

MIDDLE SECTION PROGRAM

FRIDAY, JANUARY 21, 2005

- 4:00 - Registration - Grand Ballroom Foyer
8:00
- 4:00 Poster Set Up - Grand Ballroom Foyer
- 4:00 - Speaker Ready Room - Danube
8:00
- 4:00- RESIDENT SEMINAR: CONTRACTING, DOCUMENTING AND CODING
6:00 Dearborn Room
Robert Meyers, MD, Chicago, IL
Timothy Simplot, MD, West Des Moines, IA
Eugene Rontal, MD*, Farmington Hills, MI
- 6:00 Exhibit Hall - Grand Ballrooms IV-V
- 6:00 - Welcome Reception - Grand Ballroom Foyer/Grand Ballrooms IV-V
7:30

SATURDAY, JANUARY 22, 2005

POSTERS ALL DAY--GRAND BALLROOM FOYER

- 7:00 - Registration - Grand Ballroom Foyer
5:00
- 7:00 - Speaker Ready Room - Danube
6:00
- 7:00 - Business Meeting (Members Only) - Riviere Ballrooms A&B
7:45
- 7:00 - Continental Breakfast With Exhibitors - Ballrooms IV-V
7:45
- 7:00 - Exhibit Hall Open - Ballrooms IV-V
4:00
- 8:00 - Spouse Hospitality - Dearborn
11:00
- 8:00 - Scientific Session - Grand Ballrooms I-III
4:10
- 8:00 Welcome and Introduction of President, Patrick E. Brookhouser, MD*,
Omaha, NE
Robert H. Maisel, MD*, Minneapolis, MN
- 8:05 PRESIDENTIAL ADDRESS
Patrick E. Brookhouser, MD*, Omaha, NE
- 8:15 Vice Presidential Citation Awardees
George L. Adams, MD*, Minneapolis, MN
Robert H. Mathog, MD*, Detroit, MI
Frank M. Lassman, PhD, Minneapolis, MN
Joseph Ogura, MD* (Posthumous)
- 8:30 Introduction of Guest of Honor, Robert J. Gorlin, DDS, Minneapolis, MN
Robert H. Maisel, MD*, Minneapolis, MN
- 8:35 GUEST OF HONOR LECTURE
The Filaminopathies: A Group of Disorders of Interest to Otolaryngologists
Robert J. Gorlin, DDS, Minneapolis, MN
- MODERATORS: TIMOTHY L. SMITH, MD MPH*, MILWAUKEE, WI**
- 8:55 FRANCIS LEDERER AWARD FOR CLINICAL RESEARCH
Sensitivity of Surgeon Performed Ultrasound vs. Sestamibi for Preoperative Parathyroid Adenoma Localization
Chad A. Afman, MD+, Cincinnati, OH
David L. Steward, MD*, Cincinnati, OH

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to compare sensitivity of surgeon performed ultrasound to sestamibi for preoperative parathyroid adenoma localization.

OBJECTIVES: To compare the sensitivity of surgeon performed high resolution ultrasound vs. sestamibi for localization of parathyroid adenomas. **STUDY DESIGN:** Historical cohort. **METHODS:** Fifteen patients (15 adenomas and 45 normal parathyroid glands) with biochemically confirmed primary hyperparathyroidism and surgically and histopathologically confirmed parathyroid adenomas undergoing both high resolution in-office ultrasound (10 MHz transducer) by the attending surgeon and sestamibi Tc99 parathyroid preoperative localization studies were included. Patients with parathyroid hyperplasia, or who did not have both preoperative sestamibi and surgeon performed ultrasound, were excluded. Outcome measures included sensitivity, specificity, positive and negative predictive value, for correct site localization (right vs. left side and superior vs. inferior gland). Secondary outcomes included correct side localization. **RESULTS:** All patients had postoperative resolution of hypercalcemia and hyperparathyroidism. Median parathyroid adenoma mass was 500 mg (range 250-8000). Sensitivity for correct site of localization for ultrasound vs. sestamibi was 87% vs. 53% (p=0.01). Specificity was 100% vs. 91% respectively. Positive predictive values were 100% vs. 67%. Negative predictive values were 96% vs. 85%. When analysis was performed for correct side of localization, sensitivity for ultrasound was 87% vs. 67% for sestamibi (p=0.10). When ultrasound and sestamibi were combined, sensitivity was 93% for correct site localization. **CONCLUSIONS:** High resolution ultrasound appears more sensitive than sestamibi Tc99 when performed by the attending surgeon in this cohort of subjects with a relatively small median size of parathyroid adenomas. Further prospective study is needed, but these results suggest that in-office ultrasound may be an effective localization adjunct for surgeons performing focused parathyroidectomy.

9:05 Do Antibiotics Reduce Morbidity of Tonsillectomy: Meta-Analysis of Randomized Trials

Collin M. Burkart, BS, Cincinnati, OH

David L. Steward, MD*, Cincinnati, OH

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to discuss the efficacy of antibiotic therapy to reduce post-tonsillectomy morbidity.

OBJECTIVES: To reconcile conflicting published reports regarding the clinical efficacy of oral antibiotics for reduction of post-tonsillectomy morbidity. **STUDY DESIGN:** Systematic review (meta-analysis). **METHODS:** To critically evaluate the existing evidence we performed a formal meta-analysis of eight randomized controlled trials of oral antibiotics in patients undergoing tonsillectomy or adenotonsillectomy. Reduction in postoperative pain and time to normal activity and diet were studied as distinct endpoints using a random effects model with weighted mean difference (RevMan 4.2). Search strategy included electronic searches of Pub Med and Cochrane library databases; cross referencing textbooks, reviews, and original trials; and contacting experts in the field. **RESULTS:** Subjects treated with post-operative antibiotics experienced an earlier return to a normal diet (-1.22 days; CI95 = -1.97,-0.48; p = 0.001) and an earlier return to normal activity (-0.99 days; CI95 = -1.80,-0.17; p = 0.02). Evaluation of mean pain visual analogue scores (VAS 0-10) over the first five and seven postoperative days failed to demonstrate any significant effect of antibiotic therapy (VAS difference over 5 days = -0.10; -1.96, 1.77; p = 0.92) (VAS difference over 7 days = -0.64; -3.46, 2.18; p = 0.66). **CONCLUSIONS:** The results of this systematic meta-analysis would suggest that post-operative oral antibiotics do not significantly reduce post-tonsillectomy pain, but may result in an earlier return to normal activity and diet by about one day. Given the frequency that tonsillectomy is performed, this possible benefit should be weighed against the cost and potential side effects of routine post-operative antibiotic therapy.

9:13 Cochlear Implants in Infants

Richard T. Miyamoto, MD*, Indianapolis, IN

Derek M. Houston, PhD, Indianapolis, IN

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to discuss the expanded indications for cochlear implants in infants.

OBJECTIVES: With the application of universal newborn hearing screening programs, a large pool of newly identified deaf infants has been identified. The benefits of early intervention with cochlear implants is being explored. Mounting evidence suggests that age at implantation is a strong predictor of language outcomes. However, new behavioral procedures are needed to measure speech perception and language skills during infancy. **STUDY DESIGN:** Longitudinal, single subject repeated measures. **METHODS:** Thirteen infants with profound hearing loss who were implanted between the ages of 6 to 12 months of age participated in this study. Pre-word learning skills were tested using the Preferential Looking Paradigm. The infants' ability to learn associations between speech sounds and objects that moved in temporal synchrony with the speech sounds was measured. **RESULTS:** The results were recorded as mean looking times after the infant had learned to associate an auditory cue with a paired visual cue. Patterns of increased looking times for the very early implanted infants were almost identical to those seen in a control group of normal hearing infants. **CONCLUSIONS:** No surgical or anesthetic complications occurred in this group of infants and the pattern of development of listening skill development mirrors that seen in normal hearing infants.

9:21 Long-Term Outcomes and the Cost Utility of Cochlear Implantation in Patients With Fluctuating and Progressive Hearing Loss

Bradford G. Bichey, MD+, Indianapolis, IN

Richard T. Miyamoto, MD*, Indianapolis, IN

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to discuss the changes in quality of life and the cost utility of cochlear implantation in patients with fluctuating and progressive hearing loss.

OBJECTIVES: This study details our experience with a group of sixty-three patients with fluctuating and progressive hearing loss and explores the improvements in quality of life and cost utility associated with cochlear implantation in these patients. **STUDY DESIGN:** Sixty-three consecutive patients were identified who had fluctuating and progressive hearing loss and who had undergone cochlear implantation. All patients used their cochlear implants for a minimum of two years. **METHODS:** All participants were postlingually deafened and had severe or profound hearing loss. The Ontario Health Utility Index, Mark III was distributed to each patient and scored. Changes in quality of life associated with cochlear implantation were derived by comparison of the health utility index results of each patient both pre-implant and at least two years after implantation. Cost utility measures were then made using discounted costs per QALY (5%) and a sensitivity analysis was performed. **RESULTS:** Patterns in post-implant testing showed no performance change over at least a two year period in all patients. Results from the base case indicate a 0.18 unit gain in health utility from cochlear implantation resulting in a discounted cost per QALY of \$13,887. Sensitivity analysis indicated a gain in health utility of 0.15 resulting in a discounted cost per QALY of \$25,408. **CONCLUSIONS:** This study found a long-term improvement in quality of life associated with cochlear implantation in postlingually deafened patients with fluctuating and progressive hearing loss. These results also indicate a favorable cost utility when compared to published data for other disease states.

9:29 Poster and Paper Discussion

Kathleen Yaremchuk, MD, Detroit, MI

9:40 PANEL: CURRENT TRENDS IN VERTIGO MANAGEMENT

MODERATOR: Samuel C. Levine, MD*, Minneapolis, MN

PANELISTS: Thomas J. Haberkamp, MD*, Chicago, IL

P. Ashley Wackym, MD*, Milwaukee, WI

Richard J. Wiet, MD*, Chicago, IL

MODERATOR: ROBERT C. KERN, MD*, CHICAGO, IL

10:45 RT-PCR for Minimal Residual Nodal Disease in Squamous Cell Head and Neck Cancers Treated With Preoperative Chemoradiation or Radiation Therapy

Tamra M. Knutson, BS, Minneapolis, MN
Suman Setty, MD PhD, Chicago, IL
Chung K. Lee, MD, Minneapolis, MN
Patrick M. Gaffney, MD, Minneapolis, MN
Stefan E. Pambuccian, MD, Minneapolis, MN
George L. Adams, MD*, Minneapolis, MN

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to discuss the potential value of molecular diagnosis of minimal residual disease after radiation/chemoradiation.

OBJECTIVES: To evaluate for minimal residual disease (MRD) by RT-PCR in neck dissections (ND) following chemoradiation or radiation therapy. **STUDY DESIGN:** A retrospective molecular analysis of ND specimens from patients with squamous cell carcinoma (SCC). **METHODS:** Medical records and slides of patients with primary mucosal SCC treated with radiation or chemoradiation and subsequent ND between 1995 and 2002 were reviewed. Histologically tumor free nodes displaying evidence of tumor regression or the largest node was selected. RT-PCR for keratin 5 and SCC antigen was performed on paraffin embedded lymph nodes, with beta-globin as control. Positivity for CK5 and/or SCCA was considered evidence of MRD. **RESULTS:** Molecular analysis was successful in 35 of 44 patients. In the radiation therapy group, 3 of 13 patients had histologically positive nodes and an additional 2 patients had residual disease by molecular analysis. In the chemoradiation group, 7 of 22 patients had histologically positive nodes and an additional 9 patients had positive molecular analysis. The RT-PCR sensitivity was 89%. **CONCLUSIONS:** Despite histologic evidence of tumor regression without identifiable tumor cells, ND may harbor MRD. The higher number of histologically undetected positive lymph nodes in the chemoradiation therapy group is unexpected and may be partially explained by differences in primary tumor location and stage. Alternatively, chemoradiation may be more efficient in tumor destruction, making histologic identification of sparse residual tumor cells more difficult compared to radiation alone. Currently the significance of this high incidence of MRD is unclear, but its presence seems to justify planned ND after radiation or chemoradiation therapy.

10:53 Pathologic Analysis of Neck Dissection Specimens After Concurrent Chemoradiotherapy: Significance of Radiation Dose

Kerstin M. Stenson, MD, Chicago, IL
Elizabeth E. Blair, MD, Chicago, IL
Wendy R. Recant, MD, Chicago, IL
Daniel J. Haraf, MD, Chicago, IL
Everett E. Vokes, MD, Chicago, IL
Louis A. Portugal, MD, Maywood, IL

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to: 1) describe the pathologic findings of nodal contents after induction chemotherapy followed by concurrent chemoradiotherapy; and 2) understand the survival difference between three groups of patients with advanced head and neck cancer who underwent multimodality therapy using three radiation doses.

OBJECTIVES: Concurrent chemoradiotherapy is emerging as one of the most successful treatments for patients with advanced head and neck cancer in terms of organ/function preservation and survival. Although locoregional control is very high with these regimens, distant failure has emerged as a treatment challenge. In an effort to improve distant failure rates, our group recently added induction chemotherapy to the concomitant regimen in order to eradicate systemic micrometastatic disease. Three sequential groups of patients with advanced head and neck cancer have been enrolled (9502a, b, and c). Patients in 9502b were given reduced doses of radiation to grossly uninvolved areas in order to reduce short- and long-term toxicity. Patients in 9502c were given further reductions of radiation. The main objectives of this study are to: 1) compare the pathologic findings of 73 neck dissection (ND) specimens from three groups of patients who have undergone induction chemotherapy followed by concurrent chemoradiotherapy; and 2) discuss and compare the pattern of failure and survival difference between these three groups of patients. **STUDY DESIGN:** Retrospective analysis. **METHODS:** The databases of 221 patients who underwent induction chemotherapy followed by chemoradiotherapy between 1999-2002 were reviewed. Follow-up ranged from 26-70 months. Based on N2a or greater neck disease and absence of pretreatment neck surgery, the neck contents of 73 patients were eligible for analysis (3 N2a, 28 N2b, 21 N2c, 21 N3). Nineteen of 69 patients in 9502a underwent ND, 22/62 in 9502b and 32 of 90 patients in 9502c. **RESULTS:** Forty-three patients underwent unilateral selective ND and 24 underwent bilateral selective ND. Two patients had modified radical ND and 4 had radical ND or MRND with pectoralis myofascial flap placement. There were no wound healing complications. Other complications occurred infrequently (5/73; 6.8%). Pathologic analysis revealed viable cancer in 14 of 73 patients (19.3%): 2 had N2b, 5 had N2c, and 7 had N3 neck disease. Positive pathology (viable cancer) was seen in 1/19 (5.3%) patients in 9502a, 3/22 (13.6%) patients in 9502b and 10/32 (31.3%) patients in 9502c. There were neck recurrences in two patients, one (originally path negative) surgically salvaged. There were total local regional failure in 9 patients, distant failure alone in 17 patients, and local/distant failure in 5 patients. Three year progression-free survival for 9502a and b was 80% and 90% respectively. 9502c two year progression-free survival was 69%. Statistical analysis of these pathologic and survival differences is pending. **CONCLUSIONS:** 1) As radiation doses to grossly uninvolved areas is decreased the percentage of pathologic positive neck dissection specimens increases in patients with advanced head and neck cancer undergoing induction chemotherapy followed by chemoradiation; 2) progression-free survival remains high despite the decreased radiation dose. The attenuated dose may ultimately decrease long-term radiation sequelae; 3) distant failure remains a therapeutic challenge in patients with advanced head and neck cancer; and 4) further immunohistopathologic analyses may elucidate metastatic potential of viable cancer in the chemoradiated specimen.

11:01 The Utility of Positron Emission Tomography (PET) Scanning to Direct Treatment of Head and Neck Cancer

Carol M. Bier-Laning, MD, Maywood, IL
Chad A. Zender, MD, Maywood, IL (Presenter)
Guy J. Petruzzelli, MD PhD, Maywood, IL

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to discuss the indications for PET scanning that appear to be useful in the evaluation and follow-up of patients with head and neck malignancies.

OBJECTIVES: The objective of this study was to review our use of PET scanning in the evaluation of head and neck malignancies to determine how frequently the PET scan affected the treatment plan. **STUDY DESIGN:** Retrospective review. **METHODS:** The medical records of consecutive patients at a tertiary care center over a period of 27 months whose evaluation of head and neck malignancy included a PET scan were reviewed. **RESULTS:** 43 cases of patients with head and neck malignancy or a history of such received a PET scan during our period of review. The indication for PET scanning was either the evaluation of persistent/recurrent disease (22 cases) or the identification of primary or metastatic disease (21 cases). In the former group, the PET scan correctly identified persistent/recurrent disease in 3 cases (3/22, 14%) but CT/MRI was incorrect or only partially correct. In 3 cases (3/22, 14%) PET scanning alone was used with physical exam as evidence of disease-free status with confirmation by follow-up. In the latter group, there were 10 cases of unknown primary tumors (10/21, 48%). None of the primary tumors were identified by PET scan-

ning or CT/MRI, but 3 were identified by panendoscopy and directed biopsies. In 2 cases (2/21, 10%) the PET scan was correct and CT/MRI was incorrect or only partially correct. **CONCLUSIONS:** Our data suggest that PET scanning may have significant utility in the evaluation of persistent/recurrent disease, but does not currently appear to be sufficiently sensitive to supplant panendoscopy with directed biopsies in the evaluation of the unknown primary.

11:09 Acute and Subacute Awake Percutaneous Injection Laryngoplasty for Vocal Paralysis in the Thoracic Surgery Patient

Jonathan R. Grant, MD, Milwaukee, WI
David A. Hartemink, BS, Milwaukee, WI
Nalin J. Patel, MD, Milwaukee, WI
Albert L. Merati, MD, Milwaukee, WI

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to recognize the advantages, limitations, and disadvantages of performing awake injection laryngoplasty in thoracic surgery patients.

OBJECTIVES: The rehabilitation of glottic incompetence by injection laryngoplasty is an important procedure in the management of thoracic surgery patients with vocal paralysis. While the majority of these are performed under general anesthesia, thoracic surgery patients present special considerations in the acute setting which favor percutaneous injection under local anesthesia. The objective of this study is to characterize our experience with this minimally invasive approach in both the acute and subacute settings. **STUDY DESIGN:** Retrospective chart review. **METHODS:** Thoracic surgery patients undergoing injection laryngoplasty were reviewed. Those who were injected in the acute or subacute setting were assessed for demographics, diagnoses, complications, voice and swallowing outcomes. **RESULTS:** 14 patients (12 male, 2 female) underwent percutaneous injection laryngoplasty over a 3 year period. The age range was 18-91 years with the median age of 59.5. 6 injections were performed during their acute hospitalization; 8 were medialized in the subacute outpatient setting. All 14 injections were performed without airway or bleeding complications; 14/14 of the patients' voices were improved by perceptual assessment and patient report. 6 patients suffered from dysphagia prior to injection; 5 of these 6 improved following augmentation. **CONCLUSIONS:** Awake percutaneous injection laryngoplasty can be performed safely in acute and subacute settings for the rehabilitation of glottic incompetence. Many factors must be considered in the management of vocal paralysis complicating thoracic surgery; for patients who cannot tolerate or prefer not to undergo open laryngoplasty or injection under general anesthesia, this procedure offers a safe and effective alternative. The cost savings of this approach is also discussed.

11:17 2004 TRIOLOGICAL SOCIETY THESIS Improving Surgical Wound Healing with Basic Fibroblast Growth Factor After Radiation

David B. Hom, MD*, Minneapolis, MN

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to discuss growth factor potential to improve surgical healing after radiation.

OBJECTIVE: Delayed wound healing in surgical patients who have received previous irradiation continues to be a significant problem. We investigated if radiation decreases basic fibroblast growth factor (bFGF) production in skin and if supplemental bFGF can improve post-surgical soft tissue healing. **STUDY DESIGN:** Experimental study in the porcine skin flap model. **METHODS:** To test if radiation alters bFGF production in skin, semi quantitation of bFGF mRNA was compared in irradiated skin (orthovoltage, 1,300 cGy) and nonirradiated skin using reverse transcription-polymerase chain reaction (RT-PCR). To determine if bFGF can improve post-surgical soft tissue healing, bFGF was given intravenously or intracuticularly. Six weeks later, 108 skin flaps (random and arterial) were created in 27 pigs and monitored over 2 weeks. Tissues were analyzed for flap viability, vascularity, endothelial cell apoptosis by caspase 3 activation and histological analysis. **RESULTS:** Radiation statistically increased endothelial cell apoptosis in porcine skin by 650%. By RT-PCR analysis, radiation reduced bFGF message by 75% in porcine skin. In irradiated tissue, intravenous bFGF significantly increased skin flap viability by 25% compared to controls (p<0.001). Intravenous bFGF also significantly reduced gastrointestinal side effects from irradiation by 50% compared to controls. Also, bFGF treatment induced a trend to decrease endothelial cell apoptosis in irradiated skin. **CONCLUSIONS:** Decreased bFGF production in skin may play an important role in the delayed healing of irradiated wounds. Supplemental intravenous bFGF reduced irradiated soft tissue injury and improved random skin flap viability. More studies are needed to investigate the bFGF effects in irradiated surgical wounds.

11:27 Discussion

11:34 PANEL: CONTEMPORARY MANAGEMENT OF CANCER OF THE LARYNX: CIS TO T4

MODERATOR: Henry T. Hoffman, MD, Iowa City, IA

PANELISTS: Gregory K. Hartig, MD, Madison, WI
Bruce H. Haughey, MD, St. Louis, MO
Kerry D. Olsen, MD*, Rochester, MN

12:25 - Lunch - Riviere Ballrooms

1:40

**MODERATORS: DOUGLAS A. GIROD, MD, KANSAS CITY, KS
THOMAS J. McDONALD, MD*, ROCHESTER, MN**

1:45 FRANCIS LEDERER AWARD FOR BASIC SCIENCE

Loss of Ephrin A2 Expression in a Subset of Acoustic Ganglion Cells After Hair Cell Loss Suggests Its Role in Axon Guidance During Regeneration

Kenneth H. Lee, MD PhD+, St. Louis, MO
Mark E. Warchol, PhD, St. Louis, MO

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to understand that the change in ephrin A2 expression in acoustic ganglion cells after hair cell loss may indicate its role in axon guidance to restore tonotopic innervation after hair cell regeneration.

OBJECTIVES: Hair cell regeneration in the avian cochlea is accompanied by frequency specific reinnervation and recovery of physiologic function. The molecular cues that guide ganglion cells to tonotopically appropriate new hair cells have not been identified. We investigated the potential of the ephrin/Eph family in this process. **STUDY DESIGN:** Ephrin and Eph expression was characterized in hair cells and acoustic ganglion cells of normal and gentamicin treated chick cochleae. **METHODS:** Ephrin and Eph expression in the inner ear was determined by western analysis of total protein isolated from chick cochleae and acoustic ganglia in normal animals. Protein localization was characterized by fluorescence immunohistochemistry in sections of cochlea and acoustic ganglia of normal and gentamicin treated animals. Patterns of ephrin A2 expression in acoustic ganglia were determined during hair cell regeneration. **RESULTS:** Expression of several different ephrins and Ephs were found in inner ear tissue by western analysis. Localization of these proteins by immunofluorescence revealed their presence in hair cells and acoustic ganglion cells in normal chicks. After gentamicin treatment, ephrin A2 expression was lost in a subset of acoustic ganglion cells. The spatial and temporal pattern of ephrin A2 loss coincides with the pattern of hair cell loss and regeneration. **CONCLUSIONS:** The changes in ephrin A2 immunoreactivity in acoustic ganglion cells during cochlear damage and regeneration suggests that ephrin A2 may be involved in the guidance of ganglion cells to tonotopically appropriate hair cell targets during regeneration.

1:55 2004 TRIOLOGICAL SOCIETY THESIS
Effects of Age and Diet on Rat Skin Histology
J. Regan Thomas, MD*, Chicago, IL

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to recognize a skin model from a controlled aging mouse source which both documents changes based on caloric restriction and may be used for comparative studies.

OBJECTIVE: To document age-related histological morphometric changes of rat skin and the effects of caloric restriction on such changes. **STUDY DESIGN:** Fischer 344 rats of three age groups (young: 4 months, adult: 1 year, old: 24+ months) were procured from *ad libitum* (AL) diet and calorie-restricted (CR) colonies of the National Institute of Aging and used for histological study. Each study group consisted of six animals. **METHODS:** Skin samples from the dorsum (DS) and footpad (FP) of these animals were excised and processed for histology with staining techniques for general morphology (hematoxylin-eosin-phloxine) and for differentiation of collagen bundles and elastic fibers (Verhoeff-van Gieson technique). Light microscopic morphometric and stereologic point counting procedures were applied manually to tissue sections to obtain quantitative data on the depth of the epidermis, dermis, and stratum corneum, epidermal nuclear number, and percentage fraction of collagen, elastic fibers, capillaries, and pilosebaceous units. Data were analyzed with two-way of analysis of variance to determine significant effects of age, diet, and age/diet interaction on these parameters in AL rats and their age-matched cohorts. **RESULTS:** Significant effects of age, diet, or age/diet interaction were observed in respect of the thickness of epidermis, dermis, stratum corneum of footpad, epidermal nuclear number, collagen percentage fraction, and area-fraction of capillaries. DS epidermis showed increasing thickness in AL group, but this was reduced in CR rats. A similar trend in DS dermal depth was observed. Fewer capillaries were present in aging CR rats. The DS epidermal nuclear profiles and collagen area-fraction also showed effects of diet and age-diet interaction. Aging changes, especially the effect of CR, was more evident in the measured parameters of dorsal skin. No alterations were observed in the distribution of pilosebaceous units and elastic fiber profiles of the skin. **CONCLUSIONS:** The Fischer 344 rat shows many age-related changes in the skin some of which are different from data reported in literature. The pattern of aging changes in skin parameters was different in the two groups suggesting an influence of caloric restriction. CR seems to modify the aging rate of some skin components, and this may be due to metabolic changes imposed by diet.

2:05 Nasal Valve Surgery Improves Disease-Specific Quality of Life

John S. Rhee, MD MPH, Milwaukee, WI
David M. Poetker, MD, Milwaukee, WI (Presenter)
Timothy L. Smith, MD MPH*, Milwaukee, WI
Andres Bustillo, MD, Miami, FL
Mary Burzynski, RN, Milwaukee, WI
Richard E. Davis, MD, Miami, FL

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to understand and explain the subjective benefit patients obtain in nasal airway obstruction after undergoing a functional rhinoplasty.

OBJECTIVES: Disease-specific quality of life (QOL) assessment of patients with nasal valve compromise and symptomatic nasal obstruction has not been previously studied. The objectives of this study were to determine if surgical treatment of the nasal valve improves disease-specific QOL and to identify clinical or demographic variables predictive of patients' baseline QOL or change in QOL. **STUDY DESIGN:** Prospective, multi-institutional, outcomes study of 20 patients with nasal obstruction and a surgically treatable diagnosis of nasal valve compromise. **METHODS:** Disease-specific QOL assessment was performed using the Nasal Obstruction Symptom Evaluation (NOSE) scale preoperatively (N=20) and at 3 months (N=14) and 6 months (N=20) after surgery. Clinical and demographic data were collected, along with physician reported assessments of degree of nasal obstruction. **RESULTS:** Mean NOSE scores significantly improved from baseline to 3 months after surgery (68.9 versus 20.7, $P < 0.0001$), from baseline to 6 months after surgery (68.9 versus 15.8, $P < 0.0001$), and from 3 months to 6 months after surgery (20.7 versus 15.8, $P = 0.0077$). Physician assessment of degree of nasal obstruction using a visual analogue scale was significantly correlated with baseline NOSE scores ($P = 0.013$) and change in NOSE scores at 6 months ($P = 0.0015$). No other clinical or demographic factors were found to be predictive. **CONCLUSIONS:** In patients with symptomatic nasal obstruction and nasal valve compromise, surgical repair of the nasal valve improves disease-specific QOL. Physician rating of degree of nasal obstruction was found to be significantly correlated with patient reported QOL.

2:13 SECOND PRIZE - FRANCIS LEDERER AWARD

The Use of Caspase Inhibitor to Enhance Ischemic Tolerance of Fasciocutaneous Flaps

Baran D. Sumer, MD+, St. Louis, MO
Brian R. Gastman, MD, Pittsburgh, PA
Bruce H. Haughey, MBChB, St. Louis, MO
Randal C. Paniello, MD MS*, St. Louis, MO
Brian A. Nussenbaum, MD, St. Louis, MO

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to 1) learn that pharmacologic agents can be used to inhibit apoptosis; 2) understand that inhibition of apoptosis using caspase inhibitors increases the primary critical ischemia time of fasciocutaneous flaps; and 3) describe a rat model for studying fasciocutaneous flaps.

OBJECTIVES: In order to demonstrate the significance of apoptosis in ischemia/reperfusion injury to revascularized fasciocutaneous flaps, we tested the hypothesis that pharmacologic inhibition of caspases enhances the tolerance of flaps to primary ischemia. **STUDY DESIGN:** Animal study using adult male Sprague-Dawley rats. **METHODS:** 59 rats were treated with the caspase inhibitor (QVD-OPH) reconstituted in dimethylsulfoxide (DMSO) (n=20, 8 mg/kg:0.8 ml/kg), DMSO alone (n=19, 0.8 ml/kg), or saline (n=20, 0.8 ml/kg). Treatments were given as a single intraperitoneal injection 30 minutes before starting primary ischemia. Epigastric flaps were raised and subjected to increasing ischemia times followed by reperfusion. The flaps were harvested and analyzed 7 days later and judged to be either viable or necrotic. Probit statistical analysis was used to determine the critical ischemia time. This is defined as the time point when 50% of the flaps in each group are expected to survive. **RESULTS:** The calculated primary critical ischemia times were 8.92 hours (95% Confidence Interval 7.19-10.47 hours) for the saline group, 16.35 hours (95% Confidence Interval 11.82-19.89 hours) for the DMSO group, and 21.73 hours (95% Confidence Interval 19.39-25.37 hours) for the DMSO with QVD-OPH group. These differences were significantly different from each other. **CONCLUSIONS:** Pretreatment of fasciocutaneous flaps with a free radical scavenger alone or in combination with an inhibitor of apoptosis significantly increases the flap's tolerance of primary ischemia. The added benefit of the caspase inhibitor suggests that apoptosis plays an important role in ischemia/reperfusion injury in soft tissue flaps.

2:23 THIRD PRIZE - FRANCIS LEDERER AWARD

Distraction Osteogenesis For Cleft Palate Closure In A Canine Model

Robert J. Tibesar, MD+, Rochester, MN
Uldis J. Bite, MD, Rochester, MN
Eric J. Moore, MD, Rochester, MN

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to discuss the application of distraction osteogenesis techniques in a canine cleft palate model. They should demonstrate a comprehension of distraction osteogenesis physiology. Finally, they should explain its possible benefits and limitations as compared to current methods of cleft palate treatment.

OBJECTIVES: This project assesses the utility of distraction osteogenesis (DO) when applied to the closure of a hard palate cleft in a canine model. **STUDY DESIGN:** Animal model. **METHODS:** A midline hard palate cleft was created in ten mature hounds. Two subjects served as controls and had no distraction. In the other 8, a customized DO device and osteotomies were applied to the hard palate. After a 10 day latency, distraction commenced at a rate of 1mm/day. After a consolidation period of 14 days, the device was removed and the mucosa was closed. Each animal was injected with fluorochrome labels, and the hounds were serially sacrificed at 2 week intervals. Gross photographs demonstrate the effects of the surgical intervention. The bone healing was further analyzed with traditional histology and fluorochrome labeling. **RESULTS:** There were no serious complications. Bone resorption and cleft widening occurred in both control animals. Complete bone closure of the hard palate cleft was achieved with DO in 5 of 8 experimental hounds. This was demonstrated with gross postmortem photography and confirmed with histologic analysis. Three experimental hounds had bone resorption and incomplete palatal closure. **CONCLUSIONS:** This project demonstrates that the application of DO techniques in the closure of a hard palate cleft in a canine model is safe and well tolerated. Furthermore, in some cases, it proved to be an effective means of achieving bony closure of the cleft. The results of this study are promising and warrant further investigation into the innovative use of DO in the treatment of children born with cleft palate.

2:33 Poster and Paper Discussion

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

2:44 Break with Exhibitors

3:15 PANEL: TRAUMATIC NOSE, LATE REPAIR FACE FRACTURES, MOH'S DEFECTS AND SCAR REVISION

MODERATOR: J. Regan Thomas, MD*, Chicago, IL

PANELISTS: Peter J. Hilger, MD, Minneapolis, MN
Shan R. Baker, MD, Livonia, MI
Stephen W. Perkins, MD, Indianapolis, IN

4:10 Announcements and Adjournment

6:00 - Meet The Authors Poster Reception - Grand Ballroom Foyer

7:30

POSTERS--GRAND BALLROOM FOYER

7:00 - Registration - Grand Ballroom Foyer
12:00

7:00 - Speaker Ready Room - Danube
12:00

7:30 - Exhibits - Ballrooms IV-V
10:15

7:30 - Business Meeting (Members Only) - Riviere Ballrooms A&B
8:15

7:30 - Continental Breakfast With Exhibitors - Ballrooms IV-V
8:15

8:00 - Spouse Hospitality - Dearborn
11:00

8:15 - Scientific Session - Grand Ballrooms I-III
11:30

8:15 Poster Awards
Robert H. Maisel, MD*, Minneapolis, MN; Marshall Strome, MD*, Cleveland, OH

MODERATORS: GEORGE S. GODING, JR., MD*, MINNEAPOLIS, MN
THOMAS A. TAMI, MD*, CINCINNATI, OH

8:30 2004 TRIOLOGICAL SOCIETY THESIS
Effectiveness of Multilevel (Tongue and Palate) Radio-Frequency Tissue Ablation for Obstructive Sleep Apnea Syndrome
David L. Steward, MD*, Cincinnati, OH

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to describe the effectiveness of multilevel radiofrequency treatment for obstructive sleep apnea.

OBJECTIVE: The primary objective is to determine the effectiveness of multilevel (tongue base and palate) temperature controlled Radiofrequency tissue ablation (TCRFTA) for patients with obstructive sleep apnea syndrome (OSAS). The secondary objective is to compare multilevel TCRFTA to nasal continuous positive airway pressure (CPAP). **STUDY DESIGN AND METHODS:** The study is a controlled case series of one investigator's experience with multilevel TCRFTA for patients with OSAS. Twenty-two subjects with mild to severe OSAS, without tonsil hypertrophy, completed multilevel TCRFTA (mean 4.8 tongue base and 1.8 palate treatment sessions) and had both pre- and post-treatment polysomnography. Primary outcomes included change from baseline in apnea / hypopnea index (AHI), daytime somnolence, and reaction time testing measured 2 to 3 months after TCRFTA. Secondary outcomes included change in other respiratory parameters, OSAS related quality of life, and upper airway size. Comparison of 18 patients treated with TCRFTA for mild to moderate OSAS (AHI > 5 and ≤ 40) is made with 11 matched patients treated with nasal CPAP for mild to moderate OSAS. **RESULTS:** Multilevel TCRFTA significantly improved AHI (p = 0.001), apnea index (p = 0.02), as well as respiratory and total arousal indices (p = 0.0002 and p = 0.01). Significant improvement with moderate or large treatment effect sizes were noted for OSAS related quality of life (p = 0.01), and daytime somnolence (p = 0.0001), with a trend towards significant improvement in reaction time testing (p = 0.06), with mean post-treatment normalization of all three outcome measures. Fifty-nine percent of subjects demonstrated at least a 50% reduction in AHI to less than 20. The targeted upper airway, measured in the supine position, demonstrated a trend towards significant improvement in mean cross sectional area (p = 0.05) and volume (p = 0.10). Side effects of TCRFTA were infrequent, mild, and self-limited. No significant correlation between pre-treatment parameters and outcome improvement was noted. Nasal CPAP resulted in significant improvement in AHI (p = 0.0004) to near normal levels, with an associated improvement in OSAS related quality of life (p = 0.02), and a trend towards significant improvement in daytime somnolence (p = 0.06). Reaction time testing demonstrated no significant improvement (p = 0.75). No significant differences were seen for change in AHI, OSAS related quality of life, daytime somnolence, or reaction time testing between multilevel TCRFTA and CPAP. **CONCLUSIONS:** Multilevel (tongue base and palate) TCRFTA is a low morbidity, office-based procedure performed with local anesthesia, and is an effective treatment option for patients with OSAS. On average, abnormalities in daytime somnolence, quality of life, and reaction time testing demonstrated improvement from baseline and were normalized after treatment. Polysomnographic respiratory parameters also demonstrated significant improvement with multilevel TCRFTA.

8:40 An Anatomic Study of the Posterior Sinus
James J. Holt, MD*, Marshfield, WI

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to better understand the posterior tympanum anatomy pertinent to the surgeon when removing disease from this area of the middle ear.

OBJECTIVES: Cholesteatoma and retracted epithelium can harbor in the posterior sinus, one of three sinuses located in the posterior tympanum. This sinus has not been well defined; misconceptions and anatomic questions remain. A study of the posterior sinus was conducted to discover anatomic details that will help the surgeon to better locate and remove disease from the posterior tympanum. **STUDY DESIGN:** Anatomic study of fifty temporal bones. **METHODS:** Fifty human temporal bone specimens were studied. A new method was used to directly visualize the posterior tympanum from an anterior approach. The formation of the sinus, its relationship to neighboring structures, and anatomic variations within the sinus were recorded for each specimen. **RESULTS:** The posterior sinus was present in 48 of 50 specimens. Photographs demonstrate that sinus formations range from shallow to very deep recesses. The border separating the posterior sinus and the sinus tympani was defined by a ridge of bone on the floor of the middle ear not by the ponticulus as was previously believed. A secondary sinus, adjacent to the posterior sinus and under the facial nerve, was discovered in 47 of these 50 bones. In 10 of these, the bony wall of the facial nerve, just lateral to this accessory sinus, was missing. **CONCLUSIONS:** With these new anatomic findings of the posterior sinus and the adjacent accessory sinus, surgeons will be able to more effectively locate disease harboring in this part of the middle ear. The surgeon must consider the possibility of a dehiscence facial nerve when removing disease from these sinuses.

8:48 Superantigens and Chronic Rhinosinusitis: Detection of Staphylococcus Exotoxins in Nasal Polyps
Kristin A. Seiberling, MD, Chicago, IL

David B. Conley, MD, Chicago, IL
Anju Tripathi, MD, Chicago, IL
Leslie C. Grammer, MD, Chicago, IL
Robert C. Kern, MD*, Chicago, IL

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to discuss the potential role of staphylococcal superantigens in the pathogenesis of chronic rhinosinusitis and nasal polyps.

OBJECTIVES: The etiology of chronic rhinosinusitis and nasal polyposis (CS/NP) remains unclear, however recent studies have suggested that staphylococcal toxins, acting as superantigens (SAG) may play a role. SAGs, which can be active in minute quantities, trigger the activation and proliferation of multiple inflammatory cell types. Oligoclonal proliferation of lymphocytes bearing specific V-beta domains has been demonstrated in nasal polyps suggesting local SAG activity in the nose. The goal of this study is to assay for the presence of staphylococcus toxins in polyp tissue and mucus. **STUDY DESIGN:** Prospective study of a cohort of patients with chronic rhinosinusitis and nasal polyps at one university hospital. **METHODS:** Polyp tissue and mucus were obtained from CS/NP patients undergoing ESS. Samples were initially processed on a staphylococcus toxin screening ELISA kit. Those samples positive for the presence of a toxin were then run on a staphylococcus toxin identification ELISA kit. The latter kit tested for the presence of the following toxins: staphylococcus enterotoxin (SE) A, B, C1-3, D, E **RESULTS:** Of the cohort of patients with CS/NP, 27% tested positive on the screening ELISA kit. Staphylococcus toxins were detected in both polyp tissue and mucus. Of those samples positive on the screening kit, 33% were positive for SEA while the remaining 67% fell just below the criteria mark for positivity. Those latter samples were borderline positive for the detection of SEA. **CONCLUSIONS:** The current study demonstrates the presence of staphylococcus toxins in nasal polyps. SEA was the most common toxin detected. Further studies are needed to define the precise role of these superantigens in the development of nasal polyposis.

8:56 Surgical Navigation Using CT-MRI Fusion for Transsphenoidal Hypophysectomy

James W. McIlwaine, MD, St. Louis, MO
Raj Sindwani, MD, St. Louis, MO

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to understand and discuss the methods as well as role of surgical navigation using CT-MRI fusion for transnasal hypophysectomy.

OBJECTIVES: Transnasal hypophysectomy is an operation which demands excellent anatomical localization of the tumor as well as the bony confines of the paranasal sinuses. Recent advances in image guidance technology allow surgeons to navigate using CT and MRI images which are digitally fused together. The purpose of this study was to present a novel technique that permits surgical navigation using CT-MRI fusion for transnasal hypophysectomy. **STUDY DESIGN:** Retrospective case control. **METHODS:** Twenty-three patients underwent transsphenoidal hypophysectomy using either standard stereotactic volume reduction technique employing CT image guided surgery (N=15) or CT-MRI fusion image guided surgery (N=8) from 2002-2004. Patient records were reviewed and perioperative data including operative time, estimated blood loss, length of hospital stay, and complications were examined. Collected data were compared between the two cohorts. **RESULTS:** All patients had pre-operative evaluations including CT and MRI of the head. The fused images provided excellent anatomical detail and accuracy. The utilization of CT-MRI fusion technology did not result in any significant increase in operative time, hospital stay, estimated blood loss, or complications (p>0.05). One location related complication, an optic nerve injury, occurred in the control group. **CONCLUSIONS:** Surgical navigation based upon the fusion of preoperative CT and MRI image data represents the next generation of image guidance technology. CT-MRI fusion technology is safe, easy to use, and accurate. Navigation using CT-MRI fusion should be considered for complex skull base procedures. Fusion technology is not indicated for routine sinus surgery.

9:04 Biofilms in Chronic Rhinosinusitis: Evidence for Their Presence

Michael Rontal, MD*, Royal Oak, MI
Matthew L. Rontal, MD, Ann Arbor, MI
Daniel A. Rontal, MD, Ann Arbor, MI
Eugene Rontal, MD*, Farmington Hills, MI
Donna Stolz, PhD, Pittsburgh, PA
Berrylin J. Ferguson, MD*, Pittsburgh, MI

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to define the term biofilm and discuss its presence in chronic rhinosinusitis.

OBJECTIVES: Biofilms consist of bacterial cells encased in an extracellular polysaccharide substance and attached to a surface. These bacteria exhibit a low metabolic rate, fail to grow in standard laboratory culture conditions, and are resistant to antibiotics. This phenotypic state is a known phase in many bacterial life cycles. More recently they have been found in the head and neck on indwelling medical devices and in infections such as cholesteatoma, tonsillitis, otitis media. We sought to determine whether biofilm is present on the mucosa of paranasal sinuses involved in chronic rhinosinusitis (CRS). **STUDY DESIGN:** Electron microscopic analysis of mucosa biopsied from paranasal sinuses involved in chronic rhinosinusitis and from healthy controls. **METHODS:** Mucosal biopsies were obtained from 20 patients during endoscopic sinus surgery performed for treatment of chronic rhinosinusitis and from healthy controls. These samples were then studied with scanning (SEM) and transmission (TEM) electron microscopy. **RESULTS:** SEM demonstrates both the presence of biofilm at defects of the mucous blanket and the destruction of adjacent cilia. On TEM biofilm is evident in two distinct layers separated by a layer of mucous. **CONCLUSIONS:** This is the first demonstration of biofilm in CRS. Biofilms and the distinct phenotype of their bacteria represent a new and intriguing direction for investigation into the pathophysiology of inflammation in CRS and associated polypoid mucosal changes. Most importantly, understanding the role of biofilm in CRS may provide the rationale for new modalities of treatment.

9:12 Frontal Sinus Fractures in Children

Wesley S. Whatley, MD, Memphis, TN
David W. Allison, BS, Memphis, TN
Rakesh K. Chandra, MD, Memphis, TN
Jerome W. Thompson, MD, Memphis, TN
Fredrick A. Boop, MD, Memphis, TN

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to explain the epidemiologic characteristics, clinical course and management of pediatric patients with frontal sinus fractures. Participants should also be able to discuss and compare the differences in the incidence of central nervous system injury and cerebrospinal fluid leak between children and adults.

OBJECTIVES: To review the epidemiologic characteristics, clinical course, and management of pediatric patients with frontal sinus fractures. **STUDY DESIGN:** Retrospective chart review. **METHODS:** The medical records of 120 patients with maxillofacial fractures who presented to a tertiary children's hospital from 1998-2003 were reviewed. Eleven patients with frontal sinus fractures were identified. **RESULTS:** The study group included 9 males and 2 females with a mean age of 9.7 (range: 4-14) years. The most common mechanisms of injury were unrestrained motor vehicle accident and all-terrain vehicle accident. All patients suffered concomitant orbital fractures. Other maxillofacial fractures included: naso-orbito-ethmoid (3), midface (2), and mandible (1). Seven patients (63.6%) sustained significant intracranial

injuries including intraparenchymal hemorrhage, expanding pneumocephalus, and subdural hematoma. The average age of patients with intracranial injury was younger than those without intracranial injury (8.1 vs. 12.8 years, $p=.025$). Four patients had a total of 6 sites of cerebrospinal fluid (CSF) leak. The most common sites of dural injury were the cribriform area (4) and frontal region (2). All patients with CSF leaks had significant intracranial injuries and required bifrontal craniotomy. **CONCLUSIONS:** Pediatric frontal sinus fractures are likely to involve other maxillofacial injuries, particularly involving the orbit. Frontal sinus fractures in children are associated with increased risk of serious intracranial injury and CSF leak when compared to adults. The most common site of dural injury was the cribriform area. A multidisciplinary approach is necessary to manage concomitant injuries, obtain separation of the sinonasal tract from intracranial contents, and to restore cosmesis to the brow.

9:20 Discussion

9:27 Break with Exhibitors

9:55 PANEL: EVOLUTION OF PALATAL SURGERY FOR OSA

MODERATOR: B. Tucker Woodson, MD*, Milwaukee, WI

PANELISTS: Michael Friedman, MD*, Chicago, IL

Regina P. Walker, MD, Maywood, IL

Tod C. Huntley, MD, Indianapolis, IN

11:15 Announcements and Introduction of Vice President-Elect,

David E. Schuller, MD*, Columbus, OH

Robert H. Maisel, MD*, Minneapolis, MN

11:25 Adjournment

POSTERS

HEAD AND NECK

1. Indications and Outcomes of Awake Tracheostomy: A Three Year County Hospital Experience

Kenneth W. Altman, MD PhD, Chicago, IL
Joshua D. Waltonen, MD, Chicago, IL (*Presenter*)
Robert C. Kern, MD*, Chicago, IL

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to recognize indications for awake tracheostomy, understand the etiology of upper airway obstruction leading to need for awake tracheostomy, and appreciate to potential for suboptimal outcome in emergent situations.

OBJECTIVES: To review the indications, etiology, complications and outcomes of patients undergoing awake tracheotomy. **STUDY DESIGN:** Retrospective medical chart review. **METHODS:** The inpatient and outpatient records of patients who underwent awake tracheotomy or were converted from cricothyrostomy to tracheostomy over a three year period were reviewed. This project was granted exempt status by the human subjects committee of the institutional review board at our institution. **RESULTS:** Ninety patients underwent awake tracheotomy and six were converted from cricothyrostomy to tracheostomy. Indications included potential or impending airway obstruction from squamous cell carcinoma (SCCa) of the aerodigestive tract in 68 patients (76%), neck abscess in four (4.4%), subglottic stenosis in three (3.3%), and other etiologies in fifteen patients (16.7%). Thirty-eight (42%) patients were noted to have stridor. On fiberoptic laryngoscopy, 66 patients (80%) had moderate or severe airway obstruction. Of the 68 patients with SCCa, only 5 (7.4%) have subsequently been decannulated. Among the remainder, 16 of 22 (73%) have been decannulated. Complications occurred in seven patients (7.8%) after awake tracheotomy, none with untoward sequelae. Two severe complications occurred among the six patients converted from cricothyrostomy to tracheostomy: anoxic brain injury in both, leading to death in one. **CONCLUSIONS:** Awake tracheotomy should be considered in any patient with impending or ongoing airway obstruction, or with potential for difficult intubation. This should be performed in a timely manner, before an emergent situation arises, as the complications of emergency surgical airway can be devastating.

2. Proton Pump Expression in Human Laryngeal Seromucinous Glands

Kenneth W. Altman, MD PhD, Chicago, IL
Joshua D. Waltonen, MD, Chicago, IL
G. Kenneth Haines III, MD, Chicago, IL
Neal D. Hammer, MS, Chicago, IL
James A. Radosevich, PhD, Chicago, IL

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to recognize the expression of the proton pump in human laryngeal submucosal glands and consider the scope of possible implications in patients with chronic laryngitis.

OBJECTIVES: Abnormal seromucinous secretions in the larynx are a common manifestation of laryngopharyngeal reflux disease (LPRD). Recent pilot research suggested that the H⁺/K⁺-ATPase (proton pump), which is the target of pharmacotherapy for LPRD, is associated with human laryngeal submucosal glands. The hypothesis of this study is that proton pump is variably expressed in the human larynx and is not solely associated with the parietal cells of the stomach. **STUDY DESIGN:** Retrospective pathologic immunohistochemical investigation. **METHODS:** Twenty-seven surgical larynx specimens containing seromucinous glands from 15 subjects were retrospectively obtained after approval from Human Subjects Committee. Banked human stomach tissue was also obtained for comparative positive and negative control. Sections were immunostained with monoclonal antibodies reactive with both alpha and beta subunits of the H⁺/K⁺-ATPase (proton) pump, and were reviewed for staining pattern and intensity. **RESULTS:** In the human larynx, 26 specimens showed consistent staining in the seromucinous cells and ducts for the alpha subunit and 23 specimens for the beta subunit. Overall, moderate to strong staining was present in more than half of the specimens. No significant aberrant staining or artifact was noted. Stomach parietal cells exhibited strongly positive staining for both the alpha and beta subunits of the proton pump. **CONCLUSIONS:** The H⁺/K⁺-ATPase (proton) pump is present in seromucinous cells and ducts in the human larynx. There appears to be variable expression in the specimens studied. Proton pump involvement in human laryngeal seromucinous glands may explain heightened laryngeal sensitivity in those patients with chronic laryngitis believed to have LPRD.

3. Oral Melanoacanthoma: A Case Report, Review of the Literature, and New Treatment Option

Brian T. Andrews, MD, Iowa City, IA
Douglas K. Trask, MD PhD, Iowa City, IA

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to describe a rare, benign oral mucosal lesion, oral melanoacanthoma, not previously discussed in the otolaryngologic literature. In addition we present a novel therapy, argon plasma coagulation (APC), as well as a review of the current literature.

OBJECTIVES: The objective of this presentation is to discuss a rare mucosal lesion, oral melanoacanthoma, and present a new treatment option, argon plasma coagulation (APC). A review of the literature will also be discussed. **STUDY DESIGN:** This study is a case report and a review of the literature. **METHODS:** A forty-five year old, African-American male with HIV and a persistent, painful ventral tongue ulcer was identified. Pathological staining of a biopsy diagnosed oral melanoacanthoma. After a period of observation without resolution of the lesion and subjective progression of symptoms, argon plasma coagulation (Erbe®) was performed. Complete resolution of the lesion and symptomatic relief was obtained 1 week post-APC therapy. A review of the English literature was also performed. **RESULTS:** One patient diagnosed with an oral melanoacanthoma was successfully treated with APC. APC provided for a successful treatment option and resulted in good mucosal wound healing within days. Furthermore, its self-limited depth of tissue penetration caused minimal adjacent damage. A review of the literature demonstrates this lesion to be most common in African-American adult males and is often associated with concomitant HIV infection. It is benign with no malignant potential, and it often results at the site of previous trauma. It is commonly self-limiting but may require treatment for symptomatic relief. **CONCLUSIONS:** Oral melanoacanthoma is a rare, benign mucosal lesion that may require surgical intervention for symptomatic relief. APC is a safe and effective means of treating this lesion. APC treatment may be expanded to include other benign, superficial lesions of the oral mucosa.

4. The Incidental Finding of Dysgeusia Relieved by Botulinum Toxin A Injections

Selena E. Heman-Ackah, MD, Cincinnati, OH
Myles L. Pensak, MD*, Cincinnati, OH

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to discuss a potential additional application of botulinum toxin A for the management of dysgeusia in post-operative patients following ear surgery.

OBJECTIVES: To report a case of dysgeusia secondary to facial nerve injury that was incidentally relieved by botulinum toxin A (BTX-A) injections and to describe possible mechanisms. **STUDY DESIGN:** Case report. **METHODS:** A 38 year old nonsmoker female, with past medical history of translabyrinthine acoustic neuroma resection and resolved post-operative facial nerve (FN) paresis, presented 3 years post-operatively with complaints of dysgeusia and left-sided hemifacial spasm producing a snarled appearance. One cc of BTX-A was injected into the orbicularis oris and zygomatic muscles on initial presentation, at 5 months follow-up, at 5 1/2 months fol-

low-up and at 2 years follow-up. **RESULTS:** Resolution of the snarled appearance was achieved following the first and fourth treatments. The second treatment relieved the snarled appearance but insufficiently relaxed the central lip. Two weeks following an additional dose of BTX-A was injected medially with good response. The patient reported resolution of dysgeusia following each treatment with BTX-A and return of dysgeusia in association with return of the snarled appearance between treatments. **CONCLUSIONS:** The temporal pattern of dysgeusia relief and return in association with BTX-A injections implies a possible causal relationship. In this case, both hemifacial spasm and dysgeusia represent dysfunctions of the FN, the buccal branch and the chorda tympani respectively, mediated by injury and subsequent hyperfunction of these branches. BTX-A relieved the symptoms of hemifacial spasm by preventing release of acetylcholine at the neuromuscular junction thus inhibiting hyperfunction of the buccal branch. Similarly, alleviation of dysgeusia in association with BTX-A injections may have resulted from inhibition of hyperfunction of the chorda tympani.

5. **Eagle Syndrome: Management and Outcomes Related to Transcervical Surgical Therapy**

Timothy J. Martin, MD, Milwaukee, WI
Sarvi S. Nalwa, MD, Milwaukee, WI
David R. Friedland, MD PhD, Milwaukee, WI
Albert L. Merati, MD, Milwaukee, WI

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to describe the pertinent anatomy and pathophysiology of Eagle syndrome, the surgical options for treatment, the expected outcomes, and potential complications.

OBJECTIVES: To describe a recent population of patients with Eagle syndrome and to discuss the management and outcomes related to transcervical surgical therapy. **STUDY DESIGN:** Retrospective review. **METHODS:** Data for 6 patients seen between August 1, 2002, and December 31, 2003, was collected from patient chart, operative and radiologic records. **RESULTS:** Six patients between the ages of 35 and 55 (mean age 46.5 years) presented with symptoms including unilateral throat pain (4/6), dysphagia (3/6), unilateral otalgia (2/6), and dizziness (2/6). All six patients were female. One patient reported 25 syncopal episodes in one year related to turning of her head. Five of six patients underwent surgical therapy. Transcervical resection of the styloid process was performed in each case. The mean length of the styloid resected was 2.8 cm. All five patients had complete relief of symptoms in the immediate post-operative period, with sustained relief in all patients over a mean of 6 months follow-up. Two of five patients had transient weak marginal mandibular nerve, both recovered completely. **CONCLUSIONS:** Eagle syndrome presents with a wide variety of symptoms related to the anatomical location of the elongated styloid process. Transcervical resection of the styloid process provided complete relief in all patients in this series, though marginal mandibular nerve weakness occurred in a significant portion of patients.

6. **Comparison of Cost in the Treatment of Advanced Oropharyngeal Squamous Cell Carcinoma**

David T. Rouse, MD, Kansas City, KS
Terance T. Tsue, MD, Kansas City, KS
Douglas A. Girod, MD, Kansas City, KS
Derrick I. Wallace, MD, Kansas City, KS

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to discuss the cost differential between surgical and nonsurgical therapy in advanced stage oropharyngeal carcinoma as well as appreciate the difficulties with performing cost analysis.

OBJECTIVES: To assess the cost differential between surgical versus nonsurgical therapy in advanced staged oropharyngeal squamous cell carcinoma. **STUDY DESIGN:** A cost identification analysis was conducted. **METHODS:** A retrospective review of patients with advanced oropharyngeal carcinoma was performed to identify demographics, staging, complications, and survival during the first year of therapy. Hospital and physician charges from diagnosis, therapy, follow-up, and related treatment complications were used for cost identification analysis. **RESULTS:** Fifty-four patients with primary stage III or IV oropharyngeal squamous cell carcinoma were identified. Thirteen of these patients met all inclusion criteria and were reviewed. The average one year total cost from the surgical group was twenty five percent greater than the nonsurgical group. The majority of patients in the surgical group were gastrostomy tube dependent and half were tracheostomy dependent at one year post-therapy. Patients in the nonsurgical group were less likely to be gastrostomy tube dependent and none were tracheostomy dependent. **CONCLUSIONS:** Overall cost for the nonsurgical group was less than that of the surgical group. With further analysis of the nonsurgical group, a large cost difference was found between those patients who had both chemotherapy and radiation (highest), hyperfractionated radiation, and conventional radiation (lowest).

7. **Extubation Protocol for Patients With Possible Upper Airway Obstruction**

Robert D. Silver, MD, Minneapolis, MN
Rick M. Odland, MD PhD, Minneapolis, MN
Robert S. Shapiro, MD, Minneapolis, MN

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to 1) demonstrate an appreciation for patients at risk for extubation failure secondary to upper airway obstruction; and 2) standardize their approach toward extubation of patients at risk of immediate failure through an extubation protocol.

OBJECTIVES: Extubation of patients with possible upper airway obstruction is a management problem that requires multispecialty collaboration. There is little information in the literature that provides management guidelines. An otolaryngologist "standing by" for extubation in the intensive care unit is a cost effective method of management, but if loss of airway develops, the operative management will be suboptimal. On the other extreme, extubation in the operating room is an expensive procedure. The authors propose that a protocol be developed that will provide adequate discrimination between those patients who can be safely extubated in the ICU and those who are best managed in the operating room. **STUDY DESIGN:** A standardized management algorithm for extubation of patients with possible upper airway obstruction is constructed. The protocol is based on available literature and practical experience at a large safety net hospital and trauma center. **METHODS:** Evaluation is based on history and examination. Patients are assigned to risk groups based on these criteria. Bedside tests for the extubation protocol include the cuff leak test, bedside direct laryngoscopy, and flexible laryngoscopy. **RESULTS:** Based on key factors of airway management and timing of intervention, patients can be successfully managed, with patient safety given priority over cost effectiveness. **CONCLUSIONS:** This protocol is an attempt to standardize management of extubation and a means of improving communication of important principles between multispecialty teams. Prevention of airway emergencies is a primary goal of the protocol. Additionally, prospective studies can be designed to document efficacy of the protocol and improve management of this challenging clinical problem.

8. **In Vitro Radiosensitivity of HPV16 Head and Neck Squamous Cell Cancer**

William C. Spanos, MD, Iowa City, IA
John H. Lee, MD, Iowa City, IA

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to compare the radiosensitivity of HNSCC cell lines with HPV16 to HNSCC cell lines without HPV16. Participants should be able to discuss possible explanations for the discrepancy between clinical survival data for HPV16 positive HNSCC treated with XRT and the in vitro radiosensitivity presented herein.

OBJECTIVES: Head and neck squamous cell cancer (HNSCC) is currently treated with several different modalities including irradiation. HNSCC has been associated with human papillomavirus type 16 (HPV16). Recent data has shown a survival benefit in a subset of irradiated HPV16 positive HNSCC patients versus HPV16 neg-

ative patients. To explore this statistical association in vitro, we irradiated HNSCC cell lines that were positive or negative for HPV16. **STUDY DESIGN:** See methods. **METHODS:** Three HNSCC cell lines without HPV16 and two cell lines with HPV16 were irradiated in log phase growth with colony assays to determine radiosensitivity. In an attempt to characterize the transforming properties of the cell lines we determined p53 status, cell doubling time, and E6 expression. **RESULTS:** At doses greater than 4 Gy, HPV16 positive cells had a larger surviving fraction than the HPV16 negative cells. The doubling times of the HPV16 negative cells were significantly smaller than the HPV16 positive cells. HPV16 positive cells had detectable p53 by western blot; however, the HPV16 negative cells were p53 negative. Similar levels of E6 expression were seen in the HPV16 positive cells. **CONCLUSIONS:** In contrast to a survival advantage for HPV16 positive cancer in vivo, the HPV16 positive HNSCC cells tested are less radiosensitive in vitro. The radiosensitivity of the HNSCC cell lines closely followed their cell doubling times. In addition the p53 status did not correlate with radiosensitivity. These results suggest a mechanism other than HPV16 related radiosensitivity for survival advantage in HPV16 positive HNSCC treated with irradiation.

9. Congenital Laryngeal Granuloma
David L. Walner, MD, Park Ridge, IL

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to explain the finding of a congenital laryngeal granuloma and put this information to clinical use.

OBJECTIVES: To describe a newly identified condition of the neonatal larynx. **STUDY DESIGN:** A report of a series of three patients diagnosed with a congenital laryngeal granuloma. **METHODS:** Each patient with the condition underwent photo-documentation of the lesion, followed by a biopsy and microscopic analysis by a pathologist. Each patient's chart was carefully reviewed for information about the prenatal history, the birth history, the neonatal history, and the follow-up condition. **RESULTS:** Each infant presented in the first week of life with some element of respiratory distress, hoarseness, or stridor. None of the infants had a history of laryngeal trauma or prolonged intubation. None of the infants had other congenital abnormalities. The lesions were discovered by fiberoptic laryngoscopy and subsequently treated with microlaryngoscopy and removal of the lesion. Photo-documentation was obtained for each lesion revealing varying degrees of laryngeal obstruction. Pathology review of the lesions revealed an inflammatory process consistent with a granuloma in each case. Each child has resolution of the symptoms following surgical intervention. **CONCLUSIONS:** The diagnosis of a congenital laryngeal granuloma should be considered in the differential diagnosis of a newborn with stridor, hoarseness or respiratory distress.

OTOLOGY

10. Diagnosis and Treatment of Pediatric Langerhans Cell Histiocytosis of the Infratemporal Fossa: Case Report
Luke O. Buchmann, MD, Kansas City, KS
Abbas Emami, MD, Kansas City, MO
Julie L. Wei, MD, Kansas City, KS

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to understand the various head and neck presentation of Langerhans cell histiocytosis in pediatric patients. They should also be familiar with both surgical and nonsurgical treatment options and the pros and cons of each. They should also understand the variables that determine which treatment option is optimal.

OBJECTIVES: Langerhans cell histiocytosis (LCH) is a rare clonal neoplasm that affects approximately 4-5.4 children annually. The presentation of this disease encompasses a spectrum of from single lytic bone lesions to multisystem involvement. The prognosis of LCH is generally good for single lesions or system involvement but can carry significant mortality with multisystem involvement. LCH generally affects children and has an indolent presentation with both surgical and nonsurgical treatment options. Previous reports have described head and neck LCH involving the skull, mandible and temporal bone. We present a case of an 11 year old male with rapid onset of head and neck mass of the infratemporal fossa with extension through the skull base into the middle cranial fossa, subsequently diagnosed to be Langerhans cell histiocytosis. The unusual presentation of this case, including rapid onset of a head and neck mass, trismus, and impressive intracranial encroachment on CT and MRI exams will be discussed. The histologic workup, treatment dilemmas, and ultimate successful treatment by chemotherapy sparing this patient of significant cosmetic and functional morbidity will be reported. A review of the literature and current trend in treatment options for pediatric head and neck LCH will be discussed. **STUDY DESIGN:** Case review. **METHODS:** Review. **RESULTS:** After incisional biopsy determined the diagnosis of LCH, this patient was successfully treated by chemotherapy and the large infratemporal fossa tumor has completely resolved. **CONCLUSIONS:** There has been a trend towards conservative treatment of single system LCH of the head and neck in the pediatric patient. Currently at our institution, vinblastine and prednisone are the chemotherapeutic agents used in a protocol for treating pediatric LCH. Complicated head and neck involvement presents a diagnostic and treatment challenge, and decision making should be a multidisciplinary effort. Successful treatment using chemotherapy has spared this patient of significant morbidity that would have been associated with surgical excision of this particular LCH lesion. This case has prompted current review of 11 case of pediatric head and neck LCH over the past 15 years and their treatment outcomes to be reported at a later date.

11. Role of Three Dimensional CT Angiography in Jugular Foramen Lesion Imaging
Ricardo C. Cristobal, MD, Milwaukee, WI
Glenn A. Meyer, MD, Milwaukee, WI
Michelle M. Michel, MD, Milwaukee, WI
James M. Strottman, MD, Milwaukee, WI
P. Ashley Wackym, MD*, Milwaukee, WI

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to discuss the normal anatomy of the jugular foramen and its anatomical variants; discuss the differential diagnosis of lesions in this region; understand the imaging modalities available for its evaluation; know the indications, advantages and disadvantages of each modality.

OBJECTIVES: To evaluate the role of three dimensional (3-D) computed tomography (CT) angiography in the evaluation of lesions of the jugular foramen. **STUDY DESIGN:** Case report. **METHODS:** A 15 year old female patient with history of possible seizure was evaluated with magnetic resonance imaging. The film was initially read as a mass in the jugular foramen region. CT scan failed to rule out normal variants of the venous anatomy or bone destruction. A 3-D CT angiogram was performed. **RESULTS:** A 3-D CT angiogram clearly demonstrated that the mass corresponded to a dilated emissary vein. **CONCLUSIONS:** CT angiography provides a powerful tool for the evaluation of masses of the jugular foramen identified on MR imaging and CT scan. The imaging modalities for skull base vascular lesions and advantages and disadvantages of each are discussed.

12. Preservation of Residual Hearing After Cochlear Implantation With Full Length Electrode Array Insertion
Michael B. Gluth, MD+, Rochester, MN
Jon K. Shallop, PhD, Rochester, MN
Colin L.W. Driscoll, MD, Rochester, MN

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to clearly understand the issues relating to potential preservation residual hearing with full insertion of a cochlear implant electrode array. This includes surgical considerations that may optimize the chance of hearing preservation.

OBJECTIVES: To evaluate the preservation of residual hearing in multiple cochlear implant recipients having undergone full electrode insertion of the Nucleus Advance device utilizing the “advance off-stylet” technique. **STUDY DESIGN:** Retrospective chart review. **METHODS:** The medical records of all recent cochlear implant recipients having some residual pre-operative hearing were reviewed. This included pertinent medical history, pre- and post-operative audiometric data (pure tone audiometry, tympanometry, and speech perception testing), and the surgical record. **RESULTS:** Some level of hearing preservation was achieved in multiple patients with residual pre-operative hearing after having undergone full-length electrode insertion. In each case, a “hearing preservation” surgical protocol was utilized which included: careful identification and drilling of the cochleostomy site so as to enter the scala tympani away from the osseous spiral lamina and basilar membrane, an attempt to preserve and open the endosteum with gentle microsurgical technique, avoidance of suction around the cochleostomy, and electrode array insertion immediately after the scala tympani was opened. **CONCLUSIONS:** Preservation of some residual hearing after cochlear implantation with full length electrode insertion is a realistic goal. This may result in improved performance of the cochlear implant and also allow for continued use of a hearing aid in the implanted ear. When attempting to achieve this objective, meticulous surgical technique aimed at minimizing trauma to the intra-cochlear elements should be used.

13. Decreasing Wound Complications With the Bone Anchored Cochlear Stimulator

Sam J. Marzo, MD, Maywood, IL

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to discuss potential complications during the implantation of the bone anchored cochlear stimulator (BAHA) and compare various techniques designed to decrease wound complications.

OBJECTIVES: To decrease wound complications during the surgical implantation of the BAHA. **STUDY DESIGN:** Retrospective study at a tertiary referral center. **METHODS:** Thirty patients underwent BAHA placement between September 2003, and July 2004. The first fifteen patients underwent a standard surgical procedure recommended by the manufacturer. The second fifteen patients underwent a modified surgical procedure designed to decrease wound complications. **RESULTS:** In the first fifteen patients, six patients had complete or near complete loss of the skin flap, two patients had extrusion of the prosthesis, and one patient had a wound hematoma. In the second fifteen patients, who underwent the modified surgical procedure, there were no losses of the skin graft and no implant extrusions. **CONCLUSIONS:** A modified surgical technique during implantation of the BAHA may decrease wound complications, resulting in decreased patient morbidity.

14. Biomechanical Strength of Reconstruction Plates When Used for Medial Support of Med-EI Cochlear Implants: Implications for Diagnostic MRI

David M. Poetker, MD+, Milwaukee, WI
P. Ashley Wackym, MD*, Milwaukee, WI
Narayan Yoganandan, PhD, Milwaukee, WI
Christina L. Runge-Samuelsen, PhD, Milwaukee, WI
Jill B. Firszt, PhD, Milwaukee, WI
Frank A. Pintar, PhD, Milwaukee, WI

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to explain the added strength provided by a reconstruction plate to a craniotomy site for a cochlear implant.

OBJECTIVES: It is hypothesized that a mesh reconstruction plate designed to fit a cochlear implant (CI) internal device will provide immediate structural support to the site of the implant. **STUDY DESIGN:** Cadaveric study. **METHODS:** Human calvaria specimens were drilled to conform to a Med-EI CI template and were plated with either titanium or resorbable mesh reconstruction plates. A CI template, mounted to the arm of an electrohydraulic testing device, was brought into contact with a second CI template. Force was applied until failure was reached, as defined by 3 mm of displacement or fracture of the mesh. Force and mesh displacement were measured as a function of time using a digital data acquisition system. **RESULTS:** Mean maximum force, mean force to first failure, and mean displacement measures for group 1 (resorbable mesh, n = 10) were 302.9 N (Newton), 283.0 N, and 3.05 mm, respectively. The mean maximum force for group 2 (0.4 mm titanium mesh, n = 10) and group 3 (0.6 mm titanium mesh, n = 8), were 121.3 N and 234.0 N, respectively. Mean force of first failure was 92.0 N for group 2, and 164.8 N for group 3. **CONCLUSIONS:** The placement of resorbable or titanium mesh provides an immediate increase in stability to the CI internal device. Since the force exerted by a 1.5 Tesla MRI on a CI internal magnet represents approximately 0.17 N, the force required for failure of the mesh is significantly greater than that during exposure to a 1.5 Tesla MRI scan.

15. Outcome of Cochlear Implantation in Patients Following Hydrocodone/ Acetaminophen Abuse

John M. Ryzenman, MD, Hinsdale, IL
Robert A. Battista, MD, Hinsdale, IL

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be familiar with the association between sensorineural hearing loss and excessive use of hydrocodone/acetaminophen and recognize that these patients can be excellent candidates for cochlear implantation.

OBJECTIVES: We review our experience with cochlear implantation of patients with a known history of hydrocodone/acetaminophen abuse and compare their results to matched controls. **STUDY DESIGN:** Retrospective case review. **METHODS:** We review a detailed history, clinical exam, and outcomes in this series of patients seen in a tertiary neurotologic referral center. A MEDLINE search was performed of the association of sensorineural hearing loss and hydrocodone/acetaminophen. **RESULTS:** Three patients were identified with bilateral, rapidly progressive sensorineural hearing loss and a history of hydrocodone/acetaminophen abuse. None of the patients experienced improved hearing thresholds with high dose steroids. Each of the three patients underwent successful cochlear implantation. The post-implantation performance data compare favorably to matched control cochlear implant patients. The combination of hydrocodone and acetaminophen, or one of the drug's components, may be associated with sensorineural hearing loss. **CONCLUSIONS:** Overuse of hydrocodone/acetaminophen may be associated with rapidly progressive, bilateral sensorineural hearing loss. Patients with profound sensorineural hearing loss associated with significant use of hydrocodone/acetaminophen are excellent candidates for cochlear implantation. The exact mechanism of sensorineural hearing loss and hydrocodone/acetaminophen abuse is still unknown.

16. Vestibular Evoked Myogenic Potentials in Infancy and Early Childhood

Kianoush Sheykholslami, MD PhD+, Cleveland, OH
Kimitaka Kaga, MD, Tokyo, Japan
Cliff A. Megerian, MD, Cleveland, OH
James E. Arnold, MD, Cleveland, OH

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to apply this diagnostic method for further exploring extent of the lesion causing hearing loss in neonates and help to provide better care and rehabilitation for neonates with hearing problem at risk of developmental and motor system delay.

OBJECTIVES: Hearing impairment is commonly accompanied by disruptions in balance and orientation function, which is rarely assessed in infants. Vestibular loss can impair sensory integration, which is critical to the normal development of motor coordination. Herein, for the first time, we demonstrate that vestibular evoked myogenic potentials (VEMPs) can be utilized as a noninvasive procedure to assess vestibular and saccular function in infants. The purposes of this study were to determine whether VEMPs could be reliably recorded in neonates and if the evoked responses could be characterized based on normal adult data. **STUDY DESIGN:** Prospective

cohort study. **METHODS:** Myogenic evoked potentials to air- and bone-conducted auditory stimuli were recorded from the sternocleidomastoid muscle of 12 normal neonate and 12 patients, neonates with bilateral atresia of the external auditory canals, Treacher-Collins syndrome, and neonates who failed universal neonatal screening. **RESULTS:** Almost all of the cases, except one patient with hearing loss, showed biphasic responses from the sternocleidomastoid to short tone bursts. **CONCLUSIONS:** VEMPs had characteristics that differentiate it from the postauricular responses and the jaw reflex which was dominant on the ipsilateral side to the stimulated ear. Evoked potentials have same morphology as adults with a shorter latency for n23 peak and variable amplitude. Our results suggest that VEMPs provides important information about the sacculus and sacculocollic pathway. It could help to provide better care and rehabilitation for neonates with hearing problem at risk of developmental and motor system delay.

17. Astrocytoma Arising Within a Vestibular Schwannoma: Neoplastic Transformation of the Vestibulocochlear Nerve Core

Matthew L. Ubell, MD, Milwaukee, WI
Khang-cheng Ho, MD PhD, Milwaukee, WI
Glenn A. Meyer, MD, Milwaukee, WI
David R. Friedland, MD PhD, Milwaukee, WI

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to explain the origin of an astrocytoma from the vestibulocochlear nerve.

OBJECTIVES: To provide the first report of a cerebellopontine angle mass comprised of two tumors: a dominant vestibular schwannoma and an intimate, but distinct, astrocytoma. To discuss and explain the origin of astrocytoma from a cranial nerve. **STUDY DESIGN:** Case report with clinical and pathological correlation. **METHODS:** Histological examination and immunocytochemical staining of a posterior fossa mass to confirm the presence of an included astrocytoma. **RESULTS:** A 60 year old female presented with sudden onset ataxia, headache and nausea. Radiographic evaluation demonstrated obstructive hydrocephalus caused by a 3 cm cerebellopontine angle tumor. Resection of the tumor was remarkable for adhesion to the cerebellum. Pathological evaluation of the tumor demonstrated vestibular schwannoma and a component of reactive gliosis with astrocytoma. The presence of astrocytoma was confirmed by immunostaining for GFAP and external review of the slides. **CONCLUSIONS:** This is the first report of an astrocytoma arising in combination with an acoustic neuroma. Previous reports of schwannoma and other tumors, most notably meningioma, suggest an association with NF2. In this sporadic case, the origin of the astrocytoma appears to be from the remnant of the eighth cranial nerve. Rosenthal fibers, indicative of astrocytic reaction to damage and chronic processes have been seen in schwannomas without neoplastic transformation. Further, we have identified a single report of an isolated glioma arising from the acoustic nerve. In this case, it is felt that a long-standing vestibular schwannoma induced gliosis around the remnant eighth cranial nerve leading to degeneration and transformation into an astrocytoma.

18. The Use of the Positioner in Cochlear Implant as a Possible Mechanism for Post-Implantation Meningitis

Trang T. Vo-Nguyen, MD, Minneapolis, MN
Samuel C. Levine, MD*, Minneapolis, MN

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to understand a possible mechanism for meningitis post-cochlear implant.

OBJECTIVES: Complications are rarely encountered in cochlear implant due to extensive preoperative planning and meticulous surgical techniques. The most commonly observed problems are facial nerve injury and flap breakdown. However, in 2002, there was a sudden increase in the reported incidence of post-implantation meningitis in both Europe and North America. There has been no clear mechanism for this surge in the incidence of meningitis associated with cochlear implant. We propose a possible mechanism for post-implantation meningitis. **STUDY DESIGN:** N/A. **METHODS:** Case report. **RESULTS:** Two patients implanted with the Clarion I Bionic Ear at a tertiary referral center between 2001 and 2002 subsequently developed severe vertigo and balance problem. In both patients, the positioner was used with electrode insertion. Subsequent surgical exploration revealed persistent perilymph fistula. Attempt to patch the fistula with fat failed. One patient eventually required explantation, and one had replacement of the Clarion I with the Clarion II Bionic Ear without the positioner with symptomatic relief. **CONCLUSIONS:** Persistent perilymph fistula was seen with the positioner in the above patients. Even though our patients did not develop meningitis, both had severe vertigo due to perilymphatic leak. Based on the above findings, we speculate that the positioner acted to maintain the fistula, and this is a possible mechanism for meningitis following cochlear implant.

19. Diagnosis and Management of Lateral Semicircular Canal Conversions During Particle Repositioning Therapy

Judith A. White, MD PhD, Cleveland, OH
John G. Oas, MD, Cleveland, OH

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to: 1) identify the geotropic and apogeotropic nystagmus signifying conversions from canalolithiasis of the posterior semicircular canal (PSC) into the lateral semicircular canal (LSC) during particle repositioning therapy (PRT) for benign paroxysmal positional vertigo (BPPV); 2) describe and perform effective PRT for these conversions; and 3) recognize the limitations of Dix-Hallpike positioning tests in cases of BPPV involving the LSC.

OBJECTIVES: Objectives: Lateral semicircular canal (LSC) canalolithiasis conversion occurs in about 15% of cases undergoing particle repositioning therapy (PRT) for benign paroxysmal positional vertigo (BPPV) of the posterior canal and can lead to persistent vertigo. This paper examines the sensitivity of Dix-Hallpike positioning tests in LSC-BPPV conversions, reviews the likely pathophysiology of both geotropic and apogeotropic nystagmus in such cases, and summarizes PRT protocols used in the management of LSC-BPPV conversions (including Lempert roll, Gufoni, forced prolonged positioning, Vannucchi-Asprella and Asprella technique). **STUDY DESIGN:** Case report, tertiary center. **METHODS:** Digital videonystagmography (DV-VNG) was performed on each patient treated for BPPV at a tertiary referral center with PSC to LSC conversion during PRT. **RESULTS:** 1) Dix-Hallpike positioning tests are relatively insensitive to LSC conversions. Nystagmus recorded during PRT or supine positional tests is a more sensitive indicator of LSC conversion. 2) LSC conversions respond well to a variety of PRT protocols and can be treated successfully in a single treatment session. **CONCLUSIONS:** Increased awareness of PSC to LSC conversion during PRT will potentially increase treatment success in BPPV. The use of VNG during PRT is helpful in increasing sensitivity to these conversions.

20. Case Report and Radiologic Presentation of a Hyrtl's (Tympaomeningeal) Fissure

Richard M. Wiet, MD, Columbus, OH
Edward E. Dodson, MD, Columbus, OH
D. Richard Kang, MD, Columbus, OH
Lisa C. Martin, MD, Columbus, OH
Chad D. McCormick, MD, Coeur d'Alene, ID

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation the participants should be familiarized with the causes of congenital cerebrospinal fluid otorrhea including Hyrtl's fissure and be able to identify a Hyrtl's fissure on CT and MRI.

OBJECTIVES: To review our experience with an isolated case of cerebrospinal fluid otorrhea in a 10 year old boy caused by a Hyrtl's fissure and also to discuss the differential diagnosis and mechanisms of congenital cerebrospinal fluid otorrhea. **STUDY DESIGN:** Case report and literature review. **METHODS:** We completed a chart and imaging review of a patient with cerebrospinal fluid otorrhea. In addition, a literature review of cerebrospinal fluid otorrhea was performed. **RESULTS:** A patient was

referred to the senior author for suspicion of an encephalocele having undergone middle ear exploration for left conductive hearing loss at an outside facility. Tegmen defect and encephalocele were ruled out with temporal bone CT and a brain MRI, however CSF otorrhea was confirmed upon reexploration of the middle ear. Upon further review of the case with a senior colleague, the potential diagnosis Hyrtl's fissure was entertained. When the CT and MRI were revisited, a left Hyrtl's fissure was identified. During a third surgery the lateral component of this fissure was located and repaired. Intraoperative photographs and a video recording were obtained. Four potential causes of congenital cerebrospinal fluid otorrhea were identified. Results of the literature search were compared to the present case. **CONCLUSIONS:** Congenital cerebrospinal fluid otorrhea can occur through Hyrtl's fissure, as well as through the petromastoid canal, a wide cochlear aqueduct, or the facial canal. Although causes of congenital cerebrospinal fluid otorrhea are rare, it is important for the otolaryngologist and neuroradiologist to have a working knowledge of this potential cause of life-threatening meningitis.

PEDIATRICS

21. The Maxillary Line: Anatomical Characterization and Clinical Utility of an Important Surgical Landmark

John B. Chastain, MD, St. Louis, MO
Raj Sindwani, MD, Saint Louis, MO

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to describe the anatomic relations of the maxillary line and discuss its clinical utility in functional endoscopic sinus surgery and endoscopic dacryocystorhinostomy.

OBJECTIVES: The maxillary line is a mucosal projection along the lateral nasal wall which serves as a landmark for endoscopic sinus and orbital procedures. The anatomical relations of this structure are not well described. We sought to define the anatomy of the maxillary line and explore its clinical utility. **STUDY DESIGN:** Case series/cadaver dissection. **METHODS:** Twenty-five cadaveric nasal specimens were dissected. Extranasal and intranasal measurements of structures including the lacrimal crests, sac, and duct; the suture line between the maxillary and lacrimal bones; and the maxillary sinus ostium were taken. The midpoint of the maxillary line, termed the "M" point, was used for reference. The distance from the nasal sill to the "M" point was measured in 30 clinic patients. **RESULTS:** The maxillary line corresponded intranasally to the junction of the uncinata and maxilla, and extranasally, to the suture line between the lacrimal bone and maxilla within the lacrimal fossa. This suture was approximately half-way between the anterior and posterior crests. Axially, the plane of the "M" point corresponded to the superior margin of the maxillary sinus ostium posteriorly (average 10mm) and was just inferior to the lacrimal sac-duct junction anteriorly. In live subjects, the "M" point was approximately 4.2cm from the nasal sill in women and 5.0cm in men. **CONCLUSIONS:** Understanding the conserved relationships of the maxillary line and "M" point with adjacent nasal and orbital structures will ensure the complete removal of the uncinata process during uncinectomy and promote safe and ample exposure of the lacrimal sac during endoscopic dacryocystorhinostomy.

22. The Outpatient Evaluation and Treatment of Pediatric Epistaxis

John F. Damrose, MD, Chicago, IL
John A. Maddalozzo, MD, Chicago, IL

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to understand the complications associated with pediatric epistaxis, including anemia and undiagnosed coagulopathies. In addition, they should appreciate the rationale for the outpatient workup and treatment of pediatric epistaxis and the expected outcome from conservative medical therapy.

OBJECTIVES: Otolaryngologists are frequently consulted for the evaluation and treatment of pediatric epistaxis. However, there is no consensus as to the best approach for doing so. Should the routine evaluation of these patients include a complete blood count, tests of coagulation, and CT imaging of the sinuses to rule out a worrisome lesion? In addition, what treatment should be offered and what is the outcome of this treatment? This study sought to answer these questions. **STUDY DESIGN:** Retrospective review. **METHODS:** Review of 90 outpatient charts over a 3 year period presenting to the otolaryngology service of a tertiary children's hospital. **RESULTS:** Anemia and abnormalities on coagulation testing were found in 22% and 7.8% of subjects, respectively. A family history of bleeding, and even multi-symptomatic personal bleeding histories, may not reliably predict the presence of anemia or a coagulopathy. Of all the patients undergoing CT imaging of the sinuses, none demonstrated a worrisome mass. Over 50% of patients experienced resolution of their epistaxis by the second clinic visit with medical therapy aimed at rehydrating the nasal mucosa. **CONCLUSIONS:** The outpatient evaluation of pediatric epistaxis should include a complete blood count and tests of coagulation that screen for platelet function. CT imaging of the sinuses is unnecessary in the initial evaluation of these patients. The majority of cases resolve with conservative medical therapy directed at hydrating the nasal mucosa.

23. Bleeding Rate After Coblation Tonsillectomy in Children

David L. Walner, MD, Park Ridge, IL
Gregory S. Bussell, MD, Niles, IL
Lucille T. Parreno, BS, Niles, IL

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to discuss the bleeding rate from coblation tonsillectomy in children and use this information to compare the rate with other methods of tonsillectomy.

OBJECTIVES: To determine the rate of post-tonsillectomy hemorrhage following coblation tonsillectomy in the pediatric population. **STUDY DESIGN:** A prospective entry followed by a retrospective review of patients undergoing coblation tonsillectomy over a designated time period. All surgeries were performed by two board certified otolaryngologists. **METHODS:** All patients 18 years of age and younger that underwent coblation tonsillectomy between March 2003 and June 2004 were consecutively entered into the study. Data was collected as to each patient's age at the time of surgery, indication for surgery, past medical history, and if the patient experienced any postoperative bleeding that required either a trip to the emergency room or the operating room. Patients were excluded if they had any history of a bleeding disorder or abnormal coagulation profile, a family history of bleeding, or any previous tonsil surgery. **RESULTS:** One hundred sixty-seven patients underwent coblation tonsillectomy during the time period of the study. The average age of the patients was 6.37 years with an age range of 0.6 years to 18.9 years. A total of 2 patients experienced bleeding following surgery for a post-tonsillectomy bleeding rate of 1.2%. One patient experienced the bleeding on postoperative day #4 and the other on postoperative day #6. Both patients required control of the bleeding in the operating room with no further complications or sequelae. **CONCLUSIONS:** Coblation tonsillectomy in children results in a low postoperative hemorrhage rate.

24. School Performance and Extracurricular Activities in Paradoxical Vocal Fold Dysfunction

Ho-Wang Yuen, BS, Milwaukee, WI
Nalin J. Patel, MD, Milwaukee, WI
Carol Jorgensen, MA, Milwaukee, WI
Megan McGowan, BS, Milwaukee, WI
Albert L. Merati, MD, Milwaukee, WI

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to recognize the social and educational environment of students with paradoxical vocal fold dysfunction. The audience will become familiar with the management issues unique to this high functioning group.

OBJECTIVES: Paradoxical vocal fold dysfunction (PVFD) is a laryngeal disorder in which there is inappropriate and unintentional vocal fold adduction during inspiration. Previous investigators have noted that this population is high achieving, though this observation has yet to be studied in detail. The objective of this study is to characterize school performance and extracurricular activity involvement in this patient population. **STUDY DESIGN:** Retrospective chart review. **METHODS:** A detailed patient history, including information about school performance and extracurricular activities, was completed prospectively by all patients with paradoxical vocal fold dysfunction seen at our institution between December 2002 and December 2003. This data was then collected for analysis in a retrospective manner. **RESULTS:** 47 surveys were collected; 33 patients were enrolled in school at the time of the clinic visit. The mean age of the patients was 15 years (range, 5-24 years). There were 29 females and 4 males. 29 of the 33 (87.8%) reported their grade point average (GPA); the mean GPA in the group was 3.51. 14/33 (42.4%) patients reported involvement in more than 4 extracurricular activities. Among the group the most popular activities listed included basketball (14), soccer (11), softball/baseball (8), wind musical instrument (8), and choir (8). **CONCLUSIONS:** The results of this survey reflect a high level of school success and involvement in extracurricular activities in our patients with PVFD. Further studies may detail this relationship and its association to potential cofactors, such as personality type and socioeconomic status.

PLASTIC AND RECONSTRUCTIVE

25. Self-Drilling Intermaxillary Fixation Screws: Applications in Craniofacial Trauma

Vu T. Ho, MD, Minneapolis, MN

Frank G. Ondrey, MD PhD, Minneapolis, MN

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to understand the intermaxillary fixation screw (IMFS) technique and its applications in the management of selected craniofacial trauma cases.

OBJECTIVES: To expand the application of IMFS technique in selected craniofacial trauma. To compare the efficiency of an alternative maxillomandibular technique by its potential to shorten operating time in craniofacial trauma surgery. **STUDY DESIGN:** Retrospective review of the authors' series of 10 cases at a Level 1 trauma medical center. **METHODS:** Retrospective chart review of mandibular or maxillary fractures utilizing the IMFS technique as a portion of their management. Screws were placed medial or lateral to the canine fossae of the maxillary teeth and lateral to the canine root of the mandibular teeth. Alternative maxillomandibular fixation with the IMFS technique was performed as per the authors' usual practice using arch bars and dental wires. **RESULTS:** Nine patients with mandibular and one with a palate fracture were partially managed with the IMFS technique. All mandibular fracture patients underwent open reduction and internal fixation after IMFS placement. Patients were maintained in maxillomandibular fixation with IMFS postoperatively for up to 3 weeks. Screws were removed without difficulty for up to 7 weeks. We demonstrated increased efficiency of managing these craniofacial injuries with judicious use of IMFS, manifested mainly by decreasing the operative time of repair. Application of IMFS required 5-15 minutes, saving approximately 2/3 the time when compared with using standard IMF technique of arch bars. For available follow-up, no complications or patient complaints related to hardware utilization were reported. **CONCLUSIONS:** Increased efficiency of the management of selected craniofacial trauma by judicious use of the IMFS technique, including decreased operating time. Self-drilling IMFS can be utilized to achieve maxillomandibular fixation beyond the intraoperative period. Also, this represents the report of a new method of palatal fracture reduction.

26. Plate Fracture Following Reconstruction of the Mandible

Vincent S. Toma, MD, Detroit, MI

Robert H. Mathog, MD*, Detroit, MI

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to discuss factors leading to reconstruction plate fracture, as well as prevention and treatment options.

OBJECTIVES: To discuss factors leading to reconstruction plate fracture, as well as prevention and treatment options. **STUDY DESIGN:** Retrospective clinical chart review. **METHODS:** Plate fractures were evaluated using a retrospective review of inpatient and outpatient records from 1993-2003. Literature was also reviewed for incidence, cause of plate fracture, biomechanical considerations and treatment options for jaw reconstruction. **RESULTS:** One patient fell causing the plate fracture. Another patient had a plate fracture occur while chewing food; the other two plate fractures were discovered without cause by the sudden development of pain and/or malocclusion. Defects of the body and angle of the mandible from 3-6 centimeters were bridged by either titanium or vitallium reconstruction plates. Fractures of plates occurred anteriorly in three plates and posteriorly in one. Except for one patient who is noted to be edentulous, all patients had a satisfactory number of teeth for mastication. The time to fracture was 1-4 years. Repair was accomplished either by removal of the old fracture plate with replacement with the new plate (two patients) or by new plates over bone grafts (two patients). **CONCLUSIONS:** In a review of our experience and pertinent literature, there apparently is no perfect commercially prepared reconstruction plate. Although bending has not been shown to be a major cause, the metal can fatigue and plates that better fit the contour and size of the defect with minimal bending should be preferred. In patients who have a satisfactory dentition, the preoperative occlusal relationships should be established to avoid premature contact and excessive forces. Although plates are considered temporary devices, long-term experience is generally good and the patient should be managed by watchful waiting after the reconstruction. Plate fracture can be successfully treated with a new plate with or without vascularized or free bone grafts.

27. Laryngeal Function After Vagal Nerve Stimulation in Refractory Epilepsy Patients

Andrew W. Celmer, MD, Kansas City, KS

Michael J. Hammer, MA, Kansas City, KS

Ivan A. Osario, MD, Kansas City, KS

Douglas A. Girod, MD, Kansas City, KS

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to discuss the most common adverse effects of vagal nerve stimulation and correlate these symptoms with observed laryngeal changes during pulse vagal nerve stimulation (VNS).

OBJECTIVES: To utilize video stroboscopy to identify and quantify changes in laryngeal function with altered voice quality during pulsed vagal nerve stimulation in refractory epilepsy patients. **STUDY DESIGN:** Retrospective chart review. **METHODS:** A retrospective review was completed of 16 patient charts that had undergone VNS implantation at a tertiary care center for treatment of refractory epilepsy. Subjective voice quality was compared with videostroboscopic examination at three different time intervals: 1) pre-implantation, 2) post-implantation with device off, and 3) post-implantation during pulse stimulation. Results were then used to determine if implant settings had any effect on voice quality or observed laryngeal function. **RESULTS:** In a majority of patients (63%), the vocal cord on the implanted side was noted to become fixed in a paramedian or lateral position during pulse stimulation. In the remaining patients, there were no or little observed effects. As expected, those with observed laryngeal changes were noted to have significant alteration in voice quality. In a small subgroup of patients (7%), there did not appear to be any changes in laryngeal function over time. There was no correlation between VNS settings and changes in laryngeal function or voice quality. **CONCLUSIONS:** Vagal nerve stimulation is a safe adjunct therapy for patients with refractory epilepsy. Previous studies reported that patients uniformly had fixation of the affected vocal cord in the paramedian position. In our larger study, not all patients had uniform changes in laryngeal function. Unfortunately, changes in laryngeal function were not shown to correlate with vagal nerve stimulator settings. Future studies should focus on explaining variations in laryngeal function in order to minimize adverse effects of vagal nerve stimulation.

28. Endoscopic Approaches in Frontal Sinus Lesions Associated With Posterior Table Dehiscence

Srikanth I. Naidu, MD, Cordova, TN
Rakesh K. Chandra, MD, Memphis, TN
David W. Kennedy, MD*, Philadelphia, PA

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to describe the role of endoscopic sinus surgery (ESS) in the management of expansile frontal sinus pathology associated with posterior table dehiscence.

OBJECTIVES: Expansile pathology of the frontal sinus may disrupt the bony integrity of the posterior table. These cases have traditionally been approached via an osteoplastic flap. **STUDY DESIGN:** Retrospective case series. **METHODS:** Retrospective review of 7 patients with lesions associated with posterior table dehiscence who were managed using endoscopic techniques. **RESULTS:** The study group comprised 7 males with a mean age of 52 years. Five patients presented with mucocoeles and two with allergic fungal sinusitis extensively involving the frontal sinus. Four of the 5 patients with mucocoeles had prior obliteration. All patients underwent ESS as the primary approach, utilizing image guidance in 6/7. Five lesions were addressed with Draf IIa procedures, one with Draf IIb sinusotomy, and one via a Draf III procedure. Trephine for sinuscopy and irrigation was performed in 3/7 cases. This revealed fungal debris (2) or desiccated pus (1) in the lateral extent of the sinus that was not visible from below using a 70 degree telescope. No patient suffered CSF leak or other surgical complications, but one died of CHF 4 weeks postoperatively. Mean follow-up in the remaining patients was 6.3 months (range 2-13.5). One patient required revision ESS during the follow-up interval. **CONCLUSIONS:** Frontal sinus lesions with posterior table dehiscence can be safely managed endoscopically using angled telescopes and instrumentation without an osteoplastic flap. A trephine for sinuscopy and irrigation may be a useful adjunct. Expansile pathology may widen the frontal recess, augmenting safe endoscopic access in the selected cases. Long-term follow-up is necessary for this cohort.

29. Cholesterol Granuloma of the Maxillary Antrum: An Unusual Destructive Cyst of the Head and Neck

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Michael Rontal, MD*, Farmington Hills, MI
Eugene Rontal, MD*, Farmington Hills, MI

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to diagnose and treat benign, destructive cystic lesions of the maxillary sinus.

OBJECTIVES: Discussion of benign, destructive, cystic lesions of the maxillary sinus. **STUDY DESIGN:** Case report and review of the literature. **METHODS:** Description of presentation, workup, and treatment of index case. Literature review using Medline search and discussion. **RESULTS:** Cystic lesions of the paranasal sinuses are extraordinarily common. In terms of bone involvement malignant and odontogenic lesions tend to cause bony destruction whereas benign cysts of the maxillary sinus are rarely symptomatic unless they obstruct the ostiomeatal complex. However, there is a subpopulation of benign cysts that can result in bone resorption. One such type of benign lesion is the cholesterol granuloma. Cholesterol granuloma of the maxillary sinus is rare; only 44 have been reported in the literature since 1964. **CONCLUSIONS:** A case is reported of a patient with this cholesterol granuloma of the maxillary sinus destroying the medial antral wall, the septum, and the palate. The literature is reviewed and the differential diagnosis and treatment are examined in detail.

30. Transnasal, Endoscopic Injection Laryngoplasty

Douglas K. Trask, MD PhD, Iowa City, IA
Henry T. Hoffman, MD, Iowa City, IA
David L. Shellenberger, MD, Iowa City, IA

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to compare the different approaches to injection laryngoplasty and should be able to demonstrate working knowledge of how to perform transnasal, endoscopic injection laryngoplasty.

OBJECTIVES: Injection laryngoplasty for unilateral vocal fold paresis is traditionally performed by percutaneous or transoral routes. However, these methods are marked by poor patient tolerability and a less invasive technique is warranted. Advances in flexible nasal fiberoptic instrumentation allow for excellent visualization of the larynx and operative ports within the endoscope allow for delivery of multiple materials via the port. Our aim is to develop a novel, less invasive method of vocal fold augmentation. **STUDY DESIGN:** This is a pilot study to develop and improve endoscopic based injection laryngoplasty. **METHODS:** After topical anesthesia and decongestion of the nose and oral cavity, transnasal laryngoscopy employing an endoscope with side-port was performed. Laryngeal anesthesia was obtained with topical 4% lidocaine applied through the side-port. A 23 gauge clear injection therapy sheath/needle was preloaded with micronized acellular dermis and protruded from the endoscope after fiberoptic visualization. Augmentation was then completed under endoscopic guidance. **RESULTS:** We describe a novel delivery system based upon transnasal fiberoptic laryngoscopy utilizing the operative port. This system allows superior visualization of the larynx in its functional state, is less invasive than percutaneous techniques, circumvents the gag reflex often encountered in the transoral approach, and provides for a controlled, effective delivery method of even highly viscous substances. **CONCLUSIONS:** This outpatient based technique improves delivery options, is well tolerated by patients, and provides a superior alternative to conventional injection methods.