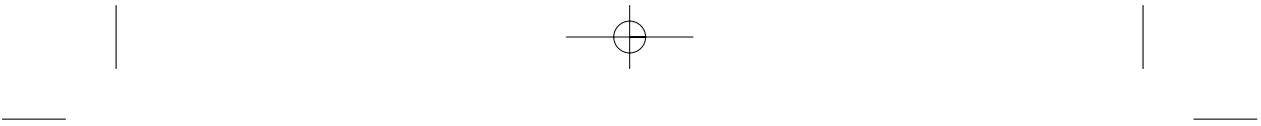




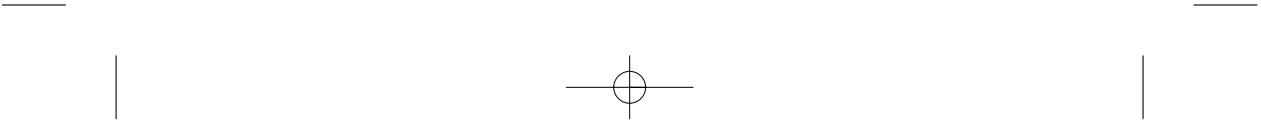
54th
annual meeting
of the American Rhinologic Society

September 20, 2008

Sheraton Hotel & Towers, Chicago, Ill



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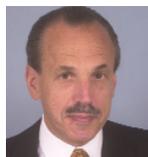
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 2007 - 2008 Marvin P. Fried, MD

**Deceased*

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 1999 - 2005
 Marvin P. Fried, MD

 1995 - 1999
 Frederick Stucker, MD

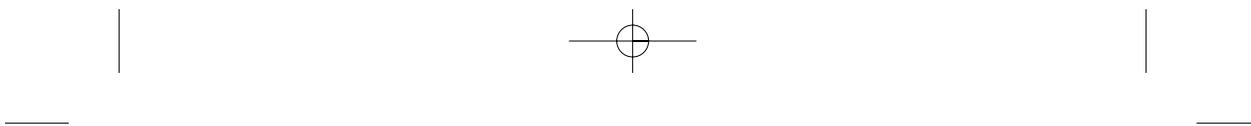
 1990-1995
 Frank Lucente, MD

 1985-1990
 George Facer, MD

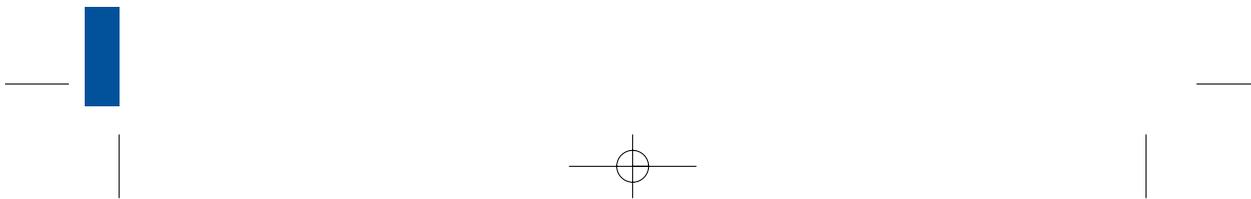
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 Pat A. Barelli, MD

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ARS Mission Statement

The American Rhinologic Society's mission is to serve, represent and advance the science and ethical practice of rhinology. The Society promotes excellence in patient care, research and education in Rhinology and Skull Base Disorders. The American Rhinologic Society is dedicated to providing communication and fellowship to the members of the Rhinologic community through on-going medical education, patient advocacy, and social programs. The ARS continuing medical education activities serve to improve professional competence, performance, and promote research.

Educational Objectives

This activity will consist of presentations from abstracts selected by the program committee through a blinded review process. Panel discussions will be held based on prior participant feedback. The specific objectives are as follows:

1. To understand recent surgical innovations
2. To implement new types of medical therapy
3. To make changes in surgical techniques
4. To learn the latest basic science and how it relates to patients

Goal

The goal of this activity is to improve competence surgically and medically and to increase the knowledge of techniques, outcomes and basic science.

Outcomes

The practitioner should be able to incorporate recent therapeutic modalities, both medical and surgical, into patient care. The practitioner should be able to understand the basic science investigations in the field of rhinology. Patient care is benefited by the appropriate use of medical and surgical use of rhinologic disorders. Success is measured by increased patient compliance with treatment and reduced surgical complications.

Target Audience

Otolaryngologists, Head and Neck Surgeons, Allergists, Rhinologists, Residents in Training and interested Allied Health professionals. The American Rhinologic Society is dedicated to providing communication and fellowship to the members of the Rhinologic community through on-going medical education, patient advocacy, and social programs.

Purpose

The American Rhinologic Society's mission is to serve, represent and advance the science and ethical practice of rhinology leading to the improvement in professional competence, performance and ultimately, patient outcomes.

Accreditation

Physicians

The American Rhinologic Society (ARS) is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

AMA PRA Statement

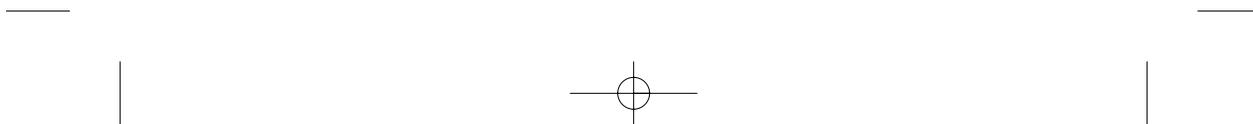
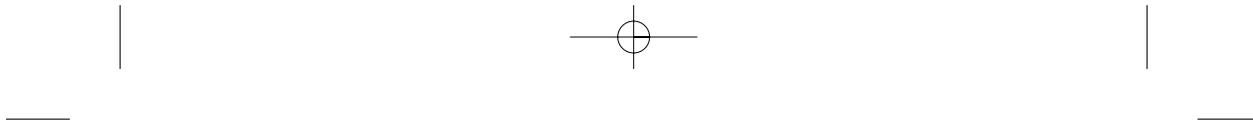
ARS designates this educational activity for a maximum of 7.15 AMA PRA Category 1 Credit(s)[™]. Physicians should only claim credit commensurate with the extent of their participation in the activity.

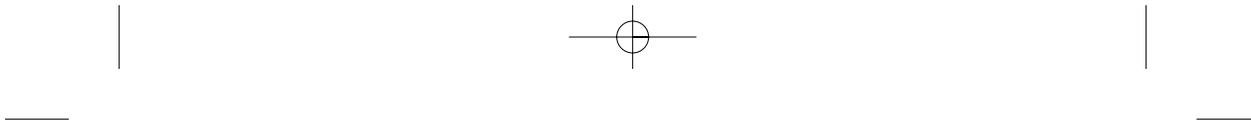
Conflict of Interest Policy

The “Conflict of Interest Disclosure Policy” of the American Rhinologic Society requires that faculty participating in any CME activity disclose to the audience any relationship(s) with a pharmaceutical or equipment company. Any presenter whose disclosed relationship proves to be in conflict with regard to their contribution to the activity, or who refuses to provide all their conflict of interest information, will not be permitted to present. The American Rhinologic Society also requires that faculty participating in any CME activity disclose to the audience when discussing any unlabeled or investigational use of any commercial product, or device, not yet approved for use in the United States. All faculty participating in a CME activity and/or any person in a position to control the content of a CME activity must complete a conflict of interest (COI) form in its entirety.

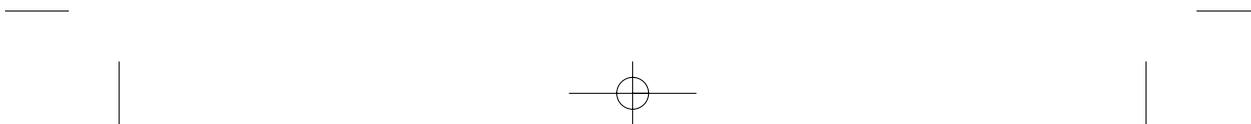
These will be reviewed by the CME Committee Chair and the committee members. If there is a question about the potential for a real conflict of interest, then the ARS Conflict of Interest Committee will contact the faculty and either satisfactorily resolve the potential conflict of interest, so as to allow the faculty to make a presentation by either clarification of the potential COI, or modification of the COI, or not permit the faculty to present at the CME activity, should the COI be real and irresolvable.







Oral Presentations



7:00am - 7:50am

Breakfast Symposium

(Supported by Medtronic)

Portable and Intraoperative CT Imaging Indications and Credentialing

7:00am-7:08am

Indications

Joseph Jacobs, MD

7:08am-7:16am

Accuracy and Radiation Exposure Using a Cadaver Model

Subinoy Das, MD

7:16am-7:24am

Intraoperative Use

Robert Kern, MD/David Conley, MD

7:24am-7:32am

Credentialing

James Palmer, MD

7:32am-7:45am

Discussion/Question & Answers

8:00am

Introduction/Secretaries Recognition

Marvin P. Fried, MD, President

Moderators: Pete Batra, MD / John DelGaudio, MD

8:07am-8:14am

Effects of a LL-37 Derived Antimicrobial Peptide in an Animal Model of Pseudomonas Sinusitis

*Sri Chennupati, MD, Alexander Chiu, MD, Edwin Tamashiro, MD, Noam Cohen, MD PhD
Philadelphia, PA*

Introduction:

LL-37, an innate immunity protein expressed within nasal mucosa, is hypothesized to defend against inhaled pathogens. In vitro, LL-37 has antibacterial and antifungal activity and against pre-formed *S. aureus* and *P. aeruginosa* biofilms. We hypothesize that a 24 amino acid peptide derivative of LL-37 with increased cationicity will demonstrate efficacy against *Pseudomonas* in an established animal model of sinusitis.

Methods:

Five groups of 6 New Zealand rabbits were each infected with *P. aeruginosa* (PAO1) and fitted with irrigating catheters into the infected maxillary sinuses 7 days later. Each group was instilled with one of three different concentrations of peptide, a positive control of topical tobramycin, or the carrier solution without the peptide once a day for 10 days. Nasal diluent was collected to measure CFU's and after sacrifice, sinus mucosa was harvested for histologic assessment of inflammation and SEM evaluation for ciliary integrity.

Results:

Topical tobramycin was effective in significantly lowering CFU's after 10 days of irrigation. The highest concentration of peptide mirrored tobramycin while the other concentrations had no effect on lowering CFU's. Histologic evaluation demonstrated marked inflammation in a dose-dependent manner within the mucosa and bone of the groups receiving the derivative peptide. SEM analysis demonstrated ciliary loss, again in a dose dependent manner.

Discussion:

Although promising as an in vitro agent, the LL-37 peptide derivative in vivo demonstrated pro-inflammatory and ciliotoxic effects on sinus mucosa at effective concentrations. This study underscores the importance of conducting animal trials prior to human application of novel topical therapeutics for sinusitis.

8:14am-8:21am

Vectorial Ion Transport in Murine Airway and Human Sinonasal Air-liquid Interface Cultures

*Bradford Woodworth, MD, Shaoyan Zhang, MD, James Fortenberry, MD, Eric Sorscher, MD
Birmingham, AL*

Introduction:

The purpose of the current study was to compare vectorial ion

transport within murine trachea(MT), murine nasal septa(MS), and human sinonasal(HS) cultured epithelium. Our hypothesis is that MS epithelium, rather than MT, will more closely mimic the electrophysiology properties of HS epithelium.

Materials and Methods:

Epithelium from MT, MS, and HS tissue were cultured at an air-liquid interface to confluence and full differentiation. A limited number of homozygous dF508 MS epithelia were also cultured. Monolayers were mounted in modified Ussing chambers to investigate pharmacologic manipulation of ion transport.

Results:

The change in forskolin-stimulated current (I_{sc} -expressed as $\mu A/cm^2$) in MS (n=19; 16.84 \pm 2.09) and HS (n=17; 12.32 \pm 2.04) cultures was significantly increased over MT cultures (n=6; 2.68 \pm 1.0) p=0.01 and 0.001, respectively}. All forskolin-stimulated I_{sc} was inhibited by the specific CFTR inhibitor INH-172 (5 μM). No forskolin-stimulated I_{sc} was demonstrated in cultures of dF508 homozygous MS epithelium (n=3). MS I_{sc} was largely inhibited by amiloride (12.03 \pm 0.66), while HS cultures had a very limited response (0.77 \pm 0.52) p<0.0001}. Baseline I_{sc} due to Cl⁻ secretion was not significantly different between groups (MS_i 4.55 \pm 2.18; HS_i 3.17 \pm 0.63; MT_i 1.77 \pm 0.67). However, the contribution of CFTR to total stimulated Cl⁻ current as measured by INH-172 was highly significantly different between all groups (MS-19.51 \pm 1.28, HS-11.12 \pm 1.58, MT-4.85 \pm 0.49) p<0.0001}.

Conclusions:

HS and MS epithelial cultures represent a useful model for studying CFTR activity and may provide significant advantages over lower airway tissues for the study of upper and lower respiratory pathophysiology.

8:21am-8:28am

The Efficacy of a Novel Chitosan Gel on Haemostasis Following Endoscopic Sinus Surgery in a Sheep Model of Chronic Rhinosinusitis

*Rowan Valentine, MD, Theo Athanasiadis, MD, Peter-John Wormald, MD
South Australia*

Introduction:

Post operative bleeding remains a major problem following endoscopic sinus surgery (ESS). Patients who continue to bleed following ESS are at risk of airway compromise from inhalation of blood clots, or from aspiration of blood stained vomitus. The aim of this study is to determine the in vivo efficacy of a novel gel on haemostasis following ESS in a sheep model of chronic rhinosinusitis.

Methods:

Twenty one sheep infested with *Oestrus ovus* underwent ESS with standardized mucosal injuries created at the anterior ethmoid region using a microdebrider. Immediately following injury a baseline bleeding time was taken using the Boezaart Surgical Field Grading Scale. Computer randomisation was performed to either receive Chitosan/Dextran gel (CD gel), or no treatment (control). Boezaart bleeding scores were calculated for each side every two minutes. Each post-operative day videoendoscopy was performed to document crusting/CD gel dissolution.

Results:

The CD gel side was significantly more haemostatic at 2, 4 and 6 minutes after injury. Average time to haemostasis was significantly better for the intervention side vs control side, 4.09 (± 1.61) vs 6.57 (± 2.20) respectively ($p=0.049$). Complete haemostasis occurred by 6 minutes for all CD gel sides, however control side bleeding was noted on 3 sides at 8 minutes and 1 at 10 minutes. There was no significant difference in crusts scores at day 1, 3, 7 and 14.

Conclusion:

In the sheep model of ESS, CD gel significantly improves haemostasis compared to control at 2, 4 and 6 minutes following mucosal injury.

8:28am-8:35am
Discussion (Q/A)

Moderators: Jay Dutton, MD / Robert Kern, MD

8:35am-8:42am
Induction of Epithelial Cell C-met Expression by Th2 Cytokines in Chronic Rhinosinusitis with Polyps

*Douglas Reh, MD, Yadong Wang, BS, Leda Pawliuk, BS, Andrew Lane, MD
Baltimore, MD*

Background:

Chronic rhinosinusitis with polyps (CRSwNPs) is a disorder characterized by persistent Th2 inflammation. Recent genomic wide expression microarray studies have identified c-Met, a receptor for an epithelial cell growth factor, to be overexpressed in CRS polyps as compared to normal sinonasal mucosa. The relationship between Th2 inflammatory cytokines and c-Met expression in human sinonasal epithelial cells (HSNECs) has not been explored.

Methods:

HSNECs isolated from control subjects, patients with chronic rhinosinusitis without nasal polyps (CRSsNP), and patients with CRSwNP were grown in cell culture. The Th2 cytokines IL-4 and IL-13 were added to the media for 24 hours, after which time the cells were harvested and RNA was extracted. c-Met mRNA expression was assessed by real-time PCR.

Results:

HSNECs obtained from patients with CRSwNP demonstrated increased expression of c-Met after exposure to Th2 cytokines. Expression of c-Met in CRSsNP and control HSNECs did not significantly change after IL-4 and IL-13 incubation.

Conclusion:

Sinonasal epithelial cells derived from patients with CRSwNP, but not from controls or patients with CRSsNP, increase expression of c-Met in response to Th2 cytokines. This result helps explain the association between elevated c-Met expression and CRSwNP identified in a previous microarray analysis. Abnormal epithelial cell responses to environmental triggers and to endogenous cytokines and growth factors may play a role in CRSwNP pathogenesis.

8:42am-8:49am

The Prevalence of Fluoroquinolone-resistant Pseudomonas Aeruginosa in Chronic Sinusitis

Joel Guss, MD, Waleed Abuzaid, MD, Adrienne Laury, BA, Alexander Chiu, MD Philadelphia, PA

Objectives:

Pseudomonas aeruginosa is cultured in nearly 35% of patients with chronic rhinosinusitis and previous endoscopic sinus surgery. Fluoroquinolones are the only enterally administered antibiotics with efficacy against *Pseudomonas*, but their frequent use raises concern for a rise in resistance. The goal of this study is to determine the prevalence of fluoroquinolone-resistant *Pseudomonas* in a tertiary rhinology practice.

Study Design:

Retrospective case series

Methods:

All bacterial culture results from the outpatient Otolaryngology clinic that yielded *P. aeruginosa* over a six year period were reviewed along with each patient's medical record.

Results:

In total, 689 culture results in 324 patients were examined. Nearly all patients had a history of endoscopic sinus surgery. Of all *P. aeruginosa* cultured, 13% were resistant to

levofloxacin and 5% were intermediately sensitive, while 5% were resistant to ciprofloxacin and 7% intermediately sensitive. Of the 324 patients in the study, 19% and 15% had a history of a *Pseudomonas* culture resistant to levofloxacin or ciprofloxacin, respectively. Muroid strains of *P. aeruginosa* were significantly more likely to be fluoroquinolone-resistant. No patient co-morbidities were associated with a higher rate of resistance. The prevalence of resistant cultures remained stable over the six year study period.

Conclusions:

A significant minority of *Pseudomonas* cultured from patients with previous sinus surgery was resistant to fluoroquinolones. Resistance to levofloxacin is more common than resistance to ciprofloxacin. This adds support to the use of culture-directed therapy in the management of the post-FESS patient and the avoidance of empiric use of fluoroquinolones.

8:49am-8:56am

Local IgE Production in Non-Atopic Nasal Polyposis

*Rodney Schlosser, MD, Patrick Sheahan, MD, Chad Ahn, MD, Richard Harvey, MD
Charleston, SC*

Introduction:

Chronic rhinosinusitis with nasal polyposis (CRSwNP) represents an eosinophilic Th2 inflammatory response. Over-expression of local IgE has been demonstrated in patients with systemic allergies. Approximately half of CRSwNP patients have no demonstrable systemic atopy and the pathophysiology of their NP development is unclear. The possible role of local mucosal IgE expression at various anatomic sites within the sinonasal cavity in non-atopic CRSwNP patients was examined.

Methods:

Sinus and inferior turbinate tissue was obtained from non-atopic CRSwNP, chronic rhinosinusitis without nasal polyposis

(CRSsNP) and healthy controls (9 patients in each group) at the time of surgery. Immunocap analysis for 14 common inhalant antigens (Ags) was performed on tissue homogenates to determine Ag-specific response. Immunohistochemistry was performed on tissue from the same patients for histologic localization and semi-quantitative analysis of total IgE.

Results:

Total and Ag-specific sinus tissue IgE, using Immunocap or immunohistochemistry analysis, did not differ between CRSwNP, CRSsNP or control patients (all $p>0.35$). There was no significant difference between sinus and inferior turbinate tissue within any group ($p>0.40$).

Conclusions:

Localized mucosal IgE response to common inhalant Ags does not appear to play a significant role in the development of NP in patients without evidence of systemic atopy. It is likely that non-IgE mediated mechanisms contribute to localized eosinophilic Th2 response within this population.

8:56am-9:03am

Discussion (Q&A)

9:03am-9:10am

Presidential Address “The State of the ARS”

Marvin P. Fried, MD

Moderators: Peter Catalano, MD / Todd Loehrl, MD

9:10am-9:17am

Frontal Sinus Inverted Papilloma: Surgical Strategy Based on the Site of Attachment

*Hwan-JungRoh, MD, Bit-Na Yoon,MD, Pete Batra,MD, Martin Citardi
Busan, South Korea*

Objectives:

The surgical management of frontal sinus (FS) inverted papilloma (IP) remains a challenge given the narrow confines of the frontal recess and the close proximity to critical structures. The objective of this study was to elucidate a surgical strategy for management of frontal sinus IP based on the site of attachment.

Method:

Retrospective chart review was performed on 18 patients with FS IP between 1998 and 2008.

Results:

The mean age was 53.8 years with a male-to-female ratio of 13:5. The sites of tumor attachment included the medial wall (MW) (6), posterior wall (PW) (5), diffuse (all walls involved) (5), intersinus septal cell (3), lateral wall (2), and anterior wall (2). IP involvement was unifocal in 10 cases and multifocal in 8 cases. Unifocal IP attached to the MW or PW was managed strictly by endoscopic frontal sinusotomy (eFS) in 5 of 6 cases (83%). Multifocal IP required endoscopic modified Lothrop (EML) and/or open approaches (osteoplastic flap [OPF] - 1, endoscopic frontal trephination - 4) in 7 of 8 cases (88%). One additional patient with bilateral anterior table involvement required OPF. Four patients developed recurrence. Two were managed by EML, one by eFS, and one by endoscopic frontal trephination and eFS. Two patients developed cerebrospinal fluid leaks all managed endoscopically without untoward effects. All patients were free of disease at the time of last evaluation with mean follow-up of 29.8 months.

Conclusion:

Frontal sinus IP with medial or posterior wall involvement can generally be managed by standard eFS. Tumors with multifocal involvement often require EML, along with adjunct endoscopic frontal trephination in selected cases. OPF can be avoided as primary surgical approach in most patients.

9:17am-9:24am

Systemic Glucocorticoid Effects on Nasal Polyposis: a Proteomics Study

*Armin Farajzadeh Deroee, MD, Christian Scharf, PhD,
Mohsen Naraghi, MD, Werner Hosemann, MD
Greifswald, Germany, Tehran Iran*

Introduction:

Nasal polyposis (NP) treatment and pathophysiology have been always challenging for otolaryngologists. Among the medical treatments for NP, glucocorticoids have been always one of the mainstays but the mechanisms of their action are not well defined. Identifying and comparing the protein profile of NP before and after treatment with glucocorticoids can help to clarify NP pathogenesis and mechanisms of glucocorticoids effects on NP.

Methods:

Samples of nasal polyps were taken from selected NP patients in work up for endoscopic sinus surgery. None of the patients used local or systemic corticosteroids within 30 days prior the sampling. The patients were given prednisone 30mg/d for 4 days before the surgery to shrink the NP tissue. Nasal polyp samples were collected during surgery. Proteins from samples were extracted and separated by immobilized pH gradient (IPG)-based two-dimensional difference gel electrophoresis (2-D DIGE). Resulting 2D-gel images were statistically analyzed using Delta2D software and differently expressed protein spots were identified by matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF/TOF-MS).

Results:

A reference map of approximately 1250 proteins could be established. Expression of 45 proteins changed significantly (2-fold, $p < 0.05$) due to the treatment of NP with glucocorticoids. Up to now several of these significantly changed proteins could be identified by MALDI-TOF/TOF-MS.

Conclusion:

Biologic function of the changed proteins will be discussed concerning the pathogenesis of NP. Identifying the changes of NP proteome due to glucocorticoids and the biological functions of proteins can lead to new ways of treatment and open new fields in NP research.

9:24am-9:31am

Discussion (Q&A)

Moderators: Bradley Marple, MD / Paul Toffel, MD

9:31am-9:38am

In Vivo Laser Tissue Welding in the Rabbit Maxillary Sinus

*Benjamin Bleier, MD, James Palmer, MD, Michael Anne Gratton, PhD, Noam Cohen, MD PhD
Philadelphia, PA*

Introduction:

One of the challenges in the current expansion of endoscopic endonasal surgery is the ability to adequately reconstruct the skull base. Laser Tissue Welding (LTW) utilizes laser energy coupled to a biologic solder to produce tissue bonds with burst thresholds exceeding human intracranial pressure. The objective of this study was to determine whether LTW can create durable tissue bonds in sinonasal mucosa which support normal wound healing and produce minimal collateral thermal injury.

Methods:

Bilateral maxillary sinus mucosal incisions were made in twenty New Zealand White Rabbits and one side was repaired using LTW. Burst pressure thresholds were measured on post-operative day 0, 5, and 15 and were compared to control using a 2- way ANOVA and a post-hoc Tukey test. Welds were examined histologically for thermal injury and graded on a 3- point scale.

Results:

The burst pressures of the LTW group were significantly higher than control on post-operative day 0 (120.85mmHg, SD=47.84 vs. 7.85mmHg, SD=0.78), and day 5 (132.56mmHg, SD=24.02 vs. 41.7mmHg, SD=7.2)($p<0.05$). By post-operative day 15 there was no significant difference between LTW (169.64mmHg, SD=18.49) and control (160.84mmHg, SD=14.16) burst thresholds. There was no evidence of thermal injury to the surrounding tissue in any group.

Conclusions:

This is the first in vivo study demonstrating that Laser Tissue Welding is capable of producing tissue bonds exceeding human intracranial pressure with negligible thermal injury in sinonasal tissue. Welding can be performed endoscopically using a fiberoptic cable and may be useful in cerebrospinal fluid leak and skull base repair.

9:38am-9:45am (2008 TRAVEL GRANT AWARD RECIPIENT) Management of Sinonasal Malignant Neoplasms: Defining the Role of Endoscopy

*Amber Luong, MD PhD, Martin Citardi, MD, Pete Batra, MD
Cleveland, OH*

Background:

Preliminary reports support the role of endoscopic techniques in the management of selected sinonasal malignancies. The objectives of this review were (1) assess outcomes for patients undergoing definitive endoscopic tumor extirpation and (2) elucidate the role of endoscopy in the management of sinonasal malignancies.

Methods:

Retrospective data analysis of patients with biopsy-proven sinonasal malignancy managed via endoscopic techniques from September 1998 to December 2007 was conducted.

Results:

Sixty-eight patients were identified (40 males and 28 females) with a mean age of 60 years. The 5 most common pathologies were SCCA (24), melanomas (11), esthesioneuroblastomas (8), adenocarcinomas (7), and SNUC (4). All endoscopic procedures were categorized according to surgical intents: 59 resections for curative intent (77%), 11 biopsies (13%), 5 tumor mappings (9%) and 7 resections for palliative intent (6%). Of the 50 patients who underwent definitive resection, the local and regional recurrence rates were 20% and 8%. Adjuvant chemotherapy and/or radiation therapy was utilized in 28 of the 50 patients (56%). For those patients undergoing definitive treatments, the disease-free survival and overall survival rates were 55.8% and 88.4% at mean of 25.5 and 39.8 months, respectively.

Conclusion:

The endoscope is a versatile tool for management of sinonasal malignant neoplasms. Although the role was once just limited to biopsy, endoscopic approaches allow for definitive resection for curative intent and palliative resection for patient comfort with acceptable survival. Moreover, endoscopy facilitates three-dimensional tumor mapping and surveillance in patients undergoing definitive chemoradiation.

9:45am-9:52am

Efficacy of Maximal Medical Treatment in Chronic Rhinosinusitis, and Predictors of Failure

*Devyani Lal, MD, Joseph Scianna, MD, James Stankiewicz, MD
Maywood, IL*

Background:

No standardized medical therapy for chronic rhinosinusitis (CRS) is universally accepted. Though success of medical therapy is reportedly 50-88%, studies differ in inclusion criteria, medications, duration of therapy and defining "success".

Objectives:

1. Determine efficacy of standardized maximal medical therapy (MMT) in CRS patients 2. Analyze factors associated with failure of MMT.

Methods:

Retrospective analysis of prospectively collected data was performed. MMT was defined as a minimum 4-week treatment with oral antibiotics, oral steroids, topical nasal steroids, topical nasal decongestant rotation and saline nasal douching. "Failure" was defined as relapse/ persistence of signs/symptoms, or need for surgery. Reviewing 2359 consecutive patient encounters from 2006-2007 in a tertiary-care clinic yielded 145 CRS patients that received MMT with a minimum 2-month follow-up. Failures of MMT were compared to those successfully treated by analyzing variables collected on all patients (history, examination and radiographic findings).

Results:

74 patients (51.03%) were successfully treated. Failures included 26 patients (17.8%) with only partial improvement and 45 (31.03%) who underwent surgery. History of facial pressure/ pain ($p=0.049$), presence of mucosal inflammation ($p= 0.013$) and higher endoscopic severity grade ($p= 0.011$) were associated with failure of MMT.

Conclusions:

Employing strict criteria for diagnosis, therapy and analysis of efficacy of medical therapy in CRS, the study reports that MMT was unequivocally successful in 51% of patients. Failures included 31% who underwent surgery and 18% with partial benefit. Surgery was avoided in 69%. Facial pressure/ pain, mucosal inflammation and higher endoscopic severity grade are associated with failure of medical therapy.

9:52am-9:59am
Discussion (Q&A)

9:59am-10:20am
Break with Exhibitors
River Exhibition B

Moderators: James Stankiewicz, MD / Roy Casiano, MD

10:20am-10:27am
Effects of L-Ascorbate on Chloride Transport in Freshly Excised Sinonasal Epithelia

*Do-Yeon Cho, MD, Beate Illek, PhD, Peter Hwang, MD
Stanford, CA*

Introduction:

Vitamin C (L-ascorbate) is present in the airway surface liquid, a 10- to 30 um layer of fluid that forms a critical interface between respiratory epithelial cells and the external environment. Our recent study showed that L-ascorbate is a novel regulator of cystic fibrosis transmembrane conductance regulator (CFTR) activity. Altered ion transport, and hence failure to clear bacteria or toxins from sinus surfaces, could play a role in the pathogenesis of chronic rhinosinusitis (CRS). This study tested the effects of L-ascorbate on chloride (Cl-) transport in normal and diseased sinonasal tissues.

Methods:

Four types of tissues were obtained during sinus surgery: normal sinus epithelium (n=5), CRS sinus epithelium (n=6), CRS nasal epithelium (n=4), and CRS polyp (n=6). Sheets of tissues were immediately placed on sliders with open areas of 0.03 to 0.71 cm² and mounted in Ussing chambers. Short-circuit current was continuously recorded. L-ascorbate stimulated Cl- currents were compared to maximal stimulation by the cAMP agonist forskolin (20uM).

Results:

L-ascorbate (500uM, mucosal) stimulated Cl- currents in a sustained fashion. Ascorbate-stimulated Cl- currents were significantly increased in CRS sinus epithelia compared to normal nasal epithelia (p = 0.011). Ascorbate stimulated Cl-

currents to 49.9 % (nasal epithelium) and 50.6% (polyp) of maximal currents stimulated by forskolin.

Conclusions:

Ascorbate stimulated Cl⁻ currents in all types of sinonasal tissue, most effectively in sinus epithelium from CRS patients. Topical ascorbate may exert beneficial effects on CFTR function and may be potentially therapeutic in diseased sinonasal tissues.

10:27am-10:34am

Cigarette Smoke Exposure Impairs Respiratory Epithelial Ciliogenesis

*Noam Cohen, MD PhD, Edwin Tamashiro, MD, Guoxiang Xiong, PhD, James Palmer, MD
Philadelphia, PA*

Introduction:

Cigarette smoke exposure is considered an important negative prognostic factor for Chronic Rhinosinusitis (CRS) patients. However, there is no clear mechanistic evidence implicating cigarette smoke exposure in the poor clinical evolution of the disease or in the maintenance of the inflammatory state characterizing CRS. This study aimed to evaluate the effects of cigarette smoke exposure on ciliogenesis, ciliary beat frequency (CBF), and transepithelial resistance of respiratory epithelial cells.

Methods:

Mouse nasal septal epithelium cultures at an air-liquid interface (ALI) were used as a model of respiratory epithelium. After 5 days of cell growth, cultures were exposed to air on the apical surface and to Cigarette Smoke Condensate (CSC) diluted in the basolateral compartment in different concentrations (0, 3, 10, 30, and 100µg/ml). After 15 days of incubation, scanning electron microscopy and immunofluorescence for type IV tubullin were used to determine presence and maturation of cilia. Transepithelial

resistance as well as basal and pharmacologically stimulated CBF were also recorded to evaluate confluence and physiologic cilia function.

Results:

CSC impairs ciliogenesis in a dose-dependent manner with notable effects in concentrations higher than 30µg/ml, yielding greater than 70% non-ciliation and shorter cilia compared to control. No statistical difference on transepithelial resistance or ciliary beat activity was evident.

Conclusions:

CSC exposure negatively impacts ciliogenesis of respiratory cells while not effecting transepithelial resistance or CBF. The impairment on ciliogenesis reduces the mucociliary clearance apparatus following injury and/or infection and may explain the poor response to therapy for CRS patients exposed to tobacco smoke.

10:34am-10:41am

Olfactory Function and Disease Severity in Chronic Rhinosinusitis

*Jamie Litvack, MD MS, Jess Mace, MPH, Kenneth James, PhD, Timothy Smith, MD MPH
Portland, OR*

Introduction:

Olfactory dysfunction is deemed to be a significant contributor to poor quality of life (QOL). However, little is known about the relationship of olfactory testing to other measures of disease burden in patients with chronic rhinosinusitis (CRS). In this study, we examine the relationship of olfactory function to computed tomography (CT) scores, endoscopy scores, and QOL measures in patients with CRS.

Methods:

A multi-institutional, cross-sectional analysis of 367 patients at three sinus centers was performed. Several objective

measures were collected: the Smell Identification Test (SIT), Lund-MacKay CT score, Lund-Kennedy endoscopy score, two validated disease-specific QOL instruments, the Rhinosinusitis Disability Index (RSDI) and the Chronic Sinusitis Survey (CSS), and a general health-related QOL instrument, the Medical Short Form-36 (SF-36). Analysis of variance was performed. Pearson's correlation coefficients were calculated.

Results:

Patients with olfactory dysfunction had significantly worse mean endoscopy scores (normosmics: 4.2 (SD 4.0); hyposmics: 6.3 (SD 4.2); anosmics: 9.6 (SD 4.5); $p < 0.001$) and worse CT scores (normosmics: 9.1 (SD 5.4); hyposmics: 11.2 (SD 6.0); anosmics: 17.6 (SD 5.4); $p < 0.001$). Endoscopy scores were moderately correlated with SIT scores ($r = -0.46$, 95% CI -0.38, -0.54, $p < 0.001$). CT scores were moderately correlated with SIT scores ($r = -0.53$, 95% CI -0.45, -0.60, $p < 0.001$). Olfactory function was not correlated with disease-specific or general health-related QOL measures.

Conclusions:

Despite the assumption that olfactory dysfunction is associated with decreased QOL in patients with CRS, the relationship may not be well measured by QOL instruments. In contrast, olfaction scores correlate well with other objective measures of CRS, namely endoscopy and CT scores.

10:41am-10:48am

Discussion (Q&A)

Moderators : Kathleen Yaremchuk, MD /Stilianos Kountakis, MD

10:48am-10:55am

Interleukin 1 receptor-like 1 Gene is Associated with Chronic Rhinosinusitis

*Roberto Castano, MD, Yohan Bossé, MD, Leandra Mfunu, Martin Desrosiers, MD
Montreal, Quebec*

Objectives:

This study is part of an initiative to identify genes linked to the pathogenesis of chronic rhinosinusitis (CRS) through a pooling-based genome-wide association scan. Among the best hits identified with this approach was a nonsynonymous single nucleotide polymorphism (SNP) located in the Interleukin 1 receptor-like 1 (IL1RL1) gene. The protein encoded by IL1RL1 is an important effector molecule of Th2 responses and may potentially be involved in the persistent inflammatory process observed in patients with CRS. We aimed to validate the association of this coding SNP and CRS using individual genotyping.

Methods:

DNA extracted from an existing population of 206 adult patients with refractory CRS and 196 postal-code matched controls was used. The SNP, rs10204137, leading to the substitution of an glutamine to a arginine at codon 501, was genotyped in this population. The analyses were performed with the Haploview software.

Results:

The Q501R polymorphism was successfully genotyped with a call rate of 88.8 % and a genotype distribution that respect the Hardy-Weinberg equilibrium ($p = 0.03$). The frequency of the Q501 allele in the IL1RL1 gene was higher in patients with refractory CRS than among controls (68% vs 59%; OR: 1.47, $p=0.03$)

Conclusions:

Pending replication, our results suggest that a nonsynonymous SNP in the IL1RL1 gene is associated with refractory CRS in a Canadian population. The Q501 allele may exert a permissive effect against the development of CRS. IL1RL1 -linked biological activity may thus play a role in the pathogenesis of CRS.

10:55am-11:02am

Fluticasone Propionate Delivered with a Novel Breath Actuated Bi-directional Nasal Device is Highly Efficient in Treating Nasal Polyps and Associated Symptoms

*Per Gisle Djupesland, MD PhD, Tony Flint, PhD, Colin Sheldrake, PhD, Ingrid Vickova, MD PhD
Oslo, Norway*

Introduction:

Existing nasal delivery methods are suboptimal in reaching important target sites beyond the nasal valve. A novel breath actuated bi-directional nasal delivery device significantly improves deposition to regions essential to achieve clinical effects in polyposis.

Methods:

Efficacy and safety of fluticasone propionate (FP) delivered by the novel device was assessed in a multicentre, randomized, double-blind, parallel group, placebo-controlled study in 109 adult patients with bilateral polyposis grade 1 or 2. FP 400µg (100µg/actuation) or placebo was delivered twice daily for 12 weeks.

Results:

The proportion of subjects with a reduction in summed polyp score ≥ 1 on the Lildholdt's Scale was significantly higher compared to placebo at 4, 8 and 12 weeks (22.2% vs 7.3%, $p=0.011$, 42.6% vs 7.2%, $p<0.001$, 57.4% vs 9.1%, $p<0.001$). Peak nasal inspiratory flow increased progressively at 4, 8 and 12 weeks ($p<0.001$). Nasal polyps resolved in 10 (18.5%) subjects on active treatment versus 1 (1.8%) on placebo. Overall improvement in combined symptom score was reported at all time points ($p<0.001$). Nasal blockage, nasal discomfort, rhinitis symptoms and sense of smell were all significantly improved. Rescue medication use was lower (3.1% vs 22.4%, $p<0.001$). Epistaxis was observed only in the active group (11.1%). Morning plasma cortisol levels were unchanged after 12 weeks.

Conclusions:

Fluticasone propionate 800µg daily administered using a novel breath actuated bi-directional nasal delivery device was

highly efficient in treating mild to moderate nasal polyposis. All parameters assessed were significantly and progressively improved compared to placebo. The treatment was safe and very well tolerated.

11:02am-11:09am

Fungal-Specific Antibodies in Suspected Allergic Fungal Sinusitis

*Devyani Lal, MD, Shifali Arora, MD, Jacquelynne Corey, MD
Maywood, IL*

Background:

Definitive diagnosis of allergic fungal sinusitis (AFS) is usually delayed until surgery. Allergen-specific IgG and IgE levels may aid early diagnosis, but have no established role yet.

Purpose:

Determine utility of total IgE, fungal-specific IgE and IgG levels, and fungal-specific IgE/IgG ratio in early diagnosis of AFS.

Methods:

Data on 106 patients from 1998-2007 with polypoid CRS clinically suspicious of AFS were studied. We reviewed total IgE levels, fungal-specific IgE and IgG levels, and fungal-specific IgE/IgG ratio for six common fungi. Antibody levels were grouped by strength of reaction. Fungal-specific IgE/IgG ratio over 2:1 was considered significantly elevated.

Results:

Significantly elevated total IgE level was present in only 50% of subjects. 'Very high' fungal-specific IgE levels were present in a majority of subjects (aspergillus in 91%; alternaria in 85%, candida in 78%, helminthosporium in 74%, curvularia in 71% and cladosporium in 67%). 'Strongly positive' levels of fungal-specific IgG were present in a minority (aspergillus 21%, alternaria 5%, candida 33%, helminthosporium 18%, curvularia 23%, and cladosporium in 23%). Fungal-specific

IgE/IgG ratios were significantly elevated in 63% of patients for aspergillus, 71% for alternaria, 49% for candida, 56% for helminthosporium, 44% for curvularia and 52% for cladosporium. Precipitating antibodies were rare.

Conclusions:

Significantly elevated levels of fungal-specific IgE antibodies are present in polypoid CRS patients suspected of AFS, with inverse correlation with fungal-specific IgG levels. About two-thirds of such patients have significantly elevated IgE/IgG ratios for aspergillus and alternaria. Fungal-specific antibody levels may aid early diagnosis of AFS in these patients.

11:09am-11:16am

Discussion (Q&A)

11:16am-12:00pm

Panel - The Maxillary Sinus: Antrostomy to Caldwell Luc

Moderator - James Stankiewicz, MD

Panelists: Peter Hwang, MD, Peter Catalano, MD, James Duncavage, MD

12:00pm-12:15pm

Business Meeting/Awards Presentation

12:00pm-1:00pm

Lunch with Exhibitors - Supported by Acclarent, Inc.

River Exhibition B

Moderators - Peter Hwang, MD /Brent Senior, MD

1:00pm-1:07pm

Alterations of Transepithelial Water Loss and Electrical Potential Differences of Human Nasal Mucosa after Nasal Pollen Challenge

Masato Miwa, MD PhD, Shintaro Yamaguchi, MD, Takashi

Hirose, MD, Kensuke Watanabe, MD

Koshigaya, Japan

Introduction:

The barrier function of nasal epithelium is critical to the host defense. The measurement of transepithelial (transepidermal) water loss had been proved to be an important non-invasive method for assessing the efficiency of the skin as a protective barrier. TEWL has been demonstrated in skin precisely in relation with atopic dermatitis. In nose, we have already demonstrated the human nasal mucosal water loss as the transepithelial water loss for the first time. The aim of this study is to evaluate the short term effect of nasal pollen challenge on TEWL in human nasal mucosa with and without allergy

Methods:

The nasal antigen exposure was done by the disc method of Japanese cedar pollen. Changes in TEWL after pollen challenge were studied using Tewameter TM 210 (Courage and Khazaka, Cologne, Germany) in association with the measurement of nasal electrical potential differences (PD) on nasal mucosa of patients with and without Japanese cedar pollinosis

Results:

The significant increase in TEWL was seen in patients with pollinosis but not in non-allergic patients. On the other hand, PD was decreased after pollen challenge in patients with pollinosis.

Conclusion:

We have shown in this study that TEWL as well as PD would reflect the down regulation of barrier function of nasal mucosa after pollen challenge. These data would contribute to understand the pathogenesis and therapy of the upper airway diseases with the rupture of the barrier function like pollinosis.

1:07pm-1:14pm

The Integration and Manipulation of Patient-Specific Paranasal Sinus CT Data into a Virtual Surgical Environment

*Sachin Parikh, MD, Sonny Chan, MS, Nikolas Blevins, MD,
Peter Hwang, MD
Stanford, CA*

Introduction:

The advent of both high-resolution multi-planar CT imaging and minimally invasive endoscopic techniques has led to revolutionary advances in paranasal sinus surgery. However, the rhinologist is still left to make the conceptual jump between static cross-sectional images and the anatomy that will be encountered at the time of surgery. A 3-dimensional visuohaptic representation of the patient's anatomy may allow for enhanced pre-operative planning and rehearsal, with the goal of improving patient outcomes, decreasing complication rates, and enhancing technical skills. The goal of this study is to manipulate patient-specific 3-dimensional reconstructions of paranasal sinus CT datasets in a surgically relevant manner.

Methods:

We developed a novel method of automatically constructing three-dimensional visuo-haptic models of the patients' anatomy from high-resolution pre-operative CT scans for placement in a virtual surgical environment (VSE). State-of-the-art techniques for real-time volume visualization and haptic rendering were employed to create a high-fidelity representation of salient bone and soft tissue anatomy, and to enable manipulation of the virtual patient in a manner familiar to rhinologic surgeons. A modified haptic interface device drives a virtual endoscope tool that closely mimics the surgical configuration. When desired, the VSE can also feature real-time multiplanar views of the CT image data during navigation with the tool, analogous to image-guided surgery.

Results:

The creation and manipulation of paranasal sinus anatomy from clinical CT images appeared to provide a relevant means of exploring patient-specific anatomy. Unlike more traditional methods of interacting with multiplanar imaging data, our VSE

provides the potential for a more intuitive experience that can replicate the views and access expected at the time of surgery. Surgically-relevant anatomy can be seen from the perspective expected at the time of the planned procedure. The inclusion of tactile (haptic) feedback provides an additional dimension of realism not present in the strictly visual representations currently available.

Conclusion:

The incorporation of patient-specific clinical CT data into a virtual surgical environment holds the potential to offer the surgeon a novel and effective means to prepare for rhinologic procedures. An automated pathway for segmentation and reconstruction, and an intuitive interface for manipulation may enable rehearsal of planned procedures, which may increase operative efficacy and safety.

1:14pm-1:21pm

Improved Quality of Life Outcomes after Endoscopic Sinus Surgery in Patients with Chronic Rhinosinusitis and Asthma

*Patricia Maeso, MD, Stilianos Kountakis, MD, PhD
Augusta, GA*

Objectives:

To evaluate the degree of improvement in quality of life outcomes in patients who suffer chronic rhinosinusitis and asthma as compared to controls.

Study Design:

Analysis of prospectively collected data of 217 patients with chronic rhinosinusitis, 80 with asthma and 137 without, in a single institution.

Methods:

Patients with chronic rhinosinusitis who underwent endoscopic sinus surgery at a single institution were prospectively enrolled from the period of 2003 to 2008. SNOT-20 scores

were gathered pre operatively and post operatively at one-, three-, six-, and twelve-month intervals. Additionally, patients were stratified according to their disease presentation, Lund-MacKay, and endoscopy scores. Finally, those who suffered from asthma were placed in one cohort (n=80) while those who did not suffer from asthma were placed in a separate cohort designated controls (n=137).

Results:

Patients with chronic rhinosinusitis and asthma presented with higher mean SNOT-20 scores (32.4) than the control group (25.2). Additionally, these patients also presented with significantly higher Lund-MacKay (16) and endoscopy scores (3.2) than the control group. As compared to the control group, patients with chronic rhinosinusitis and asthma presented with a significantly higher degree of improvement in SNOT-20 scores from a mean of 32.4 to a mean of 11.2 at one-, 9.4 at three, 10.6 at six, and 12.2 at six-month intervals ($p<0.0001$). Finally, patients with chronic rhinosinusitis with asthma presented with eosinophilic inflammatory disease to a greater degree than patients in the control group.

Conclusions:

Patients with asthma showed a greater degree of improvement in SNOT-20 scores as compared to controls. This study underscores the importance of treatment of rhinosinusitis in improving quality of life outcomes in patients with rhinosinusitis and asthma.

1:21pm-1:28pm
Discussion (Q&A)

Moderators: Stephanie Joe, MD/Andrew Lane, MD

1:28pm-1:35pm

**Chitosan Glycerophosphate Based Semi-Rigid
Dexamethasone Eluting Biodegradable Stent**

*Benjamin Bleier, MD, David Paulson, MD, Bert O'Malley, Jr., MD,
Noam Cohen, MD PhD
Philadelphia, PA*

Introduction:

Chitosan is a polysaccharide derived from chitin deacetylation which can form a biodegradable sheet capable of reversibly binding dexamethasone. The purpose of this study was to optimize the chitosan formulation to produce a semi-rigid pliable sheet, to assess the innate longevity and inflammatory potential of the polymer, and to study the in vivo rate of dexamethasone release over time.

Methods:

Chitosan glycerophosphate (CGP) sheets were produced with varying degrees of deacetylation (70-100%) and analyzed for structural integrity. Two cm² sheets of 91.7% deacetylated CGP were mixed with 10 grams of dexamethasone and implanted in 12 rabbit maxillary sinuses. Nasal lavage and peripheral blood samples were tested for dexamethasone levels by enzyme linked immuno-sorbent assay (ELISA) over 15 days. Sinuses were examined histologically on post-operative days 3, 7, and 15 for persistence of the stent and degree of inflammation as compared to CGP alone.

Results:

The 91.7% deacetylated CGP formulation was found to have optimal silastic-like properties and remained present with moderate degradation and negligible inflammation through post-operative day 15. Dexamethasone levels were detectable in nasal lavage and blood samples through post-operative day 15 and decayed over time (lavage: Day 0 7.70 +/-0.97ng/ml, Day 15 2.53 +/-1.71ng/ml; blood: Day 3 2.45 +/-0.10ng/mL, Day 15 1.62 +/-0.20ng/mL).

Conclusions:

CGP may be used to create a semi-rigid silastic like sheet which is malleable, inert, and capable of eluting steroid over 15

days when implanted intranasally. This material may be used to create a pharmacologically active stent which spontaneously degrades over time.

1:35pm-1:42pm

Evaluating Operative Competency in Endoscopic Sinus Surgery: Feasible, Reliable and Valid Instrument

*Nasir Bhatti, MD, Sandra Lin, MD, Masaru Ishii, MD, Andrew Lane, MD
Baltimore, MD*

Introduction:

Otolaryngology residency programs are required by ACGME to develop tools to objectively assess residents' operative competency. Many such tools based on the model of objective assessment of technical skills (OSATS) have been developed for other surgical specialties. No such instrument exists for otolaryngologic procedures. Endoscopic sinus surgery (ESS) is amongst the most common rhinologic procedures and lends itself to objective evaluation.

Purpose:

1. Develop a feasible and reliable instrument for objective assessment of operative competency in ESS in Otolaryngology residency 2. Test the instrument for internal consistency, content and construct validity.

Methods:

Faculty input using modified Delphi technique helped develop the content of the instrument based on OSATS model. The instrument underwent serial improvements based on three years of cadaver courses. Paired evaluations of resident performance were used to determine interrater reliability. A descriptive tool was added for the instrument to aid in faculty development. Regional and national input was incorporated for increasing generalisability. Factor analysis and intrarater correlation were calculated for determining internal consistency. Cronbach's alpha was calculated to measure interrater reliability.

Results:

A high degree of internal consistency (0.99) was noted for the instrument which took less than five minutes to complete. The interrater reliability was seen to improve with focused faculty development over three years.

Conclusion:

Our results and experience suggest that a feasible, reliable and valid instrument based on OSATS model can be developed for ESS. Further experience at other otolaryngology residency programs will be needed in order to enhance buy-in by the program directors.

1:42pm-1:49pm

Trans-septal Approach for Extended Endoscopic Resections of the Maxilla and Infra-temporal Fossa

*Richard Harvey, MD, Patrick Sheahan, MD, Nick Debnath, MD, Rodney Schlosser, MD
Charleston, SC*

Introduction:

Larger and more extensive lesions of the maxilla and infra-temporal fossa are being successfully managed by entirely endoscopic approaches. There are still limitations in access, especially the anterolateral maxilla. The suitability of various surgical approaches was assessed in relation to surgical access achieved.

Methods:

The extended access options were compared in ten cadaver heads. Five surgical zones were defined: Zone 1- Nasal Cavity, Zone 2 \downarrow V Medial to infraorbital nerve (ION), Zone 3- lateral to ION, Zone 4 \downarrow V Anterior maxilla and Zone 5 \downarrow V Premaxillary tissue. Endoscopic maxillary surgery consisted of: standard antrostomy, modified medial maxillectomy or complete medial maxillectomy with lacrimal duct resection. Trans-septal and ipsilateral approaches were compared in each surgical state. The degree of angulations and resection

zone accessed was recorded from image guided surgery. The limits of both straight and curved instrumentation were also compared.

Results:

Trans-septal access improved surgical access by 14.7% when compared to ipsilateral approaches ($p < 0.001$) across all situations. The ability to approach Zone 3 was significantly improved by 63.3% to 97.6% ($X^2 = 20.83$, $p < 0.001$) after all three surgical states. After complete medial maxillectomy, access to Zone 4 increased from 25.0% to 85.0% ($X^2 = 14.54$, $p < 0.001$) with a trans-septal approach. Improved access to the ITF was also demonstrated. Clinical cases are presented.

Conclusions:

Extended endoscopic maxillary surgery combined with a trans-septal option enables additional access to previously considered challenging locations. Pre-operative assessment of tumor extent and resection margin will dictate surgical approach.

1:49pm-1:56pm

Discussion (Q&A)

Moderators: Michael Setzen, MD/Neil Bhattacharyya, MD

1:56pm-2:03pm

Mechanisms of B Cell Recruitment in Chronic Rhinosinusitis with Nasal Polyposis (CRSwNP)

*Monica Patadia, MD, David Conley, MD, Rakesh Chandra, MD, Robert Kern, MD
Chicago, IL*

Introduction:

Mucosal B cell responses are important in immunity and may play a key role in the pathogenesis of Chronic Rhinosinusitis with Nasal Polyps (CRSwNP) via local IgA production and

activation of eosinophils. We hypothesized that elevated B cell chemokines may be observed in patients with CRSwNP. In the present study we quantified the expression in CRS of B-cell attracting chemokine 1 (BCA-1/CXCL 13), stromal cell derived factor 1 (SDF-1 alpha/CXCL12), and thymus expressed chemokine (TECK/CCL25), which have been shown to selectively recruit B cells and/or IgA+ plasma cells in mice and in humans.

Methods:

Polyp tissue was obtained from CRSwNP patients (n=17) and inferior turbinate tissue was obtained from CRSwNP patients (n=6), Chronic Rhinosinusitis without Nasal Polyp (CRSsNP) patients (n=8), and controls (n=6). Concentrations of each chemokine in tissue homogenates were determined using ELISA, and data were normalized to total protein concentration.

Results:

BCA-1 expression was significantly ($p < 0.05$) increased in polyp tissue compared to turbinate tissue from CRSwNP patients (>10 fold), CRSsNP patients (>73 fold), and controls (>22 fold). SDF-1 alpha was prominently expressed in polyp tissue and turbinate tissue from CRSwNP patients, but undetectable in tissue from CRSsNP patients and controls. TECK expression was variable.

Conclusions:

Elevated levels of B cell chemoattractant chemokines may account for the increased presence of B cells and IgA reported in CRSwNP. Increased recruitment of B cells and IgA production in nasal polyp tissue could contribute to eosinophil activation. Further studies are warranted to explore the role of B-cell chemoattractants in CRSwNP.

2:03pm-2:10pm

Trans-Antral Endoscopically-Guided Balloon Dilatation of the Osteomeatal Complex for Chronic Rhinosinusitis (CRS) under Local Anesthesia

*James Stankiewicz, MD, Thomas Tami, MD, Theodore Truitt, MD, James Atkins, Jr., MD
Maywood, IL*

Introduction:

A multi-center clinical study was performed to assess the safety and efficacy of a new trans-antral, endoscopically-guided balloon system to dilate the maxillary sinus ostia and ethmoid infundibulum. Local anesthesia was used to determine if this procedure might be successfully performed in an office setting.

Methods:

Subjects with CRS of the maxillary sinuses alone or maxillary and anterior ethmoid sinuses underwent baseline evaluation including CT imaging and symptom assessment using the Sino-Nasal Outcome Test (SNOT 20). Subjects underwent trans-antral balloon dilation of the maxillary sinus ostium and ethmoid infundibulum. Follow-up evaluation was performed at 1 week, 3 months, and 6 months.

Results:

30 subjects were treated at 3 centers. Fifty-five of 58 maxillary ostia were successfully accessed and dilated for an overall procedural success rate of 95%. Ninety-seven percent of the procedures were completed under local anesthesia with or without minimal IV sedation. There were no device-related serious adverse events or unanticipated adverse device effects. Mean overall SNOT 20 scores at baseline were 2.9 ± 1.0 . Mean overall SNOT 20 scores at 1 week, 3 months, and 6 months follow-up were 0.8 ± 0.8 , 0.9 ± 0.8 , and 1.1 ± 1.5 respectively. Patency at 3-months as confirmed by radiographic imaging was 96%.

Conclusion:

These results indicate that endoscopically-guided trans-antral balloon dilation of the osteomeatal complex under local

anesthesia is safe, effective, and might be safely performed in an office setting.

2:10pm-2:17pm

Sternberg's Canal: Fact or Fiction?

*Christopher Baranano, MD, James Palmer, MD, Joel Cure, MD, Bradford Woodworth, MD
Birmingham, AL*

Introduction:

Sternberg's (lateral craniopharyngeal) canal is purportedly a membranous space in the lateral wall of the sphenoid sinus. Originally described in anatomic studies, the canal has been etiologically associated with lateral sphenoid sinus CSF leaks. A patent Sternberg's canal has been reported in 2 to 3% of adults, and persistent vestiges of Sternberg's canal have been reported in up to 30% of adults. However, no modern studies analyzing high-resolution CT scans have been published.

Methods:

Consecutive analysis of 1000 high-resolution CT scans of sphenoid bones was performed. Scans were analyzed for a lateral recess, bony defects, arachnoid pits, and holes possibly representing Sternberg's canal. Data were compared to a case series of lateral sphenoid CSF leaks.

Results:

Average age was 40.3 years (15-89). A sphenoid lateral recess was present in 31.2% (15.2% bilateral). Arachnoid pits were present on the middle cranial fossa lateral to V2 in 26.4% of patients. Twelve skull base defects were identified, none in the described region of Sternberg's canal. In contrast, a case series of 21 patients with lateral sphenoid sinus CSF leaks all had a lateral recess, defects, and arachnoid pits lateral to V2. ($p < 0.00001$)

Conclusions:

Sternberg's canal as historically defined is not nearly as prevalent as previously reported. Furthermore, the prevalence of arachnoid pits in all sphenoid CSF leaks and the predominant leak location lateral to the sites of fusion of skull base ossification centers suggests that the leaks are acquired. Contributing factors may include arachnoid pits/weaknesses in the skull base and intracranial hypertension.

2:17pm-2:24pm

Discussion (Q&A)

2:24pm-2:45pm

**4th Annual David W. Kennedy Lectureship
A Backward Glance on our Road and a Look into the
Crystal Ball: What's Next in Endoscopic Sinus/Skull Base
Surgery**

*Heinz Stammberger, MD
Graz, Austria*

2:45pm-3:06pm

Break with Exhibitors

River Exhibition B

Moderators: Timothy Smith, MD / Todd Kingdom, MD

3:06pm-3:13pm

**Polymorphisms in the SERPINA1 Gene are Associated
with Severe Chronic Rhinosinusitis Unresponsive to
Medical Therapy**

*Shaun Kilty, MD, Yohan Bossé, PhD, Leandra Mfunu Endam,
MSc, Martin Desrosiers, MD
Montreal, Canada*

Introduction:

Alpha-1-antitrypsin (AAT) is a serine protease inhibitor that blocks the protease, neutrophil elastase. Previous population studies have already suggested that heterozygote status for

the AAT gene (SERPINA1) is a risk factor for chronic rhinosinusitis with polyps (CRSwNP). This implies a potential genetic predisposition to CRSwNP tied to AAT deficiency.

Objective:

To investigate the association between single nucleotide polymorphisms (SNPs) in the SERPINA1 gene and CRSwNP.

Methods:

DNA extracted from a population of 206 patients diagnosed with CRSwP and 196 postal-code matched controls was used. A maximally informative set of tagging SNPs from SERPINA1 on chromosome 14q were selected from the HapMap dataset and genotyped on the Sequenom platform.

Results:

Successful genotyping was performed for 29 of 30 SNPs (97%). Two SNPs (rs1243168 and rs4900229) located upstream of the SERPINA1 3'UTRregion, were associated with CRSwNP. Individuals homozygous (TT) for these SNPs had an increased probability of having CRSwNP with an odds ratio (OR) of 5.95 and 1.49, respectively. Subgroup analysis according to severity of disease identified each SNP to be increasingly common in individuals as disease severity increased ($p < 0.001$). These individuals were also less likely to be responsive to medical and surgical treatment ($p < 0.001$).

Conclusions:

Polymorphisms of the SERPINA1 gene are associated with a severe form of CRSwNP. These results, from a small subset of individuals with CRSwNP, suggest that defects in AAT may be implicated in a subset of individuals unresponsive to conventional therapy and may identify alternate therapies for their management. Further studies are underway to better understand these findings.

3:13pm-3:20pm

Fibromyalgia and Chronic Rhinosinusitis: Outcomes after Endoscopic Sinus Surgery

*Zachary Soler, MD, Jess Mace, MPH, Timothy Smith, MD
Portland, OR*

Background:

Limited clinical research exists concerning surgical outcomes for patients with chronic rhinosinusitis (CRS) and comorbid fibromyalgia. The aim of this study was to determine whether patients with CRS and concurrent fibromyalgia experience quality of life (QOL) improvement after endoscopic sinus surgery (ESS) and whether this improvement is similar to that seen in patients without fibromyalgia.

Methods:

An adult (>18 years) population (n=283) with medically-refractory CRS was assessed using two disease-specific QOL instruments: the Rhinosinusitis Disability Index (RSDI) and the Chronic Sinusitis Survey (CSS). A nested case-control analysis of matched subjects (n=18) with and without fibromyalgia was performed to compare pre- and postoperative QOL.

Results:

Improvement in postoperative QOL was found in patients with CRS and comorbid fibromyalgia ($P<0.004$). After controlling for age, gender, and disease severity, this improvement was similar to that seen in patients without fibromyalgia for all RSDI subscales as well as the CSS total and CSS symptom subscale. Patients with fibromyalgia reported significantly less improvement on the CSS medication subscale than patients without fibromyalgia ($P=0.027$).

Conclusion:

Patients with CRS and comorbid fibromyalgia demonstrate similar improvements in QOL following ESS as compared to patients without fibromyalgia when controlling for age, gender, and disease severity.

3:20pm-3:27pm

The Correlation Between Self-rated and Measured Olfactory Function

*Chih-Hungshu, MD, Shih-Hsiang Lin, MD, Po-Lei Lee, MD,
Ben-Chih Yuan, MD
Taipei, Taiwan*

Background:

Previous reports indicated that self-reported olfactory dysfunction is unreliable. The occurrence of measured olfactory dysfunction is about 20% in the general population and consistently higher than that of self-reported olfactory dysfunction. To further understand the frequencies of self-rated olfactory function in different age groups and its relation with measured olfactory function, a prospective investigation of self-rated and measured olfactory function was performed.

Materials and Method:

One thousand and five subjects were enrolled from the health care center where subjects underwent a physical checkup for possible preclinical diseases. The subjects filled a questionnaire about demographic data, medical and surgical histories and self-rated their olfactory function. Then they received a modified "Sniffin' Sticks" odor identification test. The female and male subjects were separated by age groups; i.e., 18-35, 36-55 and >55 years for data analysis.

Results:

The frequencies of self-rated olfactory function as "complete loss", "worse", "normal" or "better than normal" were similar between various age groups. The frequencies of measured olfactory dysfunction in the three age groups; i.e., 18-35, 36-55 and >55 years were 4.6%, 11.3% and 31.9% in females, and 3.1%, 21.7% and 37.8% in males, respectively. The measured odor identification scores correlated significantly inversely with age but insignificantly with self-rated olfaction function. There was distinct frequency discrepancy and different relation between self-rated and measured olfactory dysfunction in the age groups 18-35 and >55 years.

Conclusion:

The frequencies of self-rated olfactory function were similar among various age groups. The self-ratings of olfaction were unreliable at all ages. In cases of measured olfactory function, the older adults tended to underestimate their olfactory loss and the young people frequently underrated their olfactory function.

3:27pm-3:34pm

Discussion (Q&A)

Moderators: David Conley, MD / Kevin Welch, MD

3:34pm-3:41pm

Protein Microarray Analysis of Nasal Polyps from Aspirin-Sensitive and Aspirin Tolerant Patients with Chronic Rhinosinusitis

*Kelly Zander, MD, Milene T. Saavedra Saavedra, MD, Todd Kingdom, MD
Aurora, CO*

Objective:

To identify differential protein expression in aspirin sensitive versus aspirin tolerant nasal polyps.

Methods:

Nasal polyp specimens were prospectively obtained from two groups of patients with chronic rhinosinusitis (CRS) and nasal polyposis (NP). The test group (AS) consisted of five patients that were diagnosed with CRS, NP, and intolerance to aspirin based on medical history and physical exam. The control group (AT) consisted of five aspirin tolerant patients with CRS and NP. Protein was extracted and labeled from the harvested polyps and the Sigma Panorama™ Antibody Microarray - Cell Signaling Kit was used to identify differences in protein expression between the two polyp groups. Western Blot analysis was used to validate the results of the protein microarray.

Results:

Differential protein expression was demonstrated between AT and AS nasal polyps in regards to caspase pathway signaling

proteins, with downregulation of caspase 4 in AT compared to AS polyps in pooled samples. Western blot analysis of single samples was significant for interindividual variation in caspase protein expression mediated through the Fas ligand death receptor, including caspases 8 and 9.

Conclusion:

Pooled samples of AS and AT polyps evaluated by protein array demonstrate distinct protein expression profiles in the apoptosis pathway. On an individual basis, samples reveal significant interindividual variation, suggesting a need for larger scale studies to clearly define protein-based differences between AS and AT polyp disease.

3:41pm-3:48pm

Radiographic Distribution of Drops and Sprays within the Sinonasal Cavity

*Kelli Rudman, MD, Erin O'Brien, MD, Donald Leopold, MD,
Jason Helvey, MD
Omaha, NE*

Introduction:

Topical nasal steroid sprays are commonly prescribed for sinonasal disease. Nasal steroid drops applied in a head down position have been described as an alternative to spray. This pilot study analyzed the distribution of sprays and drops using intranasal radiopaque contrast solution and a flat-panel detector volume CT scanner.

Methods:

Nine healthy volunteers were recruited for this two-trial study. In the first trial, participants sprayed three sprays of contrast solution intranasally. After three minutes, a flat-panel sinus CT scan was performed. In the second trial, participants were placed in the "vertex-to-floor" position and three drops of contrast solution were placed intranasally. Participants remained in this position for three minutes and subsequently underwent a flat-panel sinus CT scan. Two otolaryngologists

and a neuroradiologist reviewed the images. The reviewers recorded the presence of contrast solution in 21 sub-sites within the sinonasal cavity.

Results:

Contrast solution was detected in the nasal vestibule and inferior nasal vault in nearly every trial. Nasal spray was more diffusely distributed within the nasal cavity and was detected at a greater proportion on the floor of the nose, inferior meatus, anterior inferior nasal cavity, and nasopharynx compared to drops. Neither spray nor drops consistently penetrated spaces superior to the middle turbinate. However, drops reached the superior upper nasal vault more often than sprays.

Conclusions:

Nasal spray distributes within spaces surrounding the inferior turbinate. Neither spray nor drops reliably penetrated superior nasal spaces. The flat-panel CT scanner provides an alternative to conventional CT scans in future studies employing this technique.

3:48pm-3:55pm (2008 TRAVEL GRANT AWARD RECIPIENT) CT Scan Severity Correlates with Improvement in Quality of Life Outcomes after Endoscopic Sinus Surgery in Patients with Chronic Rhinosinusitis and Asthma

*Patricia Maeso, MD, Stilianos Kountakis, MD PhD
Augusta, GA*

Objectives:

To correlate the degree of improvement in quality of life outcomes in patients with chronic rhinosinusitis with asthma to preoperative CT scan findings.

Study Design:

Analysis of prospectively collected data of 80 patients with chronic rhinosinusitis and asthma who underwent endoscopic sinus surgery in a single institution.

Methods:

Patients were prospectively enrolled from the period of 2003

to 2008. Preoperative sinus CT scans were graded according to Lund and MacKay and patients were placed in two groups: the first cohort consisted of low severity (≤12) Lund MacKay scores (n=29) and the second cohort consisted of high severity (≥13) Lund MacKay scores (n= 51). SNOT-20 scores were gathered pre operatively and post operatively at one-, three-, six, and twelve- month intervals. Additionally, patients were further stratified according to their disease process and endoscopy scores.

Results:

Patients in cohort one presented with a mean SNOT-20 score of 32.3 as compared to those patients in the second cohort (26.4). Additionally, patients in the first cohort had more severe endoscopy scores (mean = 19) as compared to those patients in the second cohort (mean = 8.2). Post operative SNOT-20 scores at one-, three-, six, and twelve-month intervals were 9.8, 8.2, 10.1, and 11.2 respectively for the first cohort, and respectively 10.1, 11.2, 8.4, and 9.4 for the second cohort. A significantly higher degree of improvement in SNOT-20 scores was observed for patients that belonged to the first cohort with higher pre operative CT scan severity scores ($p<0.0001$).

Conclusions: Patients with chronic rhinosinusitis and asthma who presented with more severe disease presentation as evidenced by a high degree of severity in their Lund-MacKay scores, presented with an increased degree of improvement in their post operative quality of life scores.

3:55pm-4:02pm
Discussion (Q&A)

Moderators: Rodney Schlosser, MD /Donald Leopold, MD

4:02pm-4:09pm
The Effect of Hypoxia and Cyclooxygenase Inhibitors on Nasal Polyp Fibroblasts

Ron Eliashar, MD, Smadar Cohen, MD, Alon Ben Efraim, MD,
Francesca Levi-Schaffer, PhD
Jerusalem

Background:

The pathogenesis of nasal polyposis (NP) is unknown. Chronic inflammation along with local tissue hypoxia may effect polyp's growth. Activation of Cyclooxygenases (COX) may also be involved. COX-2 up-regulates in response to different stimuli including hypoxia. Its activation is associated with enhanced cell proliferation. Histologically, besides inflammatory cells, increased stromal fibrosis is seen in NP.

Aims:

To test whether hypoxia amplifies nasal polyp fibroblasts proliferation, whether treatment with COX inhibitors could influence fibroblasts, and whether this effect may be modulated in response to different oxygenation conditions.

Methods:

Polyp fibroblasts were incubated under hypoxic or normoxic conditions with or without NSAIDs (Indometacin, Celecoxib, Rofecoxib) at different concentrations for 12 or 24 hours. Cell proliferation was quantified using BrdU ELISA. Metabolic activity was evaluated using MTT assay. Cell death was measured using Annexin V staining and FACS scan.

Results:

No significant difference was found between proliferation of fibroblasts treated under hypoxia or normoxia, both after 12 and 24 hours. Cells incubated with Indomethacin proliferated in a slightly enhanced manner compared with non-treated cells. Celecoxib significantly inhibited fibroblast proliferation ($P < 0.001$) but did not influence cell survival. Metabolic activity

of cells treated with Celecoxib was significantly reduced ($p < 0.003$), unlike cells treated with Indomethacin or Rofecoxib.

Conclusion:

Hypoxia does not affect fibroblasts proliferation. It may contribute to NP pathogenesis in other ways. The anti-proliferative effect of Celecoxib may be associated with cell cycle arrest rather than with pro-apoptotic activity. Celecoxib may be considered for treating NP. Further studies are required.

4:09pm-4:16pm

The Utility of Cadaver Dissection in Endoscopic Sinus Surgery Training Courses

*Jodi Zuckerman, MD, Aaron Rogers, MD, Sarah Wise, MD,
John DelGaudio, MD
Atlanta, GA*

Background:

Understanding complex paranasal sinus anatomy is crucial for successful outcomes in endoscopic sinus surgery (ESS).

Objective:

To evaluate subjective and objective differences in ESS cadaver dissections amongst participants of varying experience levels.

Methods:

Participants in a two-day cadaver dissection course completed daily pre-dissection surveys evaluating subjective comfort with ESS. Pre- and post-dissection CT scans were obtained to evaluate each participant's cadaver dissection. Images were analyzed for: maxillary antrostomy, frontal and sphenoid sinusotomy, residual ethmoid cells and partitions, and residual frontal recess cells.

Results:

Fifty-one sides were dissected. Participant comfort with

endoscopic dissection increased significantly from day 1 to 2 for overall ESS ($p = 0.001$) and for each individual sinus ($p < 0.001$ to $p = 0.047$). Participants with more years in practice had fewer unopened ethmoid cells ($p = 0.015$) and frontal recess cells ($p = 0.014$) on dissection day 1. Participants with increased comfort in ethmoid dissection had fewer retained ethmoid partitions on day 1 ($p = 0.017$). Observed differences on dissection day 1 for unopened ethmoid and frontal recess cells and retained ethmoid partitions were not present on dissection day 2. No significant differences were found based on use of image guidance for any parameter.

Conclusion:

Surgeons with increased comfort and more years in practice had more complete endoscopic cadaver dissections initially. Differences amongst participants of varying experience and comfort level diminished on dissection day 2, indicating that the opportunity to evaluate and critique post-dissection CT scans may improve surgeon comfort level and endoscopic dissection completeness.

4:16pm-4:23pm

Indications for External Frontal Sinus Procedures for Inflammatory Sinus Disease

*Alexander Chiu, MD, Samuel Hahn, BS, James Palmer, MD, David Kennedy, MD
Philadelphia, PA*

Objective:

External approaches to the frontal sinus (FS), although uncommon in today's practice of FESS, have an undefined role in the treatment of inflammatory disease. This study examines the FS surgery practices of three rhinologists with a focus on those who underwent an external approach. Our goal was to characterize these patients and define indications for use of an external approach alone or in combination with FESS.

Methods:

Retrospective review of FS procedures performed for inflammatory disease at one institution from 2004-2007.

Results:

717 FS procedures were performed, 38 (5.3%) of which were external alone (14) or in combination with FESS (24). Osteoplastic flap with obliteration (12/14) made up the majority of external alone procedures and the most common indication was neo-osteogenesis from previous surgery, fracture or frontal bone osteomyelitis (FOM). Trephination was the most common external adjunct to FESS (12/24), and often performed for Type 3 FR cells or in the management of FOM. 28/38 (74%) had a history of previous surgery. Of the 10 with no history of previous surgery, 6 (60%) had an external adjunct for neo-osteogenesis from previous trauma or FOM. There were no major complications but 9/38 (23.7%) required revision surgery for persistent/recurrent symptoms.

Conclusion:

External approaches alone and in combination with FESS are predominantly secondary to neo-osteogenesis of the frontal recess. Common causes of neoosteogenesis are previous surgery, frontal trauma, and FOM. External FS surgery provides adequate management of inflammatory disease but has a high revision rate.

4:23pm-4:30pm

Discussion (Q&A)

4:30pm-4:45pm

Masters in Rhinology

My Experience in Endoscopic Approaches to Frontal Recess and Sinuses

Heinz Stammberger, MD

4:55pm

Transport to Drake Hotel

5:15pm-6:15pm

ARS/AAOA Combined Session

Moderators: Marvin Fried, MD / Paul Fass, MD

Understanding the Inferior Turbinate

Panelists: Pete Batra, MD, Matthew Ryan, MD, Bradley Marple, MD

(This panel will consider diagnostic and therapeutic issues related to inflammation of the turbinates. Panelists will discuss anatomical and physiological constructs, medical intervention, obstruction and surgical intervention. Consideration of various surgical approaches including different coblation, cauterization, and microdebrider options will be presented)

Poster Presentations

#101 A Gentle Reminder: Nasal Steroids and Glaucoma

*Firas Farhat, MD, Nada Jabbur, MD
Beirut*

Nasal steroids may cause an increase of the intraocular pressure (IOP). The authors describe a case of a 41 year old female who reported increase of the IOP to the level of 19 few weeks after receiving 200 mcg of Mometasone nasal spray daily. After adjusting her Glaucoma medication and decreasing the dose of mometasone to 100 mcg, the ocular pressure went back to 16. Physicians should be aware of this possible and rare complication and should ask their patient if he/she suffers from Glaucoma before prescribing nasal steroids. A prospective study may be of benefit to study the effect of nasal steroid on IOP since we prescribe it to thousands of patients.

#102 A New Device for Targeted Drug Delivery to the Ethmoid and Frontal Sinuses During Endoscopic Sinus Surgery

*Peter Catalano, MD, Ray Weiss, DO, Tamara Rimash, MD
Burlington, MA*

Introduction:

Targeted drug delivery is a desirable technology that has positively impacted medical practice. In an attempt to treat chronic ethmoid and frontal sinusitis in patients who would otherwise be candidates for conventional endoscopic sinus surgery (ESS), a targeted drug delivery device, the sinus spacer (SS), has been developed.

Materials and Methods:

34 patients underwent placement of the SS, most in conjunction with ESS. Once placed, the SS was filled with 0.3 cc of triamcinalone-40. In 28 patients, the SS was placed in the ethmoid sinus and in 6 patients, the frontal sinus. 1 patient had bilateral frontal SS placed under local anesthesia in an office setting; all others were placed under general anesthesia. All patients had computerized tomographic sinus imaging and SNOT-20 outcome assessments pre-operatively. Both evaluations were repeated 6 months after surgery. The SS was removed in the office 14-21 days after placement. No oral or

intravenous steroids were prescribed at any point after surgery.

Results:

All SS were successfully placed and there were no complications. Of the 34 patients, 22 were male, 12 female. Ages ranged from 15 to 81 years, with a mean of 54. Concomitant ESS was performed on 54 maxillary, 30 frontal, and 11 sphenoid sinuses. Septoplasty and inferior turbinate reduction occurred in 20 and 17 patients, respectively. Lund-Mackay and SNOT-20 scores were significantly improved at 24 weeks.

Conclusions:

The SS is a novel drug eluding technology that can successfully treat inflammatory conditions of the ethmoid and frontal sinuses with minimal patient morbidity.

#103 A Systematic Review of Topical Vasoconstrictors in Pediatric Sinus Surgery

*Thomas Higgins, MD, Peter Hwang, MD, Richard Orlandi, MD, Joseph Han, MD
Norfolk, VA*

Introduction:

Topical vasoconstrictors are important hemostatic agents for maximizing visualization in pediatric sinus surgery; however, these agents can have systemic cardiovascular effects and no guidelines are available to aid the sinus surgeon in choosing the appropriate topical vasoconstrictor agent. The objective of this study is to systematically review the literature and provide recommendations for the use of topical vasoconstrictors in pediatric sinus surgery.

Methods:

A systematic literature search was performed in MEDLINE, The Cochrane Library, and National Guideline Clearinghouse, including combinations of the terms topical vasoconstrictor, sinus*, epinephrine/adrenaline, oxymetazoline, cocaine, phenylephrine, endoscop*, adenoid*, nasal, and pediatric/children. References in the selected articles were also reviewed for pertinent studies.

Results:

The search criteria captured 46 abstracts with relevant titles. A systematic review on the topical use of phenylephrine was found; however, no other systematic reviews, meta-analyses, or clinical guidelines were identified. Four randomized clinical trials, three original studies, as well as multiple case reports and review articles were also identified. The literature supports the safety of oxymetazoline and epinephrine when used judiciously in carefully selected children undergoing pediatric sinus surgery; however, topical phenylephrine is not recommended because of its risk profile.

Conclusion:

In pediatric sinus surgery, topical vasoconstrictors should be used in a manner that maximizes hemostasis and visualization while limiting the risk of cardiovascular morbidity. A proposed protocol and guide for future research are discussed regarding topical vasoconstrictors in pediatric sinus surgery.

#104 Alar Base Reduction: An Overemphasized Subject!

Seyed Alireza Mesbahi, MD
Shiraz

Septorhinoplasty is one of the most common operations in rhinologic wards worldwide especially in my country. A well balanced, natural appearing alar base in proportion to the middle and upper nose is essential for a state -of-the-art result in primary rhinoplasty .Excessive reduction of the alar base is a common complication after rhinoplasty operation in my country, because some surgeons routinely narrow the alar base in most of their primary rhinoplasty operations. \r\n Method: In this study, I did not narrow the alar base in my primary rhinoplasty operations that I was suspicious regarding the need of alar base reduction techniques in them. Among my patients who underwent primary rhinoplasty operation during one year period, in 150 patients I was suspicious regarding the need of alar base reduction. In their pre operative & intra operative evaluations they had mild excessive width of the alar base that correction of that deformity would improve the final results. But according to my idea because they had only mild problem in the alar base

widthness, I did not narrow the alar base in that patients. \r\n Results: In one year follow up of theme, during the first 3 months after their operation, most of theme (90%) was unhappy regarding the widthness of the ala & they told that their alar base is width! But little by little as their nasal edema was subsided, most of theme was happy regarding the final results after one year period. Only in 12 patients of them, the alar base width was excess after one year that under local anesthesia I corrected their problem.\r\n Conclusion: I think that by remodeling of the nasal skeleton especially the alar cartilages during the nasal tip procedures, alar base width will be narrow. On the other hand, Aesthetic problems such as scarring & asymmetry are frequent after alar base narrowing techniques. According to the results of this study, it seems to better to be more conservative regarding alar base narrowing techniques in most primary rhinoplasty operations. If the surgeon is suspicious regarding the need of narrowing of alar base in the primary operation, it is better to not do alar base narrowing & postpone that for some months later.

#105 An Atypical Case of Chronic Invasive Fungal Sinusitis and its Management

*Kalpesh Vakharia, MD, Daniel Hamilos, MD,
Marlene Durand, MD, Eric Holbrook, MD
Boston, MA*

Introduction:

Chronic invasive fungal sinusitis is considered a slowly progressive invasive fungal sinusitis. It is a relatively rare and challenging problem to treat. We present an unusual clinical presentation and successful treatment of a patient discovered to have chronic invasive fungal sinusitis.

Methods:

Case report and review of the literature.

Results:

A 75-year-old man presented with chronic persistent rhinosinusitis. He had previous endoscopic sinus surgery two years prior. Repeat CT revealed evidence for CRS but no bony erosion. After failing medical management he underwent endoscopic sinus surgery. Pathologic examination

demonstrated invasive fungal hyphae in the sinus mucosa without angioinvasion but with associated intense inflammation. Reevaluation of previous surgical pathology with silver stain revealed very rare fungal elements within the mucosa. The patient was found to be using excessive amounts of topical nasal steroids and was noted to have a mild hypogammaglobulinemia. He was treated with IV piperacillin/Tazobactam, oral Voriconazole, Amphotericin B nasal rinses and IV IG. His symptoms slowly improved with the absence of fungal elements on repeat sinus biopsy.

Conclusion:

This case demonstrates the finding of chronic invasive fungal elements in a patient on excessive steroids believed to be suffering from chronic persistent rhinosinusitis without clinical evidence of invasive fungal disease. Patients with persistent chronic rhinosinusitis may benefit from screening for fungal elements, which may be contributing to their disease.

#106 Balloon Sinus Dilatation Without Fluoroscopy Using a Lighted Guidewire

*Jewel Greywoode, MD, Marc Rosen, MD,
Douglas Leventhal, MD
Philadelphia, PA*

Introduction:

Balloon sinus dilatation has been used as an adjunct to endoscopic sinus surgery. However, the mandated use of fluoroscopy and its associated risks and increased costs have limited the acceptance of balloon sinus dilatation among Otolaryngologists. We describe the use of a new lighted guidewire for visual confirmation into the frontal sinus, precluding the use of fluoroscopy.

Methods:

In ten patients, the frontal sinuses were treated using balloon sinus dilatation instruments. A lighted guidewire is placed into the frontal sinus under direct endoscopic visualization and the light is transmitted through the anterior wall of the frontal sinus. The guide catheter position is then confirmed with fluoroscopy. The balloon is subsequently advanced into the frontal sinus, inflated under direct visualization to 12

atmospheres, and the position is again confirmed with fluoroscopy. Patency was evaluated using direct endoscopic visualization.

Results:

Transillumination of the frontal sinus allowed accurate placement of the guidewire in the frontal sinus in all patients as confirmed by fluoroscopy. Direct visualization of the balloon in the frontal recess proved to be as accurate as using fluoroscopy.

Conclusions:

Dilation of the frontal outflow tract using balloon catheter devices and a lighted guidewire can be safely performed without the use of fluoroscopy. Degree of balloon expansion cannot be determined without fluoroscopy but inflation to 12 atmospheres appears adequate and direct visualization can confirm successful dilation. Use of the lighted guidewire may eliminate the risks and costs associated with the use of fluoroscopy.

Barriers to Accessing Endoscopic Sinus Surgery

*Vinay Fernandes, BHSc, Albino Chiodo, MD
Toronto, Canada*

Background:

The ability to have access to surgery prevents disease and restores health & function. Anecdotal evidence from otolaryngologists has suggested that certain groups of patients are cancelling or refusing elective sinus surgery. The purpose of this study was to assess the characteristics and access factors that may deter patients from undergoing surgery.

Methods:

Patients with chronic or recurrent sinusitis were recruited over several clinic days and complete a brief survey as well as the SNOT-20. Patients who had undergone sinus surgery were compared with those who had not yet had surgery in order to make a barrier assessment.

Results:

26 patients completing the questionnaire had undergone sinus surgery in the past while 18 patients had not. There were no

differences in the demographic make up of the population between groups in terms of ability to speak English or work status. Ethnicity differed between groups, with more North American born patients in the non-surgery group. The ability to afford medications post-operatively or to take time off work for surgery did not differ between groups. Where appropriate, relationships were insignificant such that $p > 0.05$.

Conclusions:

Though ethnicity may play a role in sinus disease, there were no demonstrable differences between groups that would clearly indicate barriers exist to accessing surgery. However, since patients across both groups reported difficulties in several access areas, it is likely that there are in fact barriers that are being overcome by some. Further qualitative study is recommended to describe the impact of these difficulties.

#107 Bilateral Sphenoid Recess Encephaloceles: A Rare Cause for Recurrent Cerebrospinal Fluid Rhinorrhea (CSF) after Endoscopic Repair

*Paul Schalch, MD, David Keschner, MD, JD
Orange, CA*

Objective:

The purpose of this study is to describe our experience with recurrent CSF rhinorrhea secondary to bilateral lateral, sphenoid-recess-type encephaloceles; an exceedingly rare variant of middle fossa encephaloceles.

Study design:

Retrospective case report of a patient presenting with recurrent CSF rhinorrhea after endoscopic repair of lateral sphenoid encephalocele. The study was conducted at a University-affiliated institution.

Methods:

A 68 year old male presented with profuse CSF rhinorrhea. This patient did not have any history of head trauma or previous sinus surgery. After nasal endoscopy and review of imaging studies were performed, the patient was diagnosed with a left lateral sphenoid encephalocele. Endoscopic, image guidance-assisted transtethmoid-transpterygoid repair was

performed. The patient then presented with recurrence of CSF rhinorrhea. Repeat imaging studies and endoscopic evaluation revealed the presence of bilateral lateral sphenoid encephaloceles. Endoscopic repair was performed successfully.

Results:

Repair of bilateral sphenoid-recess type encephaloceles was performed endoscopically without any complications. Long-term follow-up of this patient after identification and repair of bilateral encephaloceles has not revealed recurrent CSF leak.

Conclusion:

Bilateral, sphenoid-recess type encephaloceles can be a cause for CSF rhinorrhea, particularly recurrent profuse rhinorrhea after initial endoscopic repair. This variant, although exceedingly rare, should be considered and ruled out in cases of recurrent CSF leak after repair of unilateral, middle cranial fossa defects.

#108 Characteristic radiographic findings of sinus recirculation

*Jennifer Setlur, MD, Parul Goyal, MD
Syracuse, NY*

Introduction:

Sinus recirculation can result in symptomatic chronic rhinosinusitis and is a common cause of persistent disease after endoscopic sinus surgery. The diagnosis of recirculation is typically based on the nasal endoscopic findings of a ring of mucus coursing between two separate openings of the affected sinus. In instances when endoscopic visualization is not possible or is not diagnostic, radiographic findings can be helpful. Sinuses affected with recirculation have a characteristic globular density at the site of recirculation.

Methods:

The CT scans of patients undergoing revision endoscopic sinus surgery were reviewed. Attention was directed towards finding a characteristic globular density adjacent to the outflow tracts of the paranasal sinuses. The radiographic findings were correlated with the endoscopic findings in these patients.

Results:

A globular density was identified adjacent to the maxillary sinus outflow tract in five patients and adjacent to the sphenoid sinus outflow tract in one patient. All of these patients were found to have active recirculation affecting the involved sinus at the time of revision endoscopic sinus surgery.

Conclusions:

Sinus recirculation typically occurs in patients who have undergone sinus surgery and have two separate ostia in the affected sinus. Nasal endoscopy allows for accurate diagnosis. In certain instances, visualization of the affected sinus outflow tract may be difficult, and the presence of characteristic radiographic findings may provide a means to make the correct diagnosis. The presence of a globular density adjacent to the sinus outflow tract can be used to predict the presence of recirculation.

#109 Chinook Wind Barosinusitis: An Anatomic Evaluation

*Luke Rudmik, MD, Adam Muzychuk, BSc, Elizabeth Oddone Paolucci, PhD, Mechor Brad, MD
Calgary, Canada*

Introduction:

A Chinook is a weather phenomena characterized by a rapid influx of warm, high-pressured winds into a specific location. Pressure changes associated with chinook winds induce facial pain similar to acute sinusitis. The purpose of this study was to determine the relationship between sinonasal anatomy and chinook headaches.

Methods:

Retrospective computed tomography (CT) sinonasal anatomy analysis of 38 patients with chinook headaches and 27 controls (No Chinook headaches). The chinook headache status was blinded from the CT reviewer. 41 sinonasal anatomy variants, Lund-Mackay status, and sinus size (cm³) were recorded.

Results:

There were 3 statistically significant sinonasal anatomy differences between patients with and without Chinook headaches. The presence of a concha bullosa and sphenoidal cell (Onodi cell) appeared to predispose to

Chinook headaches ($p = 0.004$). Chinook headache patients had larger maxillary sinus sizes (Right $p = 0.015$ and Left $p = 0.002$). The Lund Mackay score was higher in the control patients ($p = 0.003$) indicating that chronic sinusitis does not play a role in Chinook headaches.

Conclusions:

Chinook winds are a common source of facial pain and pressure. This is the first study to demonstrate that sinonasal anatomic variations may be a predisposing factor. Anatomic variants may induce facial pain by blocking the natural sinus ostia, thus preventing adequate pressure equilibrium.

#110 Chronic Invasive Fungal Rhinosinusitis: Revisiting The Diagnostic Algorithm

*David Lieberman, MD, Peter Hwang, MD
Stanford, CA*

Objectives:

Chronic invasive fungal sinusitis (CIFS) has been traditionally defined as invasive disease lasting greater than 4 weeks in an immunocompetent host. As advances have been made in the medical management of immunodeficiency, immunocompromised individuals who survive fulminant invasive fungal sinusitis may be more appropriately classified as CIFS. Our objectives are to re-evaluate and re-define contemporary diagnostic and treatment algorithms for CIFS and assess the outcomes of aggressive medical and surgical management.

Methods:

Retrospective review of nine cases between 2005-2008. A systematic review of the literature was performed.

Results:

Nine patients presented with invasive fungal sinusitis of greater than 4 weeks' duration. Patient age ranged from 6 to 83 and follow-up was an average of 7.4 months. Four cases of Mucormycosis and five of Aspergillus were reported. Etiologies of immunodeficiency included diabetes mellitus (3); diabetes and solid organ transplant (1); hematological malignancy, active or in remission (4); and aplastic anemia (1). Each patient was treated with systemic antifungal therapy and serial endoscopic operative debridement. Disease

resolution or stabilization occurred in all patients. One patient died of malignancy progression with evidence of stable CIFS.

Conclusions:

CIFS is not restricted to the immunocompetent and may present in immunodeficient patients with adequate immune function to avert fulminant invasion. Given advances in immune-enhancing and antifungal therapies, successful outcomes can be achieved in treating CIFS in both immunocompetent and immunocompromised patients. We propose updating the diagnostic criteria and treatment algorithms for CIFS to reflect a broader classification of disease and to incorporate novel therapies.

#111 Clinical Correlation between Irrigation Bottle Contamination and Clinical Outcomes in Post-FESS Patients

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Objective:

Irrigation is important after FESS, and the role irrigation bottles play in iatrogenic contamination of the operated sinuses is unknown. Therefore, we investigated whether irrigation bottles used post-operatively become contaminated and its potential association with post-surgical infection.

Methods:

Patients irrigated twice daily following FESS. Bottle cleaning was performed as recommended by the manufacturer. New bottles were distributed at the time of the operation and at each post-operative visit. During post-operative weeks 1, 2, and 4, bottles were cultured. Medical charts were reviewed for the presence of post-surgical infection and changes in management.

Results:

Eleven post-FESS patients were enrolled and examined at weeks 1, 2, and 4. During week 1, 3/11 bottles grew bacteria (*A. baumannii*, *P. aeruginosa*, and *E. coli*); 1/3 bottles in this group grew bacteria (*P. aeruginosa*) at week 2. All bottles with

P. aeruginosa growth were from a single patient with known pre-operative *P. aeruginosa*. No patient in this group developed a post-operative infection. Eight bottles had no growth at week 1; two of these grew bacteria at week 2: *K. pneumoniae* and *A. baumannii*. Six patients returned bottles at week 4; 3 bottles grew bacteria: *P. aeruginosa* (28 days) and *A. baumannii* (35 days). Although positive bottle cultures were more common at weeks 2 and 4, no post-operative infections occurred.

Conclusions:

Irrigation bottles used post-operatively have a low incidence of contamination. Contamination is more common when irrigation is performed for longer than one week but does not appear to result in post-surgical infection.

#112 Comparison of Cone Beam Computed Tomography for Paranasal Sinus Imaging

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Introduction:

The diagnosis of chronic rhinosinusitis is based on patient symptoms, endoscopic nasal examination and supporting radiographic information. The gold standard imaging modality for paranasal sinus disease is Computed Tomography (CT). Cone Beam Computed Tomography (CBCT) is a new technology that promises high quality imaging at considerably lower radiation dose. The purpose of this study is to compare the image quality of four different CBCT scanners.

Methods:

The primary author underwent CT scanning first with the helical CT and then by four CBCT scanners. Five blinded evaluators judged coronal, axial and sagittal images from different CBCT scanners. Bone definition, soft tissue, contrast and artifact/noise were ranked for each image based on a scale of 1(poor) to 5(excellent). Overall image quality for each scanner was ranked 1(best) to 4(worst). One-way analysis of variance was used to test whether the mean scores across scanners were significantly different. Post-hoc analysis was then used to determine differences between scanners.

Results:

The null hypothesis that there is no difference between images from different CBCT scanners was rejected ($p < 0.05$) for the overall image quality. The images qualities produced by Iluma (Imtec Corp.) and MiniCat (Xoran Technologies) were not significantly different. The images from Iluma and MiniCat were significantly ($p < 0.05$) better than images from Galileos (Sirona Dental Systems) and Newtom 3G (AFP Imaging Corp.) CBCT scanners.

Conclusions:

CBCT scanning is a new technology that offers high-quality low-radiation imaging of paranasal sinus disease. This study demonstrates there is a significant difference in image quality among different CBCT scanners.

#113 Complementary-Alternative Medicine and its Impact on Nasal and Sinus Diseases: Why Doctors Should Be Aware

*Monica Menon-Miyake, MD, Marcel Miyake, MD
Sao Paulo, Brazil*

Complementary-alternative medicine and its impact on nasal and sinus diseases: why doctors should be aware.

Background:

Many doctors are not aware of the real impact of complementary-alternative medicine (CAM) on patient's health. Given the growing popularity of alternative practices and its highly frequent use in the treatment of nasal and sinus diseases, a decision was made to analyze the most used modalities of CAM in rhinology in a critical up-to-dated overview.

Methods:

Medline (to May 2008) was searched to provide evidence-based data. Also, main concepts and problems related to practices as herbal medicine, acupuncture and homeopathy were reviewed. Current practice observational facts and referrals were critically evaluated.

Results:

The methodology of clinical trials with CAM is frequently made in different basis and may not reach current standards. Basic

information is lacking about ancient practices such as Chinese medicine, herbal medicine, and homeopathy - among many others frequently used. Drug interactions, toxicity and main disease complications may be caused by easily available herbal medicines.

Conclusions:

Therapeutic efficacy of complementary-alternative treatments for nose and sinus diseases is not supported by currently available evidence although the widespread use of such practices. Patients may be on risk. CAM critical information should be of major concern for rhinologists.

#114 Control of Anterior Epistaxis with an Activated Biodegradable Dressing

*Andrew Lerrick, MD, Jhuli Patel, PA-C
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Introduction:

Anterior epistaxis has traditionally been controlled by cauterization, topically-applied products, and/or insertion of non-resorbable barriers. On occasion, these methods fail. In patients with recurrent or intractable epistaxis we utilize a thrombin-saturated, biodegradable dressing that initially possesses sponge-like expansile qualities. This method is more effective and avoids the unnecessary application of a balloon epistat, especially in the setting of a deep anterior bleed.

Background:

Hemostasis is optimally achieved by a product that maintains pressure against the bleeding site, accelerates thrombus formation, and prevents clot disruption. Cautery, topical agents, gauze, and removable sponges lack these three qualities. Applying thrombin to a sponge provides a vehicle to maintain a high concentration of thrombin in the presence of stagnant blood.

Methods:

The NasoPore nasal dressing is an oblong-shaped biodegradable, polyurethane foam that expands when moistened, retains fluids applied to it, maintains its integrity to allow sufficient wound healing, and dissolves in situ. Topical thrombin is a bovine-derived protein. Once applied, the speed

with which thrombin clots blood is dependent upon the concentration of both thrombin and fibrinogen. After the clotting cascade is initiated, it rapidly propagates, easily controlling low-pressure septal bleeding.

Results:

Bleeding is generally controlled within minutes. If bleeding persists, additional 1cc aliquots of thrombin (1000 units/cc) can be topically applied hourly (5-6 hours) to the sponge. Twenty-four hours after hemostasis has been achieved saline drops are applied several times a day to facilitate dissolution of the dressing.

Conclusions:

Application of a biodegradable dressing containing thrombin is an effective means to control anterior epistaxis.

#115 Dacryocystitis as the Initial Presentation of Invasive Fungal Sinusitis

*Victor Scapa, MD, Ryan Vaughn, MD, Vikram Durairaj, MD,
Todd Kingdom, MD
Aurora, CO*

Introduction:

Invasive fungal infection of the sinuses is a rare and life threatening disease entity most commonly encountered within immunocompromised patient groups. This disease process remains difficult to treat, progresses rapidly, and proves fatal in some cases. Invasive fungal sinusitis presenting as dacryocystitis is exceedingly rare.

Methods:

Case report with literature review.

Results:

We present a case of an 11-year-old female undergoing induction chemotherapy for acute lymphoblastic leukemia who presented with right dacryocystitis as the initial sign of invasive fungal sinusitis. Serial endoscopic and external debridements were performed over the time period of several weeks. Endonasal resection included right total ethmoidectomy, medial maxillectomy, and inferior and middle

turbinate resection. The left middle turbinate was also resected and wide maxillary antrostomy was performed. A dacryocystectomy and debridement of periorbital soft tissue was performed through an external approach on the right side. In addition to serial surgical debridements other therapies included hyperbaric oxygen treatments, granulocyte infusion, and organism specific antifungal agents.

Conclusion:

Invasive fungal sinusitis is a rare and often rapidly progressive disease that can affect immunocompromised patients. Aggressive combined modality therapy is necessary to control this sometimes fatal disease. Our patient was successfully treated with conservative surgical debridement and tailored antifungal therapy. Although dacryocystitis as the initial presentation of invasive fungal sinusitis is rare, physicians are advised to consider invasive fungal sinusitis as a possible etiology in patients with dacryocystitis for certain at risk patient groups.

#116 Diagnosis and Endoscopic Management of Acquired Nasolacrimal Duct Obstruction Secondary to Radioactive Iodine Treatment for Thyroid Malignancy

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Aurora, CO*

Introduction:

Radioactive iodine (RAI) has been used in the management of thyroid malignancy for over 60 years. Established side effects of xerophthalmia, xerostomia, and sialadenitis are known to occur in a dose-dependent manner. Acquired nasolacrimal duct obstruction (NLDO) has recently been described in a case report and subsequent case series, with an estimated occurrence in 4% of patients receiving modest doses of RAI for malignancy. This phenomenon is going largely unnoticed, with a delay in diagnosis of nearly 18 months from onset of symptoms. To date, there are no published efforts of endoscopic management of this disease process.

Methods:

Retrospective review of 5 patients (10 sides) treated for acquired NLDO secondary to RAI therapy. Subjective and

objective outcomes were reviewed after powered endoscopic dacryocystorhinostomy (DCR).

Results:

With a mean follow-up of 12.0 months, subject assessment of epiphora and objective measurement of anatomic patency by saline irrigation and/or endoscopic visualization was performed. Out of 10 procedures performed on 5 patients, we have obtained subjective improvement and anatomic patency in 10/10 sides (100%).

Conclusions:

NLDO secondary to RAI therapy is a newly recognized phenomenon. Endoscopic management of this disease process has not been previously reported. Our results in a small cohort compare favorably to other treatment modalities in this patient population, and appear to be on par with success rates of this procedure for the general population.

#117 Effect of Coblation Polypectomy on Estimated Blood Loss in Endoscopic Sinus Surgery

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Miami, FL*

Background:

We conducted a pilot study comparing estimated blood loss (EBL) using coblation-assisted sinus surgery with traditional microdebrider technique in patients with nasal polyposis undergoing endoscopic sinus surgery (ESS).

Methods:

Retrospective analysis at a tertiary care center on patients with nasal polyposis undergoing ESS between January 2008 and May 2008. The University of Miami CT staging system was used preoperatively to evaluate extent of sinonasal disease. The duration of surgery, EBL, and demographic data were collected.

Results:

Nine patients underwent nasal polypectomy/ESS using coblation and 16 patients underwent nasal polypectomy/ESS

using microdebridement. The two groups had comparable University of Miami CT staging scores ($p > 0.05$). The average EBL was 300 ± 160 ml using coblation compared to 628 ± 424 ml using microdebridement ($p < 0.05$). The average duration of surgery using coblation was 124 ± 47 minutes, compared to 125 ± 48 minutes using microdebridement ($p > 0.05$). The average blood loss per minutes was 2.4 ± 1.1 ml in the coblation group compared to 4.8 ± 2.1 ml in the microdebridement group ($p < 0.05$).

Conclusions:

Coblation-assisted nasal polypectomy/ESS is associated with a statistically significant lower EBL and blood loss per minute when compared to traditional microdebridement technique. Coblation represents a viable alternative to microdebridement for reduction in blood loss in patients with nasal polyposis undergoing ESS. Further prospective randomized trials are needed to validate these findings.

#118 Effect of Point-of-Care miniCT on treatment of Chronic Rhinosinusitis

*David Conley, MD, Aaron Pearlman, MD, Kali Zhou, BA, Rakesh Chandra, MD
Chicago, IL*

Introduction:

Point-of-Care CT scanning (POC-CT) has become more feasible with the introduction of smaller devices that deliver lower radiation doses. As availability of this modality continues to increase, its impact on diagnostic and therapeutic algorithms in patients with chronic rhinosinusitis (CRS) must be evaluated.

Methods:

Case-control study of 40 consecutive new patients who met symptom criteria for CRS, had no prior CT scans or sinus surgery, and negative endoscopy (no pus, polyps, edema), in whom POC-CT was obtained during the initial evaluation. Fifty patients from the pre-POC-CT era whose initial treatment was based on symptoms alone served as a comparison group.

Result:

In the pre-POC-CT group, 40 CTs were completed and 10 were lost to follow-up. Evidence of inflammatory disease was observed in 24/40 (60%) patients, 11 of whom had received antibiotics. Among the 16/40 (40%) with negative CT, only 2 had received antibiotics. In the POC-CT group, 27/40 (68%) patients had positive findings, 14 of whom received both antibiotics and oral steroids. CT was negative in 13/40 (32%) patients, none of whom were prescribed antibiotics or oral steroids.

Conclusions:

The prevalence of scan positivity and antibiotic use was similar between cohorts. Patients meeting the symptomatic definition of CRS but lacking objective endoscopy findings were more likely to receive oral steroids when POC-CT was part of the initial assessment. These patients were also less likely to be lost to follow-up. Ongoing prospective studies will better characterize the magnitude of these effects on long term outcomes, antibiotic resistance, and healthcare costs.

#119 Effectiveness of Balloon Dilatation of the Sinuses for Revision Frontal Sinus Surgery

*Benjamin Wycherly, MD, Suzette Mikula, MD
Washington, DC*

Introduction:

Successful revisions of the frontal sinus open the frontal duct while minimizing mucosal trauma. The purpose of this study is to determine if balloon dilatation of the sinuses is effective in revision frontal sinus surgery.

Methods:

We retrospectively reviewed our experience with balloon dilatation of the sinuses in revision frontal sinus surgery. All patients had previously undergone endoscopic frontal sinus surgery and had persistent symptoms and evidence of frontal sinusitis on computed tomography (CT). All patients then underwent balloon dilatation of the sinuses of the frontal sinuses. Outcome measurements included endoscopic patency of the nasofrontal duct, Lund-Mackay scores, culture positive postoperative infections, and subjective persistence of symptoms.

Results:

Twenty frontal sinuses were dilated in 11 patients. Mean follow-up was 14 months (range 7-19 months). At follow-up, 18/20 sinuses were patent with 2 sinuses requiring repeat dilation. Of the patent sinuses, 3 had narrowed significantly but responded to triamcinolone injections. Postoperative CT was performed at an average of 13 months (range 6-18 months) in 15 sinuses. The average Lund-Mackay score in each sinus was 1.33 before dilation and 0.87 at follow-up ($p=0.05$), with 33% (5/15) displaying radiographic improvement. The average number of postoperative infections was 2.6 (range 0-7). Frontal headaches persisted in 45% (5/11) of patients at follow-up.

Conclusions:

With a patency rate of 90%, sinuplasty of the frontal sinus may be comparable to other endoscopic revision techniques. Despite the fact that many patients still displayed radiographic evidence of disease and experienced persistent frontal headaches, this procedure may benefit some patients who require frontal sinus revision.

#120 Endoscopic Excision of a Rare Nasopharyngeal Pleomorphic Adenoma

*Eliot Martin, PA, Patrick Munson, MD, Beiyun Chen, MD, Eric Moore, MD
Rochester, MN*

Objectives:

To describe the presentation, physical examination, endoscopic surgical approach, and pathologic details of a pleomorphic adenoma arising from the nasopharynx. To examine the literature describing this rare presentation.

Methods:

A retrospective chart review of a single case: the patient's clinical course is presented and discussed, including endoscopic operative photos and pathology slides.

Results:

An 83 year-old woman was found to have a nasopharyngeal mass on routine oral examination. Nasal endoscopy revealed a large pedunculated, smooth, mucosa covered mass

pedicled on the nasopharynx and filling the choanae. CT scan confirmed the exam findings. The patient underwent transnasal endoscopic excision and cauterization of the base. Due to the size of the mass, it was delivered transorally. Pathologic examination was consistent with a cellular pleomorphic adenoma. There was no evidence of recurrence at last follow-up.

Conclusions:

Pleomorphic adenoma arising from the nasopharynx is a rare entity with only 5 previous cases described in the literature. These masses can be successfully excised via transnasal endoscopic techniques which provides surgical cure.

#121 Endoscopic Management of Skull Base Defects Associated with Persistent or Expanding Pneumocephalus after Previous Neurosurgical Repair

*David Clark, MD, Samer Fakhri, MD
Houston, TX*

Introduction:

Endoscopic repair of skull base (SB) defects has become the preferred management approach for patients with cerebrospinal fluid rhinorrhea. There is no data in the literature, however, on the success of this approach in managing persistent or expanding pneumocephalus after neurosurgical repair.

Methods:

A 3-year retrospective review of a level-one trauma center was performed identifying patients with pneumocephalus following prior neurosurgical SB repair. Data collection included etiology, previous neurosurgical intervention, pre- and post-operative radiographic findings, and endoscopic repair technique.

Results:

Six patients underwent six endoscopic repairs. The underlying etiology was massive SB trauma in 3 patients, anterior clinoid defects following aneurysm clipping in 2 patients, and a large defect in a previously resected malignant anterior SB tumor. Four patients received mucosal onlay

grafts, one an underlay graft, and one a combination of underlay and overlay techniques for repair of multiple defects. Endoscopic repair of defects was successfully achieved in all six patients with complete resolution of the pneumocephalus in 3 of 6 after an average of 18 days, and 2 patients had trace amounts of pneumocephalus (<1cc) at 13 days. One patient, with less than one week of follow-up due to recent repair, exhibited improvement of pneumocephalus one day after surgery. Mean follow up, excluding this one patient, was 8 months.

Conclusions:

The endoscopic repair of skull base defects with associated pneumocephalus is achievable in patients who have failed prior neurosurgical repair. Skull base distortion due to previous intervention did not adversely affect the outcome of the endoscopic approach.

#122 Endoscopic Transnasal Treatment of Pediatric Congenital Midline Nasal Masses

Federica Sberze, MD, Paolo Castelnuovo, MD, Patrizia LaTorre, MD, Giovanni Delu', MD

Introduction:

Congenital midline nasal masses are rare, benign entities with a potential for intracranial connection. They include dermoids tumors, encephaloceles, nasal cerebral heterotopias (nasal gliomas) and hemangiomas. Due to their possible risk of complications they require early diagnosis and surgical correction.

Purpose of the study is to present our experience in the treatment of these lesions with conservative cosmetic surgery and review of the literature.

Methods:

Retrospective study and analysis of the management and outcomes on the treatment of 16 pediatric patients treated at a tertiary-care medical center from 2001 to 2008. Four patients presented with glioma, 4 with dermoid and 8 with encephalocele. Preoperative cross sectional imaging study has been performed with thin-cut CT and multiplanar MRI for diagnosis, surgical planning and to predict intracranial

extension. Biopsy has always been avoided. All patients underwent endoscopic transnasal surgical excision, combined with external approach only for dermoids.

Results:

No complication was encountered. We observed CSF-leak recurrence in a patient affected by multiple site meningoencephaloceles.

Conclusions:

The surgical approach is curative and is tailored on the location and size of the mass. They are benign lesions and recurrences are rare, so surgical treatment needs to be conservative. For intranasal lesions we recommend a transnasal endoscopic approach, even if preoperative imaging shows extension to the anterior cranial fossa. A combined external approach is necessary if the lesion is in the falx cerebri or presents nasal cutaneous involvement.

#123 Endoscopy Post Septoplasty: Does it Have a Role?

Abdulmohsen Hussain, FRCS, Yaseen Ali, MB

Objective:

To assess the role of intra-operative endoscopy post formal septoplasty in order to identify and correct any secondary causes of nasal obstruction.

Study design:

Non-randomized consecutive prospective study

Methods:

From January 2004 till December 2007, 90 adult patients (61 male and 29 females) with chief complaint of nasal obstruction that was evident on anterior rhinoscopy, underwent septoplasty, followed by Intra-operative nasal endoscopy as part of their surgical management, to exclude any secondary causes of nasal obstruction.

Patients with snoring, obstructive sleep apnea and symptomatic deformity that prevented adequate office endoscopic examination were included, while patients with nasal polyposis, previous septoplasty and previous sinus surgery were excluded from the study.

Results:

20 patients out of 90 scoped intra-operatively post-septoplasty showed a secondary cause of nasal obstruction that could have been missed with just only septoplasty, these included adenoid hypertrophy (10 patients), synechiae (2 patients) and hypertrophy of the posterior portion of the inferior turbinate (8 patients), and in all of these patients corrective surgery was done.

Conclusion:

1- Intra-operative endoscopy post septoplasty may have a role in excluding any secondary cause of nasal obstruction. 2- When consenting the patient for surgery, it should be explained that the procedure may involve correction of nasal obstruction and not just a deviated nasal septum.

#124 Hemangiopericitoma in the Maxillary Alveolar Region: A Case Report

*Thomaz Antonio Curado, MD, Andres Siqueira, MD, Giancarlo Cherobin, MD, Gabrielle Holanda, MD
Sao Paulo Brazil*

Introduction:

Hemangiopericitomas, are uncommon tumors. The nasal form of this tumor is benign with a low rate of recurrence. Patients usually present epistaxis, nasal obstruction and anosmia. In this case report, we describe the appearance of this tumor in its benign form with slow evolution.

Report of Case:

Female, 46 years old with complaints of bulging in the left facial region beginning two years previously and increasing progressively. Also reporting ipsilateral pain and progressive nasal obstruction, denying previous rhinorrhea, epistaxis, fever, cough or nasal trauma. The anterior rhinoscopy showed an important bulging in the region of the nasal valve causing reduction of its lumen. A CT-scan revealed nodular expansive lesion located in the subcutaneous tissue near the left nose wing. The lesion had a compressive effect on the homolateral nasal fossa without bone erosion. The tumor was resected preserving its capsule. The histological evaluation was consistent with hemangiopericitoma and the immunohistochemical was positive for CD34 antigens,

Vimetiva and Bcl-2, confirming the diagnosis. The patient progressed well in the postoperative period, with improvement of nasal obstruction and so far there are no signs of recurrence.

Conclusion:

Hemangiopericitoma tumor is rare, exceptionally located in the nose and adjacent tissues. The tumor is slow-growing and indolent, presenting nasal symptoms according to their location and size. The exeresis must contain the same margin of safety as the current literature recommends and a long follow-up.

#125 High-resolution Computed Tomography Analysis of the Frontal Sinus Ostium

*David Neskey, MD, Jean Eloy, MD, Roy Casiano, MD, Jose Ruiz, MD
Miami, FL*

Background:

Identification and exposure of the frontal recess (FR) during endoscopic sinus surgery (ESS) is challenging due to the variable anatomy, the narrow opening of the frontal sinus ostium (FSO), and the proximity of vital anatomic structures. Despite these obstacles, a strong understanding of frontal sinus anatomy is required to prevent intracranial entry. In an effort to develop a framework to expose the frontal sinus, consistent and easily identifiable landmarks could expedite a safe entry into the FSO. In this study, we determine the distances from the columella and nasal spine (NS) to the nasofrontal beak (NFB) and skull base (SB).

Methods:

Measurements were made using high-resolution sagittal paranasal sinus CT scans. Thirty three CT scans were analyzed by three observers, and the mean distances were calculated.

Results:

The mean distance from the NS to the NFB was 52 ± 3 mm in men and 48 ± 4 mm in women. Mean distance from the NS to the SB was 62 ± 4 mm in men and 56 ± 4 mm in women.

Mean distance from the columella to the NFB was 59 ± 2 mm in men and 53 ± 3 mm in women and from the columella to the SB was 68 ± 4 mm in men and 62 ± 4 mm in women.

Conclusion:

While performing FR exposure in ESS, it is recommended to stay a distance of 60-65 mm in men and 55-60 in women from the columella to minimize the risk of intracranial complications.

#126 Identification of Bacterial Contaminants in Sinus Irrigation Bottles

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Objectives:

To determine the range of bacterial species of that can be cultured from sinus rinse bottles upon prolonged use by patients with chronic sinusitis. To determine the time course of contamination during prolonged use of sinus rinse bottles

Methods:

The tips of the sinus irrigation bottles along with the inner tubing will be cultured to determine if any bacteria can be identified. Individual colonies will be isolated in pure culture and identified by molecular methods. 16S rRNA sequences will be amplified by PCR, sequenced and compared to DNA sequence databases for identification of genus and species. Patients who are advised to treat their sinusitis with saline irrigations will be given free professional sample bottles. They are asked to use the bottle as directed. When patients are seen in follow-up (at 1 week, 2 weeks and 4 weeks) after using the bottle, they are asked to bring in the bottle in exchange for another free professional sample. Patients are normally advised to throw out the bottle after 1 month in the event that they may be contaminated.

Results:

Our technique yielded various bacterial species including *Pseudomonas* sp. and *Streptococcus* sp. from sinus rinse bottles after the above assigned intervals of patient use.

Conclusion:

Sinus rinse bottles harbor many organisms after periods of use by patients with chronic sinusitis. Patients are likely reinnoculating their sinuses with bacteria unsuspectingly.

#127 Improved Quality of Life Outcomes after Endoscopic Sinus Surgery in Patients with Chronic Rhinosinusitis and Asthma

*Patricia Maeso, MD, Stilianos Kountakis, MD, PhD
Augusta, GA*

Objectives:

To evaluate the degree of improvement in quality of life outcomes in patients who suffer chronic rhinosinusitis and asthma as compared to controls.

Study Design:

Analysis of prospectively collected data of 217 patients with chronic rhinosinusitis, 80 with asthma and 137 without, in a single institution.

Methods:

Patients with chronic rhinosinusitis who underwent endoscopic sinus surgery at a single institution were prospectively enrolled from the period of 2003 to 2008. SNOT-20 scores were gathered pre operatively and post operatively at one-, three-, six-, and twelve-month intervals. Additionally, patients were stratified according to their disease presentation, Lund-MacKay, and endoscopy scores. Finally, those who suffered from asthma were placed in one cohort (n=80) while those who did not suffer from asthma were placed in a separate cohort designated controls (n=137).

Results:

Patients with chronic rhinosinusitis and asthma presented with higher mean SNOT-20 scores (32.4) than the control group (25.2). Additionally, these patients also presented with significantly higher Lund-MacKay (16) and endoscopy scores (3.2) than the control group. As compared to the control group, patients with chronic rhinosinusitis and asthma presented with a significantly higher degree of improvement in SNOT-20 scores from a mean of 32.4 to a mean of 11.2 at one-, 9.4 at three, 10.6 at six, and 12.2 at six-month intervals

($p < 0.0001$). Finally, patients with chronic rhinosinusitis with asthma presented with eosinophilic inflammatory disease to a greater degree than patients in the control group.

Conclusions:

Patients with asthma showed a greater degree of improvement in SNOT-20 scores as compared to controls. This study underscores the importance of treatment of rhinosinusitis in improving quality of life outcomes in patients with rhinosinusitis and asthma.

#128 Incidence of Middle Turinate Pneumatization, Concha Bullosa, in Twisted Nose (A Prospective Study)

Shahriar Nazari, MD
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Abstract:

Objective: to investigate whether the presence of middle turbinate pneumatization, concha bullosa, (CB) is related to twisted or deviated nose or not. Methods: A CT scan was done for 112 patients who had done aesthetic septorhinoplasty for reshaping of their noses and correcting twisted noses, and these CT scans analysed for the presence of CB. Results: CB was detected in 53 cases of 112 patients (47.32%), 77 of 112 patients have some apparent axis deviation or twisted nose. 45 cases of these 77 patients had CB (58.44%) in 13 patients of these 45 cases CB was bilateral (28.8%) with predominancy of size of CB in concave side of septal deviation. With statistical test of proportions, correlation of CB with twisted nose in comparison of CB in the study group was checked and we found a p value < 0.01 that was statistically significant.

Conclusion:

It seems a strong correlation between twisted nose and CB would be coexisted. It may be a compensatory mechanism of air flow regulation like inferior turbinate hypertrophy in concave side of septal deviation and may need especial concern in correcting the deviated nose.

#129 Inferior Turbinate Pedicle Flap (ITPF) for Endoscopic Skull Base Defect Repair

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Introduction:

Endoscopic skull base reconstruction (ESBR) has been widely accepted in the management of skull base defects. Larger defects have been successfully repaired with pedicled mucosal flaps. A number of options from the septum and nasal cavity exist. Planning for pedicled flaps is important for harvesting is often required prior to tumor removal or initial surgical access. The potential utility of the ITPF in ESBR is assessed.

Methods:

The ITPF was raised in nine cadaver heads. The most anterior extent reached on the anterior cranial fossa (ACF) and the most inferior limit on the posterior cranial fossa (PCF) were recorded with image-guided surgery. Measurements were calculated as a percentage of ACF or PCF length from easily reproducible measurements from pre-operative radiology. The width was defined as the widest measurement in the distal third. The length to height ratio of the skull base was also assessed as a confounding factor.

Results:

Mean length for the ITPF was 54.0 \pm 4.9mm with a width of 22.1 \pm 3.7mm. The mean reach was 112 \pm 21% (range 90-150%) of the PCF. The ACF was less accessible with a mean reach of 67 \pm 9.9% (range 52-84%). The skull base proportions did not have a strong association on utility ($p=0.53$). Clinical examples are presented.

Conclusions:

ITPF presents one option for ESBR. It has several limitations with access to the anterior ACF. Larger posterior septal flaps may provide better reach to ACF defects. The ITPF may be an excellent salvage flap when previous septectomy has been performed. Careful pre-operative assessment can estimate the reach of the ITPF.

#130 Is Anterior Ethmoid Disease Really Responsible for Chronic Frontal Sinusitis?

*Yvonne Chan, MD, Christopher Melroy, MD, Frederick Kuhn, MD
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Introduction:

Partial or complete ethmoidectomy is the traditional procedure of choice for chronic ethmoid sinusitis. The objective of this paper is to report resolution of anterior ethmoid sinusitis after frontal sinusotomy and no ethmoid surgery.

Study Design:

Case series with prospectively collected data.

Methods:

Six balloon catheter frontal sinusotomies were performed in 5 patients with chronic frontal sinusitis who failed maximal medical management. These patients also had ipsilateral anterior ethmoid sinusitis. Post-operative antibiotic treatment was only prescribed on the basis of intra-operative cultures. Endoscopic images, CT scans, and symptom outcome data were prospectively collected at subsequent office visits after surgery.

Results:

All patients reported symptomatic improvement. Sequential post-operative CT scans demonstrated complete resolution of both frontal and anterior ethmoid sinus disease at six months. The modified Lund-MacKay score for each anterior ethmoid sinus decreased from 3 pre-operatively to 0 post-operatively.

Conclusion:

These cases demonstrate successful treatment of chronic ethmoid and frontal sinusitis with balloon frontal sinusotomy. This finding is contrary to the traditional belief that anterior ethmoid sinus disease controls chronic frontal sinusitis and challenges the dictum that ethmoid disease must be cleared with ethmoidectomy in order for the frontal sinus disease to resolve.

#131 Localized Amyloidosis of the Nasal and Paranasal Mucosa

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Objective:

Amyloidosis is a rare condition that is characterized by the deposition of insoluble protein fibrils into extracellular tissue. Amyloidosis can be further classified as either systemic or localized. Systemic amyloidosis is seen more frequently, and typically affects the heart, liver and kidneys. Localized amyloidosis, in which only one organ system is affected, is uncommon and sequestration to the nose and paranasal sinuses is particularly rare, with only X prior cases. We present a patient with localized amyloidosis of the sinus mucosa.

Methods:

Case-report

Result:

The patient is a 55-year-old woman with a history of monoclonal gammopathy of undetermined significance (MGUS) and rheumatoid arthritis who presented with fevers, persistent nasal congestion and a left nasal polyp. Computed tomography (CT) revealed mucosal inflammation of the sinuses and a left antral polypoid lesion. Initial biopsy of the lesion was consistent with an inflammatory nasal polyp. However, repeat biopsy one month later revealed amyloid deposition, confirmed with Congo red stain, in the sinuses bilaterally, nasal septum and turbinates. Workup systemic amyloidosis, including abdominal fat biopsy, was negative.

Conclusion:

Localized amyloidosis of the head and neck, an extremely rare disorder, can be confused with more typical causes of inflammation of the nose and paranasal sinuses and as such, should be considered in the differential of patients with rhinosinusitis and co-morbid autoimmune disorders. Multiple biopsies of suspicious tissue may be necessary to achieve the correct diagnosis.

#132 Management of Caudal Septal Deviation Using Cutting and Overlap Suture Technique of Caudal L-strut

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Background:

The correction of caudal septal deviation has been a challenging problem in septoplasty. The aim of this study was to introduce an author's surgical technique for management of caudal septal deviation and to evaluate its efficacy and surgical outcomes.

Methods:

We retrospectively reviewed the medical records of the 29 patients who underwent endonasal septoplasty using cutting and overlap suture technique of caudal L-strut between May 2006 and Aug 2007. After excision of deviated portions of cartilage and bone, at least a 1-cm strip of dorsal and caudal septal cartilage was preserved. If caudal septal deviation was not corrected, cutting of caudal septum in the caudocephalic direction and suturing of overlapped upper and lower caudal septum was performed. Visual analogue scale (VAS) for nasal obstruction, acoustic rhinometry, and questionnaire for subjective satisfaction were measured before and at 6 months after septoplasty.

Results:

Significant improvement was achieved in VAS score from 76 to 35 ($p < 0.05$). Nasal volumes and minimum cross-sectional areas changed from 7.3 ± 2.6 to 8.4 ± 1.6 ml and from 0.4 ± 0.17 to 0.5 ± 0.12 cm², respectively. Subjective satisfaction for operation showed excellent (17.2%), good (55.2%), fair (17.2%), and poor (10.4%). No patients showed saddle nose and drooping of nasal tip postoperatively.

Conclusions:

Cutting and overlap suture technique of caudal L-strut" appears to be a useful procedure for correction of caudal septal deviation."

#133 Management of Long Standing Foreign Bodies of the Skull Base

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Introduction:

Organic foreign bodies of the skull base are an uncommon problem with the potential for serious morbidity that present complicated treatment dilemmas best managed by a multidisciplinary approach.

Methods:

Case report and review of the literature.

Results:

We describe the case of a 58 year old male who presented to the emergency department with fevers and mental status changes in the setting of a recently treated sinus infection who was found to have bacterial meningitis. Computed tomography (CT) of the sinuses revealed two adjacent defects of the ethmoid roof. He had a remote history of a penetrating left maxilla injury with a stick 13 years earlier. After 3 weeks of intravenous antibiotics, an attempt at endoscopic repair of the skull base defects revealed a splinter of wood adjacent to a purulent collection that emanated from the ethmoid roof defect. Consultation with Neurosurgery and Infectious Disease provided a multidisciplinary management plan that allowed for safe and successful treatment of this patient. Points taken from this scenario can be used for management of future patients with skull base foreign bodies.

Conclusion:

Traumatic skull base foreign bodies can have a delayed presentation and require a multidisciplinary team approach. Attention to certain aspects of the history and characteristics of the foreign body allow for safe and successful management.

#134 Modified Turbinate Reduction in Bone-Dominant Turbinate Hypertrophy

*Andrew Lerrick, MD, Jhuli Patel, PA-C
Chicago, IL*

Introduction:

Turbinate hypertrophy is attributable to bony enlargement, soft-tissue engorgement, or a combination of each. In bone-dominant inferior turbinate hypertrophy, we employ a mucosa-sparing technique to remove bone by combining partial turbinectomy with submucosal bone debridement.

Background:

Current approaches to turbinate reduction emphasize sparing mucosa to facilitate healing. Submucosal bone resection utilizes shielded-debriders with bone-cutting blades. Submucosal bone removal is associated with inadvertent breaches of the mucosa.

Methods:

A sinus CT scan determines whether or not the patient has bone-dominant turbinate hypertrophy. The image is used to establish the bone:soft-tissue ratio. If the bone measures greater than two-thirds (>0.66) of the turbinate's cross-sectional diameter, the patient has bone-dominant turbinate hypertrophy. If the bony component measures less than one-third of the diameter (<0.33) the patient has soft-tissue dominant turbinate hypertrophy. If the bone:soft-tissue value falls between 0.33 and 0.66, the hypertrophy is mixed.

Operative Technique:

Following medialization, a narrow straight clamp is placed along the medial third of the turbinate. In mixed and bone-dominant turbinate hypertrophy, soft-tissue and bone are simultaneously compressed. If the initial placement of the clamp is unsatisfactory, it can be repositioned. A single pass of bipolar cautery (15 watts) provides hemostasis, after which a straight endoscopic turbinectomy scissor is used to cut the pre-determined segment. The turbinate defect is 4mm wide. The soft-tissue is elevated and the desired amount of bone is debrided. The mucosa is then draped over the medial edge of the remnant turbinate bone, easily closing the 4mm gap, and sealed using cautery.

Conclusion:

Turbinate bone can be removed using a modified partial turbinectomy technique and a micro-debrider.

#135 Modified Turbinate Reduction in Soft-Tissue Dominant Turbinate Hypertrophy

*Andrew Lerrick, MD, Jhuli Patel, PA-C
Chicago, IL*

Introduction:

Turbinate hypertrophy is caused by bony enlargement, soft-tissue engorgement, or some combination of each. Reduction of the soft-tissue or bone improves the nasal airway. In soft-tissue dominant inferior turbinate hypertrophy, we utilize a method that preserves mucosa to maintain adequate bone coverage by combining partial turbinectomy with minimal bone debridement.

Background:

Mucosal-sparing techniques facilitate healing and diminish post-operative crusting. Surface debridement sacrifices soft-tissue and leaves the underlying bone exposed, making it vulnerable to chronic infection and progressive atrophy. In patients with soft-tissue engorgement, submucosal resection requires delicate elevation of the soft-tissue off the underlying bone, often causing inadvertent breaches of the mucosa.

Methods:

The pre-operative CT scan is used to determine if the patient has bone-dominant, soft-tissue dominant, or mixed turbinate hypertrophy. The classification is based upon the bone:soft-tissue ratio, which is easily measured. If the bone occupies less than one-third of the cross-sectional diameter of the turbinate, the patient has soft-tissue dominant hypertrophy. In this instance, the bone:soft-tissue ratio is less than 1:2 and the bony component is less than 0.33. If the bone occupies greater than two-thirds of the diameter of the turbinate, the patient has bone-dominant turbinate hypertrophy. The bone:soft-tissue ratio exceeds 2:1 and the fraction is greater than 0.66. If the bone:soft-tissue value falls between 0.33 and 0.66, the hypertrophy is mixed.

Operative Technique:

Following in-fracture, a straight clamp is placed along the length of the medial third of the inferior turbinate. In soft-tissue hypertrophy, only soft-tissue will be compressed. After

the clamp is released the mucosa has the appearance of a "railroad track". If the initial placement of the clamp is unsatisfactory, it can be repositioned and placed once again. Hemostasis is achieved with a single pass of bipolar cautery (15 watts). A straight endoscopic turbinectomy scissor cuts the soft-tissue along the length of the turbinate adjacent to the bone, allowing the specimen to be removed. The width of the defect along the length of the turbinate measures 4mm. The specimen is palpated to confirm that its contents do not contain bone. Additional anesthetic can be injected for hydrodissection purposes. The mucosa is elevated off the bone under direct vision using the Freer elevator. The debrider removes the desired amount of bone to permit the mucosa to drape over its medial edge. The 4mm gap is easily closed. The mucosa is then "spot welded" into place using the bipolar cautery.

Conclusion:

Using a technique that combines partial turbinectomy and a microdebrider the desired amount of soft tissue and bone can be removed in cases of soft-tissue dominant turbinate hypertrophy.

#136 Nontuberculous Mycobacteria (NTM) as a Cause of Chronic Rhinosinusitis (CRS): Endoscopic Culture Negative, Sputum (post nasal drip) Positive: A Case Report

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Nontuberculous mycobacteria (NTM) as a cause of chronic rhinosinusitis (CRS): endoscopic culture negative, sputum (post nasal drip) positive: a case report.

Introduction:

We have previously reported 24 patients who had NTM as a cause of CRS by endoscopically directed cultures. Patients were subsequently successfully treated with 3-6 months of a combination of antibiotics. Almost all patients with NTM causing CRS reported previous to our series had either cystic fibrosis or HIV disease. None of our 24 patients had these comorbidities. There remain, however, a large number of patients who do not respond to treatment of chronic sinusitis.

It has been suggested that lidocaine is bacteriocidal to NTM which may complicate endoscopically directed cultures. This paper expands on the number of patients who may have NTM as a cause.

Methods:

Endoscopically directed cultures from the sinuses were performed for mycobacteria (M). Sputum was also collected for M. Standard mycobacterial culture techniques were used.

Results:

The patient was culture negative on endoscopically directed cultures, but grew out mycobacterium NTM from the cough sample (cough originated from the post nasal drip)

Conclusions:

Patients with chronic sinusitis which is not responsive to treatment should have both endoscopically directed cultures as well as samples from cough (sputum) or nasal irrigation since the volume of mucus collecting from endoscopically directed cultures is small. In addition growth of NTM may be inhibited by the use of lidocaine for anesthesia. Larger amounts of mucus will increase the likelihood of positive cultures.

#137 Ozena Caused by Klebsiella Ozena, an Often Forgotten Cause of Atrophic Rhinitis

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Introduction:

Atrophic rhinitis is commonplace in a rhinology practice and often a frustrating entity to treat. However, primary atrophic rhinitis caused by *Klebsiella ozenae* is rarely reported in the modern antibiotic era with less than 10 papers in the English literature in the last 35 years.

Methods:

Prospective evaluation and treatment of two patients with primary atrophic rhinitis and *Klebsiella ozenae* infection and comprehensive literature review.

Results:

Both patients presented with years of nasal congestion and foul smelling nasal crusts. Examination showed extensive thick bilateral nasal crusting extending to the osteomeatal complex, erosion of bilateral inferior turbinates and a normal septum. Cultures showed heavy growth of *Klebsiella ozenae* in both patients. Treatment with three months of oral ciprofloxacin and saline irrigation resulted in near complete resolution of disease both endoscopically and clinically in one patient and moderate improvement in the second. The patient with less improvement had longer standing symptoms, anosmia at presentation, and thinning of bilateral middle turbinates.

Conclusion:

Primary atrophic rhinitis or ozena is rarely seen in the United States. Features consist of enlarged nasal cavities, erosion of turbinates, mucosal atrophy and thick crusting. In these cases extensive workup is required including history of allergen exposure and drug use, blood tests, imaging, cultures and biopsies. A high suspicion needs to exist for infection caused by *Klebsiella ozena*. Treatment remains challenging, but should consist of prolonged antibiotics and washes. It is likely that success is tied to the ability to diagnose and treat early in the course of infection.

#138 Pediatric Inferior Turbinate Reduction: Short- and Long-Term Improvement by Treatment Modality

*Meredith Merz, MD, Anthony Magit, MD, Seth Pransky, MD
San Diego CA*

Objective:

To retrospectively review the short- and long-term outcomes of pediatric patients undergoing inferior turbinate reduction and to compare the various modalities used in turbinate reduction.

Methods:

The charts of all patients undergoing inferior turbinate reduction from January 1, 2002 and December 31, 2007 at a tertiary pediatric hospital were retrospectively reviewed. Patients were evaluated for symptom severity, comorbid conditions, medications used pre- and post-operatively, surgical modality, and initial and long-term improvement with surgery.

Results:

A total of 382 patients with an age range of 3-20 years underwent inferior turbinate reduction. Seventy-two of these patients were treated with turbinate reduction alone and 310 with turbinate reduction in combination with another procedure for relief of nasal obstruction. Fifteen patients required more than one turbinate procedure. Analysis focused on patients undergoing turbinate reduction alone, of which three were treated with cautery, five with submucous resection, twenty-seven with coblation, and thirty-seven with radiofrequency ablation. Immediate postoperative and long-term results were analyzed for each modality for improvement in reported symptoms and examination findings, relief of comorbid conditions, and cessation of nasal and allergy medications.

Conclusions:

Given the prevalence of allergic disease in the pediatric population, nasal obstruction secondary to inferior turbinate hypertrophy is a common problem, which may result in significant morbidity. Multiple surgical techniques are available to address this problem, however their comparative efficacies and the longevity of their results have not been reported previously. The need for long-term follow up and for a controlled, prospective trial comparing different treatment modalities is discussed.

#139 Polyrrhinia: Report of a Rare Nasal Anomaly

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Tehran, Iran*

Objective:

Report of a very rare congenital nasal anomaly that is known as polyrrhinia due to aberrant embryological development.

Method:

Systematic examinations of a malformed newborn girl were performed by Neonatologist, Otorhinolaryngologist, Cardiologist and Ophthalmologist to detect any accompanied abnormality. In addition, CT scan, MRI, Ultrasonography, Echocardiography and biochemistry tests were done. Physical examination revealed a female newborn from a healthy 25 years mother, with absence of the left nasal cavity and

attached tube of skin to the upper left side of the nose near to medial canthus. On elevation of the tube, a blind canal was attached to the left side of nose was seen. There was a right side choanal atresia which had been caused dyspnea just after delivery. The Right eye was hpoplastic and the left was blind. No other congenital anomalies were detected. There was no relevant family history. There was no history of intake of any teratogenous agents or known infection during pregnancy and her neonate was full term child which was born via normal vaginal delivery.

Results:

The patient underwent operation to open Right choanal atresia after birth. Her vision could not be obtained after complete ophthalmological examinations.

Conclusion:

Although glioma, dermoid cyst and heamangioma are more common congenital nasal anomalies, accessory nose as a very rare condition should be into consideration. Through systematic organ assessment and notifying to other organ defect especially the eyes is recommended to prevent permanent vision loss.

#140 Prevention of Post-Operative Epistaxis with an Activated Biodegradable Dressing

*Andrew Lerrick, MD, Jhuli Patel, PA-C
Chicago, IL*

Introduction:

Management of epistaxis following nasal surgery risks disruption of the surgical result. In patients at high risk for post-operative bleeding we routinely place an antibiotic-coated, thrombin-saturated biodegradable dressing, achieving superior results to traditional methods we have used to prevent bleeding.

Background:

The nasal dressing is a compressible, oblong-shaped biodegradable, polyurethane foam. When moistened, the dressing initially expands like a sponge, contouring to the nasal cavity and applying pressure to its surfaces. The nasal dressing retains liquid medications applied to it. Over several

days, exposure to nasal secretions causes its dissolution. Topical thrombin is a bovine-derived protein. Thrombin causes fibrinogen to initiate and propagate clot formation.

Methods:

At the conclusion of the procedure an antibiotic ointment is liberally applied to the surface of the dressing. A long nasal septum protects the septal flaps and turbinates during intra-nasal placement of the dressing with a bayonet forceps. 2.5-5.0 cc of thrombin (1000 units/cc) is slowly instilled into each dressing. The combination of these physical and biochemical effects can be described as "expansion hemostasis". Clot stability in the post-operative setting can be enhanced with the application of ice to the nose.

Results:

Occurrences of breakthrough bleeding are rare. Steam inhalation and application of saline accelerates the dissolution process. Oil emollients reduce the dressing's adhesiveness to the intranasal membranes. Suctioning and extraction can be performed at a suitable time when the risk of bleeding is low.

Conclusions:

Placement of a biodegradable dressing possessing sponge-like properties, containing clot-activating thrombin, reduces the risk of epistaxis in post-operative patients.

#141 Rhinology Fellowship

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Introduction:

The sub-specialization of Rhinology is in evolution and is largely dependent on the emergence of formal fellowship training. The educational goals and success of fellowship programs, however, remain incompletely defined.

Methods:

An anonymous, internet based survey of current and past (5 years) fellows was performed to examine the goals and training associated with Rhinology fellowship. A 5-point ordinal Likert scale was used for responses, with higher scores being more favorable.

Results:

Complete responses were collected from 46 of 70 eligible participants (66%) representing 20 programs. High overall satisfaction with the fellowship experience was reported (mean: 4.7). Pooled scores for comfort level with the management of surveyed medical issues (mean: 4.8) and surgical procedures (mean: 4.5) were also positive. Following completion of training, lesser levels of comfort were associated with craniofacial surgery ($p<0.001$), frontal sinus obliteration ($p<0.001$) and dacryocystorhinostomy ($p=0.002$) compared to all surveyed procedures. In terms of fellowship training, respondents reported both greater interest in (4.3 versus 2.4, $p<0.0001$) and preparation for (4.3 versus 3.5, $p<0.0001$) a career in academic medicine compared to private practice. Current fellows noted a lesser interest in pursuing private practice as a goal of fellowship compared to former fellows (1.6 versus 2.7, $p=0.006$).

Conclusions:

The fellowship experience in Rhinology appears to be favorable in terms of meeting training goals and achieving subjective comfort with medical and surgical management of rhinologic issues. An ongoing critical examination of the educational goals of fellowship training in Rhinology is required to further advance the field.

#142 Rhinoscleroma Presenting as Huge Nasal Tumor

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Tehran, Irajn*

Objective:

To review a chronic granulomatous infection affecting the respiratory tract mucosa and nasal cavity and to Present an unusual case of Rhinoscleroma presenting as a huge nasal tumor.

Methods:

Case report consists of a 28 years old man who suffered from chronic nasal obstruction and frequent epistaxis for about one year. He was referred to the rhinology clinic with apparent nasal deformity and complete nasal obstruction. Characteristic histopathology was revealed by incisional biopsy. The patient was treated by surgical excision of the nasal mass.

Results:

Definitive histopathology findings revealed sheets of large foamy histiocytes with abundant clear vacuolated cytoplasm which are known as Mikulicz cells, with or without bacteria. It was associated with mononuclear inflammatory cells and scattered multinucleated giant cells. These findings confirmed the diagnosis of rhinoscleroma. Follow up visits has shown no evidence of recurrence over two years.

Conclusion:

Rhinoscleroma is an unusual granulomatous disease which could be presented as a large tumor and should be considered as a differential diagnosis of massive nasal tumors.

#143 Sclerosing Pseudotumor of the Maxillary Sinus

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Objectives:

1. To present a novel case of primary sclerosing fibro-inflammatory pseudotumor of the maxillary sinus. 2. To discuss presentation, diagnosis, radiographic appearance, and histopathologic findings of primary sclerosing pseudotumor.

Methods:

A case of primary sclerosing fibro-inflammatory pseudotumor of the maxillary sinus from a tertiary care university teaching hospital is presented, including the patient's clinical course and subsequent treatment. The case is discussed within the context of a review of the current literature regarding this disease entity. To our knowledge, this report represents the first case of sclerosing pseudotumor of the maxillary sinus.

Results:

The patient underwent uncomplicated medial maxillectomy and left frontal sinusotomy with complete excision of a granular, friable mass histopathologically consistent with sclerosing fibro-inflammatory pseudotumor. The patient continues to do well at 6 months followup without evidence of radiographic or endoscopic recurrence.

Conclusions:

The fibrosclerosing variant of pseudotumor typically associated with the orbit can manifest in the maxillary sinus. Medical management with steroid therapy alone is not sufficient. Surgical management with adjunct steroid therapy is effective.

#144 Technical Feasibility of Endoscopic Anterior Ethmoid Artery Ligation: Assessment with Intraoperative CT Imaging

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Background:

The objective of this study was to evaluate the technical feasibility of endoscopic AEA ligation by intraoperative volume CT scanning.

Methods:

A prospective study was conducted with 8 cadaver heads. Pre- and intraoperative CT scans were performed. Skull base anatomy relative to the AEA was reviewed. Endoscopic AEA ligation was attempted in 4 heads including all 6 arteries with a mesentery and 2 without. Intraoperative CT scans were performed to assess the position of the clips and the integrity of the skull base and lamina papyracea.

Results:

The mean lateral lamella height was 4.75 mm and 4.83 mm on the right and left, respectively. Of the 16 arteries, 37.5% of the AEAs were within a bony mesentery. No AEA canals were dehiscent. Four AEAs (66.7%) within a mesentery were successfully clipped and two (33.3%) were partially clipped by endoscopic evaluation. Both arteries without mesentery were partially clipped by endoscopic examination. Review of intraoperative CT scans demonstrated that the AEA with a mesentery was clipped successfully on 3 sides, partially on 1 side, and unsuccessfully on 2 sides. AEA clipping was unsuccessful on both sides without a mesentery. None of the specimens showed skull base or lamina papyracea disruption.

Conclusions:

Intraoperative CT scanning revealed that AEA ligation was less successful than was apparent endoscopically. Successful

AEA clipping was performed in 50% of cases with a mesentery. Endoscopic clipping was not technically feasible in cases with AEA without a mesentery.

#145 The Changing Face of Paranasal Sinus Fungus Balls

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Introduction:

Paranasal sinus fungus balls represent a disease entity that is routinely encountered but sparsely discussed in current literature. Fungus balls are defined as a collection of matted fungal hyphae typically found in one sinus or sinus region with associated variegations on computed tomography. The classic description is a spoonable, grayish-green, crumbly paste without evidence of histopathologic invasion.

Methods:

A retrospective review of 24 consecutive patients with the diagnosis of a paranasal sinus fungus ball (mycetoma) from 2001 to 2008 was performed.

Results:

18/24 primary sinuses had bony thickening, and 13/24 patients had notable dilatation of the ostium of the primarily involved sinus. 11/24 patients were found to have some degree of an immunocompromise (e.g. post organ transplant, diabetic, etc.). We found that the patient's immune status seemed to correlate with involved fungus (mucor-like fungi more common in immunocompetent and aspergillus-like fungi in immunocompromised). Also, there was a predilection for immunocompetent patients to have dilated ostia whereas immunocompromised patients were more likely to have a non-dilated ostium ($p < 0.019$).

Conclusions:

Our series of paranasal sinus fungus balls defines a group of patients heretofore previously described poorly in the literature. Our data reveals an increased incidence in the immunocompromised patient group. We also found consistent radiographic patterns, correlations between immune status and fungal pathogen, correlations between ostial enlargement

and immune status, and presence of cranial nerve pareses. These represent new findings that merit further study.

#146 Training, Practice, and Referral Patterns in Rhinologic Surgery: Survey of Otolaryngologists

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Objective:

Rhinology, which encompasses clinical and surgical treatment of the nasal cavity and paranasal sinuses, is a growing subspecialty with advances in the surgical, clinical and research realms. The advancement of this subspecialty and its impact on the practice of otolaryngology, in both academic and non-academic institutions, is not yet understood.

Methods:

A novel survey created by our research team was mailed out to 150 randomly selected otolaryngology staff and eight fellowship trained rhinologists throughout Canada asking questions related to demographics, training, referral patterns, technique and adequacy of training.

Results:

One-hundred respondents completed the survey, yielding a response rate of 63%. The average age of rhinologists that responded (38 years) was younger than those who were non-rhinologists (50 years). Compared to fellowship trained rhinologists, both generalists and specialists felt less comfortable with cerebrospinal (CSF) leak repairs, skull base surgery, frontal sinus surgery, paranasal sinus neoplasm removal and sphenopalatine artery (SPA) ligation.

Conclusions:

Rhinology is not a new field in otolaryngology, however it is growing as a distinct subspecialty with new fellowship opportunities combined with advances in surgical technique, clinical treatments and research. There are procedures that can be performed by both rhinologists and non-rhinologists, however there are a subset of procedures that non-rhinologists do not feel comfortable performing. These procedures should be referred to fellowship trained rhinologists at regional referral centres.

#147 Transnasal Endoscopic Resection of Solitary Fibrous Tumor of the Frontal Sinus

*Anthony Fama, MD, Michelle Roeser, MD, Daniel Price, MD,
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Solitary fibrous tumor (SFT) is a spindle cell tumor that is most commonly found on the pleura, but it has been reported in a number of extrapulmonary locations including the liver retroperitoneum, oral cavity, external auditory canal, larynx, parapharyngeal space, and central nervous system. The tumor demonstrates a combination of fibrous stromal tissue and richly vascularized spaces, and its behavior has been described as similar to hemangiopericytoma. We present a unique case of solitary fibrous tumor arising in the left frontal sinus and causing contralateral nasal obstruction. A review of the literature, endoscopic resection technique, relevant imaging, histopathologic characteristics, and treatment recommendations are discussed.

#148 Triamcinolone Injection for the Treatment of Supratip Edema

*Seyed Alireza Mesbahi, MD
Shiraz,*

Supratip fullness is one of the most common problems after rhinoplasty, especially in the countries with thick skin population.

Method:

Since 2 years ago I used triamcinolone injection in supratip area in all of my rhinoplasty patients who had supratip edema after 4 weeks of their operation (575 patients).

Results:

Five hundred of these 575 patients had a very good result, as judged by myself & my patients, with good supratip definition after 3 weeks of injection. A second injection with the same concentration was performed in remaining 75 patients after 3 weeks of their first injection who had no good response to first injection. Fifty five patients of 75 patients had a good result after another 3 weeks follow up. A third injection with higher concentration was done for the remaining 20 patient that after

another 3 weeks follow up, 9 of them had a desirable result. I had not any complication due to the triamcinolone injection in any patients.

Conclusion:

As supratip edema is a very common problem in the middle east countries, local injection of triamcinolone with suitable dose and concentration & in a correct plane and place, can satisfactory treat this important post rhinoplasty problem.

#149 Use of a Nasal Implant to Prevent Valve Collapse in Open Rhinoplasty

*Andrew Lerrick, MD, John Rachel, MD, Jhuli Patel, PA-C
Chicago, IL*

Introduction:

Nasal valve obstruction is caused by collapse of the lower lateral cartilage during inspiration. The condition is attributable to laxity of the supporting structures of the nasal vestibule. We describe placement of a nasal implant to prevent nasal valve collapse during open rhinoplasty, achieving results superior to graft and suspension techniques.

Methods:

The implant consists of malleable titanium situated between two implant-grade silicone-elastomers. Pre-operatively, a bendable template is placed over the lower lateral cartilages to determine the appropriate implant size (range 46-52mm). The periphery is positioned 2mm medial to the naso-facial crease. Intra-operatively, following elevation of the skin in the usual manner and completion of the rhinoplasty, the implant is gently bent over the round surface of a marking pen using a thumb and forefinger until a contour matching the supratip anatomy is achieved. Following in-setting, resorbable sutures are placed over the implant and through the perichondrium to stabilize the prosthesis. A nasal speculum placed within the vestibule is slowly opened to enlarge the nasal valve, using a thumb on one wing and forefinger on the other to provide counter-traction. When the airway is deemed satisfactory, the nasal skin is repositioned and closed.

Results:

The nasal airway remains patent with proper implant placement. Post-operative adjustments are permitted to maintain a satisfactory result. In the event of infection or exposure, the implant can be removed under local anesthesia.

Conclusions:

A nasal implant can prevent nasal valve collapse. Corrections are permitted if inadvertent changes to the implant shape occur.

#150 Use of Sinus Illumination During Balloon Dilation of the Sinuses

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Introduction:

Balloon dilation technology currently requires fluoroscopy to confirm guidewire position within the sinus, adding time, cost, and logistical challenges to the procedure. In an attempt to eliminate fluoroscopy, technology employing transcutaneous sinus illumination via a fiberoptic light within the guidewire this technology has been developed. This technology can be used to confirm guide-wire position within the sinus in both the OR and office settings.

Materials and Methods:

A prospective study comparing the operative time required to successfully pass a fiberoptic light wire into the frontal and maxillary sinuses as compared to a conventional guide-wire. Ostial balloon dilation was then performed on 20 frontal sinuses and 15 maxillary sinuses.

Results:

There were no complications in this series. All attempts at cannulation were successful. Average time to cannulation of the frontal sinus: 84 seconds using the fiberoptic light wire; 13 seconds using the conventional wire. Uncinectomy was required in 2 of the fiberoptic light wire cases. Eliminating the time required for the uncinectomy reduces the average cannulation time for fiberoptic light wire to 14 seconds. The average time for maxillary sinus cannulation: 15 seconds using fiberoptic light wire; 98 seconds for the conventional

wire. Uncinectomy was required in 1 conventional wire case. Eliminating the time required for the uncinectomy reduces the average cannulation time for conventional guidewire to 16 seconds.

Conclusion:

Use of the fiberoptic light wire guidewire requires no more operative time than conventional guidewires, is equally successful, and eliminates fluoroscopy. Uncinectomy may be required with either guidewire.

#151 Use of Sinus Illumination with Balloon Dilation Technology

*Brian Weeks, MD, Elgan Davies, FRCS, Julian Rowe-Jones, FRCS, Peter Catalanp, MD
San Diego, CA*

Introduction:

Balloon dilation technology was introduced in 2005 to dilate sinus ostia and restore ventilation to the sinuses. Currently fluoroscopy is used, which may be logistically challenging. This is a report on the first applications of balloon dilation technology used with a Sinus Illumination System (SIS) which may facilitate elimination of fluoroscopy. Combined with endoscopy, the SIS allows for transcutaneous illumination from within the sinus structure to confirm sinus access.

Materials and Methods:

A retrospective review was conducted of the SIS in twenty-nine adults who failed medical therapy and were candidates for endoscopic sinus surgery (ESS). ESS was performed on 32 maxillary and 38 frontal sinuses using the SIS in conjunction with other balloon dilation technology at eight surgical centers.

Results:

There were no complications related to the SIS. Of the 70 sinuses accessed by the SIS, 99% demonstrated clear transcutaneous illumination. One maxillary sinus was not illuminated; access was confirmed by endoscopy and dilation was performed. Fluoroscopy was not used in 63% of the sinuses treated. In the other 37%, fluoroscopy was used at the clinician's discretion to compare the information provided

by fluoroscopic and direct transcutaneous visualization, or to assist in catheter or balloon localization. All cannulated sinuses were successfully dilated.

Conclusion:

Our initial experience with use of the SIS is encouraging, with no complications or adverse events noted and the potential to eliminate fluoroscopy realized. In our study, transillumination and balloon ostial dilation of the frontal and maxillary sinuses was performed successfully using the SIS; however more experience is warranted.

#152 Use of Sinus Illumination with Balloon Dilation Technology

*Brian Weeks, MD, Elgan Davies, FRCS, Julian Rowe-Jones, FRCS, Peter Catalanp, MD
San Diego, CA*

Introduction:

Balloon dilation technology was introduced in 2005 to dilate sinus ostia and restore ventilation to the sinuses. Currently fluoroscopy is used, which may be logistically challenging. This is a report on the first applications of balloon dilation technology used with a Sinus Illumination System (SIS) which may facilitate elimination of fluoroscopy. Combined with endoscopy, the SIS allows for transcutaneous illumination from within the sinus structure to confirm sinus access.

Materials and methods:

A retrospective review was conducted of the SIS in twenty-nine adults who failed medical therapy and were candidates for endoscopic sinus surgery (ESS). ESS was performed on 32 maxillary and 38 frontal sinuses using the SIS in conjunction with other balloon dilation technology at eight surgical centers.

Results:

There were no complications related to the SIS. Of the 70 sinuses accessed by the SIS, 99% demonstrated clear transcutaneous illumination. One maxillary sinus was not illuminated; access was confirmed by endoscopy and dilation was performed. Fluoroscopy was not used in 63% of the sinuses treated. In the other 37%, fluoroscopy was used at

the clinician's discretion to compare the information provided by fluoroscopic and direct transcutaneous visualization, or to assist in catheter or balloon localization. All cannulated sinuses were successfully dilated.

Conclusion:

Our initial experience with use of the SIS is encouraging, with no complications or adverse events noted and the potential to eliminate fluoroscopy realized. In our study, transillumination and balloon ostial dilation of the frontal and maxillary sinuses was performed successfully using the SIS; however more experience is warranted.

#153 Use of Suspension and Stabilizing Implants in Nasal Valve Obstruction

*Andrew Lerrick, MD, John Rachel, MD, Jhuli Patel, PA-C
Chicago, IL*

Introduction:

Internal and external nasal valve obstructions are often the result of cartilage laxity and insufficient connective-tissue integrity. Nasal valve obstruction may present following nasal surgery as a result of the increased negative pressure that occurs during inhalation. In this situation use of two independent means of mechanical support, suspension and stabilization, performed simultaneously or as staged procedures, may be necessary to correct the problem.

Methods:

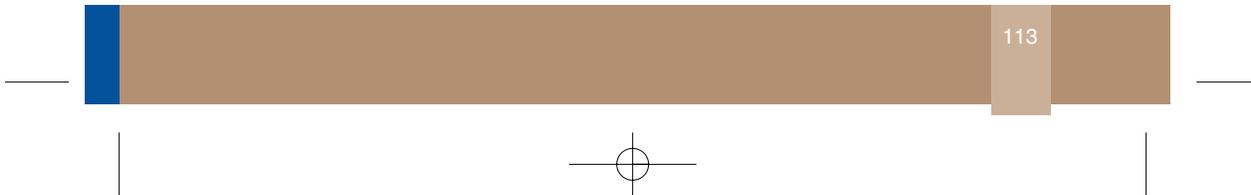
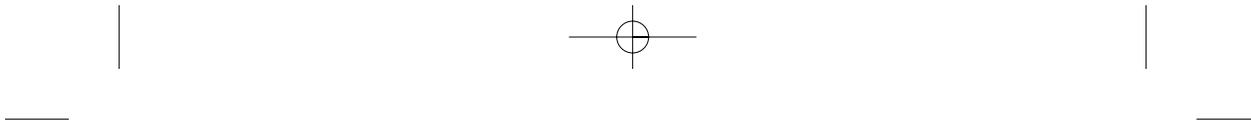
Evaluation of the obstructed primary nasal airway or the compromised post-operative nasal airway should include inspection of the nasal valve. In addition to common static structural barriers situated more posteriorly and anterior deformities, dynamic airway obstruction is evident during inhalation, manifested by collapse of the nostrils. Forceful exhalation causes the nostrils to flare. The diagnosis is confirmed by performing the Cottle maneuver, which mechanically maintains cartilaginous support during inspiration.

Results:

One suture of a two-armed implant is placed at the middle-third and the other is placed at the lateral-third of the lower lateral cartilage to maintain support of the internal valve. A single suspension suture may not prevent cartilage collapse at points distant to the stitch. The nasal implant is a malleable implant comprised of two silicone elastomers surrounding a titanium core. The implant is placed superficial to the lower lateral cartilages. Once sutured to the cartilage the implant stabilizes it, much like a scaffold. The implant is especially effective in providing support for the external valve.

Conclusions:

Suspension and stabilizing implants prevent cartilage collapse in patients who are vulnerable to nasal valve obstruction.



Dr. Maurice H. Cottle Honor Award

**For Outstanding Clinical and Laboratory Investigation in
Rhinology**

First Place Gold Medal Winners

1978

The Nasal Cycle in the Laboratory Animal

Winston M. Campbell, MD, Mayo Clinic, Rochester, MN

Eugene B. Kern, MD, Mayo Clinic, Rochester, MN

1979

**The Physiologic Regulation of Nasal Airway Resistance
During Hypoxia and Hypercapnia**

T.V. McCaffrey, MD, Mayo Clinic, Rochester, MN

Eugene B. Kern, M.D., Mayo Clinic, Rochester, MN

1980 (Two Awards Given)

**Growth Patters of the Rabbit Nasal Bone Region - A
Combined Serial Gross Radiographic Study with Metallic
Implants**

Bernard C. Sarnat, MD, Los Angeles, CA

Abbee Selman, DDS, Los Angeles, CA

Sleep Disturbances Secondary to Nasal Obstruction

Kerry D. Olsen, MD, Mayo Clinic, Rochester, MN

Eugene B. Kern, MD, Mayo Clinic, Rochester, MN

Phillip R. Westbrook, MD, Mayo Clinic, Rochester, MN

1984

**Nasal Problems in Wood Furniture Workers-A Study of
Symptoms and Physiological Variables**

Borje Drettner, MD, Sweden

Bo Wihlelnisson, MD, Sweden

1987

**Eustachian Tube and Nasal Function During Pregnancy -
A Prosepective Study**

Craig S. Derkay, MD, Pittsburgh, PA

1988

The Effects of Kiebsiella Ozenae on Ciliary Activity in Vitro: Implications for Atrophic Rhinitis

Jonathan Ferguson, MD, Mayo Clinic, Rochester, MN

1990

The in Vivo and in Vitro Effect in Phnylephrine (Neo Synephrine) on Nasal Ciliary Beat Frequency and Mucoilliary Transport

P. Perry Phillips, MD, Mayo Clinic, Rochester, MN

1991

Ultrastructural Changes in the Olfactory Epithelium in Alzheimer's Disease

Bruce Jafek, MD, University of Colorado, Denver, CO

1992

A Scanning Electron Microscopic Study of Msoking and Age Related Changes in Human Nasal Epithelium

Steven Kushnick, MD, New York, NY

1993

Mucociliary Functionin Endothelins 1, 2 & 3

Finn Ambie, MD, Mayo Clinic, Rochester, MN

1996

Capsacin's Effect on Rat Nasal Mucosa Substance P Release

Frederick A. Kuhn, MD, Savannah, GA

1999

Subacute Effects of Ozone-Exposure on Cultivated Human Respiratory Mucosa

Joseph Gosepath, MD, D. Schaefer, MD, C. Broomer, MD, L. Klimek, MD, R.G. Amedee, MD, W.J. Mann, MD, Mainz, Germany

2000

Capsacin's Effect on Trigenonal Nuciens Substance P Release

Frederick A. Kuhn, MD, Savannah, GA

2002

Bioengineering of Cartilage Using Human Nasal Chondrocytes Propagated in Microcarrier Spinner Culture

Alan H. Shikani, MD, David J. Fink, Ph.D., Afshin Sohrabi, M.H.S., Phong Phan, BS, Anna Polotsky, MD, David S. Hungerford, MD, Carmelita G. Frondoza, Ph.D, San Diego, CA

2004

Composition Of Hyaluronan Affects Wound Healing In The Rabbit Maxillary Sinus

Matthew Proctor, M.D., Kery Proctor, M.D., Xian Zheng Shu, PhD., L.D. McGill, DVM,PhD., Glenn D. Prestwich, PhD., Richard R. Orlandi, M.D.

2005

Acoustic Rhinomotry Predicts Tolerance of Nasal Continuous Positive Airway Pressure (nCPAP): A Pilot Study.

Luc G. Morris, MD, Jennifer Setlur, BS, Omar E. Burschtin, MD, David L. Steward, MD, Joseph B. Jacobs, MD, Kelvin C. Lee, MD

2006

Reversal of Chronic Rhinosinusitis Associated Sinonasal Ciliary Dysfunction

Bei Chen, MD, Marcelo B. Antunes, MD, Steven Eau Claire, James Plamer, MD, Alexander Chiu, MD, David W. Kennedy, MD, Noam Cohen, MD, Ph.D.

2007

Reversible Olfactory Loss Due to Inflammation in a Transgenic Mouse Model

Andrew Lane, M.D., Justin Turner, M.D., Lindsey May, BS, Randall Reed, PhD.

Golden Head Mirror Honor Award For Meritorious Teaching in Rhinology

The Golden Head Mirror Honor Award was first given by Dr. Maurice Cottle to colleagues who were chosen because of “Meritorious Teaching in Rhinology”. The first pair of Golden Head Mirror Cuff Links was given by Dr. Cottle to Dr. George Fisher in 1948.

A

Vijay Anand, US
 Pierre Arbour, US
 Harold Arlen, US
 Walter J. Aagesen, US
 Tomas L. Aguara, Mexico

B

Pat A. Barelli, US
 Fred W. Beck, US*
 Carlos G. Benavidee, US
 Michael Benninger, US
 Bernard Blomfield, US*
 Max Bornstein, US*

C

Jamie Carillo, Mexico*
 James Chesson, US*
 Maurice H. Cottle, US*

D

Efrain Davalos, Mexico
 John Delgaudio, US
 H.A.E. van Dishoeck, The Netherlands*
 George H. Drumheller, US*
 Glen W. Drumheller, US
 Larry E. Duberstein, US

E

F

George W. Facer, US
 Anthony Faills, US*
 George G. Fisher, US*
 Douglas W. Frericha, US
 Amos D. Friend, US*

G

Irwin E. Ganor, US
 Norman E. Ginsberg, US*
 Vernon D. Gray, US*
 Charles Gross, US
 Harvey C. Gunderson, US

H

James A. Hadley, MD
 Richard B. Hadley, US*
 Robert M. Hansen, US*
 Edward W. Harris, US*
 Raymond L. Hilsinger, US*
 Kenneth H. Hinderer, US*
 Leland R. House, US
 Sandy Hoffman, US
 Egbert Huizing, The Netherlands

J
Gerald F. Joseph, US
Joseph B. Jacobs, MD

K
Alvin Katz, US
David Kennedy, US
Eugene Kern, US
John Kirchner, US
Daniel D. Klaff, US*
Zvonimir Krajina, Croatia
Frederick A. Kuhn, US

L
Clifford F. Lake, US*
Donald Lanza, US
Donald Leopold, US
Walter E.E. Loch, US*
W. Kaye Lochlin, US
Fausto Lopez-Infante,
Mexico
Roland M. Loring, US*
Frank Lucente, US

M
Henry Merriman, US*
Lewis E. Morrison, US

N
William J. Neidlinger, US*
Roberto Neveus-Pinto,
Brazil
Leon Neiman, US

O
Joseph H. Ogura, US*
Harold Owens, US

P
Charles J. Patrillo, US*
Ivan W. Philpott, US*
Loring W. Pratt, US

R
Frederico Reyes, Mexico
Ralph H. Riggs, US
Zvi Henry Rosen, Israel

S
Piefer H. Schmidt, The
Netherlands
Thomas C. Smersh, US
Maynard P. Smith, US
Pinckney W. Snelling, US*
Carl B. Spath, US
Heinz Stammberger, Austria
Albert Steiner, US*
Sydney L. Stevens, US*
Fred Stucker, US
Giorgio Sulsenti, Italy
Edward A. Swartz, US

T
William H. Tenny, US
H. Ashton Thomas, US*
Paul H. Toffel, US
Richard Trevino, US
Charles A. Tucker, US

W
Richard C. Webster, US*
Alvin P. Wenger, US
Joseph W. West, US*
Manual R. Wexter, US*
Henry L. Williams, US*
Russell I. Williams, US

* Deceased

New Investigator Award — (CORE)

2008

The Role of Epithelial Cells in Chronic Rhinosinusitis with Nasal Polyps

Bradley Otto, MD

2007

Regulatory T Cells in Chronic Rhinosinusitis

Jayant Pinto, MD

2006

Efficacy of Topical Lactoferrin and Antibiotics in an Animal Model of Sinusitis

Alexander Chiu, MD

2005

Surfactant Proteins A and D In Chronic Sinusitis

Rodney J. Schlosser, MD

2004

Assessment of Bacterial Biofilms in Sinusitis

James N. Palmer, M.D.

2002

Characterization of Eosinophil Peroxidase-Induced Tissue Damage in Sinonasal Polyposis and Chronic Rhinosinusitis

Martin J. Citardi, MD

Influence of Estrogen on Maturation of Olfactory Neurons

Karen J. Fong, MD

2001

Apoptosis in the Aging Olfactory Mucosa

David B. Conley, MD

Clinical Science Research Award

2007 (COSM)

Demonstration of Biofilms in Chronic Sinusitis Using Light Microscopy

A. Bhatki, M.D., A. Goldberg, M.D., M. Gangar, M.D., G. Hradek, M.S.

2006 (COSM)

Impact of Depression on Disease-Specific Symptoms and Quality of Life in Patients with Chronic Rhinosinusitis

Rebecca Bransted, MD

Basic Science Research Award

2008 (COSM)

Reversible Loss of Neuronal Marker Protein Expression in a Transgenic Mouse Model for Sinusitis-associated Olfactory Dysfunction

Justin Turner, MD, PHD, Lindsey May, BS, Randall Reed, PhD., Andrew Lane, MD

2007 (COSM)

Methods for Removing Bacterial Biofilms: In Vitro Study Using Clinical Chronic Rhinosinusitis Specimens

Martin Desrosiers, M.D., M. Myntti, Ph.D., G. James, Ph.D.

2006 (COSM)

Chronic Rhinosinusitis with Nasal Polyps is Associated with Decreased Expression of Epithelial Interleukin 22 Receptor

Murugappan Ramanathan, Jr., MD

2005

Altered Expression Of Genes Associated With Innate Immunity In Recalcitrant Rhinosinusitis With Polyps.

Andrew P. Lane, M.D.

2004

Superantigens and Chronic Sinusitis II: Analysis of T Cell Receptor VB Domain in Nasal Polyps

David B. Conley, MD, Anju Tripathi, MD, Kristin A. Seiberling, MD, Leslie C. Grammar, MD, Robert C. Kern, MD

2003

Nitric Oxide and Collagen Expression in Allergic Upper Airway Disease

Marc A. Tewfik, CSc, Julio F. Bernardes, MD, Jichaun Shan, MD, Michelle Robinson, BSc, Saul Frenkiel, MD, David H. Eidelman, MD

2000

An Animal Model for Allergic Fungal Sinusitis

Felicia Grisham, MD

Histologic Study of the Superior Turbinate

Donald Leopold, MD

International Research Award

2008

Development of a Low Cost Endoscopic Sinus Surgical Trainer

*Randy M. Leung, MD, Jerry M. Leung, MD, Adam Dubrowski, PhD, Ian Witterick, MD
Toronto, Canada*

2006

Effectiveness of Topical Antibiotics on Staphylococcus Aureus Biofilm in Vitro

Martin Desrosiers, MD, Zohra Bendouah, Msc., Jean Barbeau, Ph.D

A Sheep Model for the Study of Biofilms in Rhinosinusitis

Kien R. Ha, MBBS, Alkis J. Psaltis, MBBS, Lorwai Tan, Ph.D, Peter John Wormald, MD

2005

Brain Perfusion SPECT Findings in Patients with Posttraumatic Anosmia and Comparison with Radiological Imaging

Mohammad Eftekhari, Majid Assadi, Majid Kazemi, Mohsen Naraghi, Jalal Mehdizadeh, Mohsen Saghari, Alireza Mojtahedi, Mohammad Sadeghi-Hasamabadi, Armagan Fard-Esfahani, Babak Fallahi, Davood Beiki

2004

Development of A Rhinovirus Study Model Using Organ Culture of Turbinate Mucosa

Yong Ju Jang, M.D., Si Hyeong Lee, M.D., Hyon-Ja Kwon, MSc, Yoo-Sam Chung, M.D., Bong-Jae Lee, M.D.

2003

Nitric Oxide and Collagen Expression in Allergic Upper Airway Disease

Marc A. Tewfik, MD, Julio F. Bernardes, MD, Jichuan Shan, MD, Michelle Robinson, MD, Saul Frenkiel, MD, David H. Edelman, MD

2002

Recording of the Electro-Olfactogram (EOG) Using Externally Placed Electrodes

Churunal K. Hari, F.R.C.S., Liwei Wang, Ph.D, Tim J.C. Jacob, Ph.d, San Diego, CA

Resident/Fellows in Training Travel Grant

2008

Management of Sinonasal Malignant Neoplasms: Defining the Role of Endoscopy

Amber Luong, MD

CT Scan Severity Correlates with Improvement in Quality of Life Outcomes after Endoscopic Sinus Surgery in Patients with Chronic Rhinosinusitis and Asthma

Patricia Maeso, MD

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Keith Richardson, MD
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Brynn E Richardson, MD
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Phoenix, AZ

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Arlington, TX

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Boston, MA

Kenneth Briskin, MD
Chester, PA

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David R Brown, MD
Santa Fe, NM

Andrew Blitzer, MD
New York, NY

Orval E. Brown, MD
Dallas, TX

Ann Bogard, MD
Winston Salem, NC

Grady L. Bryant, Jr., MD
Hermitage, TN

Robert E. Bonham, MD
Dallas, TX

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Bismarck, ND

Joseph Houston Bosley, MD
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Nicolas Busaba, MD
Boston, MA

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Chicago, IL

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Stoneham, MA

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Gainesville, GA

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Dallas, TX

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Chicago, IL

Ricardo Carrau, MD
Pittsburgh, PA

Octavio D Carreno, MD
Ellsworth, Maine

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Flowood, MS

Russell P Cecola, MD
New Orleans, LA

Antonio Cedin, MD
Sao Paulo

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Utica, NY

Gretchen Champion, MD
Allen, TX

Dennis F Chang, MD
Loma Linda, CA

Jerry Chapnik, MD
Canada

Bradley J. Chastant, MD
Lafayette, LA

Rashid Chaudhry, MD
Brooklyn, NY

Burke Chegar, MD
Connersville, IN

Alexander Chester, MD
Washington, DC

Dewey Christmas, Jr., MD
Ormond Beach, FL

Clifford Timothy Chu, MD
Brick, NJ

Suzanne Cleland-Zamudio, MD
Portland, OR

William Cobb, MD
Plano, TX

Joel Cohen, MD
Scottsdale, AZ

Noam Cohen, MD
Philadelphia, PA

Randall Cohen, MD
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