting as a life threatening intranasal mass in a neonate. **Study Design:** Case report and literature review. **Methods:** A case of life threatening congenital nasal glioma was reviewed. A literature search was performed looking for similar cases and evidence regarding neonatal breathing patterns. **Results:** A neonate was born at full term to a healthy mother via uncomplicated vaginal delivery. Immediate course was notable for inability to pass a 5Fr suction catheter through either naris. Feeding difficulties were encountered. Patient was discharged day of life #2. She subsequently suffered a period of apnea and limpness and was observed overnight. She was discharged with referral to pediatric otolaryngology where scope exam revealed an obstructive nasal cavity mass on the right deviating the septum significantly, causing contralateral nasal obstruction. Furstenburg sign was negative. The patient was readmitted and imaging verified no intracranial communication. Endoscopy at the time of surgery showed a right lateral nasal mass attached to the caudal end of the inferior turbinate. The mass was resected, pathology returned as ectopic central nervous system tissue. There were no further anomalous respiratory events. **Conclusions:** Nasal glioma as a rare cause of congenital sinonasal mass, likely resulting from encephalocele with subsequent involution of the intracranial connection. Only 20% of nasal gliomas occur internally. The common wisdom that neonates are obligate nasal breathers is supported by anatomic features including an upturned nose, formation of a velopharyngeal sphincter, and interdigitating uvula and epiglottis. Obligate nasal breathing makes nasal obstruction of any etiology a crucial consideration in newborn evaluation. To our knowledge, this is the first case report of a nasal glioma presenting in a life threatening fashion.

182. Identifying Adenoidal Hypertrophy Using Drug Induced Sleep Endoscopy versus Cine MRI

Jenna H. Barengo, BSE, Cincinnati, OH; Michal Trope, MD, Cincinnati, OH (Presenter); John A. Stafford, MD, Cincinnati, OH; Robert J. Fleck, MD, Cincinnati, OH; Mohamed A. Mahmoud, MD, Cincinnati, OH; Stacey L. Ishman, MD MPH, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the relationship between adenoid size on cine MRI, and the identification of adenoid hypertrophy on drug induced sleep endoscopy in patients with obstructive sleep apnea.

Objectives: Nasal endoscopy is routinely used to assess adenoid hypertrophy (AH), however, it is unclear how this assessment compares to objective cine magnetic resonance imaging (cMRI) measurement for children with obstructive sleep apnea. The aim of this study was to evaluate the relationship between cMRI adenoid size and AH identification with drug induced sleep endoscopy (DISE). **Study Design:** Retrospective chart review. **Methods:** We included all patients undergoing concurrent DISE and cMRI from 5/15 to 10/2017. AH was identified by the surgeon performing the DISE. Ade-

noid anterior to posterior diameter was measured by the radiologist from the cMRI. **Results:** We assessed 48 patients with a mean age of 10.8 years [95% CI:9.3-12.3] and mean body mass index percentile (BMIp) of 79.6 [95% CI:70.7-88.5]; 37.5% had Down syndrome. Overall mean adenoid size was 9.7mm [95% CI:8.3-11.0] with 42 (87.5%) \geq 5mm, and 21 (43.8%) \geq 10mm. AH was noted in 15 patients (31.3%) on DISE, with a mean adenoid size of 13.2mm [95% CI:10.8-15.6, range of 4-19mm]. Those without AH identified on DISE had a mean adenoid size of 8.04mm [95% CI:6.7-9.4, range 0-17mm, $P=0.001$]. Of the 15 with AH on DISE, 14(93%) were \geq 5mm, and 11(73.3%) \geq 10mm. There was a weak but significant correlation between AH identification on DISE and adenoid size \geq 10mm ($r=0.402$, $P=0.007$) but no significant correlation between AH and adenoid size \geq 5mm. The mean BMIp was higher for patients identified with AH on DISE than for those without ($P=0.045$). **Conclusions:** Identification of AH with DISE only weakly correlated with objective adenoid size on cMRI suggesting that AH may be overestimated with DISE.

183. Assessing Racial Disparities in Time to Decannulation among Children with Tracheostomies

Clarice Brown, MD, Dallas, TX; Jenna Wiles, BS, Dallas, TX; Cynthia Wang, MD, Dallas, TX; Gopi B. Shah, MD MPH, Dallas, TX; Ron B. Mitchell, MD, Dallas, TX; Romaine F. Johnson, MD MPH, Dallas, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss racial and ethnic disparities in the long term outcomes of children with tracheostomies.

Objectives: 1) Compare the decannulation and mortality rates using the Kaplan-Meier method among a cohort of children; (2) analyze outcomes by race and ethnicity to assess for disparities; and (3) determine levels of neurocognitive disability among survivors at the time of censoring (decanulation or current status). **Study Design:** Retrospective case series. **Methods:** We queried a tracheostomy registry of patients entered between 2014 to 2019. Patients are automatically entered into the registry at the time of tracheostomy or the first visit to the institution if tracheostomy was performed elsewhere or before the implementation of the registry in 2014. Primary outcomes (death or decannulation) were analyzed for racial and ethnic groups by the Kaplan-Meier method. Censoring occurred if the patient aged out (> 21 years old) or was lost to followup (no visits in 36 months). Statistical significance was set at $p \leq .005$. **Results:** The study included 445 patients with a median (IQR) age at tracheostomy placement of 0.5 (0.1) years. The population was 54% male. The racial composition was: 32% Hispanic, 31% White, 30% Black, 4.3% Other, 2.9% Asian. The median time to decannulation was 2.3 years (95% CI, 2.0 to 2.7 years). The 5 year decannulation rate was 49% (95% CI 40% to 57%) The median time to death was 6.9 months (95% CI 4.8 months to 1.3 years) and the 5 year survival rate after tracheostomy was 77% (95% CI, 69% to 83%). The log rank test showed no significant differences among racial groups for decannulation ($P = .168$) or death ($P = .920$). Additional investigation with the Cox proportional hazard regression showed that decannulation and death probabilities were equal after controlling for age, sex, prematurity, and ventilation dependence. The neurocognitive disability was deemed normal in 39 (12%), moderate, $n=138$ (44%), and severe in 137 (44%) among the survivors with no racial differences ($P = .921$). **Conclusions:** Among a cohort of pediatric tracheostomy patients, the decannulation and mortality rates were similar across racial and ethnic groups. Also, the neurocognitive disability was moderate to severe among most of the survivors.

184. Safety and Efficacy of Adenotonsillectomy for Obstructive Sleep Apnea in Children and Young Adults with Prader-Willi Syndrome: A Systematic Review

Anna Christina Clements, BS, Baltimore, MD; Jonathan M. Walsh, MD, Baltimore, MD; Xi Dai, BA, Baltimore, MD; Stella M. Seal, MLS, Baltimore, MD; Marisa A. Ryan, MD MPH, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the safety and efficacy of adenotonsillectomy for obstructive sleep apnea in young patients with Prader-Willi syndrome.

Objectives: Prader-Willi syndrome (PWS) increases the risk of obstructive sleep apnea (OSA) due to obesity and hypotonia. Patients with PWS and OSA may have more complications and residual OSA after adenotonsillectomy. We reviewed the existing literature on this topic. **Study Design:** A systematic review in accordance with PRISMA guidelines. **Methods:** PubMed, Embase, Cochrane, Web of Science, and Scopus databases were searched. Two researchers independently reviewed studies about adenotonsillectomy to treat OSA in patients <21 years old with PWS. Data on study design, number of patients, patient age, complications, polysomnography, and quality of life (QOL) were extracted. The Methodological Index for Nonrandomized Studies (MINORS) criteria were applied to assess study quality. **Results:** The search yielded 169 studies. Screening of titles/abstracts excluded 58 and full text evaluation excluded 20 more. Eight studies with variable risk of bias were included. A total of 68 patients were included. Six of the studies reported on complications and 24% of patients had at least one, including supplemental O2 support, hemorrhage or velopharyngeal insufficiency. Velopharyngeal insufficiency was the most commonly reported. Among 53 patients with postoperative polysomnograms 19% had resolution of OSA. Two studies evaluated QOL and both demonstrated postoperative improvement. **Conclusions:** Young patients with PWS undergoing adenotonsillectomy for OSA have a substantial risk of postoperative complications that may require additional interventions, especially velopharyngeal insufficiency. Despite improvements in polysomnography and QOL after surgery, most patients had residual OSA. This information can be used to counsel patients with PWS and their families when considering treatment options for OSA.

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185. Cranial Venous Thrombosis Secondary to Pediatric Otolaryngologic Infection

Margaret I. Engelhardt, MD, Minneapolis, MN; Noel Phan, MD, New York City, NY; Hanan Zavala, MS, Minneapolis, MN; Sivakumar Chinnadurai, MD, Minneapolis, MN; Brianne B. Roby, MD, Minneapolis, MN

Educational Objective: At the conclusion of this presentation, the participants should be able to better understand the presentation and management of cranial venous thrombosis secondary to pediatric otolaryngologic infections. Common infectious sources, thrombosis site location, and risk factors for surgery and longer length of stay will be discussed.

Objectives: Cranial venous thrombosis is a rare but potentially devastating complication of childhood ear, nose, and throat infections. Our study sought to review the presentation and management of thrombosis secondary to these infections. **Study Design:** Retrospective chart review was performed of all pediatric patients with otolaryngologic infections complicated by cranial venous thrombosis at a tertiary children's hospital 2007-2018. **Methods:** Patient demographics, presentation, infection sites, location of thrombosis, hospital length, and surgical interventions were assessed. **Results:** Thirty-three patients (14 females, 19 males) met inclusion criteria. The most common infection source was otologic (n = 20), followed by sinonasal (n = 9), and neck (n = 4). The most common site of thrombosis secondary to ear pathology was the sigmoid sinus (n = 16). The ophthalmic veins were the most common site of thrombosis for sinonasal infections (n = 7). Twenty-three subjects (70%) required surgical intervention greater than myringotomy. Those who required surgery had significantly greater WBC on admission than those who did not (17.0 ± 7.3 v 13.8 ± 3.0 , $p = 0.04$). Younger patients (<11 years) had longer length of stay than those who were older (13.25 ± 7.2 v 8.0 ± 3.1 days, $p = 0.043$). Nerve palsy was observed in eleven patients (33%), all of whom required surgery. **Conclusions:** Cranial venous thrombosis resulting from contiguous otolaryngologic infection is a serious complication requiring proper recognition and management. The involved vasculature and cranial nerve findings are dependent on the anatomic location of the underlying infection. Cranial neuropathies in the presence of these infections should prompt evaluation for possible thrombosis.

186. Readability Analysis of Pediatric Patient Reported Outcome Measures

Zainab Farzal, MD MPH, Chapel Hill, NC; Christina Dorismond, MPH, Chapel Hill, NC; Nicholas J. Thompson, MD, Chapel Hill, NC; Saangyoung E. Lee, BS, Chapel Hill, NC; Carlton J. Zdanski, MD, Chapel Hill, NC

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the readability grading of pediatric patient reported outcome measures (PROMs). Health literacy experts recommend 6th grade reading levels for all PROMs.

Objectives: Pediatric/adolescent patient reported outcome measures (PROMs) should take caregiver or adolescent readability into account. Health literacy experts recommend 6th grade reading level for PROMs. The objective of this study was to assess reading levels of otolaryngology specific PROMs and whether they meet this criterion. **Study Design:** Descriptive review. **Methods:** Non-copyrighted pediatric otolaryngology PROMs were reviewed. Three readability metrics were used: Gunning Fog, Simple Measure of Gobbledygook (SMOG), and FORCAST. Readability levels determined by each metric and mean readability levels across all three metrics were calculated for each PROM. **Results:** Thirteen PROMs were included on conditions including hearing loss (2), obstructive sleep apnea (3), otitis media (3), pinnaplasty (1), throat disorders (1), and voice disorders (3). The majority of PROMs were intended for caregiver administration (12/13). Mean readability level for all PROMs combined across the three metrics was 9th grade (readability score of 8.9). No individual PROM met 6th grade readability criterion when averaged across the three grading metrics. Six of 13 PROMs (46%) met 6th grade readability criterion on Gunning Fog assessment, the least stringent of the three readability metrics. **Conclusions:** Overall, pediatric/adolescent PROMs are written at a higher readability level than recommended by health literacy experts which may result in imprecise assessment of disease related quality of life particularly among patients/families from lower socioeconomic strata. Considering readability in development of future PROMs will be essential in ensuring equity in healthcare delivery.

187. Otolaryngologic Sequelae in Children with Low Gestational Age

Zaroug A. Jaleel, BS, Boston, MA; Rita Y. Wang, BS, Boston, MA (Presenter); Michelle C. Hsu, MS, Boston, MA; Jessica R. Levi, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the otolaryngologic sequelae associated with prematurity when compared to presenting children born at term.

Objectives: The length of time between conception and birth, gestational age (GA) is an important predictor for neonatal and early childhood health. However, current literature lacks a comprehensive overview of the otolaryngologic sequelae of prematurity. **Study Design:** Retrospective case control study. **Methods:** A study on pediatric patients aged 0-18 presenting to an otolaryngology clinic from 2012-2018 was conducted (n=5352). Patients were divided into four GA categories (<= 28 weeks, 28-32 weeks, 32-37 weeks, >= 37 weeks) and grouped according to their primary diagnosis into five otolaryngologic diagnostic categories: otologic, sinonasal, laryngeal, congenital malformations, and obstructive sleep apnea. The odds ratio of GA and its association with each diagnostic category was determined. **Results:** When adjusted

for age at visit, sex, and birthweight, patients with low GA (<37 weeks) were found to have significantly higher rates of otologic conditions overall than presenting children born at term (e37 weeks) ($p < 0.001$). This trend was noted across all GA categories when compared to patients born at term, with d28 weeks (adjusted odds ratio (aOR) 2.25 [95% CI: 1.45-3.51]), 28-32 weeks (aOR 2.05 [95% CI: 1.430-2.936]), and 32-37 weeks (aOR 1.34 [95% CI: 1.078-1.669]). Similarly, low GA overall (<37 weeks) was associated with higher rates of laryngeal disorders ($p < 0.0312$). However, this trend was not noted in the individual GA categories for laryngeal disorders. **Conclusions:** Children born preterm presenting to an otolaryngology clinic were more likely to be diagnosed with an otologic or laryngeal disorder than the children born at term. These results suggest a correlation between prematurity and otologic and laryngeal pathology.

188. First Branchial Cleft Cyst with Duplicate EAC Attached to the Facial Nerve: A Case Report and Review of the Literature

Aron Kandinov, MD, Newark, NJ; Mayand Vakil, MD, Newark, NJ; Evelyne Kalyousef, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the incidence, basic embryology, and surgical management of this disorder.

Objectives: First branchial cleft cysts (FBCC) are challenging entities to diagnose and to treat. Here we describe a unique case of a type II anomaly with duplicate external auditory canal (EAC) adherent to the facial nerve deep. **Study Design:** Case report and Review of Literature. **Methods:** N/A. **Results:** A 14 year old girl presents with a congenital left cheek mass, which had subtly grown over the years. CT and MRI showed a 3.0x3.1x3.7cm parotid mass, read as a lipoma. Intraoperatively, a well circumscribed encapsulated cystic mass was identified at the tail of the parotid. At the superior most extent of the mass, just deep and medial to the main trunk of the facial nerve there was a cartilaginous portion which formed a duplicate EAC. There was no communication with the normally located EAC lumen. Complete resection of the duplicate EAC could not be safely accomplished due to its proximity and attachment to the facial nerve. Pathology and cytology confirmed the benign diagnosis of type II first branchial cleft cyst. Postoperatively the facial nerve function was intact. Branchial cleft anomalies are the second most common congenital neck mass; however, ones originating from the first cleft are rare, compromising only 1% of all branchial anomalies. Of this small number of FBCCs, 8% were seen with an EAC duplication surrounding the facial nerve. **Conclusions:** Type II FBCCs are often misdiagnosed due to their rarity, varied presentation, and nonspecific radiographic appearance. Treatment is complete resection; however, due to their close association with the facial nerve, that may not always be possible.

189. The Value of Pre-Decannulation ICU Observation for Pediatric Patients

Kevin J. Karlic, BS, Ann Arbor, MI; Nico M. Espinosa, BS, Ann Arbor, MI; Brittany E. Fleming, MS, Ann Arbor, MI; Jennifer L. Helman, MSN, Ann Arbor, MI; Kelly A. Krawcke, BSN, Ann Arbor, MI; Aaron L. Thatcher, MD, Ann Arbor, MI

Educational Objective: At the conclusion of this presentation, the participants should be able to understand and discuss the value of pre-decannulation ICU observation for determining decannulation readiness in pediatric patients.

Objectives: Despite pediatric decannulation failure rates ranging from 6.5%-21.4%, there remains significant variability among decannulation protocols. Published decannulation protocols incorporate various ambulatory and inpatient readiness tests; however, there remains a paucity of literature investigating the efficacy and value of these methods. **Study Design:** Single center retrospective cross-sectional study. **Methods:** Using ICD-9 codes, all pediatric patients age 0-17 years with a tracheostomy between July, 2013 and July, 2018 were identified. During the specified timeframe, 125 patients attempted decannulation for a total of 126 attempts. Patients undergoing major airway reconstruction immediately prior to decannulation were excluded, resulting in 105 eligible attempts. Descriptive outcome statistics were calculated. **Results:** Of the 105 eligible attempts, 75 included overnight pre-decannulation ICU observation, while 30 did not. Subsequent rates of successful decannulation were 97.33% (73/75) and 100.00% (30/30), respectively. The pre-decannulation ICU observation passing rate was 98.67% (74/75) despite a complication rate, defined as clinically significant oxygen desaturations, of 5.33% (4/75). 98.08% (102/104) of decannulated patients were monitored inpatient for a minimum of 24 hours post-decannulation. **Conclusions:** With a 24hr ICU observation estimated at \$2188 for room and board alone and similar rates of successful decannulation among both groups, pre-decannulation ICU observation is a low value, high cost item; especially in the setting of post-decannulation inpatient observation. We advocate that ambulatory testing may be sufficient to supplement physicians' perceived readiness for decannulation and that pre-decannulation ICU observation does not contribute significantly to decannulation readiness protocols.

190. Chronic Rhinitis among Chinese American Children

So Un Kim, BS, Boston, MA; Andrew R. Scott, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the effects of treatment and presentation among Chinese American children with chronic rhinitis in an urban setting.

Objectives: To examine the presentation and management of chronic rhinitis within a Northeastern inner city Chinese

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American pediatric population. **Study Design:** Retrospective, single center study. **Methods:** Case series and chart review of patients diagnosed with chronic rhinitis between 2009 and 2018 at a pediatric otolaryngology clinic in an urban, tertiary medical center. **Results:** 71 Chinese American patients were evaluated for symptoms of chronic rhinitis, with approximately half (52.1%) of the patients presenting at age 6 years or younger. Approximately half (54.1%) of patients reported at least some objective improvement in symptoms after two or more weeks of once daily intranasal steroid administration. Approximately 30% of patients underwent adenoidectomy, however symptom relapse was common (70.0%). Of 71 children, 40 patients underwent an allergy evaluation. Among the patients who had the RAST testing done (n=29), 75.9% of the patients had a positive result, with the most common allergens being D. farina (48.3%) and house dust (48.3%). Among the patients who had skin prick testing done (n=15), 80.0% of the patients had a positive result, with the most common allergens being Mite Dfar (66.7%) and Mite Dpter (66.7%). **Conclusions:** This Northeastern urban Chinese American population studied herein was consistently affected by perennial allergic rhinitis. Adenoidectomy and intranasal steroids had a modest benefit on symptom relief. Our results suggest that the allergen profile for chronic rhinitis in Chinese children living in the Northeastern U.S. may more closely resemble that of children residing in China as compared to the allergen profile of non-Chinese American children living in the Northeastern U.S.

191. Capillary Blood Gas Screening and Hypoventilation in Infants with Pierre Robin Sequence

James T. Kwan, BSE, Boston, MA; Andrew R. Scott, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the utility of capillary blood gas testing in screening for hypoventilation in infants with Pierre Robin sequence.

Objectives: To describe the use of capillary blood gas (CBG) values as a quantifiable and objective measurement for hypoventilation in infants with Pierre Robin sequence (PRS). **Study Design:** Retrospective case control study at an urban, tertiary, pediatric medical center. **Methods:** Charts of 39 infants with PRS over an 8 year period were examined. HCO₃ (reference range: 21-37 mEq/L) and CO₂ (reference range: 34-64 mmHg) levels obtained through CBG sampling were examined. **Results:** The nonoperative group mean HCO₃: 25.9 mEq/L (n=11; 95% CI: 23.5 - 28.3); mandibular distraction osteogenesis (MDO) group mean HCO₃ between day of life (DOL) 1-6: 27.1 mEq/L (n=28; 95% CI: 23.8 - 30.3; p=0.04) and DOL 7-14: 30.9 mEq/L (n=28; 95% CI: 28.4 - 33.2; p<0.00001). Mean CO₂ in the nonoperative group: 44.0 mmHg (n=11; 95% CI: 40.0 - 48.1); mean CO₂ in MDO between DOL 1-6: 46.2 mmHg (n=28; 95% CI: 39.8 - 52.5; p=0.04) and DOL 7-14: 52.0 mmHg (n=28; 95% CI: 45.5 - 58.5; p<0.00001). Receiver operating characteristic curves for identifying MDO candidates between DOL 1-30 were created for mean HCO₃ and CO₂. HCO₃ cutoff: 30 mEq/L with sensitivity=64.7%, specificity=100%, AUC=0.647. CO₂ cutoff: 50 mmHg with sensitivity=75%, specificity=100%, AUC=0.75. MDO candidates crossed HCO₃ cutoffs at a mean of 6.9 days and CO₂ cutoffs at a mean of 8.6 days. **Conclusions:** Neonates with PRS may benefit from the incorporation of CBG into the preoperative workup for determining surgical intervention for objective hypoventilation in infancy. By DOL 7, respiratory acidosis with compensatory metabolic alkalosis may be apparent.

192. Narcotic Usage in Post-Pediatric Tonsillectomy Management and Opioid Disposal

Brittany A. Leader, MD, Cincinnati, OH; Barbara A. Rich, RN, Cincinnati, OH; Matthew M. Smith, MD, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the usage rate of narcotics after pediatric tonsillectomy and ways to increase proper narcotic disposal.

Objectives: (1) Examine the amount of narcotics prescribed after pediatric tonsillectomy; (2) determine the usage rate of narcotics after pediatric tonsillectomy; and (3) examine if appropriate narcotic disposal increases with proper parental education. **Study Design:** Retrospective case series of consecutive pediatric patients eligible for narcotic prescription (age 6 and above) after tonsillectomy at a pediatric academic center from March 2019 to June 2019. **Methods:** Narcotics prescribed were a standard 20 doses of oxycodone/Roxicodone. Data collected included age, gender, race, operative technique, narcotic usage and refills, and postoperative complications. All patients were called three weeks after tonsillectomy for a standard interview about pain, complications, narcotic usage, and disposal patterns. **Results:** 198 patients underwent tonsillectomy. The average age was 9.6 years, 110 (55.6%) were female, and 168 (84.8%) were white. 192 (97%) patients were given a narcotic, 180 (93.8%) filled the prescription, 134 (70%) used at least one dose, and 162 (84.4%) had unused narcotics after the recovery period. Of those with unused narcotics, 97 (59.9%) did not dispose of the remaining narcotic. Parents who were instructed regarding narcotic disposal had a greater disposal rate compared to those who were not educated on proper disposal (90% vs 38%). Only 12 (6.3%) patients required a narcotic refill. **Conclusions:** Most children undergoing tonsillectomy do not use the full amount of prescribed narcotics postoperatively. Educational efforts on proper narcotic disposal increases compliance which is critical in the current opioid epidemic, as up to 70% of narcotic abusers report receiving narcotics from a friend or family member.

- 193. Postoperative Fistula Development after Primary Cleft Palate Repair: Experience from Two Institutions**
Grace R. Leu, BS, Boston, MA; Bridget Ebert, BS, Minneapolis, MN; Brianne B. Roby, MD, Minneapolis, MN;
Andrew R. Scott, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the factors associated with palatal fistula development after primary cleft palate repair.

Objectives: To assess the incidence of palatal fistula development at two multidisciplinary cleft centers and identify patient and surgeon characteristics that are predictive of fistula development after primary palatoplasty. **Study Design:** Retrospective chart review. **Methods:** Pediatric patients who underwent a primary cleft palate repair between 2007 and 2017 at two multidisciplinary cleft centers were identified. Primary outcome was the development of palatal fistula requiring palate revision surgery. χ^2 test and logistic regression analysis was performed to evaluate potential predictors of fistula formation. **Results:** From 2007-2017, a total of 477 patients underwent primary cleft palate repairs at two multidisciplinary cleft centers. Thirty children had incomplete charts so 447 of these patients were included in the logistic regression analysis. The incidence of palatal fistula development after primary palatoplasty was 10.2% and 7.5% at the two institutions ($p=0.525$). Controlling for multiple variables, logistic regression analysis showed that Veau IV classification was the strongest predictor of fistula development ($OR=10.582$; $p=0.004$). Repair by a specific surgeon was not found to be significantly associated with fistula development ($p>0.05$ for each surgeon). **Conclusions:** Our analysis demonstrates that Veau IV classification is the strongest predictor of palatal fistula development, even after adjusting for multiple variables, including diagnosis of syndrome, age at time of palate repair, and surgeon performing the repair.

- 194. The Impact of Surgical Approach on an Orbital CSF Leak: A Case Report and Literature Review**
Weston L. Niermeyer, BS, Columbus, OH; David Z. Allen, BA, Columbus, OH; Charles A. Elmaraghy, MD,
Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the approaches for subperiosteal abscess drainage and treatment options for orbital CSF leak in infant pediatric patients by reviewing a unique case.

Objectives: To discuss the management of an iatrogenic orbital cerebrospinal fluid (CSF) leak by illustrating a unique case. **Study Design:** Case report and literature review. **Methods:** We report a case of a pediatric patient who had a transorbital abscess drainage complicated by CSF leak. **Results:** A 5 month old male with history of recurrent periorbital cellulitis presented with increased left eye swelling and erythema. The patient had received a bilateral endoscopic sinus surgery and left medial orbital decompression for a subperiosteal abscess three days prior and was discharged following clinical improvement. New imaging showed persistent opacification of the paranasal sinuses and reaccumulation of the abscess. The decision was made to drain the abscess via orbitotomy, and the oculoplastic surgeon selected an eyelid incision for the surgical approach. A rush of serosanguinous fluid was encountered upon entering the subperiosteal space, and a bony dehiscence with visible dura mater was later identified. In order to repair the defect, the otolaryngologist utilized a 0 degree endoscope to repair the defect with DuraGen, Gelfoam, and Surgicel through the eyelid incision. Neurosurgery was consulted intraoperatively and did not recommend additional intervention. There was no evidence of persistent CSF leak postoperatively or at one month followup. **Conclusions:** Orbital CSF leak is a rare but serious surgical complication. The surgical approach likely contributed to this patient's CSF leak, and the otolaryngologist played a key role in the leak repair. This case serves as a pedagogic tool for avoiding orbital CSF leaks and providing treatment should one occur.

- 195. Steroids for Pediatric Patients with Orbital Cellulitis: A Case by Case Treatment Option at a Pediatric Tertiary Hospital**
Weston L. Niermeyer, BS, Columbus, OH; Sean M. McDermott, BS, Columbus, OH; Patrick C. Walz, MD,
Columbus, OH; Charles A. Elmaraghy, MD, Columbus, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role of steroids in treatment of orbital cellulitis.

Objectives: Characterize the symptoms and management of pediatric patients receiving systemic steroids during inpatient orbital cellulitis (OC) treatment and assess treatment related outcomes. **Study Design:** Single institution retrospective review. **Methods:** A total of 128 pediatric patients receiving treatment for OC secondary to sinusitis from 2008-2018 were evaluated for presenting symptoms, interventions, and visual, infectious, and sinonasal outcomes. **Results:** Fourteen (10.9%) patients received steroids during hospitalization. Patients were treated with 0.10 - 0.50 mg/kg/dose of dexamethasone or 2 - 4 mg/kg/dose of methylprednisolone. At presentation, patients who went on to receive steroids had 3 times the rate of visual acuity changes and 33% greater chance of having decreased extraocular eye muscle movements. Those receiving steroids had higher rates of endoscopic sinus surgery (71.4% vs 46.5%; $p=0.079$) and orbital decompression (57.1% vs 28.1% $p=0.027$) as well as revision surgery during hospitalization (20.0% vs 3.6%; $p=0.046$). Length of stay was not different between the steroid group and the no steroid group. There was no progression of infection or other reported medical complication in patients receiving steroids. **Conclusions:** Use of steroids in OC remains controversial

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due to varying opinions on anti-inflammatory and immunocompromising properties of these medications. In this study, patients receiving steroids had higher rates of ocular symptoms on presentation and need for surgical intervention. Length of stay was not different between the groups despite a higher rate of revision surgery in those receiving steroids. This topic requires further investigation as otolaryngologists play a key role in the management of OC.

196. Role of Adenoidectomy in Provision of Secondary Tympanostomy Tube Placement

Anthony M. Padgett, BS, Memphis, TN; Andrew J. Maroda, MD, Memphis, TN; Anthony M. Sheyn, MD, Memphis, TN

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the role and potential benefits of concurrent primary adenoidectomy during initial tympanostomy tube placement in the reduction of secondary tympanostomy tube placement.

Objectives: To explore the rate of recurrence for tympanostomy tube (TT) placement in children who underwent concurrent primary adenoidectomy vs. initial TT placement alone. **Study Design:** Retrospective cohort study. **Methods:** By recording each TT procedure performed at a single tertiary academic children's hospital over the course of 45 months (September 2015 - June 2019), we were able to determine the rate of recurrence among each subject group. Of the patients who underwent primary adenoidectomy, we further stratified patients based on age (<4 years old vs. 4 years and older) to assess any differences in outcomes. The senior author primarily utilized coblation technology for adenoidectomy procedures. **Results:** In this cohort of 1,640 subjects, we determined that 10.67% of patients who underwent initial TT placement with concurrent primary adenoidectomy required repeat TT placement, while 28.8% of patients receiving TT placement alone required repeat TT placement ($P < 0.0001$). Moreover, there was no significant difference in TT recurrence rate amongst patients who received primary adenoidectomy when controlling for age ($P = 0.266$). **Conclusions:** Our findings support that concurrent primary adenoidectomy performed in pediatric patients at the time of initial tympanostomy tube placement results in a statistically significant reduction in the need for repeat TT placement. Given the substantial direct and indirect financial burdens of recurrent otitis media and TT placement in the United States, this data and future studies may be used to influence clinical practice guidelines in more readily considering provision of concurrent primary adenoidectomy with initial TT placement in pediatric patients.

197. Adenoidectomy: Inpatient Criteria Study

Ravi N. Patel, BA, Hempstead, NY; Neha A. Patel, MD, Queens, NY; Guillaume J. Stoffels, MA MS, Queens, NY; Joshua B. Silverman, MD PhD, Queens, NY; Lee P. Smith, MD, Queens, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to demonstrate an understanding of common complications after adenoidectomies, major comorbidities that affect postoperative intervention rates and the reasoning behind the guidelines suggested in the study.

Objectives: Current practices for admission for overnight observation after an adenoidectomy alone vary from hospital to hospital, as there are currently no studies that provide evidence for overnight observation criteria. The objective of this study is to determine any relationships between risk factors and postoperative complications or interventions in patients under 2 years old who undergo adenoidectomy and use this data to form a set of guidelines that may be used to stratify patients for inpatient observation. **Study Design:** Consecutive pediatric adenoidectomy without tonsillectomy cases in children younger than 2 years old with subsequent inpatient observation from January 2014 to October 2018 were reviewed at a single tertiary children's institution using electronic medical records. **Methods:** Patient demographics, surgical data, and comorbidities were analyzed for correlations with postoperative complications or interventions. **Results:** Out of the 76 patients with sleep disordered breathing (SDB) examined, one patient (1.3%) required readmission for postoperative dehydration and seven patients (9.2%) required intervention. The presence of at least one major comorbidity was significantly associated with increased incidence of complication or intervention compared to patients with no major comorbidities (18.9% vs. 2.6%, $p = 0.03$). Specifically, O₂ nadir <80% ($p = 0.01$), craniofacial syndrome ($p = 0.01$) and seizure history ($p = 0.007$) were significant factors of complication or intervention. **Conclusions:** Otherwise healthy children (>18 month old) with SDB should be considered for discharge the same day of surgery. Children younger than 2 years old with one or more major comorbidities may benefit from overnight inpatient observation. Otherwise healthy children who are younger than 18 month old or children with a history of RAD or CLD should be managed on a case by case basis.

198. Management and Impact of Pediatric Deep Neck Space Infections

Jackson R. Randolph, BS, Tampa, FL; Sabreen K. Aulakh, BS, Tampa, FL; Sarah Azari, BS, Tampa, FL; Ski K. Chennupati, MD, Allentown, PA

Educational Objective: At the conclusion of this presentation, the participants should be able to compare surgical versus nonsurgical management of pediatric deep neck space infections and discuss the growing incidence of disease.

Objectives: Management of pediatric deep neck space infections (DNSIs) remains up to clinical discretion without clear guidelines on surgical versus nonsurgical intervention. National demographics and disease burden statistics are limited.

The purpose of this study is to identify risk factors for surgical management and to further characterize the incidence of DNSIs. **Study Design:** Retrospective data set review. **Methods:** A review of the 2016 National KIDS' Inpatient Database for pediatric patients diagnosed with either retropharyngeal, parapharyngeal, peritonsillar, or other pharyngeal abscesses identified 6,246 patients. Demographic data and procedural data were collected. Chi-square tests and odds ratio statistics were performed for dehydration, gender, dysphagia, asthma, streptococcus infection, leukocytosis, lymphadenitis, and sepsis in order to compare procedural versus non-procedural intervention. **Results:** Of the 6,246 patients, 3,368 (53.9%) were male and 2,878 (46.1%) were female with two patients missing this data. The estimated incidence of hospitalized DNSIs was 8.5 per 100,000 children, increasing from previous reports. Mean age at admission was 10.2. Patients with dysphagia and sepsis were statistically more likely to have surgical intervention ($p=0.024$ and 0.008 , respectively). In contrast, those patients with dehydration and lymphadenitis were more likely to receive non-procedural intervention ($p=0.016$ and 0.021 , respectively). Those patients who underwent surgical intervention had significant increases in mean length of stay and total charges ($p<0.0005$). **Conclusions:** Increased number of admissions and incidence for pediatric DNSI's may indicate growing antibiotic resistance or greater virulence of neck infections. Early identification of risk factors leading to surgical intervention may help guide treatment. Further studies regarding management in this population is necessary.

199. Evaluation of Late Onset Hearing Loss among Pediatric Patients with Tracheostomies

Andres Urias Rivera, BS, Dallas, TX; Rachel St. John, MD, Dallas, TX; Kenneth Lee, MD PhD, Dallas, TX; Romaine F. Johnson, MD MPH, Dallas, TX

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the rates of delayed hearing loss in infants with tracheostomies.

Objectives: 1) To evaluate the prevalence of late onset hearing loss in a high risk population; and (2) to calculate the time to hearing assessment after tracheostomy to determine if the Joint Committee on Infant Hearing (JCIH) guidelines are being met (36 months for at risk and 6 months or at higher risk). **Study Design:** Retrospective case series. **Methods:** We conducted a retrospective analysis of pediatric patients with a tracheotomy and determined if they were "at risk" (e.g., NICU stay > 5 days), or "at higher risk" (e.g., birth weight < 1500 grams) for late onset hearing loss. We also determined the time to hearing assessment using the Kaplan Meier method. **Results:** This study included 198 patients. 129/198 (65%) were at higher risk for late onset hearing loss. The most common risk for at risk for late onset hearing loss was NICU stay > 5 days (98%) and for higher risk was birth weight < 1500 grams (35%). 40% (92/198) had hearing loss, including 25% with sensorineural hearing loss. The proportion obtaining their six month hearing assessment was 41% for at risk and 50% for at higher risk. The 36 month hearing assessment rate was 82% and 91% respectively. The log rank test of equality was not significant between the two groups, $p = .28$. **Conclusions:** This study found among pediatric patients with a tracheostomy, 25% had a sensorineural loss, and there was no difference in time to hearing assessment between "at risk" and "at higher risk" patients. This finding suggests that many patients are not meeting JCIH screening criteria and represents an opportunity for quality improvement.

200. A Rare Case of Tympanostomy Tube Otorrhea: Pigmentiphaga

Samuel J. Rubin, MD MPH, Boston, MA; Claire M. Lawlor, MD, Washington, DC; Gi S. Lee, MD EdM, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to explain the natural history of the bacteria pigmentiphaga and presentation and management in tube otorrhea.

Objectives: Understand the natural history of the bacteria genus pigmentiphaga and presentation and management in a case of tympanostomy tube otorrhea. **Study Design:** Case report. **Methods:** Case report. **Results:** Tympanostomy tube otorrhea (TTO) is a common complication of tympanostomy tubes. The most common bacteria that cause TTO include haemophilus influenza, moraxella catarrhalis, and streptococcus pneumoniae, staphylococcus aureus, and pseudomonas aeruginosa. Current guidelines recommend topical otic antibiotics for management of TTO rather than oral antibiotics. We present the first case of a 9 year old female patient with a history of 22 q. 11 syndrome, hemifacial microsomia, tetralogy of Fallot, hearing aid dependent with profound sensorineural hearing loss in the left ear and moderate conductive hearing loss in the right ear, who presented with TTO caused by the bacteria pigmentiphaga daeguensis/kullae, a bacteria often found in soil. This patient's otorrhea did not respond to ciprofloxacin/dexamethasone (Ciprodex) drops, because this bacteria is resistant to ciprofloxacin, but rather required multiple doses of intramuscular ceftriaxone for management of TTO. **Conclusions:** We describe the natural history, presentation, and management of a case of TTO caused by a rare bacteria from the genus pigmentiphaga.

201. Transoral Vestibular Endoscopic Thyroglossal Duct Cyst Excision

Marisa A. Ryan, MD MPH, Baltimore, MD; Jonathan M. Walsh, MD, Baltimore, MD; Desi P. Schoo, MD, Baltimore, MD; Jonathon O. Russell, MD, Baltimore, MD

Educational Objective: At the conclusion of this presentation, the participants should be able to describe the indications, risks, benefits and approach of a transoral vestibular endoscopic modified Sistrunk procedure as an alternative to

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transcervical surgery.

Objectives: Thyroglossal duct cysts (TGDCs) are relatively common congenital midline neck masses treated with surgical excision to prevent infection and a small risk of malignancy. TGDCs are traditionally removed with any associated tract and the central portion of the hyoid through an anterior neck incision as described by Sistrunk. Some patients want to avoid this external neck scar. We describe details of a three port transoral vestibular endoscopic excision of a TGDC and central hyoid in an adolescent. This is the first report of this approach for a TGDC. **Study Design:** Description of a case and surgical technique. **Methods:** A 16 year old male presented with a TGDC. Radiographic images, an alternative surgical approach and the outcome are described. **Results:** An MRI showed a 1.1x1.1x0.6cm T2 intense mass overlying the left thyroid ala and hyoid. A transoral vestibular endoscopic excision of the TGDC, associated soft tissues, and central hyoid was performed without complication. Midline gingivobuccal and oral commissure incisions were made to access the submental subplatysmal pocket. A 10mm endoscope was placed through the central port; laparoscopic instruments including a Maryland dissector and Harmonic shears were used in the lateral ports for tissue dissection. The Sonopet ultrasonic aspirator efficiently divided the hyoid allowing for an en bloc excision of the hyoid and cyst. Pathology confirmed a TGDC. He had an excellent functional and cosmetic result. **Conclusions:** We propose that TGDCs can be safely and completely removed without a neck scar in appropriate patients, including pediatric patients, by using a transoral vestibular endoscopic approach to a modified Sistrunk operation.

202. Surgical Treatment and Outcomes of Head and Neck Keloid in the Pediatric Population

Syed H. Sagheer, BS, Orlando, FL; Timothy M. Maul, CCP PhD, Orlando, FL; Julie L. Wei, MD, Orlando, FL

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the practice variation in pediatric keloid treatment and compare the use of the Kenalog injections.

Objectives: The study objectives are to (1) describe practice pattern variation in the surgical treatment of keloids by ENT surgeons in a single practice and hospital; (2) demonstrate whether Kenalog treatment at the time of surgical excision and postoperatively may decrease recurrence; and (3) identify other potential factors that may predict or influence keloid recurrence. The primary outcome measure looked at recurrence rates of keloids. **Study Design:** Retrospective cohort study and cross sectional survey. **Methods:** Review of all keloid patients seen and treated from January 2013 to October 2018 at a single children's hospital. **Results:** Thirty-six patients were identified with 21 (58%) females. Median age was 14.6 years. Ear keloid was found in 92%, with 61% involving the ear lobe. Half (50%) were African American, 11 (31%) were Hispanic. A majority (72%) had ear piercing. Family history was reported in 5 (14%). Most were unilateral (62%: 31% left, 44% right) and on posterior earlobes. Kenalog was injected preoperatively in 1 (3%) and intraoperatively in 67% of cases with surgical excision. The median number of followups was 2.0 (IQR 1- 3). Postoperative Kenalog injection was performed in outpatient clinics in 67% of patients. Followup contact was made in 47%, and of those recurrence was reported in 41%. There was no statistically significant difference in any patient factor or treatment factor that was associated with reported recurrence. **Conclusions:** Pediatric keloids appear to present following ear piercing, predominantly in African American and Hispanic patients. Despite combined therapy of surgical excision and Kenalog injection, recurrence is still possible.

203. A Rare Case of Pediatric Intranasal Lobular Capillary Hemangioma

Sam D. Schild, MD, Brooklyn, NY; Rachel T. Irizarry, MD, Brooklyn, NY; Ann W. Plum, MD, Brooklyn, NY

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the pathology, diagnosis, and management of intranasal lobular capillary hemangiomas (LCH) and consider it in their differential diagnosis of pediatric intranasal vascular tumors.

Objectives: Pediatric nasal cavity vascular tumors express a wide variety of pathologies. Lobular capillary hemangioma (LCH) is an acquired benign vascular growth of skin and mucosa whose etiology remains unknown, though trauma and hormonal influences are implicated. Although well documented in the head and neck literature for children age five or less, it is a rarity within the nasal cavity and has yet to be documented in the midseptum. We describe a unique case of intranasal LCH and review the current literature. **Study Design:** Case report. **Methods:** Case report with review of literature. **Results:** A nine year old male presented with one week of profuse intermittent unilateral epistaxis and no history of nasal trauma. Rhinoscopy revealed a pink, pedunculated mass of the right midnasal septum at the bony cartilaginous junction. CT and MRI imaging were consistent with an expansile vascular lesion receiving prominent bilateral sphenopalatine artery supply. Following embolization, en bloc endoscopic surgical excision of the lesion using cold dissection was performed with no bony or cartilaginous involvement noted. The epistaxis resolved following resection. Final histology confirmed the mass as a lobular capillary hemangioma. **Conclusions:** Pediatric intranasal LCH is a rare entity yet warrants consideration in our differential diagnosis of pediatric vascular tumors. Our study indicates these lesions can develop in the midseptum despite the absence of a vascular plexus. Preoperative embolization should always be considered for pediatric nasal cavity tumors due to concern for hemorrhage. Endoscopic wide local excision is an appropriate and effective treatment.

204. How Steep is the Learning Curve? Evaluating the “July Effect” for Pediatric Tonsillectomies/Adenoidectomies

Andria G. Sharma, BA, Newark, NJ; Taylor J. Bostonian, BS, Monroe Township, NJ; Evelyne Kalyoussef, MD, Newark, NJ

Educational Objective: At the conclusion of this presentation, the participants should be able to evaluate the “July effect”, as a possible risk factor for perioperative complications in tonsillectomy/adenoidectomy during first and last academic quarters.

Objectives: To evaluate the “July effect”, as a possible risk factor for perioperative complications in tonsillectomy/adenoidectomy during first and last academic quarters. **Study Design:** Retrospective database review. **Methods:** Tonsillectomy/adenoidectomy outcomes in the Kids’ Inpatient Database (2000-2013) were compared between the first academic quarter (July-September) to the last academic quarter (April-June). The primary outcome was length of stay, and secondary outcomes included postoperative complications. **Results:** There were 5,532 patients who underwent tonsillectomy and/or adenoidectomy during the first academic quarter and 6,024 patients who underwent tonsillectomy and/or adenoidectomy during the last academic quarter. The odds ratio of pulmonary edema postoperatively during the last academic quarter compared to the first academic quarter is 1.68 (P = 0.012). The mean length of stay for the first academic quarter was 1.9074 days compared to 2.0405 days during the last academic quarter (P = 0.000490). There was no significant difference in other postoperative complications (wound disruption, postoperative hemorrhage, postoperative infection, pneumonia, respiratory complications, sepsis, dehydration, mortality). **Conclusions:** In pediatric tonsillectomy/adenoidectomy, there appears to be no July effect. Due to close monitoring of residents during July-September, the July effect may be mitigated. Further studies should be done in order to identify if the increase in length of stay and postoperative pulmonary edema are due to the decrease in attending supervision of residents/interns toward the end of the academic year.

205. Lingual Tonsils in Cine MRI versus Drug Induced Sleep Endoscopy

Michal Trope, MD, Cincinnati, OH; Jenna H. Barengo, BSE, Cincinnati, OH; Eshita Singh, BS, Cincinnati, OH; Robert J. Fleck, MD, Cincinnati, OH; Mohamed A. Mahmoud, MD, Cincinnati, OH; Stacey L. Ishman, MD MPH, Cincinnati, OH

Educational Objective: At the conclusion of this presentation, the participants should be able to understand the roles of drug induced sleep endoscopy and cine MRI for lingual tonsillar hypertrophy evaluation in patients with obstructive sleep apnea.

Objectives: Drug induced sleep endoscopy (DISE) and cine magnetic resonance imaging (cMRI) are used to identify lingual tonsillar hypertrophy (LTH) in patients with obstructive sleep apnea. Our aim was to compare lingual tonsil findings on DISE and cMRI to assess the relationship between LTH, body mass index percentile (%BMI), gastroesophageal reflux (GERD) and Down syndrome (DS). **Study Design:** Retrospective case series. **Methods:** We included patients undergoing concurrent DISE and cMRI between 5/2015 and 10/2017. LTH was identified by the surgeons performing the DISE and the radiologist reading the cMRI. Regression analysis was conducted to assess associations between LTH, GERD, %BMI and DS. **Results:** We included 48 patients with mean age of 10.75 years [95% CI:9.25-12.25]. Mean %BMI was 79.6 [95% CI:70.73-88.51], 37.5% had DS and 41.7% had GERD. LTH was identified in 9 (25%) patients on cMRI and 29 (80.5%) on DISE (P=0.055). For those with subjective LTH, mean maximal thickness (MTT) was 12.1±7.0mm on cMRI and 6.1±6.2mm on DISE (P=0.015). Surgeons performing DISE identified LTH 56.1%, 55.9% and 50.0% of the time when lingual tonsils were <10mm, <7mm and <5mm on cMRI. DS was associated with LTH on cMRI (P=0.009), but not on DISE (P=0.354). %BMI and GERD were not significant with either modality. **Conclusions:** LTH was identified on DISE at significantly smaller MTT than on cMRI. LTH was also identified far more commonly on DISE, although this difference was not significant. LTH was associated with DS on cMRI and was not identified more frequently in patients with GERD or %BMI.

206. Parental Attitudes toward Opioid Use for Pediatric Otolaryngology Patients

Libby M. Ward, MA, Boston, MA; Yash Prakash, , Boston, MA; Michael B. Cohen, MD, Boston, MA; Jessica R. Levi, MD, Boston, MA

Educational Objective: At the conclusion of this presentation, the participants should be able to understand parental attitudes toward postoperative opioid use for pediatric otolaryngology patients.

Objectives: To determine parental attitudes toward postoperative opioid use for pediatric otolaryngology patients at a safety net, academic medical center. **Study Design:** Descriptive survey. **Methods:** A survey was distributed to parents of pediatric patients undergoing otolaryngology procedures in the preoperative setting assessing demographic information and attitudes toward opioids for postoperative pain management for their children. **Results:** 68 parents anonymously completed the survey. 35% of parents stated they would feel comfortable giving their child opioids to manage pain, 29% stated they would not feel comfortable, and 35% stated they were unsure. Parents who have taken opioids in the past were more likely to feel comfortable giving their child opioids (65%) compared to those who have not (25%) (p=.015). The

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comfort level of parents giving opioids did not differ significantly based on race or education level. The most common reason reported for feeling comfortable giving their child opioids was believing it was necessary. The most common reasons reported for not feeling comfortable giving opioids included beliefs that opioids are addictive, cause harmful side effects, and are too strong for children. 15% of parents reported not knowing what opioids are. **Conclusions:** The majority of parents are either unsure about or do not feel comfortable giving their child opioids for postoperative pain management. Most are specifically concerned about the risk of addiction, side effects, and strength. Understanding parental views on opioids is essential so providers can better plan postoperative pain management in their surgical, pediatric patients.

207. Sleep Endoscopy Findings in Children with Obstructive Sleep Apnea and Small Tonsils

Adrian Williamson, MD, Morgantown, WV; Michele M. Carr, DDS MD PhD, Morgantown, WV;
Steven W. Coutras, MD, Morgantown, WV

Educational Objective: At the conclusion of this presentation, the participants should be able to interpret findings on drug induced sleep endoscopy and to construct a potential operative plan to alleviate the patient's obstruction.

Objectives: Obstructive sleep apnea (OSA) is primarily treated with tonsillectomy and adenoidectomy in children. With small tonsils on clinical exam, the value of T&A in resolving OSA is uncertain and may lead to unnecessary surgery. The aim of this study is to determine the utility of drug induced sleep endoscopy (DISE) for children with OSA and small tonsils (1+). **Study Design:** A retrospective chart review was performed for patients who underwent DISE at a tertiary care center over a 2 year period. Inclusion criteria was 1+ tonsils determined in clinic and during DISE and a positive sleep study or clinical sleep disordered breathing. **Methods:** The group was compiled by reviewing all pediatric patients who underwent DISE over the 2 year period. Data collected included the level of obstruction identified on DISE, BMI, comorbidities and preop PSG data. A common document was used to describe DISE findings. **Results:** 51 children were included with a mean age of 5.8 years (range 8 months-16 years). Mean AHI and oxygen saturation nadir was 6.6 and 86% respectively. The most common contributor to airway obstruction was the adenoid (64%), followed by the tongue base or lingual tonsils (51%). Obstruction secondary to the palatine tonsils (20%), soft palate (14%), epiglottis (18%), or intrinsic to the larynx (10%) were less frequently identified as contributors to OSA. The majority of patients had multilevel obstruction (64%). **Conclusions:** In this group, small palatine tonsils were infrequently identified as a contributor to airway obstruction and tonsillectomy could be avoided in most cases. This study illustrates the utility of DISE as a tool to avoid unnecessary surgery and to personalize the surgical management of pediatric patients with OSA.

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