



September 10, 2011

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PROGRAM AT-A-GLANCE

September 10, 2011

Grand Ballroom B

Breakfast Symposium

Supported by NeilMed Pharmaceuticals

7:00am - 7:50am

Office Based Procedures in Rhinology

Moderator: **Todd Kingdom, MD**

- Turbinate Procedures in the Office
Richard Orlandi, MD
- Balloons in the Office
Michael Sillers, MD
- Office Based ESS
John DelGaudio, MD

7:55am - 8:00am

Welcome

Michael Setzen, MD, Program Chairman

8:00am - 8:20am

Invited Key Note Speaker

Rodney Lusk, MD

Introduction by Brent Senior, MD, ARS President

Management of Pediatric Rhinosinusitis-Medical and Surgical-Then and Now

Audience Response Session

Joseph Han, MD

Moderator(s): **Peter Hwang, MD, James Palmer, MD**

8:20am -8:26am

A Blinded Randomized Controlled Trial on the Efficacy of Chitosan Gel on Ostial Stenosis Following Endoscopic Sinus Surgery

Rowan Valentine, MD

8:26am - 8:32am

Single-blind Randomized Controlled Trial of Surfactant (S) vs. Hypertonic Saline (HS) Irrigation following Endoscopic Endonasal Surgery in the Early Post-operative Period

Alexander Farag, MD

Q&A

Moderator(s): **Joseph Jacobs, MD Rodney Schlosser, MD**

8:38am - 8:44am

Nationwide Incidence of Major Complications in Endoscopic Sinus Surgery

Vijay Ramakrishnan, MD

8:44am - 8:50am

Long-term Outcomes after Frontal Sinus Surgery

Yuresh SirkariNaidoo, MD

8:50am - 8:56am

Q&A

Moderator: **Michael Setzen, MD**

8:56am - 9:56am

Controversies in Rhinology

Panelists: David Kennedy, MD, Heinz Stammberger, MD, Brent Senior, MD, Roy Casiano, MD, Michael Sillers, MD Peter Catalano, MD

- Uncinectomy or Not!
- Middle Meatal Antrostomy-Large, Small or No!
- Debridement Post ESS-Yes or No?
- Maximum Medical Therapy-What is This?
- Balloons in ESS-My Indications!
- IGS-Standard of Care or State of the Art?
- Confirmed Recurrent Sinusitis with normal CT between events-Dilemma!
- Sinus Headache-True or False?
- Osteitis-Fact or Fiction?
- Nitric Oxide-Yes or No?

9:56am - 10:10am

Presidential Address and Awards

Presentation - Brent Senior, MD President, ARS

10:10am - 10:40am

(Introduction by Dr. David W. Kennedy)

7th Annual David W. Kennedy Lectureship

Supported by Karl Storz Endoscopy

My Lifetime Experience in the Management of Sinusitis: Then & Now

Professor Heinz Stammberger

10:40am - 11:00am

**Break with Exhibitors
Grand Ballroom C**

Moderator: Timothy Smith, MD

11:00am - 12:00pm

Panel: What Evidence Exists for What I Do for CRS?

- *Introduction and Evidence for ESS for CRS* - Timothy Smith, MD
- *Evidence for Systemic Steroids for CRS* - Peter Hwang, MD
- *Evidence for Topical Therapies for CRS* - Rodney Schlosser, MD
- *Evidence for Image-Guided Sinus Surgery* - Todd Kingdom, MD
- *Evidence for Frontal Sinus Stenting* - James Stankiewicz, MD
- *Evidence for Postoperative Debridement* - Luke Rudmik, MD

12:00pm - 12:15pm

Business Meeting
All Members are invited

12:00pm - 1:00pm

Attendee Lunch with Exhibitors
Grand Ballroom C

12:00pm - 1:00pm

Residents/Fellows in Training Luncheon - Union Square
Grand Ballroom Level - Third Floor
Supported by Acclarent, Inc.

Moderators: Seth Brown, MD
Belachew Tessema, MD

- *Why do a Rhinology Fellowship?*
- *How to Choose the Right Fellowship for You*
- *How to Choose Between Private Practice and Academics*
- *How to Select the Perfect First Job*

Moderators: James Hadley, MD
Ralph Metson, MD

1:00pm - 1:06pm

Occupational Hazards of Endoscopic Endonasal Surgery
Charles Ebert, Jr., MD

1:06pm - 1:12pm

Early Post-operative Care Following Endoscopic Sinus Surgery: An Evidence-based Review with Recommendations
Luke Rudmik, MD

1:12pm - 1:18pm

Outcomes of Endoscopy and Computed Tomography (CT) in Patients with Chronic Rhinosinusitis
Muhamad Amine, MD

1:18pm - 1:24pm
Q&A

Moderators: Peter Doble, MD
Paul Toffel, MD

1:24pm - 1:30pm

Examining the Safety of Prednisolone Acetate 1% Nasal Spray for Treatment of Patients with Nasal Polyposis
Jonathan Liang, MD

1:30pm - 1:36pm

CSF Volume Replacement Following Large Endoscopic Anterior Cranial Base Resection
Angela Blount, MD

1:36pm - 1:42pm

The Safety and Efficacy of Ketorolac in Patients Undergoing Primary Endoscopic Sinus Surgery: A Prospective Randomized, Double-Blinded Clinical Trial
Kevin Welch, MD

1:42pm - 1:48pm
Q&A

**Moderators: Vijay Anand, MD
Marc Dubin, MD**

1:48pm - 1:54pm
Beyond Eosinophilia: Does Neutrophilic Inflammation in Chronic Rhinosinusitis Help Better Understand the Disease?
Annie Gaudreau

1:54pm - 2:00pm
Patterns of Dural Involvement in Anterior Skull Base Tumors: Prospective Correlation of MRI and Histopathologic Findings
John McIntyre, MD

2:00pm - 2:06pm
Microbiological Outcomes Following Mupirocin Nasal Rinses for Symptomatic, S.aureus-positive Chronic Rhinosinusitis Following Endoscopic Sinus Surgery
Josh Jervis-Bardy, MD

2:06pm - 2:10pm
Q&A

**Moderator(s): Roy Casiano, MD
James Stankiewicz, MD**

2:10pm - 2:16pm
Efficacy of Transnasal Endoscopic Resection of Malignant Anterior Skull Base Tumors
John Wood, MD

2:16pm - 2:22pm
Augmented Real-Time Image Guided Surgery Reduces Task Workload During Endoscopic Sinus Surgery
Benjamin Dixon, MBBS

2:22pm - 2:28pm
Structured Histopathology Profiling of Chronic Rhinosinusitis in Routine Practice
Richard Harvey, MD

2:28pm - 2:34pm
Cost Analysis of Office-Based and Operating Room Procedures in Rhinology
Kara Prickett, MD

2:34pm - 2:40pm
Q&A

2:40pm - 3:00pm
Break with Exhibitors
Grand Ballroom C

Moderator: Jan Gosepath, MD

3:00pm - 4:00pm
Panel: An International Perspective on the Etiology of Nasal Polyposis
Panelists: Wytske Fokkens, MD, Richard Harvey, MD, Heinz Stammberger, MD, Thibaut van Zele, MD

**Moderators: Todd Kingdom, MD,
Richard Orlandi, MD**

4:00pm - 4:06pm
Inter-rater Agreement of Nasal Endoscopy for Chronic Rhinosinusitis
Roheen Raithatha, MD

4:06pm - 4:12pm
Environmental Air Pollution Mediates Oxidative Stress Induced Sinonasal Epithelial Cell Inflammation
Murugappan Ramanathan, MD

4:12pm - 4:18pm
Endoscopic Skull Base Surgery and its Impact on Sinonasal-Related Quality of Life
Edward McCoul, MD

4:18pm - 4:24pm
Q&A

**Moderators: John DelGaudio, MD
Michael Stewart, MD**

4:24pm - 4:30pm
Changing Paradigms in Frontal Sinus CSF Leak Repair
Virginia Jones, MD

4:30pm - 4:36pm
Increased Percentage of Mast Cells within Sinonasal Mucosa of Chronic Rhinosinusitis with Nasal Polyp Patients Independent of Atopy
Joanne Shaw, Ph.D

4:36pm - 4:40pm
Multimodality Topical Therapy for Refractory Chronic Rhinosinusitis with and without Nasal Polyposis
Alan Shikani, MD

4:40pm - 4:46pm

Olfactory Neuroepithelium in the Superior and Middle Turbinate: Which is the Optimal Biopsy Site?

Fabio Pinna, MD, PhD

4:46pm - 4:52pm

Effect of LD Placement on Recurrence of CSF Rhinorrhea After Endoscopic Repair

Nadieska Caballero, MD

4:52pm - 5:00pm

Q&A

5:00pm - 6:30pm

Wine & Cheese Poster Reception *Supported by*

Intersect ENT

Grand Ballroom Foyer

World Renowned Sommelier, Courtney Cochran - Highlighting California's Wines

Grand Ballroom A

Moderators: Andrew Lane, MD

1:00pm - 2:00pm

Panel: ARS Young Investigators: Innovative Rhinology Research with Impact

Panelists: Amber Luong, MD, Murray Ramanathan, MD, Bruce Tan, MD, Sarah Wise, MD, Brad Woodworth, MD

Moderators: Noam Cohen, MD, Robert Kern, MD

2:00pm - 2:06pm

Comparative Analysis of Nasal and Sinus Microbiota in Chronic Rhinosinusitis and Control Subjects

Cindy Liu, MD

2:06pm - 2:12pm

The Effects of Nitric Oxide on Staphylococcus Aureus Biofilm Growth and its Implications in Chronic Rhinosinusitis

Camille Jardeleza, MD

2:12pm - 2:18pm

Two-year Results: Transantral Balloon Dilation of the Ethmoid Infundibulum

James Stankiewicz, MD

2:18pm - 2:24pm

CD8+ Lymphocyte Immunodeficiency: an Important Unrecognized Factor in Refractory Chronic Rhinosinusitis?

Marie-Christine Noel, MD

2:24pm - 2:30pm

Q&A

2:30pm - 3:00pm

Break with Exhibitors

Grand Ballroom C

Moderator(s): Martin Derosiers, MD, Stephanie Joe, MD

3:00pm - 3:06pm

CD44 as a Marker of Cancer Stem Cells in Nasopharyngeal Carcinoma

Agnieszka Janisiewicz, MD

3:06pm - 3:12pm

Phenotypes of Chronic Rhinosinusitis

Sal Taliercio, MD

3:12pm - 3:18pm

Human Sinonasal Explant System for Testing Cytotoxicity of Intranasal Agents

Jae Lim, MD, PhD

3:18pm - 3:24pm

Q&A

Moderators: David Conley, MD, Alexander Chiu, MD

3:24pm - 3:30pm

Dose Quantification of Topical Drug Delivery to the Paranasal Sinuses by Fluorescein Luminosity Calculation

Benjamin Bleier, MD

3:30pm - 3:36pm

Incidental Sinonasal Findings Identified During Preoperative Evaluation for Endoscopic Sella Approaches

Adrienne Laury, MD

3:36pm - 3:40pm

Prospective Evaluation of Balloon-Only and Combination Balloon-Sinonasal Surgical Procedure Outcomes through One-Year Follow-Up
James Atkins, Jr., MD

3:40pm - 3:46pm
Q&A

Moderators: Belachew Tessema, MD, Kathleen Yaremchuk, MD

3:46pm - 3:52pm
A Meta-Genomic Analysis of 16S rRNA Gene Based Bacterial Detection Results Enhances Understanding of the Bacteriology of CRS
Saud Alromaih, MD

3:52pm - 3:58pm
Microwave Disinfection: Assessing the Risks of Irrigation Bottle and Fluid Contamination
Sharon Morong, MD

3:58pm - 4:02pm
Paranasal Sinus Fibro-osseous Lesions: When is Biopsy Indicated for diagnosis?
Guy Efunne, MD

4:02pm - 4:08pm
Q&A

Moderators: Kevin Welch, MD, Peter J. Wormald, MD

4:08pm - 4:14pm
Expression of the Extracellular Matrix Gene Periostin (POSTN) Decreases after Successful ESS
Wei Zhang

4:14pm - 4:20pm
Regional Expression of Epithelial MDR1/P-gp in Chronic Sinusitis with and without Nasal Polyposis
Benjamin Bleier, MD

4:20pm - 4:26pm
Regulation of Murine Sinonasal Cilia Function by Microbial Secreted Factors
Jessica Shen, MD

4:26pm - 4:32pm
Q&A

Moderator: Pete Batra, MD, Steven Schaeffer, MD

4:32pm - 4:38pm
Efficacy of NVC-422 Against S. aureus Biofilms in Sheep Biofilm Model of Sinusitis
Deepti Singhal, MD

4:38pm - 4:44pm
Absence of Disease-Specific Gene Expression by Nasal Polyp Epithelial Cells in Culture
Babar Sultan, MD

4:44pm - 4:50pm
When Does Surgery Become Cost-Beneficial in the Management of Recurrent Acute Rhinosinusitis?
Randy Leung, MD

4:50pm - 5:00pm
Q&A

5:00pm - 6:30pm
Wine & Cheese Poster Reception Supported by Intersect ENT Grand Ballroom Foyer

World Renowned Sommelier, Courtney Cochran - Highlighting California's Wines

POSTERS
Grand Ballroom Foyer
Wine & Cheese Poster Reception, Sept. 10, 2011, 5:00-6:30pm
Supported by Intersect ENT

Poster# 1 - **Acute Invasive Fungal Rhinosinusitis: Review of 6 Patients**
Fábio Pinna, MD, PhD

Poster# 2 - **Bacterial Microcolonies Exist within the Sphenoid Bone in Chronic Rhinosinusitis**
Andrew Wood, MD

Poster# 3 - **Bilateral Onodi Cells in Patients with Pituitary Adenoma: A Potential Advantage of the Endoscopic Endonasal Approach**
Thuy-Anh Melvin, MD

Poster# 4 - Characterization of the Cellular Composition of the Murine Nasal Epithelium through Development

Dawn Bravo, PhD

Poster# 5 - Comparison of Coblator and KTP laser for Treatment of Hereditary Hemorrhagic Telangiectasia (HHT)-related Epistaxis: A Preliminary Report

Nathan Sautter, MD

Poster# 6 - Complications in the Treatment of Juvenile Nasopharyngeal Angiofibroma with Intracranial Invasion

Maria Godoy, MD

Poster# 7 - Confirmation of Transnasal Balloon Device Placement within the Maxillary Sinus Ostium in a Cadaveric Model

David Brodner, MD

Poster# 8 - Cost of Allergy Immunotherapy- Sublingual versus Subcutaneous Administration

Kristin Seiberling, MD

Poster# 9 - Diffuse Large B-Cell Lymphoma Masquerading as Pott's Puffy Tumor

Josh Meier, MD

Poster# 10 - Effect of LD Placement on Recurrence of CSF Rhinorrhea after Endoscopic Repair

Nadieska Caballero, MD

Poster# 11 - Effectiveness of the Hydrodebrider Apparatus Used at the Time of Endoscopic Sinus Surgery for Chronic Rhinosinusitis on Early Postoperative Outcomes

Martin Desrosiers, MD

Poster# 12 - Endoscopic Endonasal Transclival Approach to the Basilar Artery: An Anatomic Study with Clinical Case Correlates

BrianThorp, MD

Poster# 13 - Endoscopic Resection of a Nasal Pyogenic Granuloma with a Harmonic Scalpel

Jonathan Lee, MD

Poster# 14 - Endoscopic Resection of an Anterior Ethmoid Schwannoma

Stewart Adam, MD

Poster# 15 - Endoscopic Transnasal Resection of Skull Base Meningiomas

Yuresh Naidoo, MD

Poster# 16 - Endoscopic Transtemporal Gillies Approach for Superoposterior Infratemporal Fossa Access: A Cadaveric Feasibility Study

Mark Friedel, MD

(Presented by Shawn Li, MD)

Poster# 17 - FESS Impact on Quality of Life of CRS Patients in Brazil

Thiago Bezerra, MD

Poster# 18 - Giant Cell Bone Lesions in the Craniofacial Region: A Diagnostic and Therapeutic Challenge

Fábio Pinna, PhD

Poster# 19 - Giant Pneumatized (concha bullosa) Superior Turbinate Causing Unilateral Facial Pain

Jeremy Hornibrook, FRACS

Poster# 20 - Improvement in Nasal Valve Function with Non-surgical Structural Augmentation

Mohsen Naraghi, MD

Poster# 21 - Intranasal Drug Induced Fungal Rhinopharyngitis

Allen Seiden, MD

Poster# 22 - Invasive Actinomycosis of Bilateral Facial Bones, A Case Report

Nopawan Vorasubin, MD

Poster# 23 - Less Invasive Endonasal Approach for Total Removal of Antrochoanal Polyp

Yasuyuki Hinohira, MD

Poster# 24 - Locally Destructive Skull Base Lesion; IgG4-related Sclerosing Disease

Jeremiah Alt, MD

Poster# 25 - Lupus Pernio, a Midline Destructive Lesion with Potential for Long-term Sinonasal Complications

Roheen Raithatha, MD

Poster# 26 - Molecular Modulation of Upper Airway Ciliary Response to Sneezing

Ke-Qing Zhao, MD

Poster# 27 - Nasal Lobular Capillary Hemangioma: A Rare Cause of Epistaxis in Children

Jordan Virbalas, MD

Poster# 28 - Nasal Septal Pleomorphic Adenoma Presenting as Recurrent Epistaxis

Laura Shively, MD

Poster# 29 - Nontraumatic Posterior Ischemic Optic Neuropathy (PION) Following Uncomplicated Functional Endoscopic Sinus Surgery

Roheen Raithatha, MD

Poster# 30 - Olfactory Improvement with the Use of the Ball Tracheotomy Speaking Valve

Alan Shikani, MD

Poster# 31 - Ophthalmologic Complications as Unusual Presentations of Sinonasal Wegener's Granulomatosis

Philip Chen, MD (Presented by Spencer Payne, MD)

Poster# 32 - Oxidative stress induces Pseudomonas aeruginosa (PAO1) Biofilm Growth

John Chi, MD

Poster# 33 - Paraguesia Following Pine Nut Ingestion

Bruce Tan, MD

Poster# 34 - Pedicled Nasoseptal Flap for Reconstruction of Skull Base Defects: Incidence of Post-Operative Cerebrospinal Fluid Leak

Arjuna Kuperan, MD

Poster# 35 - Posterior Nasal Neurectomy for Treatment of Allergic Rhinitis

Takeo Kanaya, MD

Poster# 36 - Posterior Nasal Neurectomy for Treatment of Allergic Rhinitis in Children with Sleep-disordered Breathing: A Pilot Study

Toru Kikawada, MD

Poster# 37 - Pre-Pontine Abscess: A Rare Complication of Bacterial Rhinosinusitis

Arjuna Kuperan, MD

Poster# 38 - Prognostic Factors in Sinonasal Sarcomas: Analysis of the SEER Database

Arthur Wu, MD

Poster# 39 - Propionibacterium Acnes as a Sinus Pathogen

Kristen Boyle, MD

Poster# 40 - Radiofrequency Coblation of Encephaloceles

Kevin McLaughlin, MD

Poster# 41 - Raeder's Syndrome: A Unique Presentation of Chronic Sinusitis

Cedric Pritchett, MD

Poster# 42 - Residual Chloride Secretion in Freshly Excised Epithelia from Cystic fibrosis Patients

Do-Yeon Cho, MD

Poster# 43 - Sinonasal Tumor with Two Distinct Histologies

Henry Barham, MD

Poster# 44 - Symptom Scores Equally Improved After Treatment with a Novel Device Delivering Fluticasone Propionate in Patients with Chronic Rhinosinusitis with Nasal Polyps Irrespective of Prior Surgery

Per Djupesland, MD, PhD

Poster# 45 - The Bacterial and Fungal Burden in Chronic Rhinosinusitis: Molecular Detection, Biofilm, and Conventional Culture

Sam Boase, MD

Poster# 46 - The Gold Laser in Management of Concha Bullosa: First Description of a Novel Technique

Ryan Winters, MD

Poster# 47 - The Pattern and Extent of Sphenoid Sinus Pneumatization May Influence Location of the Sphenoid Ostium

April Landry, MD

Poster# 48 - Three Cases of Inverted Tooth in the Nasal Cavity

Go Takahashi, MD

**Poster# 49 - Transsphenoidal
Meningocele with Intranasal
Extension: Case Report and Literature
Review**

Maria Godoy, MD

**Poster# 50 - Treatment of Recalcitrant
Chronic Sinusitis with Topical
Irrigation of a Povidone-Iodine /
Budesonide Suspension**

Belachew Tessema, MD

**Poster# 51 - Two Cases of Organized
Hematoma of the Maxillary Sinus**

Toshiyuki Shimizu, MD

**Poster# 52 - Use of CT imaging for
Rhinosinusitis Care: Variations Based
on Physician Type**

Giant Lin, MD

**Poster# 53 - Use of Enterprise Data
Warehouse to Study the Management
of Chronic Sinusitis**

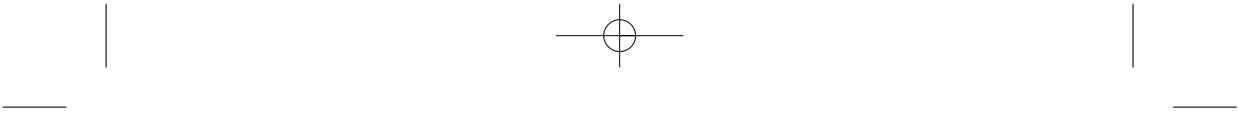
Joseph Raviv, MD

**Poster# 54 - Utilization of Image
Guidance System during Endoscopic
Procedures**

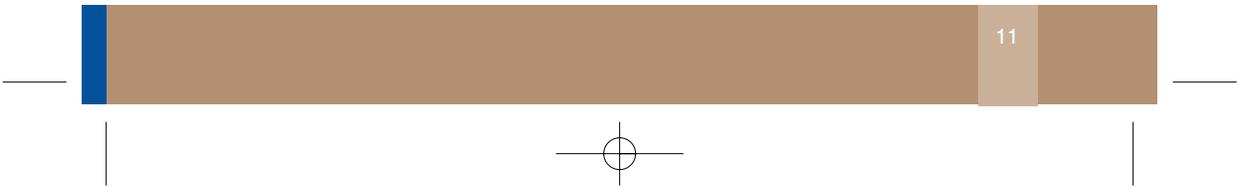
Joseph Han, MD

**Poster #55 - Dermoid Cyst in the
Infratemporal fossa?**

Marco Fornazieri, MD



Officers





Brent A. Senior, MD

President

University of North Carolina
Department of Otolaryngology - Physician Building
170 Manning Drive, CB 7070
Chapel Hill, NC 27955
Tel: 919-966-3342
Fax: 919-966-7941
Email: brent_senior@med.unc.edu



Michael Setzen, MD

President Elect

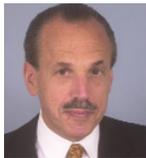
600 Northern Blvd., Suite 312
Great Neck, NY 11021
Tel: 516-829-0045
Fax: 516-829-0441
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Peter Hwang, MD

Secretary

801 Welch Road
Stanford, CA 94305
Tel: 650-725-6500
Fax: 650-725-8502
Email: secretaryars@gmail.com



Joseph B. Jacobs, MD

Treasurer

NYU Medical Center
530 First Avenue, Suite C
New York, NY 10016
Tel: 212-263-7398
Fax: 212-263-8490
Email: joseph.jacobs@nyumc.org



Todd Kingdom, MD

First Vice President

University of Colorado School of Medicine
12631 E. 17th Avenue, #B205
Aurora, CO 80045
Tel: 303-724-1960
Fax: 303-724-1961
Email: todd.kingdom@ucdenver.edu



Timothy Smith, MD
Second Vice President
Oregon Health and Science University
Oregon Sinus Center
3181 SW Sam Jackson Park Rd PV- 01
Portland, OR 97239
Tel: (503) 494-7413
Fax: (503) 494-4631
Email: smithtim@ohsu.edu



Stilianos Kountakis, MD
Immediate Past President
Medical College of Georgia
1120 15th Street
Suite BP-4109
Augusta, GA 30912
Tel: 706-721-6100
Fax: 706-721-0112
Email: skountakis@mcg.edu



James Stankiewicz, MD
Past President
Loyola University
Department of Otolaryngology
2160 South First Avenue
Maywood, IL 60153
Tel: 708-216-8527
Fax: 708-216-4834
Email: jstank@lumc.edu



Wendi Perez
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PO Box 495
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Fax: 845-986-1527
Email: wendi.perez@gmail.com

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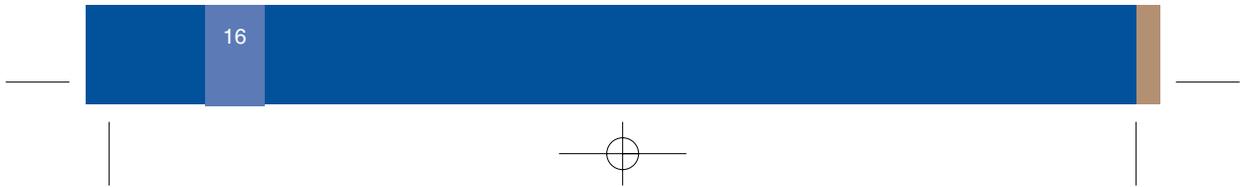
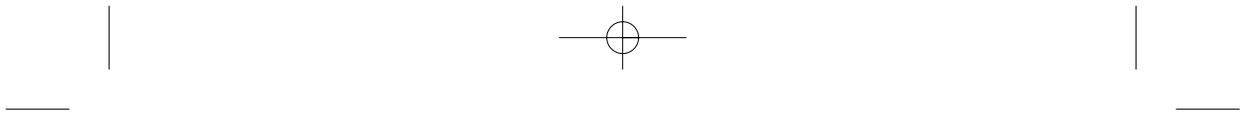
Patient Advocacy
Pete Batra, MD

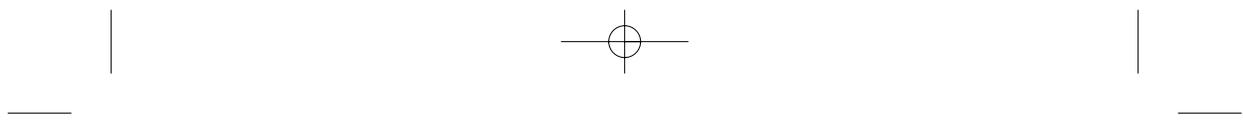


Pediatric Rhinology
Sanjay Parikh, MD

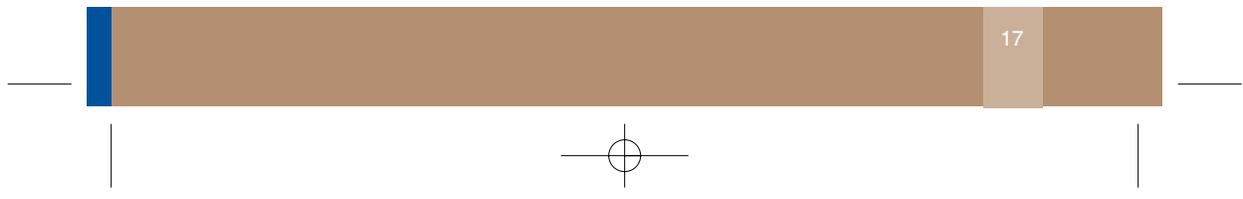


Resident/Fellows
Seth Brown, MD





Past Presidents/Secretaries



Past Presidents

1954 - 1955 Maurice H. Cottle, MD*
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 1959 - 1960 Roland M. Loring, MD*
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 1967 - 1968 Richard Hadley, MD*
 1968 - 1969 Henry L. Williams, MD*
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 1974 - 1975 George H. Drumheiler, MD*
 1975 - 1976 Joseph W. West, MD*
 1976 - 1977 Albert Steiner, MD*
 1977 - 1978 Anthony Failla, MD*
 1978 - 1979 Clifford F. Lake, MD*
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 1984 - 1985 George C. Facer, MD
 1985 - 1986 Larry E. Duberstein, MD
 1986 - 1987 Glenn W. Drumheiler, DO
 1987 - 1988 Alvin Katz, MD
 1988 - 1989 Donald Leopold, MD
 1990 - 1991 Pierre Arbour, MD
 1991 - 1992 Fred Stucker, MD
 1992 - 1993 David W. Kennedy, MD
 1993 - 1994 Sanford R. Hoffman, MD
 1994 - 1995 Richard J. Trevino, MD
 1995 - 1996 Vijay K. Anand, MD
 1996 - 1997 Dale H. Rice, MD
 1997 - 1998 Michael S. Benninger, MD
 1998 - 1999 William Panje, MD
 1999 - 2000 Charles W. Gross, MD
 2000 - 2001 Frederick A. Kuhn, MD
 2001 - 2002 Paul Toffel, MD
 2002 - 2003 Donald C. Lanza, MD
 2003 - 2004 James A. Hadley, MD
 2004 - 2005 Joseph B. Jacobs, MD
 2005 - 2006 Michael J. Sillers, MD
 2006 - 2007 Howard L. Levine, MD
 2007 - 2008 Marvin P. Fried, MD
 2008 - 2009 James Stankiewicz, MD
 2009 - 2010 Stilianos Kountakis, MD
 2010 - 2011 Brent A. Senior, MD

**Deceased*

Past Secretaries

2009-Present
 Peter Hwang, MD

 2005-2008
 Brent A. Senior, MD

 1999 - 2005
 Marvin P. Fried, MD

 1995 - 1999
 Frederick Stucker, MD

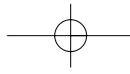
 1990-1995
 Frank Lucente, MD

 1985-1990
 George Facer, MD

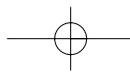
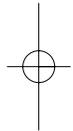
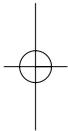
 1980 - 1985
 Pat A. Barelli, MD

 1975 - 1980
 Glenn H. Drumhiller, MD

 1970 - 1975
 Ralph H. Riggs, MD



Business/ACCME



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.

Learning Objectives:

- Become familiar with the management of pediatric sinusitis both medical and surgical.
- Learn the newest information on the medical management of patients with Rhinosinusitis and other rhinologic diseases.
- Learn the newest information regarding the surgical management of patients with Rhinosinusitis.
- Become familiar with the current research in the pathogenesis and pathophysiology of chronic Rhinosinusitis and other rhinologic diseases.
- Become familiar with the management of complex sinus patients who have failed endoscopic sinus surgery.
- Become familiar with the topical application of drugs post endoscopic sinus surgery.
- Become familiar with the best treatment remedies in rhinology based on evidence based practice.
- Become familiar with patients with nasal polyps and how to handle these patients.

Activity Outcomes & Goals

- The practitioner should be able to choose appropriate therapy for the different subtypes of chronic Rhinosinusitis to improve outcomes.
- The practitioner should be able to choose appropriate therapy for the patient with Rhinosinusitis and allergic rhinitis to improve outcomes.
- The practitioner should be able to optimally manage patients with nasal polyps.
- The practitioner should be able to optimally manage patients with complex sinus issues and who have failed endoscopic sinus surgery.
- The practitioner should be able to handle those areas of controversy in rhinology.
- The practitioner should become familiar with pediatric sinusitis.
- The practitioner should be more aware of new research in rhinology and how they can apply this in their own practice.

Target Audience

Otolaryngologists, Allergists, Otolaryngologists in Training (Residents) and Allied Healthcare Professionals.

Continuing Education

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 8.0 AMA PRA Category 1 Credit(s)TM. Physicians should only claim credit commensurate with the extent of their participation in the activity.



Research Contributors - 2011

From the strength of our recent Scientific Programs at both the Spring and Fall meetings, it is easy to see that research is at the heart of the future of our specialty. Each year, the ARS awards resident and new investigator grants in rhinology as a participating society of the AAO-HNSF CORE Grant program. Many of these small grants have served to support the early development of some of our brightest minds and future leaders of our specialty.

For the first time, members of the American Rhinologic Society will have the opportunity to make a direct donation to the ARS in support of research. Past grants have been largely supported by donations from industry, but in the ever-changing financial landscape of medicine, it is up to us to ensure the strength and vitality of our specialty.

Platinum Partner in Research (Multi-Year)
Winston Vaughan, MD (San Francisco, CA)

Platinum Partner in Research - (Single Year)
Timothy Smith, MD (Portland, OR)

Gold Partner in Research
Rodney Schlosser, MD (Mt. Pleasant, SC)

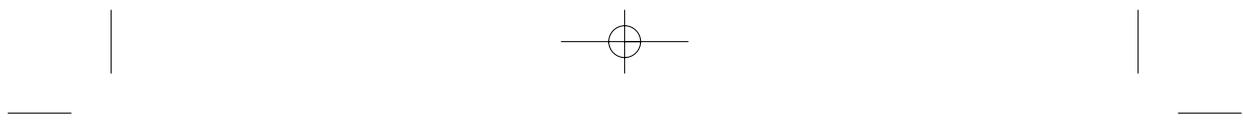
Silver Friend in Research
Frank Lucente, MD (New York, NY)

Bronze Friend in Research
Mrs. Susan Arias (Sherman Oaks, CA)

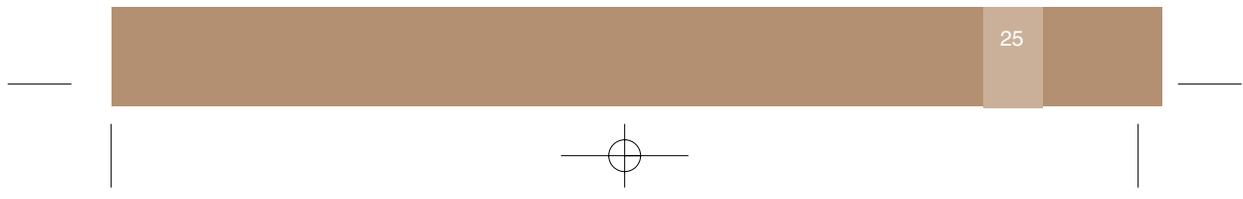
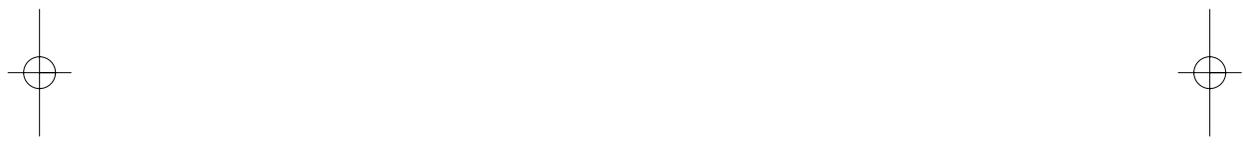
Friend in Research

-

(Donations received prior to 8/21/2011 are listed above)



Oral Presentations



57th Annual Meeting
September 10, 2011
Intercontinental Hotel - Grand Ballroom B

7:00am - 7:50am

Breakfast Symposium

Supported by NeilMed Pharmaceuticals

Title: Office Based Procedures in Rhinology

Moderator: Todd Kingdom, MD

Panelists:

- *Turbinate Procedures in the Office - Richard Orlandi, MD*
 - *Balloons in the Office - Michael Sillers, MD*
 - *Office Based ESS - John DelGaudio, MD*
-

7:55am - 8:00am

Welcome

Michael Setzen, MD, Program Chairman

8:00am - 8:20am

Invited Key Note Speaker:

Rodney Lusk, MD

Introduction by Brent Senior, MD, ARS President

**“Management of Pediatric Rhinosinusitis-Medical and Surgical-
Then and Now”**

Audience Response Session

Joseph Han, MD

Moderators: Peter Hwang, MD & James Palmer, MD

8:20am - 8:26am

A Blinded Randomized Controlled Trial on the Efficacy of Chitosan Gel on Ostial Stenosis Following Endoscopic Sinus Surgery

*Thanh Ha, MD, Rowan Valentine, MD, Peter-John Wormald, MD
(Presented by Rowan Valentine, MD)
Adelaide, Australia*

Background:

Stenosis of sinus ostia following endoscopic sinus surgery (ESS) is the most common reason for revision surgery. Chitosan/dextran (CD) gel has been shown to be an effective hemostatic agent and prevent adhesion formation however its effects on ostial stenosis are unknown. This study aims to quantify the effect of CD gel on circumferential scarring of sinus ostia following ESS.

Methods:

A blinded randomized controlled trial was conducted in 26 patients undergoing ESS for chronic rhinosinusitis. At the completion of the procedure endoscopic measurements were taken using a novel standard-sized measuring probe for each of the neo-patent ostia. Chitosan/Dextran gel was applied to either the left or right side, with the opposite side received no gel. Ostial diameters were measured by an independent blinded observer at 2, 8 and 12 weeks post-operation. Sinus ostial diameters calculated as a proportion of the original were compared for each ostium at each time point.

Results:

Intra-operative ostial diameters were comparable for CD and control sides (38mm² vs 39mm² in frontal ostia, 131mm² vs 120mm² in sphenoidal ostia, and 203mm² vs 193mm² in maxillary ostia respectively). CD gel significantly improved sinus ostial patency, the greatest difference was seen at 12 weeks following surgery for all three sinus ostia (66% vs 31% frontal, $p < 0.001$; 85% vs 47% sphenoidal, $p < 0.001$ and 74% vs 54% maxillary, $p = 0.002$).

Conclusion:

Chitosan/Dextran gel produced significantly less stenosis of all neoostia following ESS and may reduce the necessity for revision surgery in patients with chronic rhinosinusitis.

8:26am - 8:32am

Single-blind Randomized Controlled Trial of Surfactant (S) vs Hypertonic saline (HS) Irrigation Following Endoscopic Endonasal Surgery in the Early Post-operative Period

*Alexander Farag, MD, Charles Ebert, MD, Brent Senior, MD, Adam Zanation, MD
Chapel Hill, NC, USA*

Background:

Recent discussion has revolved around formulations of irrigation in the post-operative functional endoscopic sinus surgery patient, specifically the efficacy of emulsion based nasal irrigations.

Methods:

51 consecutive adult candidates for endonasal surgery were prospectively randomized. Patients irrigated three times a day with their respective solutions and completed SNOT-22 and RSOM-31 surveys as well as a PEA smell threshold tests preoperatively and over three visits in a 4 month period. Repeated measures analyses and Fisher's Exact tests were used to assess statistical differences.

Results:

Both S and HS irrigation groups showed significant decreases in scores for both the SNOT-22 and RSOM-31 over time (both $p < 0.0001$), but no difference was seen between the two groups ($p = 0.5, 0.8$). PEA thresholds showed overall improvement in both groups 3-4 months after surgery: 61% (11/18) HS patients and 41% (7/17) S patients, but did not differ between the groups ($p = 0.3$). The S group reported significantly more side effects (50% v 4%, $p = 0.0002$) and had more patients stop the solution (19% v 0%) and less patients (56% v 75%) finish the study, compared to the HS group.

Conclusions:

There was no significant differences in overall subjective symptoms related to sinonasal disease between S and HS irrigation, tolerability appeared to be an issue. More patients reported side effects with S irrigation, and 19% receiving S irrigation stopped the solution, compared to none receiving HS irrigation.

Moderators: Joseph Jacobs, MD & Rodney Schlosser, MD

8:38am - 8:44am

Nationwide Incidence of Major Complications in Endoscopic Sinus Surgery

*Vijay Ramakrishnan, MD, Todd Kingdom, MD, Peter Hwang, MD, Richard Orlandi, MD
Aurora, CO USA*

Introduction:

Endoscopic sinus surgery (ESS) is one of the most commonly performed procedures in otolaryngology. Major complications are estimated to occur in 1-3% of cases, based on early studies with relatively small patient cohorts in academic institutions. The aim of this study was to update data regarding major complication rates associated with ESS by analyzing a large patient database.

Methods:

Retrospective review of a nationwide database of patients who underwent ESS between 2003-2007. Major postoperative complications-cerebrospinal fluid (CSF) leak, orbital injury, and hemorrhage requiring blood transfusion-were identified by searching the database for related ICD-9 and CPT codes. Complication rates were examined and time to occurrence analyzed. Two-tailed test of proportions, global chi-square test and logistical regression analysis were used for statistical comparison.

Results:

62,823 patients who met rigorous inclusion criteria were included. The overall major complication rate was 1.00% (CSF leak 0.17%; orbital injury 0.07%; hemorrhage requiring transfusion 0.76%). CSF leak was less likely to occur in the pediatric population ($p=0.05$), whereas orbital injury was more likely to occur in children ($p<0.001$). Examination of the impact of image guidance (IGS) was limited by study design.

Conclusion:

The incidence of major complications associated with ESS appears to have improved since early reports over ten years ago. There may be different complication rates in the pediatric population. Study design limitations did not allow for assessment of IGS in the development of these complications. These data help to educate otolaryngologists and patients about complication rates in ESS in a modern context.

8:44am - 8:50am

Long-term Outcomes after Frontal Sinus Surgery

*Yuresh Naidoo, MD, Ahmed Bassiouni, MD, Mark Keen, MD, Peter Wormald, MD
Adelaide, Australia*

Objectives:

To evaluate the long-term patency of the frontal ostium and symptom improvement in patients undergoing primary and revision endoscopic frontal sinusotomy; and to assess the impact of prior surgery, frontal ostium size, and other risk factors for CRS on long-term outcomes.

Study Design: Retrospective Case Series

Level of Evidence: Level 4

Methods:

Endoscopic assessment of frontal ostium patency and patient reported symptoms were prospectively collected on patients who underwent standard endoscopic frontal sinusotomy between January 2003 and December 2009.

Results:

339 patients underwent endoscopic frontal sinus surgery over the study period, 118 in the primary group and 221 in the revision group. The mean follow up was 23.3 months (95% CI 20.6-26.0 months, SD =19.3 months). The frontal sinus patency rate was higher in the primary group (90% vs 86%, p=not significant). Complete resolution of symptoms was lower in the revision group (69% vs 81 %, p= 0.029). The revision group was more likely to require a frontal drillout for persistence of symptoms (17% v 7.6%, p=0.02). Stenosis of the frontal sinus ostium correlated significantly with persistence of symptoms, infection and polyp recurrence (p=0.0058). No significant correlation could be found between the presence of eosinophilic mucin, asthma, polyposis, smoking and frontal ostium size on patency or resolution of symptoms.

Conclusions:

To our knowledge, this is the largest study of endoscopic frontal sinus surgery in the literature. The technical and subjective measures of success are high. Patients undergoing revision surgery tend to have worse outcomes than primary ESS patients. Polyposis, Asthma, EMCRS, allergy and smoking do not affect outcomes.

8:50am - 8:56am

Q&A

8:56am - 9:56am

Panel: Controversies in Rhinology

Moderator: Michael Setzen, MD

*Panelists: David Kennedy, MD
Heinz Stammberger, MD
Brent Senior, MD
Roy Casiano, MD
Michael Sillers, MD
Peter Catalano, MD*

- Uncinectomy or Not!
 - Middle Meatal Antrostomy-Large, Small or No!
 - Debridement Post ESS-Yes or No?
 - Maximum Medical Therapy-What is This?
 - Balloons in ESS-My Indications!
 - IGS-Standard of Care or State of the Art?
 - Confirmed Recurrent Sinusitis with normal CT between events-Dilemma!
 - Sinus Headache-True or False?
 - Osteitis-Fact or Fiction?
 - Nitric Oxide-Yes or No?
-

9:56am - 10:10am

**Presidential Address and Awards
Presentation**

Brent Senior, MD

10:10am - 10:40am

**7th Annual David W. Kennedy Lectureship
My Lifetime Experience in the Management of Sinusitis: Then &
Now - Heinz Stammberger, MD**

10:40am - 11:00am

Break with Exhibitors - Grand Ballroom C

11:00am - 12:00pm

Panel: What Evidence Exists for What I Do for CRS?

Moderator: Timothy Smith, MD

Introduction and Evidence for ESS for CRS - Timothy Smith, MD

Evidence for Systemic Steroids for CRS - Peter Hwang, MD

Evidence for Topical Therapies for CRS - Rodney Schlosser, MD

Evidence for Image-Guided Sinus Surgery - Todd Kingdom, MD

Evidence for Frontal Sinus Stenting - James Stankiewicz, MD

Evidence for Postoperative Debridement - Luke Rudmik, MD

12:00pm - 12:15pm

Business Meeting - All Members Invited

12:00pm - 1:00pm

Attendee Lunch with Exhibitors - Grand Ballroom C

Moderators: James Hadley, MD & Ralph Metson, MD

1:00pm - 1:06pm

Occupational Hazards of Endoscopic Endonasal Surgery

*Charles Ebert, Jr, MD, Rachel Little, MSIV, Adam Zanation, MD,
Brent Senior, MD
Chapel Hill, NC, USA*

Background:

The toll of minimally invasive surgery on surgeons' well-being has revealed many physical consequences for surgeons. However, little has been investigated specifically for otolaryngologists performing endoscopic endonasal surgery (EES). The purpose of this study is to define the prevalence, quality, and severity of physical symptoms that otolaryngologists experience as they relate to the surgeons' use of ergonomically designed endoscopic instruments in endonasal surgery.

Methods:

A comprehensive 29-question survey was administered between 9/2010 and 3/2011 to practicing otolaryngologists. The questions addressed demographics, physical symptoms, ergonomics and operating room environment. Data were analyzed using Fisher's Exact and Wilcoxon Rank Sum statistics.

Results:

65 surgeons responded with a median age of 40.3 years. Responders performed a median of 125 EES per year and 36% had completed an endoscopic fellowship. The majority (76%) of responders had experienced physical discomfort or symptoms that they attributed to EES. 13% of those who had experienced symptoms felt that their symptoms were persistent. Only 23% of those experiencing symptoms had sought medical care. No significant associations were seen between surgeon age, number of cases, standing, or having adjustable video display with experiencing discomfort (all $p > 0.6$). Interestingly, fewer surgeons completing an endoscopic fellowship experienced discomfort (70% v 80%, $p = 0.4$).

Conclusion:

Previous studies report 20-30% incidence of occupational injury. Our data showed that 76% of physicians who regularly perform EES suffer physical discomfort or symptoms attributable to EES. As expanded endonasal procedures become more prevalent, additional data and ergonomic analysis are necessary to reverse this trend and reduce possible long-term damage for surgeons.

1:06pm - 1:12pm

Early Post-operative Care Following Endoscopic Sinus Surgery: An Evidence-based Review with Recommendations

Luke Rudmik, MD, Timothy Smith, MD

Calgary, Alberta, Canada

Introduction:

Early post-operative care following endoscopic sinus surgery (ESS) has been suggested to minimize avoidable complications and optimize long-term outcomes. Several post-operative care strategies have been proposed but a formal comprehensive evaluation of the evidence has never been performed. The purpose of this article is to provide an evidence-based approach to early post-operative care following ESS.

Methods:

A systematic review of the literature was performed and the Clinical Practice Guideline Manual, Conference on Guideline Standardization (COGS), and the Appraisal of Guidelines and Research Evaluation (AGREE) instrument recommendations were followed. Study inclusion criteria were: adult population > 18 years old; chronic rhinosinusitis (CRS) based on published diagnostic criteria; ESS following failed medical therapy; primary study objective was to evaluate an ESS early post-operative care strategy; and clearly defined primary clinical end-point.

Results:

This review identified and evaluated the literature on seven early post-operative care strategies following ESS: saline irrigations, sinus cavity debridements, systemic steroids, topical steroids, oral antibiotics, topical decongestants, and drug eluting spacers/stents. Conclusion: Based on the available evidence, use of nasal saline irrigation, sinus cavity debridement, and standard topical nasal steroid spray are recommended early post-operative care interventions. Post-operative antibiotic, systemic steroid, non-standard topical nasal steroid solution, and/or drug eluting spacers/stents are options in post-operative management. These evidence-based recommendations should not necessarily be applied to all post-operative patients and clinical judgment, in addition to evidence, is critical to determining the most appropriate care.

1:12pm - 1:18pm

Outcomes of Endoscopy and Computed Tomography (CT) in Patients with Chronic Rhinosinusitis

*Muhamad Amine, MD, Lauren Lininger, BS, Kevin Welch, MD, Keith Fargo, Ph.D
Maywood, IL, USA*

Objective:

Chronic Rhinosinusitis (CRS) is a common disease diagnosed based on a combination of symptoms, imaging, and/or endoscopy. CT is the gold standard in diagnosis of CRS due to inherent low sensitivity of endoscopy. We sought to assess the correlation between symptoms, endoscopy, and imaging in order to reduce the number of CT's without decreasing diagnostic accuracy.

Patients and Methods:

Retrospective review of a single practitioner's patients from 2008 to 2010 who presented for evaluation of CRS. Data on demographics, symptoms, endoscopic and CT findings were collected and analyzed. Exclusion criteria included patients with prior surgery, no imaging, and those that failed to meet the 2007 CRS Task Force symptom criteria.

Results:

244 patients met the Task Force symptom criteria. Using CT as the gold standard, the sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of endoscopy alone was 36%, 95%, 89%, and 55%, respectively. The number of symptoms (NOS) strongly correlated with the absence or presence of disease ($p < 0.01$). Incorporating NOS into a CRS diagnostic algorithm improved sensitivity and NPV of nasal endoscopy to 82% and 79% while maintaining its specificity and PPV at 82% and 84%, respectively. Applying our algorithm retrospectively would have resulted in a reduction in the number of CT's by 69% resulting in an acceptable 10% ($n=24/244$) false negative rate and 8% ($n=20/244$) false positive rate.

Conclusion:

Incorporating number of symptoms in a CRS diagnostic algorithm may drastically reduce the number of CT's needed. Clinical diagnostic accuracy is enhanced with this new algorithm while significantly reducing the cost and radiation burden of CT's.

1:18pm - 1:24pm

Q&A

Moderators: Peter Doble, MD & Paul Toffel, MD

1:24pm - 1:30pm

Examining the Safety of Prednisolone Acetate 1% Nasal Spray for Treatment of Patients with Nasal Polyposis

*Jonathan Liang, MD, Edward Strong, MD
Sacramento, CA*

Background:

Topical intranasal corticosteroid sprays are a mainstay of treatment for nasal polyposis. Newer treatment strategies for refractory disease have included “off label” topical steroids, such as prednisolone acetate and budesonide. There have been no studies evaluating the systemic absorption of prednisolone acetate when used intranasally. The authors investigate the effect of intranasal prednisolone acetate on serum cortisol and adrenocorticotropic hormone (ACTH).

Methods:

Patients with nasal polyposis who were not taking any oral steroids for 3 months were included in this retrospective study. Patients applied 2 sprays of prednisolone acetate 1% delivered via a 15-mL standard spray bottle twice daily. Morning serum cortisol and ACTH levels were collected prior to drug treatment and 6-8 weeks later. Pre- and post-treatment levels were compared.

Results:

Nine patients were included in this study. The average serum cortisol and ACTH prior to treatment was 12.09 mcg/dL (95% CI, 6.94 to 17.24) and 12.33 ng/L (95% CI, 8.97 to 15.70), respectively. After 6-8 weeks of treatment, the average serum cortisol and ACTH were 11.76 mcg/dL (95% CI, 9.51 to 14.00) and 13.22 ng/L (95% CI, 10.68 to 15.77), respectively. There was no statistically significant difference between pre- and post-treatment values of cortisol ($p = 0.89$) or ACTH ($p = 0.63$).

Conclusions:

Intranasal delivery of prednisolone acetate at the specified does not result in suppression of the adrenal axis. The authors feel that prednisolone acetate nasal spray is safe to administer in patients

with refractory polyposis, as an alternative to traditional steroid sprays or systemic corticosteroids for treatment of nasal polyposis.

1:30pm - 1:36pm

CSF Volume Replacement Following Large Endoscopic Anterior Cranial Base Resection

*Angela Blount, MD, Kristen Riley, MD, Joel Cure, MD, Bradford Woodworth, MD
Birmingham, AL USA*

Introduction:

Large endoscopic skull base resections often result in extensive post-operative pneumocephalus secondary to copious evacuation of cerebrospinal fluid (CSF) during the procedures. Replacing CSF lost during craniotomy with saline is a common technique in neurosurgery, but is difficult after extensive transnasal resection of the anterior cranial base because direct transnasal CSF augmentation will escape until the skull base reconstruction is sealed. The present study evaluated the effectiveness of intraoperative CSF volume replacement via lumbar drains on improving postoperative outcomes.

Methods:

Ten large endoscopic anterior skull base resections (> 2.5 cm) were performed from 2008-2011. Sellar, parasellar, and transplanum resections were excluded. Etiologies included esthesioneuroblastoma(2), squamous cell carcinoma(2), intracranial dermoid(2), adenocarcinoma(1), adenoid cystic carcinoma(1), melanoma(1), meningioma(1). Six patients were administered preservative free normal saline via lumbar drain during skull base reconstruction. Data collected included volume of post-operative pneumocephalus, intravenous pain medicine requirements 24 hours after surgery, and length of hospital stay.

Results:

Volume of pneumocephalus (4.78cm³ vs. 12.8cm³, p = 0.04) and length of hospital stay (2.17 days vs. 8.5 days, p = 0.03).were significantly decreased in the normal saline volume replacement group. Average intravenous pain medication requirements were reduced in the first 24 hours postoperatively (8 mg morphine vs. 14 mg morphine, p = 0.25), but did not reach statistical significance.

Conclusions:

Evacuation of intracranial air by transthecal administration of saline during reconstruction of large anterior cranial base defects was an effective technique to decrease post-operative pneumocephalus and length of hospital stay. Further evaluation is warranted.

1:36pm - 1:42pm

The Safety and Efficacy of Ketorolac in Patients Undergoing Primary Endoscopic Sinus Surgery: A Prospective Randomized, Double-Blinded Clinical Trial

*Kevin Welch, MD, Carl Moeller, MD, Julius Pawlowski, MD, Anna Pappas, MD
Maywood, IL, USA*

Introduction:

Ketorolac (KT) is an intravenous (IV) NSAID for acute, moderate pain. KT has an established safety profile, but may be linked to increased risk of post-tonsillectomy hemorrhage. The safety and efficacy of KT following primary endoscopic sinus surgery (ESS) is unknown.

Methods:

All patients underwent primary ESS and septoplasty. Patients randomly received either IV KT, 30 mg or IV fentanyl, 25 mcg initially post-procedure. Post-operative pain was recorded at 0, 30, and 60 minutes via visual analogue scale (VAS), and patients received as needed fentanyl and hydrocodone/acetaminophen for additional pain. Postoperative bleeding questionnaires were completed on post-operative day (POD) 1 and 7. Preoperative and postoperative (POD 7) hemoglobin were compared.

Results:

34 patients enrolled in the study. 16 patients received KT and 18 patients received fentanyl. There was no significant difference in pre- and post-op hemoglobin between groups. Bleeding self-assessments revealed no significant difference between groups. There was a zero incidence of post-operative hemorrhage. There was no significant difference in pain VAS between the KT and fentanyl groups (3.5, 3.2, 2.1 versus 3.0, 4.4, 3.8 at 0, 30, and 60 minutes respectively). There was no significant difference between doses of supplemental analgesics for the KT and fentanyl groups (2.0 versus 3.4 doses of IV; 1.0 versus 1.4 doses of PO respectively).

Conclusion:

In this study, KT was a safe analgesic in the setting of primary ESS. There was no increased risk of hemorrhage or acute blood loss anemia. Although not significant, KT appears to offer superior pain control over narcotics alone.

1:42pm - 1:48pm

Q&A

Moderators: Vijay Anand, MD & Marc Dubin, MD

1:48pm - 1:54pm

Beyond Eosinophilia: Does Neutrophilic Infiltration in Chronic Rhinosinusitis Help Better Understand the Disease?

*Annie Gaudreau, MD, Martin Desrosiers, MD, Léandra Mfun-Endam, MD, Ali Filali-Mouhim, MD
Montréal, QC, Canada*

Introduction:

We have previously reported (Desrosiers, 2011) that neutrophilia in chronic rhinosinusitis (CRS) biopsies reflects activation of the NF- κ B-IL1-IL8 axis and identifies different underlying molecular mechanisms. We wished to verify whether neutrophilia in CRS influenced patient demographics, biochemical markers, and post-surgical evolution of patients.

Method:

Pathology specimens taken at surgery in 65 consecutive CRS patients during 2009 were examined to determine average number of eosinophils and neutrophils per high-powered field (HPF) and ratio of eosinophils/neutrophils (Eo/Neu). Patient demographics, biochemical markers and postoperative evolution were determined from hospital records. Decision Tree analysis was performed to determine factors influencing post-operative course.

Results:

Eosinophilia varied widely between subjects (10.2-168.4 eos/HPF) and was significantly higher in CRSwNP than CRSsNP (78.7 vs. 39 eos/HPF; $p=0.00016$). No difference in neutrophilia was observed

(CRSwNP: 18.5 vs. CRSsNP: 15.8 neutro/HPF; $p=0.56$). We used a Decision Tree model to predict post-ESS evolution, determined for 53 patients as a categorical outcome. Best factors predicting outcome were Eo/Neu ratio and total serum IgE. Eo/Neu ratio 5.3 predicted more favourable evolution (74%; 20/27 patients) than low Eo/Neu ratio, with the low IgE group having the worse prognosis (Eo/Neu 5.3 and IgE 70; favourable =62%, (8/13 patients); Eo/Neu 5.3 and IgE 70; favourable =31%, (4/13 patients)).

Conclusion:

Eosinophilic/neutrophilic ratio in combination with measures of serum IgE are good predictors of prognosis for patients with CRS, independently of clinical phenotype. Poorer outcome in patients with higher proportion of neutrophils to eosinophils supports the concept of distinct pathogenic mechanisms, possibly reflecting differential activation of the NF-IL1-IL8 axis.

1:54pm - 2:00pm

Patterns of Dural Involvement in Anterior Skull Base Tumors: Prospective Correlation of MRI and Histopathologic Findings

*John McIntyre, MD, Carlos Perez, MD, Pete Batra, MD, Mrudula Penta, MD
Dallas, TX USA*

Introduction:

The presence of dural invasion serves as an important negative predictive factor for survival in skull base neoplasms. The objective of this study was to prospectively correlate preoperative MRI findings with intraoperative surgical findings and histopathology to establish key correlates for dural involvement in skull base tumors.

Methods:

Prospective blinded MRI review of 50 anterior skull base neoplasms was performed by a staff neuroradiologist. Retrospective chart review was performed to accrue salient patient and tumor data. Results: The mean patient age was 54.6 years with male:female ratio of 1.7:1. The most common tumor histologies included adenocarcinoma (18%), squamous cell carcinoma (18%), mucosal melanoma (8%), and olfactory neuroblastoma (8%). MR imaging demonstrated dural thickening in 20 patients (40%), with 1 mm noted in 14 (70%) and 2 mm in 6 (30%) cases. Spectrum of MR

findings included linear enhancement (75%), nodular thickening (25%), and loss of hypointense zone (60%). Intraoperative findings and histology confirmed dural invasion in 14 cases (28%). Positive predictive value (PPV) for linear and nodular dural enhancement was 46.7% and 60%, respectively. PPV for 1 mm and 2 mm of dural thickening was 42.8% and 83.3%, respectively. Loss of the hypointense zone had highest PPV at 91.7%.

Conclusion:

The presence of 2 mm of dural thickening, nodularity, and loss of hypointense zone are highly predictive for presence of dural invasion by skull base tumors. Preoperative knowledge of these MRI patterns may better guide surgical planning and patient counseling.

2:00pm - 2:06pm

Microbiological Outcomes Following Mupirocin Nasal Rinses for Symptomatic, S.aureus-positive Chronic Rhinosinusitis Following Endoscopic Sinus Surgery

*Josh Jervis-Bardy, MD, PJ Wormald, MD
Woodville South, Adelaide, South Australia*

Background:

Persistent infection following endoscopic sinus surgery (ESS) for Chronic Rhinosinusitis (CRS) is a frustrating entity for the patient and Rhinologist alike. Such patients, despite complete sinus surgery, continue to have infected mucosa and complain of purulent rhinorrhoea, post-nasal drip and smell disturbance. Mupirocin nasal lavage has been proposed as an efficacious treatment in such patients. Two small studies have reported excellent short-term post-treatment outcomes, however the long-term microbiological outcomes following treatment are not known; likewise, the rate of mupirocin-resistance following treatment has not been explored.

Methods:

This was a retrospective chart review of 57 patients with S.aureus-positive surgically-recalcitrant CRS having undergone 0.05% mupirocin lavage treatment, twice-daily for 4 weeks. Specific outcomes reported included post-treatment culture results, time to first post-treatment S.aureus culture, and mupirocin-sensitivity following treatment.

Results:

42/57 (73.7%) patients progressed to microbiological relapse by subsequently cultured *S.aureus* following mupirocin treatment. Mean time to first positive culture was 144 days. Of the 42 patients who progressed to microbiological relapse, only 1 was found to subsequently harbor a mupirocin-resistant strain of *S.aureus*, thus yielding a post-treatment resistance rate of 2.4%.

Conclusion:

Treatment with mupirocin nasal rinses in *S.aureus*-positive, surgically recalcitrant CRS has a high microbiological relapse rate, with 73.7% of patients subsequently re-culturing *S.aureus*. Our current treatment regime of 0.05% nasal rinses twice-daily for 4-weeks is associated with a post-treatment resistance rate that is consistent other studies, suggesting that mupirocin rinses are no more likely to induce resistance than nasal vestibule decolonization in the high risk medical or surgical patient.

2:06pm - 2:10pm

Q&A

Moderators: Roy Casiano, MD & James Stankiewicz, MD

2:10pm - 2:16pm

Efficacy of Transnasal Endoscopic Resection of Malignant Anterior Skull Base Tumors

*John Wood, MD, Johnathan Castano, BS, Richard Vivero, MD, Roy Casiano, MD
Miami, FL, USA*

Introduction:

Surgical resection at the anterior skull base (ASB) is challenging due to its complex anatomy and vital neurovascular structures. Craniofacial resection (CFR), introduced by Dandy and refined by Ketchum, remains to date the gold standard. Due to the morbidity of CRF, transnasal endoscopic resection (TER) was introduced but remains controversial with respect to oncologic outcomes.

Methods:

Retrospective review of 39 patients with ASB malignancies treated with TER between 1997 and 2011, and 48 patients who underwent

CFR between 1999 and 2006, who were used as controls. Exclusion criteria for outcomes analysis was follow up less than 12 months or having both CFR and TER (N=5). SPSS statistical software was used for data analysis.

Results:

There were no statistically significant differences the age, sex, follow up, comorbidities, or use of adjuvant therapies. The majority of TER patients had olfactory neuroblastoma (OFN) while the majority of CFR patients had squamous cell carcinoma. CFR patients were more likely to have T3 or T4 lesions. Rates of positive margins, metastatic disease and disease specific mortality were equivalent. TER patients had shorter operating room times, ICU stays and hospital stays. They had fewer major complications, better cosmesis and less risk of local recurrence.

Conclusions:

TER provides an oncologically sound surgical approach in appropriately selected patients for the management of ASB malignancies with disease specific outcomes at least equal to CFR. Furthermore, patients undergoing TER are much more likely to have less complicated postoperative courses and discharge home earlier than patients undergoing CFR.

2:16pm - 2:22pm

Augmented real-time image guided surgery reduces task workload during endoscopic sinus surgery

*Benjamin Dixon, MBBS, Harley Chan, PhD, Michael Daly, MSc,
Jonathan Irish, MD
Toronto, Ontario, Canada*

Objective:

Due to proximity to critical structures the need for spatial awareness during endoscopic sinus surgery (ESS) is essential. We have developed an augmented, real-time image-guided surgery (ART-IGS) system that provides live navigational data and proximity alerts to the operating surgeon during ablation. We wished to test the hypothesis that task workload would be reduced when using this technology.

Methods:

A randomized-controlled trial involved eight otolaryngology residents and fellows performing ESS on cadaveric specimens; one side in a conventional method (control) and one side with ART-IGS. After computed tomography scanning, anatomical contouring and registration of the head, a parallel 3-D virtual view, tool tracking and proximity alerts were enabled. Each subject completed ESS tasks and rated their workload during and after the exercise using the NASA task load index. A questionnaire and open feedback interview were completed after the procedure.

Results:

There was a significant reduction in mental demand, temporal demand, effort and frustration when using the ART-IGS system in comparison to the control ($p < 0.02$). Perceived performance was increased ($p = 0.02$). Most subjects agreed that the system was sufficiently accurate, caused minimal interruption and increased their confidence. Optical tracking line-of-sight issues were frequently cited as the main limitation early in the study, however, this was largely resolved by the end of the trial.

Conclusion:

ART-IGS reduces task workload for trainees performing ESS. Live navigation and alert zones may increase safety and become a valuable teaching aid. Experienced surgeons could find this technology helpful in selected cases when visual cues enabling orientation are absent or unreliable.

2:22pm - 2:28pm

Structured Histopathology Profiling of Chronic Rhinosinusitis in Routine Practice

*Kornkiat Snidvongs, MD, Matthew Lam, MD, Raymond Sacks, MD, Richard Harvey, MD
Sydney, Australia*

Introduction:

There is a growing evidence base of the impact of tissue eosinophilia in CRS as it potentially defines an inflammatory disorder often recalcitrant to simple surgical intervention. Traditional features of eosinophilic chronic rhinosinusitis (ECRS) include asthma, polyps, aspirin sensitivity, high serum eosinophilia and IgE. However, many ECRS patients may not present with classic fea-

tures and associations between tissue histopathology and other surrogate markers of this disease has yet to be defined.

Methods:

A cross-sectional study of structured histopathology reporting was undertaken on CRS patients undergoing surgery. Eosinophilia along with other features were correlated to surrogate features of ECRS such as asthma status, aspirin sensitivity, serum eosinophilia and IgE, symptom, radiologic and endoscopic severity.

Results:

51 patients were assessed (47% female, age 46.6±4.1yrs). Strong tissue eosinophilia (>10/HPF) was prominent in polyps (84%) but also in a subgroup of non-polyp patients (19%) although the phenotype correlated well ($\chi^2=25.76, p<0.01$). Asthma status did not predict eosinophilia ($p=0.60$) with 43% of non-asthmatics had strong tissue eosinophilia. Serum eosinophilia only predicted tissue eosinophilia at $>0.21 \times 10^9/L$ (Sensitivity 57% , specificity 83%, ROC $p=0.001$). Serum IgE is nonpredictive (ROC $p=0.08$).

Conclusion:

The prognosis of ECRS differs greatly from other forms of CRS. Traditional features of the ECRS phenotype are not necessarily good markers for the presence of eosinophilia in the sinus mucosa. A more structure approach to histopathology reporting in CRS is suggested.

2:28pm - 2:34pm

Cost Analysis of Office-Based and Operating Room Procedures in Rhinology

*Kara Prickett, MD, Sarah Wise, MD, John DelGaudio, MD
Atlanta, GA USA*

Background:

Analyses of office-based procedures in laryngology and otology have shown them to be safe and satisfying for patients, with substantial savings of time and money for patients and physicians.

Objectives:

To compare the billable charges and reimbursement for rhinologic procedures performed in the office with those performed in an ambulatory surgery center operating room (OR).

Methods:

A retrospective, matched-pair cost analysis was performed. Patients who underwent office-based procedures between 2006 and 2011 were matched by CPT code with patients who underwent similar procedures in the OR. Twenty-nine matched pairs were included. Charges for surgery, anesthesia, and facility useage were analyzed. Because surgery charges may be influenced by contracts with insurance providers, both the total billed charges and total allowed charges were analyzed using paired t-tests. When a single office-based procedure was compared with multiple procedures performed during the same operation in the OR, anesthesia and facility charges were scaled to allow for more accurate comparison.

Results:

Mean total charges for office-based procedures were significantly less than for OR procedures (\$2,737.17 vs. \$7,329.69, $p < 0.001$). Mean allowed charges for office-based procedures were significantly less than for OR procedures (\$762.08 vs. \$5,835.09, $p < 0.001$). Mean scaled charges for office-based procedures were also significantly less than mean scaled charges for OR procedures (\$762.08 vs. 4089.33, $p < 0.001$). Office procedures were reimbursed at similar or higher rates than were OR procedures.

Conclusion:

In appropriate patients, performing simple rhinologic procedures in the office rather than in the OR offers significant cost savings without impacting physician reimbursement.

2:34pm - 2:40pm

Q&A

2:40pm - 3:00pm

Break with Exhibitors - Grand Ballroom C

3:00pm - 4:00pm

Panel: An International Perspective on the Etiology of Nasal Polyposis

Moderator: Jan Gosepath, MD

*Panelists: Wytske Fokkens, MD
Richard Harvey, MD
Heinz Stammberger, MD
Thibaut van Zele, MD*

Moderators: Todd Kingdom, MD & Richard Orlandi, MD

4:00pm - 4:06pm

Inter-rater Agreement of Nasal Endoscopy for Chronic Rhinosinusitis

*Roheen Raithatha, MD, Vijay Anand, MD, Timothy Smith, MD, Abtin Tabae, MD
New York, NY*

Introduction:

Nasal endoscopy is a routine and important diagnostic tool in the evaluation of patients with chronic rhinosinusitis. Although the procedure is ideally “objective”, the subjective nature of endoscopy interpretation and lack of standardization are potential limitations.

Objectives:

To describe the inter-rater agreement of nasal endoscopy in patients with chronic rhinosinusitis.

Methods:

14 patients (28 sides) with chronic rhinosinusitis underwent clinical evaluation, SNOT-22, CT sinus and digital video nasal endoscopy. 5 independent academic rhinologists blindly reviewed the endoscopies for structural anatomic issues, inflammatory rhinosinusitis findings and atypical lesions. Statistical comparison of the endoscopy interpretations was performed using the unweighted Fleiss' kappa statistic and the prevalence-adjusted bias-adjusted kappa. Kappa values range from -1.0 to 1.0 (0.0 represents “agreement expected by chance” and 1.0 representing “perfect agreement”).

Results:

The mean Lund-Mackay CT scan score was 7.8(SD:4.9) and the mean SNOT-22 score was 35.8(SD 22.7). Significant variability was noted amongst the raters with regard to the nasal endoscopy findings. The overall levels of inter-rater agreement for the various categories were: “almost perfect” for atypical lesions(0.912); “substantial” for nasal polyps(0.693); “moderate” for nasal discharge(0.422) and mucosal inflammatory changes of the middle turbinate(0.413); “fair” for edema of middle meatus(0.214), obstruction by nasal septum deviation(0.240), and obstruction by the middle turbinate(0.276).

Conclusions:

Variability was noted in the inter-user agreement for nasal endoscopy findings in this study with relatively limited agreement in some of the key aspects of the procedure. Additional investigation and standardization of nasal endoscopy interpretation is required to improve the clinical utility of the procedure.

4:06pm - 4:12pm

Environmental Air Pollution Mediates Oxidative Stress Induced Sinonasal Epithelial Cell Inflammation

*Murugappan Ramanathan, MD, Rajesh Thimmulappa, PhD.,
Andrew Lane, MD, Shyam Biswal, PhD
Baltimore, MD USA*

Background:

Environmental air pollution in the form of particulate matter (PM) and aeroallergens appears to promote sustained oxidative stress and inflammation in the lower respiratory tract. Environmental exposures are believed to contribute to the pathogenesis of chronic rhinosinusitis (CRS), although supporting evidence to date is limited. This study will examine the role of various components of air pollution in promoting oxidative stress related inflammation in human sinonasal epithelial cells (HSNECs).

Methods:

Human sinonasal epithelial cells isolated from control subjects were grown in cell culture at the air:liquid interface and stimulated with various components of air pollution (hydrogen peroxide and particulate matter (PM)) and the aeroallergen chitin for 24 hours. Cells were then harvested and mRNA was extracted for measurement of the inflammatory markers IL-6, IL-8, and macrophage chemotactic protein-1 (MCP-1) by qRT-PCR. Additionally levels of reactive oxygen species (ROS) were measured in PM stimulated HSNECs via flow cytometry.

Results:

HSNECs stimulated with all environmental stimulants (hydrogen peroxide, PM, and chitin) resulted in elevated expression of IL6, IL8, and MCP-1. Additionally there was a significant increase in ROS production in HSNECs after stimulation with PM.

Conclusions:

Environmental stimulants induce inflammation in sinonasal epithelial cells, likely through oxidative stress mechanisms. In addition to classical Th2 mediated inflammatory pathways, this unique and underinvestigated inflammatory cascade could play a potentially important role in CRS pathogenesis, suggesting a role for anti-oxidant therapies in managing environmentally-induced sinonasal inflammatory disease.

4:12pm - 4:18pm

Endoscopic Skull Base Surgery and its Impact on Sinonasal-Related Quality of Life

*Edward McCoul, MD, Vijay Anand, MD, Jeffrey Bedrosian, MD,
Theodore Schwartz, MD
New York, NY USA*

Introduction:

Endoscopic skull base surgery (ESBS) is considered a surgical modality with less morbidity and patient discomfort. Quality-of-life (QOL) assessments provide a patient-reported estimate of well-being that may be clinically relevant. Although the sinonasal tract is central to ESBS, the change in sinonasal-related QOL before and after ESBS has not been well-studied. The aim of this study was to prospectively assess QOL after ESBS using validated outcome measures.

Methods:

Consecutive adult patients undergoing ESBS for anterior skull base lesions were prospectively enrolled from a tertiary referral center. Patients undergoing concurrent craniotomy and those without both preoperative and postoperative data were excluded. The Sinonasal Outcome Test (SNOT-22) and Anterior Skull Base Questionnaire (ASBQ) were completed by each patient preoperatively and again at each postoperative visit for 1 year.

Results:

A total of 74 patients were included for study, the majority of whom (57.8%) underwent transsphenoidal resection of pituitary adenoma. Postoperative mean SNOT-22 scores were transiently increased in the early postoperative period, and significantly improved at 6 months and 1 year after surgery ($p < 0.01$). Type of reconstruction, tumor pathology and degree of resection did not affect QOL scores. Correlation between SNOT-22 and ASBQ scores was moderate at all time points ($r > 0.60$). Cerebrospinal fluid leak and other complications were uncommon.

Conclusions:

ESBS does not have a detrimental long-term effect on sinonasal-related QOL up to 1 year after surgery. Short-term impairments of sinonasal-related QOL are predictable and self-limited. Prospective assessment using both site-specific and sinonasal-related QOL instruments provide complementary information about ESBS outcomes.

4:18pm - 4:24pm

Q&A

Moderators: John DelGaudio, MD & Michael Stewart, MD

4:24pm - 4:30pm

Changing Paradigms in Frontal Sinus CSF Leak Repair

*Virginia Jones, MD, Frank Virgin, MD, Kristen Riley, MD, Bradford Woodworth, MD
Birmingham, AL USA*

Objectives/Hypothesis:

Frontal sinus CSF leaks have traditionally been repaired via open procedures (e.g. osteoplastic flap or cranialization). Advancements in instrumentation, technique, and experience have improved the feasibility of repairing frontal sinus skull base defects using an endoscopic approach. This study describes endoscopic closure of frontal sinus CSF leaks focusing on management, surgical technique, and outcomes.

Methods:

Prospective evaluation of patients with skull base defects involving the frontal sinus was performed. Demographics, size of skull base defect, length involving the posterior table, successful closure, frontal sinus patency, and complications were recorded.

Results:

Over 3.5 years, 37 patients (avg. age 46) were treated for CSF leaks involving the frontal sinus by a single otolaryngologist. Etiologies included spontaneous (13), tumor (13), and trauma (11). Average defect size (length vs. width) was 16.9x10.7mm and average length involving the posterior table was 6.9mm (1-30mm). Success rate on first attempt was 91.9% (34/37), but improved to 97.3% on subsequent endoscopic revision. One patient required a cranialization. The average follow up was 48 weeks. The nasoseptal flap was used for reconstruction in 27 patients. A Draf III procedure was required in 14 subjects. Three patients referred due to unsuccessful closure following cranializations were successfully repaired using endoscopic approaches. Two individuals required a subsequent endoscopic frontal sinus procedure, but have maintained long term patency following revision.

Conclusion:

Frontal sinus CSF leaks were successfully closed in 97.3% of individuals. Our data supports the routine use of endoscopic repair in the treatment algorithm for frontal sinus skull base defects.

4:30pm - 4:36pm

Increased Percentage of Mast cells and CRTh2+ T cells within Sinonasal Mucosa of Chronic Rhinosinusitis with Nasal Polyp Patients Independent of Atopy

*Amber Luong, MDPhD, Joanne Shaw, PhD, Samer Fakhri, MD, Martin Citardi, MD
Houston, TX USA*

Introduction:

Initial attention on the pathophysiology of chronic rhinosinusitis (CRS) has focused on eosinophils. Other immune cells such as mast cells have been identified and appear to be elevated in CRS with nasal polyp (NP) patients. Mast cells are commonly linked to IgE-mediated inflammatory changes characterized by elevated T helper 2 cytokines. Although atopy is a common comorbid condition with CRS, the objective of this study was to determine if elevated mast cells were linked primarily to atopic CRS patients and to understand their significance in the pathophysiology of CRS.

Methods:

Ethmoid sinonasal mucosa from patients undergoing endoscopic sinus surgery was harvested from 3 groups: healthy controls (HCs), CRS without NP, and CRS with NP and analyzed by flow cytometry to quantify CD117+/CD203+ mast cells and CD4+/ CRTh2+ T Cells. RNA levels of prostaglandin synthetase were determined by quantitative RT-PCR.

Results:

Mast cells were significantly elevated in CRS with NPs patients as compared to CRS without NPs and HCs. This elevation was independent of the presence of IgE-mediated hypersensitivity. In CRS with NP patients, a population of memory T cells expressing the prostaglandin D2 receptor (CRTh2) was identified. Prostaglandin synthetase responsible for PGD2 was also increased in CRS with NP patients.

Conclusion:

Elevated percentages of mast cells are found in the sinonasal mucosa of CRS with NP patients, regardless of atopic status. Secreted by mast cells, elevated PGD₂ may play a role in the recruitment and activation of CRTh2 memory T cells and may also be important in nasal polyp formation.

4:36pm - 4:40pm

Multimodality Topical Therapy for Refractory Chronic Rhinosinusitis with and without Nasal Polyposis

*Alan Shikani, MD, Konstantinos Kourelis, MD, Jeff Leid, PhD, Randall Basaraba, PhD
Baltimore, MD, USA*

Objective:

To evaluate the effect of multimodality topical therapy on refractory chronic rhinosinusitis with and without nasal polyps (CRSwNPs and CRSsNPs).

Study Design:

Prospective clinical study. Subjects and methods: Thirteen refractory CRSwNPs and twelve refractory CRSsNPs patients were treated with multimodality topical therapy protocol for six-weeks. Therapy consisted of weekly endoscopic sinus debridement followed by intra-sinus installation of a hydroxyl-ethylcellulose gel that releases antibiotics and mometasone. Subjects also performed daily saline pressure hydrotherapy, followed by nasal nebulization of antibiotics and mometasone. The control groups included five refractory CRSwNPs and five refractory CRSsNPs patients who were treated with the same protocol, however replacing topical gel and nebulized medications with oral antibiotics and commercially available mometasone spray. Mucosal epithelial barrier changes were evaluated through H&E histology and immunohistochemistry for Aquaporin 5. Clinical outcome was assessed using Lund-Kennedy (LK) symptom and endoscopic appearance scores.

Results:

Post-treatment mucosal biopsies showed histological changes indicative of mucosal membrane repair, with reduction in inflammation and edema, more significant in the topical therapy group. Immunohistochemistry revealed decreased epithelial expression of the water-specific membrane channel protein Aquaporin 5 mainly in the untreated CRSwNPs group, with restoration of levels after topi-

cal therapy. There was a statistically significant difference in the patients' LK symptom and endoscopic appearance scores after topical therapy, more evidenced in the CRSwNPs group.

Conclusion:

Collectively, these data illustrate that multimodality topical therapy has the potential for mucosal epithelial repair in refractory CRS. The epithelial expression of Aquaporin5 is significantly decreased in CRSwNPs and restored with topical therapy.

4:40pm - 4:46pm

Olfactory Neuroepithelium in the Superior and Middle Turbinate: Which is the Optimal Biopsy Site?

*Fabio Pinna, PhD, Paulo Saldiva, Phd, Bruno Ctenas, MD, Richard Voegels, PhD
Brazil*

Background:

Olfactory neuroepithelium (ON) biopsy provides perspectives for several therapeutic applications, both in disorders of olfaction and in neurodegenerative diseases. Successful collection of ON is still anything but routine due to a dearth of studies on ON distribution in the superior and middle turbinate.

Objective:

To describe the most likely location where ON is present in endoscopically removed cadaver superior and middle turbinates, as well as the influence of gender, age, and naris side on the presence of ON and the extent to which it is present.

Methods:

We conducted a prospective anatomical study. Superior and middle turbinates were bilaterally and endoscopically removed from 25 fresh cadavers (under 12 h post-mortem). Turbinates were halved into anterior and posterior fragments for a total of 200 specimens, which were analyzed after hematoxylin and eosin and immunohistochemical staining. Hematoxylin and eosin-stained slides were subjected to blind examination by three independent pathologists, and ON prevalence was graded on a five-point scale of zero to four. Agreement between pairs of observers was determined through kappa measurement.

Results:

ON was present in 82.9% of superior turbinate samples and in 17.1% of middle turbinate slides. Immunohistochemistry detected ON only through S-100 staining in superior turbinates and only in 15 fragments. Gender, age, and naris side were not associated with statistically significant differences in the presence of ON.

Conclusion:

When doing biopsy for ON, the posterior portion of the superior turbinate should be targeted whenever possible as it has the highest concentration of ON among nasal structures.

4:46pm - 4:52pm

Effect of LD Placement on Recurrence of CSF Rhinorrhea after Endoscopic Repair

*Nadieska Caballero, MD, Kevin Welch, MD, James Stankiewicz, MD, Vidur Bhalla, MS
Maywood, IL USA*

Objectives:

To analyze the relationship between lumbar drain (LD) placement and CSF leak recurrence after endoscopic repair.

Study Design:

Retrospective case series.

Methods:

Patients who underwent CSF leak repair by the Department of Otolaryngology from 1999-2010 were identified. Data collected included demographics, BMI, history of OSA or BIH, associated meningoencephalocele, etiology and site of leak, LD placement, fluorescein and antibiotic use, recurrence, and site of recurrence. Correlation between LD placement and leak recurrence was analyzed.

Results:

105 patients underwent CSF leak repair. 68 patients had a LD. 17/64 (26%) had a recurrent leak. There was no follow-up on 4 patients. 37 patients did not have a LD, and 5/37 (14%) recurred. Recurrence rates with and without LD were not significantly different ($p = 0.13$). 39/105 (37%) had a spontaneous leak, 15 (14%) had a traumatic leak and 50 (48%) had an iatrogenic leak. The etiology was unknown in one patient. In the spontaneous group, 26/39 patients had a LD and 10/39 did not. Recurrence was not significant

between these subgroups ($p = 1.0$). LD was used in 10/15 patients with traumatic leaks. 4/15 did not have a drain. Recurrence was not significant between these subgroups ($p = 1.0$). In 27/50 patients with an iatrogenic leak a LD was placed. 23/50 did not have a LD. There was no statistical significance when the recurrence rates for these subgroups were compared ($p = 0.15$).

Conclusion:

In our analysis, LD placement did not appear to affect recurrence after endoscopic repair of CSF rhinorrhea.

4:52pm - 5:00pm

Q&A

5:00pm - 6:30pm

Wine & Cheese Poster Reception - Grand Ballroom Foyer

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September 10, 2011 - Grand Ballroom A

1:00pm - 2:00pm

**Panel: ARS Young Investigators: Innovative Rhinology
Research with Impact**

Moderator: Andrew Lane, MD

Panelists: Amber Luong, MD

Murray Ramanathan, MD

Bruce Tan, MD

Sarah Wise, MD

Brad Woodworth, MD

Moderators: Noam Cohen, MD & Robert Kern, MD

2:00pm - 2:06pm

Comparative Analysis of Nasal and Sinus Microbiota in Chronic Rhinosinusitis and Control Subjects

*Cindy Liu, MD, Lance Price, PhD, Paul Klein, PhD, Andy Lane, MD
Flagstaff, AZ USA*

Introduction:

A clearer understanding of the role of microbes in CRS pathogenesis is critical for improving CRS diagnosis and management. Our previous work has shown the sinus microbiota to be diverse, with a wider intra-group variation in CRS with nasal polyps. Here we concurrently examine the composition of sinus bacterial and fungal communities in non-diseased versus CRSsNP and CRSwNP individuals.

Methodology:

Sinus and nasal samples were collected under endoscopic guidance, lysed using mechanical disruption, and purified to obtain DNA. Bacterial and fungal load were quantified with real-time qPCR. Fusion primers were used to generate barcoded 16S rRNA gene (bacterial) and 18S rRNA gene (fungal) amplicons for bacterial and fungal community analysis. Resulting pyrosequences were processed and analyzed to generate data matrices for comparative ecological analyses.

Results:

Bacterial and fungal DNA were detected in both nasal and sinus samples. The bacterial and fungal loads did not differ significantly between the three patient groups. Diverse bacteria and fungi were detected in all groups, including many that were not previously reported in the sinonasal cavity. In comparison to the sinus, the nasal microbiota were much more similar to the skin microbiota.

Conclusions:

Diverse bacterial and fungal communities are present in the nasal and sinus of non-diseased and diseased individuals. Such finding suggests that the traditional 'one-organism

2:06pm - 2:12pm

The Effects of Nitric Oxide on Staphylococcus Aureus Biofilm Growth and its Implications in Chronic Rhinosinusitis

*Camille Jardeleza, MD, Andrew Foreman, BMBS, Lor Wai Tan, PhD, Peter Wormald, MD
Woodville South, South Australia*

Background:

The relationship between sinonasal nitric oxide levels and the pathogenic organism *Staphylococcus aureus* is yet to be established. High nitric oxide levels measured in healthy sinuses likely contribute to maintenance of relative sterility. Lower concentrations such as is found in the sinuses of chronic rhinosinusitis (CRS) patients may decrease this effect. *S. aureus* in biofilm form has recently been implicated in recalcitrant CRS, its isolation predicting a higher risk of post-treatment re-infection. This in-vitro study aims to characterize the changes in *S. aureus* biofilm formation when exposed to different NO levels mimicking the normal & diseased NO sinus concentrations reported in previous literature in an in-vitro setting.

Methodology:

S. aureus ATCC 25923 & seven clinical isolates were cultured in biofilm form using a biofilm-forming device and the established biofilms exposed to 1-1000 micromolar (μM) NO concentrations. Biofilms were visualized using LiveDead BacLight stain & confocal scanning laser microscopy, and quantified using Comstat 2, a biofilm quantification software.

Results:

Biofilm biomass decreases from an average of 0.105 to 0.057 $\mu\text{m}^3/\mu\text{m}^2$ at higher NO concentrations (125-1000 μM), but is increased to 0.470 $\mu\text{m}^3/\mu\text{m}^2$ at lower NO concentrations (0.9-2 μM). The average biomass at high vs. low concentrations are statistically significant ($p < 0.001$).

Conclusion:

S. aureus biofilm formation varies across exposure to different NO levels, with anti-biofilm effects at higher concentrations, and enhanced biofilm formation at lower or sub-physiologic concentrations. These results coincide with the often dualistic function of NO, and have implications in its future use in the treatment of CRS.

2:12pm - 2:18pm

Two-year results: Transantral Balloon Dilation of the Ethmoid Infundibulum

James Stankiewicz, MD

Maywood, IL, USA

Background:

Multiple prospective and retrospective studies have reported results from balloon-only procedures and hybrid balloon sinus surgeries through intermediate follow-up periods of up to one year. Long-term durability results beyond two years are limited.

Methods:

One-year results from the original study of standalone transantral balloon dilation in patients with CT evidence of chronic inflammation in the maxillary sinuses alone or maxillary and anterior ethmoid sinuses combined were previously reported. Revision rate, symptom improvement, and productivity improvement were prospectively evaluated after a minimum follow-up of two years.

Results:

Fifty-nine subjects (107 maxillary ostia) underwent balloon dilation of the maxillary sinus outflow tract and completed post-procedure follow-up assessment at 27.4 ± 3.6 months. Patient SNOT-20 symptoms improved from 2.65 ± 0.97 at baseline to 0.82 ± 0.79 at long-term follow-up ($p < 0.0001$). Improvement in work productivity and activity due to sinus-related health issues for all patients was statistically significant across all survey instrument characteristics (p -value range: < 0.0001 - 0.02). An analysis of the outcomes in a subgroup of patients with maxillary and anterior ethmoid disease (20; 34%) showed similar significant improvement in symptoms (SNOT-20 decrease = -2.1 ; $p < 0.0001$). Approximately 92% of all patients reported satisfaction with the balloon procedure. Four (6.8%) subjects underwent revision sinus surgery at 11.1 ± 7.3 months after treatment.

Conclusion:

Patients with chronic rhinosinusitis and radiographic evidence of isolated maxillary disease with or without anterior ethmoid disease have reported clinically meaningful and statistically significant improvement in symptoms, productivity, and activity through a minimum of two years following standalone balloon dilation.

2:18pm - 2:24pm

CD8+ Lymphocyte Immundeficiency: an Important Unrecognized Factor in Refractory Chronic Rhinosinusitis?

*Marie-Christine Noel, MD, Saud Alromaih, MD, Begin Philippe, MD, Francois Larivière, MD
Montreal, Quebec Canada*

Introduction:

Reports of intracellular bacteria in chronic rhinosinusitis (CRS) suggest impaired cellular immunity. In support, molecular defects in T-cell function (TAP1/2 deficiency) have a clinical phenotype that resembles CRS with nasal polyposis (CRSwNP). We wished to determine whether defects in cellular immunity are present in CRS patients.

Methods:

T-cell lymphocyte phenotyping is routinely performed in our center for CRS patients with a clinical profile suggesting an immune deficiency. All lymphotyping results performed for CRS patients from 06/2009-12/2010 were reviewed and patients with abnormally low counts in any lymphocyte subgroup identified. Associated clinical phenotype was determined by retrospective review of patient demographics, evolution of the disease, and bacteriology on endoscopic culture.

Results:

Of the 115 patients that underwent lymphocyte phenotyping, fifteen (13%) had a low CD8+ count ($<0.20 \times 10^9/L$). In this group, CRSwNP was present in 66.6%, asthma in 50.0%, and 60.0% were refractory to treatment. Bacterial cultures revealed *Staphylococcus aureus* in 30.1%. Since this retrospective review was performed, a further 8 subjects with low CD8+ count and similar clinical phenotype to the first group have been prospectively identified, supporting our initial observation. Conclusions: We have identified a novel subgroup of CRS patients with a potential defect in T-cell function characterized by a low CD8+ count. Marked resemblance to 'common' CRSwNP with asthma and *Staphylococcus aureus* colonization suggests a potential role for defective cellular immunity in the pathogenesis of CRS. Additionally, the unexpected high frequency of this disorder suggests that lymphocyte phenotyping should be included in the assessment of patients with CRS refractory to therapy.

2:24pm - 2:30pm
Q&A

2:30pm - 3:00pm
Break with Exhibitors - Grand Ballroom C

Moderators: Martin Derosiers, MD & Stephanie Joe, MD

3:00pm - 3:06pm
CD44 as a Marker of Cancer Stem Cells in Nasopharyngeal Carcinoma

*Agnieszka Janisiewicz, MD, Quynh-Thu Le, MD, Christina Kong, MD, John Sunwoo, MD
Stanford, CA USA*

Introduction:

A subpopulation of cells within a tumor appear to have the exclusive ability to initiate tumors, self-renew and differentiate. These “cancer stem cells” (CSCs) are CD44+ in several epithelial malignancies. We examined the potential of CD44 to identify the CSC population in nasopharyngeal carcinoma (NPC).

Methods:

C666, an EBV+ human NPC cell line, was stained for CD44 and sorted by fluorescence-activated cell sorting (FACS). CD44+ and CD44- subpopulations were evaluated for (1) proliferative potential, (2) ability to differentiate, and (3) expression of BMI1, markers of epithelial-to-mesenchymal transition (EMT), and EBV genes. Immunocompromised mice were injected with CD44+ and CD44- populations to assess the tumor-initiating capacity. Immunohistochemistry for CD44 was performed on an 87-patient tissue microarray (TMA), and clinical correlations examined.

Results:

Heterogeneous expression of CD44 was seen among C666 cells. As with other CSC types, CD44+ cells had increased expression of BMI1. Further, CD44+ cells differentiated into CD44- cells, indicating a hierarchical relationship. No differences were seen in proliferation rates, EBV gene expression, or expression of EMT markers

between CD44+ and CD44- subsets. Patient tumors were heterogeneous for CD44 staining, and a trend toward an association between CD44 expression and clinical outcome was observed.

Conclusions:

NPC contains a CD44+ subpopulation with features consistent with CSCs. CD44 expression within NPC tumors appears to correlate with a trend towards decreased time to local failure/relapse in patients with CD44+ tumors. Xenograft experiments to assess for tumor-initiating capacity of the CD44+ and CD44- cells are ongoing.

3:06pm - 3:12pm

Phenotypes of Chronic Rhinosinusitis

*Sal Talierto, MD, Joseph Han, MD, Chris Benson, BS
Norfolk, VA, USA*

Introduction:

The presentation of sinus disease varies amongst patients with chronic rhinosinusitis (CRS). The objective of this study was to characterize patients with clinically distinct subclasses of CRS.

Methods:

285 patients were prospectively recruited at a tertiary center for Rhinology. All completed BMI calculation, CT scoring via the Lund McKay Staging System, Nasal Endoscopy, and 2 QOL questionnaires (RSDI and CSS). Clinically distinguishable subclasses of CRS were Aspirin Triad(AT), allergic fungal sinusitis(AFS), asthmatic sinusitis with and without allergy(AS c/s A), non-asthmatic sinusitis with and without allergies(NAS c/s A), and cystic fibrosis (CF). Results were analyzed for variance and correlations using Wilcoxon Ranked Sum and Spearman's Correlation Analyses.

Results:

All analyses between CRS subclasses and control, for CT and nasal endoscopy scores were significant ($p < 0.01$). Differences in CT scores were observed between CRS subgroups ($p < 0.01$). CT and nasal endoscopy scores correlated well in AFS ($r = 0.84$). Significant differences in nasal endoscopy scores were found between the different groups of CRS ($p < 0.01$). When RSDI and CSS were compared, there were correlations observed for Control ($r = 0.63$), AFS ($r = 0.57$), AS c A ($r = 0.80$), AS s A ($r = 0.77$), CF ($r = 0.99$), NAS c A ($r = 0.43$), and NAS s A ($r = .50$). BMI negatively correlated against CT scores in AS c A ($r = -0.55$) and positively cor-

related against the CSS ($r=0.94$) in AS s A. Analysis of BMIs between CRS subclasses revealed significantly higher scores for all subclasses (>25.4) against CF ($=20.6$) $p<0.02$. Conclusion: Marked phenotype differences exist between subclasses of CRS.

3:12pm - 3:18pm

Human Sinonasal Explant System for Testing Cytotoxicity of Intranasal Agents

*Jae Lim, MD, PHD, Greg Davis, MDMPH, Dan Storm, PHD
Seattle, WA USA*

Background:

Intranasal agents play a critical role in the management of sinonasal disorders. There are ongoing efforts to develop new intranasal medications to combat sinonasal disease. Some intranasal agents, however, can have cytotoxic effects on human sinonasal tissue. In order to facilitate safe drug discovery, we developed a simple and reliable in vitro screening assay using human sinonasal explants to measure the cytotoxic profiles of commonly used intranasal agents.

Methods:

We obtained sinonasal tissues from several regions of the nasal cavity from 12 patients undergoing endoscopic sinonasal surgery. These tissues were cultured on polytetrafluoroethane membrane in serum free growth medium. We determined the biochemical properties of these explants by measuring extracellular lactate dehydrogenase (LDH) levels and performing histological analyses over a period of 1-2 weeks. We then examined the cytotoxic profiles of 12 intranasal agents by measuring LDH levels using the human sinonasal explant system.

Results:

Sinonasal explants exhibited a rapid reduction in LDH levels and stabilized in the culture environment within 2 days. Histological analysis showed maintenance of good cellular architecture for up to 2 weeks. The explants displayed intact epithelium and expressed Beta-III-tubulin and Ki-67. Of the 12 tested intranasal agents, only zinc gluconate application demonstrated significant elevation of LDH levels.

Conclusion:

Based on the unique biochemical properties of the human nasal explant culture system, we developed a simple and reliable in vitro

screening assay to determine the cytotoxic profiles of various intranasal agents by examining extracellular LDH levels and histopathology.

3:18pm - 3:24pm
Q&A

Moderators: David Conley, MD & Alexander Chiu, MD

3:24pm - 3:30pm
Dose Quantification of Topical Drug Delivery to the Paranasal Sinuses by Fluorescein Luminosity Calculation

Benjamin Bleier, MD, Dhulshan Preena, MD, Richard Harvey, MDI USA

Introduction:

Our group has previously described a novel method of objectively quantifying the temporospatial distribution of sinonasal irrigation in a non-anesthetized patient. The purpose of this study is to refine this technique to provide an accurate method of determining concentration of dose delivery as well.

Methods:

An endoscope at a fixed position within two dissected cadaveric heads was used to image 4 subsites under blue light. Each site was dosed with 3mL of successively increasing concentrations of fluorescein labeled saline. In vitro images of the labeled saline were also captured over a range of depths. Images were exported into a graphics editing program which was used to calculate luminosity at three regions per subsite. The relationship between luminosity and fluorescein concentration was calculated using a Pearson product-moment correlation coefficient. Significance was determined using a 2-tailed student's t-test.

Results:

Luminosity of the irrigation delivered to the maxillary sinus, lamina papyracea, ethmoid roof, and frontal sinus positively correlated with the fluorescein concentration over a range of 0.1-0.01mg/mL (n=6; r=0.95, p<0.001; r=0.94, p<0.001; r=0.92, p<0.001; r=0.94, p<0.001; respectively). There was no significant difference between luminosities of a 0.01mg/mL irrigation layer subtending a range of depths up to 0.66cm.

Conclusions:

The described method is capable of determining the concentration of fluorescein delivery to a mucosal surface via objective luminosity quantification. Our data suggest that this method will remain accurate regardless of the potential for heterogenous pooling of irrigation. This method may be used to optimize delivery strategies of a variety of topical sinonasal therapies.

3:30pm - 3:36pm

Incidental Sinonasal Findings Identified During Preoperative Evaluation for Endoscopic Sella Approaches

*Adrienne Laury, MD, Nelson Oyesiku, MD, John DelGaudio, MD, Sarah Wise, MD
Atlanta, GA USA*

Introduction:

Endoscopic transsphenoidal approach to pathology in the sella is typically performed via collaboration between neurosurgery and otolaryngology. At times, this approach may be significantly altered by concomitant sinonasal disease, anatomic variants, or previous surgery.

Methods:

Review of 272 patients undergoing combined neurosurgery-otolaryngology endoscopic transsphenoidal approach to the sella August 1, 2007-April 1, 2011. The incidence of sinonasal pathology or anatomic variants noted endoscopically or radiographically was evaluated to determine whether these sinonasal findings necessitated alterations in management pre- or intra-operatively. Routine institutional practice for TSA patients involves pre-operative otolaryngology clinical evaluation and MRI review. Intraoperative image guidance is not routinely used for uncomplicated endoscopic TSA.

Results:

The total number of patients who had an alteration in their care plan based on otolaryngology evaluation was 95/272 (34.9%). Most common was the addition of image guidance due to prior surgery or anatomic variants on MRI in 81 patients (29.8%). Eight patients (2.9%) were pre-operatively treated with antibiotics and surgery postponed secondary to acute or chronic purulent rhinosinusitis; 2 required functional endoscopic sinus surgery for medically refractory disease prior to TSA. Five patients (1.8%) required anterior septo-

plasty intra-operatively. Two patients had inverted papilloma and one had esthesioneuroblastoma identified pre-operatively during nasal endoscopy.

Conclusions:

This is the largest review of patients undergoing TSA and the only study describing how intra-operative management was altered based on pre-operative sinonasal evaluation. The incidence of sinonasal pathology or anatomic variants leading to changes in routine operative planning is significant; thorough sinonasal evaluation is warranted in these cases.

3:36pm - 3:40pm

Prospective Evaluation of Balloon-Only and Combination Balloon-Sinonasal Surgical Procedure Outcomes through One-Year Follow-Up

James Atkins, Jr., MD
Boerne, TX USA

Background:

The purpose of this prospective, multi-center registry is to analyze post-operative symptomatology changes following trans-antral balloon dilation in several subgroups of patients including those who underwent stand-alone ostial dilation or balloon treatment in conjunction with nasal surgery.

Methods:

Patients with either recurrent acute or chronic rhinosinusitis who were identified by their treating physicians as candidates for trans-antral dilation of the maxillary sinus ostia and ethmoid infundibulum underwent ostial dilation with or without concomitant sinonasal surgery. Patients with thickened polypoid mucosa too excessive to allow visualization of the primary ostium through the maxillary antrum were excluded. Symptom severity, sinus medication use, and work/social status at baseline, six-month, and one-year follow-up were assessed using two validated surveys.

Results:

Stand-alone balloon dilation of the maxillary sinus ostia was attempted in 42 patients (80 ostia) and combination balloon dilation with septoplasty and turbinate reduction was scheduled in another subgroup of 46 patients (91 ostia). Trans-antral access to, and successful dilation of, the targeted ostia and ethmoid infundibula was

greater than 98% in each treatment group. Improvements in the balloon-only and combination septoplasty/turbinate reduction subgroups were statistically significant and clinically meaningful with symptom score changes of -1.5 ($p < 0.0001$) and -1.4 respectively ($p < 0.0001$). No adverse events were reported to the balloon catheter manufacturer. Three patients (3.4%) underwent revision surgery.

Conclusion:

These results demonstrate that balloon dilation as either a stand-alone or combination sinonasal procedure provides significant improvement in sinus symptoms through one-year with revision surgery rates similar to those reported for endoscopic sinus surgery.

3:40pm - 3:46pm

Q&A

Moderators: Belachew Tessema, MD & Kathleen Yaremchuk, MD

3:46pm - 3:52pm

A Meta-Genomic Analysis of 16S rRNA Gene Based Bacterial Detection Results Enhances Understanding of the Bacteriology of CRS

*Saud Alromaih, MD, Leandra Endam, Mrs, Michael Surette, Dr, Martin Desrosiers, FRCSC
Montreal, QC Canada*

Introduction:

Molecular-based bacterial detection based on sequencing of the 16S ribosomal RNA gene unique to prokaryotes identifies bacterial species independently of culture conditions. We have previously reported the results of 16S sequencing in chronic rhinosinusitis (CRS) and controls (Stephenson, 2010). However, the great diversity of bacterial organisms identified makes the implication of individual species difficult. We wished to assess whether a meta-genomics approach to data analysis might offer more meaningful interpretation.

Methodology:

Biopsies of the ethmoid bulla were obtained from subjects undergoing surgery for CRS with nasal polyposis (CRSwNP), CRS without nasal polyposis (CRSsNP) or controls undergoing ESS for skull

base access. DNA was extracted, the 16S rRNA gene amplified and pyrosequencing performed for bacterial identification on an FLX genome sequencer. Assessment of microbial composition was performed according to Gram status and bacterial taxonomy.

Results:

In control subjects, there was a marked predominance of Gram-positive to Gram-negative bacteria. However, in CRS subjects, there was an increase in proportion of Gram-negative to Gram-positive bacteria. While this pattern was present for all CRS subjects, this was most pronounced for the CRSsNP group. At phylum level, principal Gram-negative organisms were Proteobacteria. Principal Gram-positive phyla were Firmicutes and Actinobacteria.

Conclusion:

CRS is characterized by an increase in the proportion of Gram-negative to Gram-positive bacteria. This suggests either that increased presence of Gram-negative species contributes to development of CRS, or conversely, that reduced levels of Gram-positive bacteria contribute to dysregulation of immune responses in the sinus mucosa by a loss of their regulatory role on immune signaling.

3:52pm - 3:58pm

Microwave Disinfection: Assessing the Risks of Irrigation Bottle and Fluid Contamination

*Sharon Morong, MD, Martin Desrosiers, MD, John Lee, MD
Toronto, ON, Canada*

Background:

It was previously shown that 50% of irrigation bottles and 40% of irrigation fluids had evidence of bacterial contamination despite cleaning with hot water and soap. While a novel method of microwave disinfection has recently been proposed to minimize contamination risk, this has not been studied in a real life setting.

Objective:

To investigate the effectiveness of microwave disinfection for reducing both nasal irrigation bottle and fluid contamination risk following endoscopic sinus surgery (ESS).

Methods:

Twenty consecutive patients undergoing ESS for chronic rhinosinusitis (CRS). Patients were given NeilMed™ Sinus Rinse bottles

with microwave cleaning instructions pre-operatively. Bottles were collected and cultured at 1 week post-operatively. Sterile saline (5cc) was mixed into the irrigation bottle and cultured separately. An additional ten patients were recruited whereby the bottle was cultured at collection and immediately after microwave disinfection performed in clinic.

Results:

For the first cohort of the study, 40% of the bottles and 20% of the irrigation samples had positive cultures 1 week post-operatively. Common bacteria included acinetobacter, coagulase negative staphylococcus, and gram negative bacilli. For the second cohort of patients, 20% of the irrigation bottles had positive cultures. However, after supervised microwave disinfection, there was a 0% contamination rate.

Conclusion:

Despite detailed instructions on microwave disinfection, positive bacterial cultures may still occur after ESS. This risk, however, appears to be significantly reduced when bottles are microwaved under supervision. These findings suggest either a reduced patient compliance to cleaning or a time dependent re-contamination risk after disinfection.

3:58pm - 4:02pm

Paranasal sinus fibro-osseous lesions: When is biopsy indicated for diagnosis?

*Guy Efune, MD, Jordan Rihani, MD, Pete Batra, MD
Dallas, TX USA*

Introduction:

Paranasal sinus fibro-osseous (FO) lesions represent a heterogeneous group, often sharing overlapping radiographic and pathologic features posing a dilemma in accurate diagnosis. The objective of this study was to correlate preoperative radiologic and postoperative histologic characteristics to elucidate a diagnostic algorithm.

Methods: Retrospective analysis of 60 FO lesions between 1994 and 2010.

Results:

The mean age was 42.3 years with average follow-up of 15 months. The preliminary radiologic diagnosis was osteoma in 22 (36.7%), fibrous dysplasia (FD) in 9 (15%), ossifying fibroma (OF) vs. FD in 5 (8.3%), and OF in 3 (5%) cases. The diagnosis was indeterminate

in 21 (35%) cases. Management consisted of excision in 29 (48.3%), observation in 17 (28.3%), and biopsy in 14 (23.3%) patients. For patients undergoing surgery, radiologic-histologic correlation was noted in 100% (10/10) of osteoma, 86.7% (6/7) of FD, and 33.3% (1/3) of OF cases. For the indeterminate lesions, most common pathologic diagnoses for 21 patients included osteoma in 5 (21.7%), OF in 4 (17.4%), and arrested pneumatization in 4 (17.4%). For FD vs. OF cases, 3 underwent surgery revealing osteoma, FD, and OF in 1 patient each.

Conclusion:

In this series, radiologic-histopathologic correlation was high for osteoma and FD and low for OF and OF vs. FD. This data suggests that patients with classic radiologic characteristics of osteoma and FD may be observed, unless resection is warranted based on clinical symptoms. Preoperative diagnosis of OF, OF vs. FD, or indeterminate lesions require biopsy to establish definitive diagnosis to guide management.

4:02pm - 4:08pm

Q&A

Moderators: Kevin Welch, MD & Peter J. Wormald, MD

4:08pm - 4:14pm

Expression of the Extracellular Matrix Gene Periostin (POSTN) Decreases after Successful ESS

*Wei Zhang, MD, Gregory Hubin, MD, Abdelali Filali-Mouhim, MD, Martin Desrosiers, MD
Montreal, Quebec Canada*

Introduction:

The extracellular matrix (ECM) is a potentially important component of mucosal immunity. ECM dysregulation in CRS is suggested by genome-wide association studies identifying ECM genes as top candidates. Further support is afforded by the demonstration of increased expression of periostin (POSTN) in CRS biopsy samples compared to controls (Stankovic, 2008), and by reported roles in eosinophilic inflammation and steroid responsiveness. We wished to evaluate potential utility of POSTN as a biomarker for disease activity by determining whether POSTN levels were modified in disease and whether they were modulated by endoscopic sinus surgery (ESS).

Methods:

Twelve patients undergoing ESS for CRS and ten controls undergoing ESS for skull base access were recruited. An epithelial sample from the frontal recess was collected using a cytology brush at time of and three months after surgery. Microarray analysis of gene expression was performed using the Illumina HumanHT-12 Bechip v3. Limma package from Bioconductor software was used to compare differences of gene expression before and after ESS.

Results:

All patients resolved CRS with ESS. At surgery, a higher expression of POSTN was seen in the CRS group compared to controls (FC=4.89, pFDR (false discovery rate) =0.0006). After successful ESS, POSTN expression in the CRS group decreased (FC= -3.074, pFDR=0.004), and was no longer different from controls (FC=1.56, pFDR=0.3).

Conclusion:

Demonstration of reduced levels in the expression level of POSTN, an ECM gene, following resolution of disease, implicate POSTN in the pathogenesis of CRS and suggest that POSTN may prove useful as a biomarker specific to CRS disease activity.

4:14pm - 4:20pm

Regional Expression of Epithelial MDR1/P-gp in Chronic Sinusitis with and without Nasal Polyposis

Benjamin Bleier, MD

USA

Introduction:

P-glycoprotein(P-gp) is a 170kDa transmembrane glycoprotein encoded by the MDR1(ABCB1) gene and is constitutively expressed on lower airway epithelium. P-gp has been shown to function as an immunomodulator regulating efflux of Th1/Th2 cytokines from its host cell however its association with sinonasal inflammation has not been described. The purpose of this study is to determine the pattern and degree of epithelial P-gp expression in chronic sinusitis(CRS) with or without nasal polyposis(NP).

Methods:

IRB approved study utilizing sinus, septal, and inferior turbinate mucosa in patients with no disease, CRS, and CRSw/NP(n=4 each). Quantitative Fluorescent Immunohistochemistry(Q-FIHC) was per-

formed using an anti-P-gp antibody and a secondary FITC conjugated Fc specific fragment. Protein expression was quantified by calculating the epithelial to nonspecific background intensity ratio(4 images/subsite). Scores less than 1 suggested negligible expression. Staining ratios between patient groups and subsites were compared using a 2-tailed Student's t-test.

Results:

Among the sinus mucosa, P-gp expression in CRSwNP(1.570 \pm 0.354) was significantly greater than both CRS(1.224 \pm 0.248) and control(0.762 \pm 0.128)(p <0.001, p =0.002; respectively). CRS scores were significantly greater than control(p =0.002). Among the septal mucosa, there was no significant difference between CRSwNP(0.914 \pm 0.264), CRS(1.126 \pm 0.476), or control(0.966 \pm 0.327). Among the inferior turbinate mucosa, there was no significant difference between CRSwNP(1.047 \pm 0.157), CRS(1.099 \pm 0.362), or control(0.824 \pm 0.181).

Conclusions:

MDR1/P-gp is overexpressed in the epithelial layer of sinus mucosa in patients with both CRSwNP and CRS relative to other sinonasal subsites. Expression in healthy mucosa is negligible. Given its known immunomodulatory function this suggests that P-gp may play a role in the pathogenesis or maintenance of chronic sinonasal inflammation.

4:20pm - 4:26pm

Regulation of Murine Sinonasal Cilia Function by Microbial Secreted Factors

Jessica Shen, MD, Emily Cope, BS, Jeff Leid, PhD, Noam Cohen, MD Philadelphia, PA USA

Introduction:

Chronic rhinosinusitis is a multifactorial disease resulting in impaired mucociliary clearance. Recent literature suggests that different bacterial species are associated with varied disease severity. We examined the immediate effect of microbial secreted factors on sinonasal ciliary function.

Methods:

Murine primary sinonasal cultures were established in an air-liquid interface (ALI). Bacterial supernatants were isolated from mono-cultures of *H. influenzae*, *S. pneumoniae*, *S. aureus*, and *P. aeruginosa*

cultures, as well as co-cultures of *H. influenzae*/*S. pneumoniae* and *S. aureus*/*P. aeruginosa*. Controlling for pH and osmolarity, supernatants were administered at 50% concentration to the apical surface of the ALI culture. Basal ciliary beat frequency (CBF) was recorded for 20 minutes, at 5-minute intervals. Control groups were treated with culture broth. At minimum, experiments were performed in triplicate. Stimulated CBF was recorded after mechanical stimulation via short burst of pressurized air (55 mmHg).

Results:

All supernatants reduced basal CBF. Both *S. pneumoniae* and *P. aeruginosa* caused significant reduction in CBF at all time points, the largest decrease of $-46.3\% \pm 1.6\%$ ($p < 0.001$) for *S. pneumoniae* and $-27.1\% \pm 2.8\%$ ($p < 0.001$) for *P. aeruginosa*. *S. aureus* declined basal CBF by $-33.0\% \pm 2.8\%$ ($p < 0.001$) at 5 minutes, which reversed by 15 minutes. Overall, *H. influenzae* yielded the least change in CBF ($-20.0\% \pm 2.8\%$, $p < 0.002$). Co-cultures (*H. influenzae*/*S. pneumoniae* and *S. aureus*/*P. aeruginosa*) resulted in delayed CBF reduction compared with mono-cultures. *P. aeruginosa* also blunted stimulated CBF ($p < 0.01$).

Conclusion:

Results demonstrated immediate decreases in murine sinonasal CBF after exposure to bacterial supernatants. Moreover, *P. aeruginosa* resulted in diminished ciliary stimulation capacity.

4:26pm - 4:32pm

Q&A

Moderators: Pete Batra, MD & Steven Schaeffer, MD

4:32pm - 4:38pm

Efficacy of NVC-422 Against *S. aureus* Biofilms in Sheep Biofilm Model of Sinusitis

*Deepti Singhal, MD, Andreas Jekle, MD, Lu Wang, MD, Peter Wormald, MD
South Australia, Australia*

Background:

Bacterial biofilms are a recognised torment in management of recalcitrant chronic rhinosinusitis. NVC-422 is a fast-acting, broad-spectrum antimicrobial effective against biofilm bacteria in in-vitro conditions.

Aim:

Investigate safety and efficacy of NVC-422 as a local anti-biofilm treatment in sheep model of rhinosinusitis.

Methods:

After accessing and occluding frontal sinus ostia in 24 merino sheep via staged endoscopic procedures, a *Staphylococcus aureus* clinical isolate was instilled in frontal sinuses to simulate biofilm associated sinusitis. Following biofilm formation, ostial obstruction was removed, sinuses irrigated with 0.1% and 0.5% NVC-422 in 5 mM Acetate/Saline. Sheep were monitored for adverse effects and euthanized 24 hrs after treatment. Frontal sinus mucosa was assessed for changes after treatment. Biomass of *S. aureus* biofilms identified with Baclight-Confocal scanning Microscopy protocol was assayed using COMSTAT 2 program to recorded image stacks.

Results:

After only two irrigations with 0.1% NVC-422, *S. aureus* biofilm biomass reduced to 0.71 ± 0.8 m³/m² compared to 1.94 ± 1.1 m³/m² in control sinuses ($P=0.0001$). 0.5% NVC-422 irrigations reduced biofilm more significantly to 0.11 ± 0.11 m³/m² and consistently over all samples ($P<0.0001$). 0.5% NVC-422 was also more effective than the vehicle control and normal saline in reducing biofilm ($P<0.05$ for all subgroups). No adverse events were observed in sheep after sinus irrigations with 0.1% and 0.5% NVC-422.

Conclusion:

NVC-422 is safe and effective topical agent against *S. aureus* biofilms, with 0.5% solution concentration being more efficacious in this animal study. This study exemplifies a new treatment opportunity for sinusitis using a solution of NVC-422.

4:38pm - 4:44pm

Absence of Disease-Specific Gene Expression by Nasal Polyp Epithelial Cells in Culture

*Andrew Lane, MD, Thomas Higgins, MD, Babar Sultan, MD, Joan Lee, BA
Baltimore, MD USA*

Introduction:

Recent research has implicated sinonasal epithelial cells as playing an important role in the pathogenesis of chronic rhinosinusitis with polyps. Published microarray experiments involving whole sinus mucosa from CRSwNP and controls have demonstrated significant differential expression of multiple genes. To what extent polyp epithelial cells maintain a disease-specific gene expression phenotype when cultured in vitro is not well-established.

Methods:

Sinonasal mucosa was obtained from 10 patients with well-characterized CRSwNP and 10 control subjects without sinus disease. Sinonasal epithelial cells were isolated and grown in air-liquid culture for 3 weeks until fully differentiated. RNA and DNA was extracted and purified for Illumina microarray analysis of mRNA expression and gene methylation.

Results:

Genome-wide comparison of differential mRNA expression by sinonasal epithelial cells in ALI culture showed no significantly up- or down-regulated genes between polyp and control subject groups. Similarly, methylation array analysis of over 14,000 genes did not show significant difference in epigenetic modification at CpG sites between polyp and control groups.

Discussion:

Primary sinonasal epithelial cell culture models have been increasingly utilized to study CRS pathogenesis. While very significant changes in epithelial cell gene expression have been reported in vivo between nasal polyps and normal epithelium, many of these phenotypic differences may be lost once cells are removed from the host and grown in isolation. Notwithstanding technical limitations of microarrays and a relatively modest sample size, these results suggest that if a disease-specific gene expression phenotype exists for polyp epithelial cells, it may not persist in vitro in differentiated culture.

4:44pm - 4:50pm

When Does Surgery Become Cost-Beneficial in the Management of Recurrent Acute Rhinosinusitis?

*Randy Leung, MD, Robert Kern, MD, Rakesh Chandra, MD
Chicago, Illinois, USA*

Background:

The treatment of recurrent acute rhinosinusitis (RARS) has historically consisted of medical management for each individual episode. Endoscopic sinus surgery has been found to reduce the frequency of infection but it is unclear when surgery should be considered.

Objective:

To determine the threshold number of annual infections where surgery becomes more cost-beneficial than continued medical therapy alone.

Methods:

Cost-benefit modeling was performed using literature-reported response rates to surgery, medicine, and their attendant complication rates. Expenses were estimated based on current Medicare rates and the Redbook pharmaceutical reference.

Results:

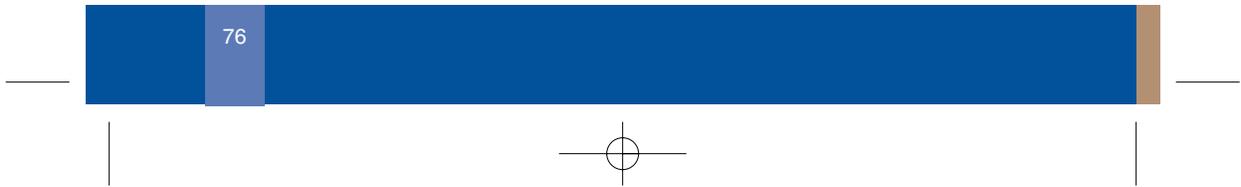
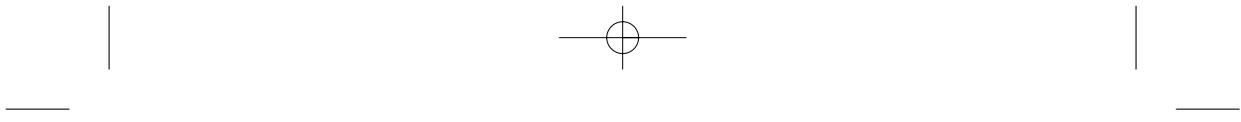
The threshold where surgery becomes more cost effective to patients occurs when patients experience more than 1.3-2.8 episodes of RARS per year. Sensitivity analysis using ranges of pretest probabilities suggest that surgery may be more cost effective when patients experience as little as 0.7 or as many 12.5 episodes per year. Patient recall bias and misclassification of viral URI as RARS we identified as potential confounding factors.

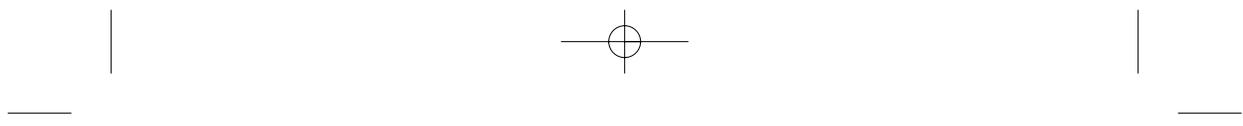
Discussion:

In the US adults, average 2-2.5 viral upper respiratory infections per year. To adjust for this background rate, surgery becomes cost effective when when patients suffer from 4-6 episodes per year.

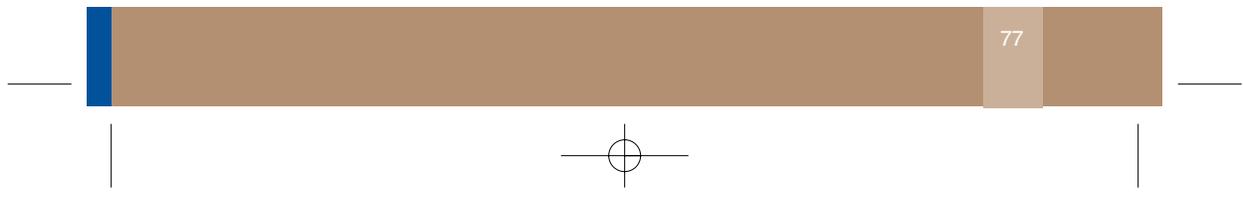
4:50pm - 5:00pm

Q&A





Posters



Wine & Cheese Poster Reception

Supported by Intersect ENT

Saturday, September 10, 2011

5:00pm - 6:30pm, Grand Ballroom Foyer

Poster # P1

Acute invasive fungal rhinosinusitis: Review of 6 patients

Fábio Pinna, PhD, Nelson Melo, MD, Luisa Medeiros, MD, Richard Voegels, PhD

São Paulo - SP, Brazil

Introduction:

Acute invasive fungal rhinosinusitis (AIFR) is an opportunistic infection that occurs in immunocompromised patients and the course varies according to the severity of underlying disease. It is classically known by a histopathologically prominent vascular invasion, high mortality and morbidity rate. The aim of this study was to review our experience with AIFR.

Methods:

Retrospective review of case records of histopathologically verified AIFR from November 2008 to February 2011 was done.

Results:

Six patients with AIFR were identified. These included 3 males and 3 females with a mean age of 38 years (age range 18-61 years). All patients had a predisposing factor to fungal infection such as insulin dependent diabetes mellitus in 3 patients, immunosuppressant therapy after renal transplantation in one patient, hematological malignancy in one and bone marrow aplasia in the latter. The majority of patients presented with facial pain and/or edema while two patients were investigating febrile neutropenia. Orbital involvement with ophthalmoplegia and visual changes were present in two patients. Endoscopic surgical debridement was performed for all patients. Rhizopus species were found in four patients while Aspergillus species were in one. Survival rate was 50 percent.

Conclusion:

In our sample, diabetes was the main predisposing factor for AIFR as mucor was the major causative agent. Depending on the extent of the fungal infection, the endoscopic approach could be suitable.

Poster # P2
Bacterial Microcolonies Exist within the Sphenoid Bone in Chronic Rhinosinusitis

*Andrew Wood, MD, John Fraser, MD, Richard Douglas, MD
Auckland New Zealand*

Background:

Some patients with chronic rhinosinusitis (CRS) exhibit sinus bone thickening which has been termed 'osteitis'. The histopathology and microbiology of these changes have not been fully described. We have recently identified colonies of bacteria prevalent within CRS sinus mucosa that appear to modulate the local immune response. The aim of this study was to look for the presence of bacteria and immune cells within samples of bone from patients with CRS.

Methods:

Bone of the anterior face of the sphenoid was assessed radiologically and histologically in 8 patients with CRS with nasal polyposis, 8 patients with CRS without polyposis and 6 control patients with pituitary adenomas and normal sinuses. Bone thickness and density were measured by CT. Bone samples were collected intra-operatively and 20 tissue sections were analysed for each patient. Bacteria were identified by Giemsa and Gram stains. Immune cells were identified by conventional histology and immunohistochemistry.

Results:

Small colonies of bacteria were identified within the bone in 3/16 CRS patients and 2/6 control subjects ($p=0.59$). Isolated immune cells were identified within the bone in 3/16 CRS patients and 2/6 control subjects ($p=0.59$). The presence of bacteria or immune cells within bone samples did not correlate with either bone thickness or bone density.

Conclusions:

This study describes the presence of small numbers of both bacteria and immune cells within a minority of CRS patients and normal controls. However, the microcolonies do not appear to be the cause of 'osteitic' changes seen in CRS patients.

Poster # P3**Bilateral Onodi Cells in Patients with Pituitary Adenoma: A Potential Advantage of the Endoscopic Endonasal Approach**

*Thuy-Anh Melvin, MD, Doug Reh, MD, Gary Gallia, MD
Baltimore, MD USA*

Objective:

The purpose of this paper is to review two cases of recurrent or persistent pituitary macroadenomas despite prior sublabial resections. In both cases, large bilateral posterior ethmoid Onodi cells limited access to the sella despite prior surgery. Adequate exposure through an endoscopic endonasal approach (EEA) was ultimately achieved for gross total resection. This case series highlights the need for preoperative recognition of variant sinus anatomy on CT and illustrates potential advantages of the EEA to sella tumors in patients with Onodi cell anatomy.

Methods:

Two adult cases were retrospectively reviewed at a tertiary hospital.

Results:

The first case was a 54 year-old woman who presented with recurrent pituitary macroadenoma despite two prior procedures including a sublabial microscopic approach. She underwent revision EEA and has been free of disease for 13 months. In the second case, a 49-year-old man presented with a 3 cm sellar recurrence of pituitary macroadenoma after having undergone 2 prior surgeries. After an EEA procedure, he is currently 6 months without recurrence. In both cases, presence of Onodi cells were taken into account during preoperative planning. Intraoperative endoscopy was utilized to open the sphenoid sinus and Onodi cells in order to gain access to the entire sella thereby enhancing the exposure for complete tumor resection.

Conclusions:

The presence of Onodi cells may predict limited sellar exposure during trans-sphenoid pituitary approaches and consequently difficulty with tumor resection. Preoperative recognition of this anatomic variant is important for surgical planning and for achieving adequate surgical access to the sella.

Poster # P4

Characterization of the Cellular Composition of the Murine Nasal Epithelium through Development

*Dawn Bravo, PhD, Bryan Nguyen, MS, Saku Sinkkonen, MD, Jayakar Nayak, MD
Stanford, CA USA*

Introduction:

Knowledge of the ontogeny and precise cellular composition of the nasal epithelium would assist in strategies targeted at epithelial repair and regeneration. Few reports have comprehensively detailed the makeup of the non-sensory murine epithelial lining from gestation to adulthood.

Methods:

Four-color immunofluorescence staining of coronal frozen thin sections of wild-type C57BL/6 mice using monoclonal antibodies against epithelial, ciliated, goblet and olfactory cells. Structural and cellular development from embryonic day 9.5 of gestation (E9.5) to E19.5 and postnatal day 1 (P1) through P180 was analyzed.

Results:

Four anatomically and cellularly distinct regions were defined in the coronal plane, termed regions 1-4. The EpCAM epithelial marker is stably expressed throughout murine embryonic and postnatal development by both nasal and olfactory epithelium. Ciliated cells, marked by tubulin, are first noted at embryonic day 17.5, becoming more pronounced with age. The polysaccharide marker MUC5ac is first detected in goblet cells only after birth (P1), primarily within the central nasal cavity. The olfactory marker protein OMP stained the neuroepithelium exclusively, to demarcate the sensory from non-sensory mucosa. Its earliest detection at E17.5 was confined to the skull base epithelium. Detailed nasal subsite analysis was also performed for each marker.

Conclusions:

Through exhaustive characterization of the primary intranasal cell phenotypes that comprise the mucosal epithelium at all developmental stages, we demonstrate temporal and regional specificities that were previously underappreciated. This work provides the foundation for future studies with genetically engineered murine systems, to gain more refined appreciation of the regenerative properties of the nasal epithelium.

Poster # P5
Comparison of Coblator and KTP Laser for Treatment of
Hereditary Hemorrhagic Telangiectasia (HHT)-Related Epistaxis:
A Preliminary Report

Nathan Sautter, MD
Portland, OR, USA

Background:

Epistaxis is the most common manifestation of HHT, affecting 90% of patients. KTP laser photocoagulation and bipolar cautery are the mainstays of treatment for HHT-related epistaxis. Coblation is a newer technology utilizing low-heat plasma energy for tissue ablation and cautery.

Study design:

Randomized prospective

Setting:

Tertiary care center

Methods:

Patients seeking treatment for HHT-related epistaxis were enrolled and randomly assigned to either coblator or KTP laser treatment. Patients completed Epistaxis Severity Score (ESS) questionnaires at the time of enrollment, and 3 and 6 months following surgical treatment. Data collected at time of surgery included length of case and estimated blood loss (EBL).

Results:

10 consecutive patients were enrolled between September 2010 and May 2011. Average follow up was 18 weeks (20.4 for KTP arm, 16.4 for coblator arm). The male:female ratio was 3:7. Average age was 65.9 years (63.8 KTP, 68 coblator). Average ESS at time of enrollment was 10 (8.75 KTP, 11.25 coblator), at 3 months was 7.8 (8 KTP, 7.5 coblator), and at 6 months was 10 (10.7 KTP, 8 coblator). Average EBL was 97 cc (50 cc KTP, 144 cc coblator). Average length of case was 46.3 minutes (52.6 KTP, 40 coblator). There were no surgical complications.

Conclusion:

Preliminary data indicates the coblator is an effective treatment alternative to KTP laser photocoagulation for HHT-related epistaxis. Enrollment in the study is ongoing, and greater numbers are required to determine if the coblator is superior to the KTP laser in terms of surgical and patient outcomes.

Poster # P6
Complications in the Treatment of Juvenile Nasopharyngeal Angiofibroma with Intracranial Invasion

Maria Godoy, MD, Thiago Bezerra, MD, Fábio Pinna, PhD, Richard Voegels, PhD
Sao Paulo SP, Brazil

Introduction:

Juvenile nasopharyngeal angiofibroma is a rare benign tumor, characterized by local aggressiveness and high vascularity, with the potential risk of the skull base erosion and intracranial extension. Surgical excision is considered the main treatment for this tumor. The external approach has largely been replaced by endoscopic approach in small lesions and can be used as a complement in more advanced cases. The purpose of this study was to evaluate the complications of the surgical treatment of juvenile nasopharyngeal angiofibroma with intracranial invasion.

Methods:

Retrospective review was made in all patients with juvenile nasopharyngeal angiofibroma with intracranial extension class IIIA of Radkowski who were treated with endoscopic, endoscopic-assisted and external surgery from January 1996 to May 2010. Greater attention was given to intraoperative and postoperative complications, recrudescence rate and technical difficulties.

Results:

Thirteen patients presenting with juvenile nasopharyngeal angiofibroma with intracranial extension (grade IIIA Radkowski) underwent surgery. Endoscopic surgery was performed in three of them without postoperative complications, the endoscopic-assisted surgery was performed in other three ones, with the occurrence of complications in two patients and external surgery was performed in other seven patients.

Conclusion:

Surgical treatment of juvenile nasopharyngeal angiofibroma with intracranial invasion is a major challenge to the otolaryngologist. In this regard, endoscopic surgery can be safely performed even in cases of advanced tumors.

Poster # P7**Confirmation of Transnasal Balloon Device Placement within the Maxillary Sinus Ostium in a Cadaveric Model***David Brodner, MD**Boynton Beach, FL, USA***Background:**

As balloon treatment of maxillary sinus disease evolves into an office procedure, transnasal techniques to access sinus ostia without tissue removal are emerging. Lacking direct visualization, obstructive nasal anatomy or accessory ostia may impede treatment of the maxillary ostium and illuminated guidewires alone cannot ensure cannulation of the primary ostium. Misdirected dilation of an accessory ostium or violation of the posterior fontanelle may result in abnormal drainage, worsening disease through recirculation. This cadaver study records placement success of a malleable-tipped balloon device into the primary maxillary sinus ostium under endoscopic visualization, using tactile localization without dissection.

Methods:

Pre-study CT scans characterized the sinonasal anatomy of ten human cadaveric specimens. Endoscopes placed via transantral puncture within twenty maxillary sinus antrums allowed direct assessment of transnasal balloon device placement into primary ostium. The physician was blinded to all transantral images. After bending the balloon device 135 degrees, the tip was positioned into the maxillary ostium without sinonasal tissue dissection using tactile feedback under transnasal endoscopic visualization. Placement success or failure within the targeted anatomy was recorded.

Results:

No nasal anatomic anomalies were observed on CT scan. The tip of the balloon device was placed into the primary maxillary ostium in 20 out of 20 (100%) attempts. There were no tip placements within accessory ostia or violations of the posterior fontanelle.

Conclusion:

These results indicate a malleable-tip balloon device can be accurately and consistently placed into the primary maxillary sinus ostium transnasally without dissection.

Poster # P8
Cost of Allergy Immunotherapy- Sublingual versus
Subcutaneous Administration

Kristin Seiberling, MD, Jared Hiebert MD
Loma Linda, USA

Introduction:

Allergy immunotherapy is an effective way to manage the allergic patient and may be administered either through the subcutaneous route (SCIT) or the sublingual route (SLIT). Both have been proven efficacious, however, SLIT is currently not covered by insurance companies and is considered an out of pocket expense. The goal of the current study is to compare the overall cost of SCIT to SLIT.

Methods:

A total of 9 different insurance groups were studied including 8 PPOs and Medicare. Costs were broken down according to the percentage of coverage for the injections and serum vials, weekly co-pays and deductible. Total yearly cost for SCIT was calculated for the varying insurance plans and compared to SLIT.

Results:

PPO plans cover between 60-100% of allergy immunotherapy treatment with weekly co-pays between 0-50 dollars. Deductibles range between 0 and \$7,000. The average yearly cost with and without deductible is \$484.00 (range 0-2,600) and \$1,075 (range 0-7,000) respectively for one serum vial (up to 13 antigens). Medicare has a flat rate of 80% coverage costing the insurer \$404.00 a year. None of the above costs include loss of work productivity and travel expenses. The cost of SLIT ranges from \$2,500 (10 allergens) to \$4,500 (30 allergens).

Discussion:

The cost of SCIT varies dramatically according to insurance plan (percentage of coverage and weekly co-pay) and individual deductibles. When loss of productivity and travel expense is added into the cost of SCIT, SLIT might be comparable in expense and more convenient for the patient.

Poster # P9**Diffuse Large B-Cell Lymphoma Masquerading as Pott's Puffy Tumor**

*Josh Meier, MD, Peter Sadow, MDPH, Eric Holbrook, MD
Boston, MA USA*

Introduction:

The frontal sinus is a rare location for lymphoma to arise. In Western countries, Non-Hodgkin's lymphoma (NHL) of the paranasal sinuses accounts for 2% of all NHL. Hatta et al in 2007 described a case series of 53 NHL of the paranasal sinuses; only 1.9% arose in the frontal sinus. We describe a case of diffuse large B-cell lymphoma (DLBCL) that was initially treated as Pott's puffy tumor. Methods: We performed a retrospective case review, and a review of the literature for frontal sinus lymphoma.

Results:

This 50 year old gentleman was referred to our institution for evaluation of chronic forehead swelling. He had previously undergone external drainage of his right frontal sinus with endoscopic sinus surgery (ESS) 14 months prior. Cultures grew actinomycosis, which was treated with long-term IV antibiotics, which resolved the swelling. The mass recurred two months prior to presentation. He underwent ESS; pathology showed chronic rhinosinusitis. He represented four months later. A CT scan at that time showed extracranial phlegmon with epidural extension. A biopsy was performed of the forehead mass. He was diagnosed with stage IVB DLBCL. He underwent 6 cycles of RCHOP-M with radiation.

Conclusions:

Frontal sinus lymphoma is a rare entity, with mostly single case reports present in the literature. We present a case that represents the diagnostic difficulty associated with this disease. This patient underwent multiple courses of antibiotics and two surgeries prior to the diagnosis of DLBCL. Otolaryngologists must consider lymphoma for sinus disease refractive to standard therapy.

Poster # P10**Effect of LD Placement on Recurrence of CSF Rhinorrhea after Endoscopic Repair**

*Nadieska Caballero, MD, Kevin Welch, MD, James Stankiewicz, MD, Vidur Bhalla, MS
Maywood, IL USA*

Objectives:

To analyze the relationship between lumbar drain (LD) placement and CSF leak recurrence after endoscopic repair.

Study Design:

Retrospective case series.

Methods:

Patients who underwent CSF leak repair by the Department of Otolaryngology from 1999-2010 were identified. Data collected included demographics, BMI, history of OSA or BIH, associated meningoencephalocele, etiology and site of leak, LD placement, fluorescein and antibiotic use, recurrence, and site of recurrence. Correlation between LD placement and leak recurrence was analyzed.

Results:

105 patients underwent CSF leak repair. 68 patients had a LD. 17/64 (26%) had a recurrent leak. There was no follow-up on 4 patients. 37 patients did not have a LD, and 5/37 (14%) recurred. Recurrence rates with and without LD were not significantly different ($p = 0.13$). 39/105 (37%) had a spontaneous leak, 15 (14%) had a traumatic leak and 50 (48%) had an iatrogenic leak. The etiology was unknown in one patient. In the spontaneous group, 26/39 patients had a LD and 10/39 did not. Recurrence was not significant between these subgroups ($p = 1.0$). LD was used in 10/15 patients with traumatic leaks. 4/15 did not have a drain. Recurrence was not significant between these subgroups ($p = 1.0$). In 27/50 patients with an iatrogenic leak a LD was placed. 23/50 did not have a LD. There was no statistical significance when the recurrence rates for these subgroups were compared ($p = 0.15$).

Conclusion:

In our analysis, LD placement did not appear to affect recurrence after endoscopic repair of CSF rhinorrhea.

Poster # P11**Effectiveness of the Hydrodebrider Apparatus Used at the Time of Endoscopic Sinus Surgery for Chronic Rhinosinusitis on Early Postoperative Outcomes**

*Martin Desrosiers, MD, Leandra Mfunu Endam, MD, Scot Dowd, MD, Michael Surette, MD
Montreal, QC, Canada*

Introduction:

Surface colonization of the sinus mucosa with bacteria plays an important role in chronic rhinosinusitis (CRS), thus bacterial clearance may have a role in management. We wished to determine whether pulsatile pressure irrigation after endoscopic sinus surgery (ESS) was more effective in resolving disease than irrigation with saline.

Methods:

13 adult subjects undergoing first-time ESS for CRS were recruited. At completion of ESS, irrigation of the operated sinuses was performed using 1) a 60 second treatment of involved sinuses using the MedtronicXomed Novus™ hydrodebrider apparatus or 2) 20 mL of 0.9% saline administered via J-suction. Biopsy samples were obtained before and after treatment, and processed using qPCR and sequencing of the 16S ribosomal RNA gene to assess bacterial load and bacterial diversity. Endoscopic aspect of the sinus mucosa was assessed using the Perioperative Sinus Endoscopy (POSE) scoring system 2.5 and 5 weeks after ESS.

Results:

At 2.5 and 5 weeks, POSE score was similar for treated and untreated sides. However, at 2.5 weeks, mucosal edema was significantly lesser (Hydrodebrider: 0.36 ; irrigation: 0.64 ; $p=0.040$) and a trend to lesser polypoid change seen (Hydrodebrider: 0.07 ; irrigation: 0.29 ; $p=0.082$). While no difference in total bacterial load with treatment was seen, greater presence of the Acetobacteraceae family was noted in the irrigation-only side.

Conclusions:

Hydrodebrider therapy after ESS is associated with enhanced mucosal aspect in the early post-operative period. Differences in microbial ecology between hydrodebrider and irrigation treated sides suggest a differential effect on the layers of the sinus microbiome.

Poster # P12

Endoscopic Endonasal Transclival Approach to the Basilar Artery: An Anatomic Study with Clinical Case Correlates

*Brian Thorp, MD, Kibwei Mckinney, MD, Anand Germanwala, MD, Adam Zanation, MD
Chapel Hill, NC USA*

Introduction:

Endoscopic endonasal approaches have revolutionized skull base surgery. Contemporary approaches to the dorsum sellae, clivus, and adjacent structures are evolving; however, descriptive studies of these anatomically-rich sites via the endoscopic endonasal approach are lacking. This study describes key vascular anatomical features and relationships integral to understanding the intradural transclival approach from the endonasal endoscopic perspective.

Methods:

Endoscopic endonasal transclival approaches were performed in 12 latex-injected adult human cadaveric specimens. Using rigid endoscopes and calibrated endoscopic instruments, measurements were collected describing the vertebrobasilar junction, basilar artery, basilar apex/bifurcation, circle of Willis, and proximity to surrounding osseous and neurovascular structures. Results: The endoscopic endonasal approach provided exceptional access allowing basilar artery visualization from the vertebrobasilar junction to basilar apex, a segment averaging 26.6 mm. With pituitary gland mobilization, the posterior cerebral artery P1 segment was visualized in all specimens while the posterior communicating and P2 segments were visualized in 9 of 12 specimens. Lower clival dissection and access to the vertebrobasilar junction was achieved in all specimens with the abducens nerves noted in 10 of 12 dissections. Importantly, this structure originated an average of 1.9 and 3.4 mm above the vertebrobasilar junction on the right and left respectively, following a 20° to 40° course superolaterally, as measured from the vertical midline. Clinical cases illustrating the importance of these structures are demonstrated.

Conclusions:

Understanding the vertebrobasilar and basilar/PCA arterial system are of utmost importance during transclival intradural surgery. This study illustrates the variability in these structures and key relationship between the abducens nerve and basilar artery.

Poster # P13**Endoscopic Resection of a Nasal Pyogenic Granuloma with a Harmonic Scalpel**

*Jonathan Lee, MD, Kelly Malloy, MD, Jason Newman, MD
Philadelphia, PA USA*

Background:

Pyogenic granuloma, or lobular capillary hemangioma, is a benign lesion that occurs in the skin and mucous membranes. Although the etiology is unknown, it has been associated with pregnancy and oral contraceptives, and appears to be related to levels of estrogen and progesterone.

Case:

A 24-year-old female presented with a 6 week history of progressive growth of a right nasal lesion, first noticed 2 weeks before the delivery of her third child. She denied any history of trauma. The lesion had caused progressive nasal obstruction, leading to complete right sided nasal obstruction, purulent rhinorrhea, and right cheek pressure. She also reported frequent episodes of epistaxis that would eventually respond to pressure. On exam, the patient had a large purple, soft, mobile, non-tender, and friable mass filling the entire anterior portion of her right nasal cavity. MRI demonstrated a 2.7 X 3.2 X 2.2 cm exophytic mass filling the right nasal cavity, with imaging features consistent with a hemangioma. The patient was taken to the operating room for endoscopic excision of the lesion and the tumor was noted to be connected to the inferior turbinate by a vascular pedicle. A Harmonic Scalpel was used to carefully dissect and remove the lesion in its entirety, resulting in minimal blood loss. Histopathologic evaluation demonstrated lobular capillary hemangioma with focal surface ulceration.

Conclusion:

Pyogenic granuloma is a common lesion of the skin and mucous membranes, particularly in the setting of pregnancy. Symptoms of intranasal pyogenic granuloma most often include obstruction, intranasal tumor, and epistaxis. Although pyogenic granuloma may remit spontaneously 1 to 2 months post partum, persistent lesions or tumors that bleed excessively should be managed with endoscopic excision. A Harmonic Scalpel may be used to minimize intraoperative blood loss.

Poster # P14**Endoscopic Resection of an Anterior Ethmoid Schwannoma**

*Stewart Adam, MD, Eugenia Vining, MD
New Haven, CT, USA*

Introduction:

Sinonasal schwannomas represent less than 4% of all head and neck schwannomas. These neural sheath tumors arise from the ophthalmic and maxillary divisions of the trigeminal nerve, as well as autonomic nerves from sympathetic fibers of the carotid plexus and parasympathetic fibers of the sphenopalatine ganglion. Patients commonly present with nonspecific symptoms such as nasal obstruction, epistaxis, and anosmia. Nasal endoscopy usually reveals a unilateral polypoid mass. Diagnostic imaging with CT and MR is typically nonspecific. Diagnosis may be delayed due to the masquerade of common sinonasal conditions, such as allergic rhinitis and chronic rhinosinusitis.

Methods:

We report a case involving a 51 year old male with an anterior ethmoid nerve schwannoma that was excised endoscopically. Clinical features, imaging characteristics, histopathology, and treatment of sinonasal schwannomas are discussed.

Results:

We present successful management of an anterior ethmoid nerve schwannoma with endoscopic resection and good patient outcome.

Conclusions:

Given the advances in functional endoscopic sinus surgery, we advocate the use of endonasal endoscopic resection of anterior ethmoidal sinonasal schwannoma as a safe, effective, and curative approach.

Poster # P15**Endoscopic Transnasal Resection of Skull Base Meningiomas**

*Yuresh Naidoo, MD, Vikram Padhnye, MD, Peter John Wormald, MD
Adelaide, Australia*

Background:

Anterior cranial fossa meningiomas are difficult to surgically manage. The traditional transcranial approach necessitates brain retraction to access tumours of the skull base. Endoscopic transnasal surgical resection of these tumours have been utilised as a minimally invasive route to the anterior skull base. Brain retraction is avoided and the manipulation of large vessels and neurological structures is reduced. This approach has been directly shown to hasten post-operative recovery and improve patient compliance. The purpose of this study is to evaluate the management of skull base meningiomas surgically resected via an endoscopic transnasal approach by the South Australian Endoscopic Skull Base Unit in South Australia since 2004. The safety and efficacy of the procedure, the role of a team approach, and areas for further refinement and improvement are analysed.

Methods:

Retrospective case series of 16 consecutive patients who underwent endoscopic transnasal resection of anterior skull base meningiomas in South Australia between 2004 -2010. Preoperative symptoms, tumour size, tumour location, intra-operative time, intraoperative complications, defect closure techniques, post-operative complications and length of hospital stay were assessed and compared.

Results:

3/16 (19%) cases had a postoperative complication. Two cases (12.5%) developed CSF leaks postoperatively, one of which required returned to theatre to repair an ongoing leak. One case returned to theatre for evacuation of haematoma. There were no other complications. Conclusion Anterior cranial fossa meningiomas can be safely removed endonasally, and offer significant advantages over the traditional transcranial approach.

Poster # P16**Endoscopic Transtemporal Gillies Approach for Superoposterior Infratemporal Fossa Access: A Cadaveric Feasibility Study**

*Mark Friedel, MD, Senja Tomovic, MD, James Liu, MD,
J. Anderson Eloy, MD
Newark, NJ USA*

Background:

Few clinical studies exist regarding the use of an endoscopic transtemporal Gillies approach for superoposterior infratemporal fossa (ITF) access. In this cadaveric study, we photodocument the surgical technique for achieving this access and investigate visualization and surgical maneuverability allowed through this route.

Methods:

Cadaveric dissection with photo and video documentation was used to perform the surgical steps to provide access to the superoposterior ITF. Visualization and ease of surgical manipulation were assessed.

Results:

Using 4 cadaver heads (8 sides), the surgical technique and steps required to perform an endoscopic transtemporal Gillies approach were clearly demonstrated. The endoscopic transtemporal Gillies approach provided adequate access and visualization to the superoposterior ITF in all anatomic specimens. However, surgical maneuverability was significantly restricted.

Conclusions:

The endoscopic transtemporal Gillies approach can be used to access the superoposterior ITF with adequate visualization. Nonetheless, surgical maneuverability is significantly limited through this route. We suggest using this approach in combination with other endoscopic approaches to this region in order to achieve adequate surgical freedom.

Poster # P17**FESS Impact on Quality of Life of CRS Patients in Brazil**

*Thiago Bezerra, MD, Fabio Pinna, PhD, Marco Fornazieri, MD,
Richard Voegels, PhD
Sao Paulo, SP, Brazil*

Introduction:

Chronic rhinosinusitis is a disease of undefined etiology that significantly impacts the quality of life of patients. The endoscopic sinus surgery has been demonstrated as an effective treatment in improving the quality of life in other countries, although there are no national studies.

Aim:

Assess the impact of endoscopic sinus surgery on quality of life of patients with chronic rhinosinusitis.

Design:

Prospective study

Methods:

Patients undergoing endoscopic sinusectomy after failed drug therapy were evaluated for quality of life disease-specific questionnaire SNOT-20p before and 12 months after surgery. We evaluated the improvement in total score and the five items considered most important for each patient. We also evaluated the correlation between scores on the preoperative and postoperative improvement, and whether there were differences between the improvements according to sex.

Results:

We included 43 patients in the study aged 44 (19), md (IQR) and 60.5% (26/43) were male. The patients showed a statistically significant improvement in SNOT-20 and SNOT-20 (5 +), and a correlation between the preoperative score and improvement in scores ($p < 0.001$). There was no difference between improved quality of life score according to sex.

Conclusion:

Endoscopic sinus surgery in patients with chronic rhinosinusitis improves disease-specific quality of life.

Poster # P18**Giant Cell Bone Lesions in the Craniofacial Region: A Diagnostic and Therapeutic Challenge**

*Fábio Pinna, MD, Ana Bezerra, MD, Bruno Borges, MD,
Richard Voegels, MD
São Paulo, Brazil*

Introduction:

Giant cell tumors of bone are common in the long bones, but rare in the craniofacial region, with only 1% of cases occurring in the latter. Clinical, radiological, and anatomical diagnosis of this locally aggressive disease, which occurs in response to trauma or neoplastic transformation, poses a major challenge in clinical practice.

Methods:

The present study describes a series of four cases and highlights the main features of the differential diagnosis of these lesions: giant cell tumor of bone (GCT), giant cell reparative granuloma (GCRG), and the brown tumor of hyperparathyroidism.

Results:

GCT presents as a benign neoplasm, most typically affecting the knees, and rarely in the temporal and sphenoid bones. It is radiologically indistinguishable from GCRG due to its lytic, poorly defined appearance. The distinction can only be made microscopically, as the presence of multinucleated giant cells scattered throughout the stroma and the absence of a history of trauma favor a diagnosis of GCT. The brown tumor of hyperparathyroidism occurs with rapid, localized osteoclast activity secondary to the effects of increased PTH levels; parathyroid examination is indispensable.

Conclusion:

The diagnosis and treatment of these lesions poses a major challenge due to their similar clinical presentation and radiological appearance. Accurate diagnosis is essential for definition of appropriate management, as complete resection is the goal in GCT and GCRG to avoid recurrence, whereas the brown tumor often yields to treatment of the underlying hyperparathyroidism.

Poster # P19**Giant Pneumatized (concha bullosa) Superior Turbinate Causing Unilateral Facial Pain**

*Jeremy Hornibrook, FRACS, Robert Taylor, MD
Christchurch, New Zealand*

Objective:

So-called “contact points” in the nose as a cause of facial pain and headache has always been controversial, and usually based on the middle turbinate. Extreme pneumatization of the superior turbinate has only recently been recognized. It was decided to investigate whether removing contact between a giant pneumatized superior turbinate and the nasal septum could relieve long-standing unilateral facial pain.

Methods:

A 53 year old woman presented complaining of unilateral right facial pain for six years. Each month for a week she experienced a pain which started in the nose and radiated to the cheek and forehead. It often woke her. She had been prescribed numerous analgesics, including intramuscular pethidine. The diagnosis had been migraine. A CT scan of sinuses showed a right giant pneumatized (concha bullosa) superior turbinate indenting the nasal septum. On the likelihood that this was the cause and endoscopic approach to removed the contact was offered and accepted. Under general anaesthesia, with a 0 degree video-telescope guidance, the medial half of the right superior turbinate was excised with a sickle knife.

Results:

At six weeks follow-up she reported no pain, and there has been no recurrence after four years and no hyposmia.

Conclusions:

Large studies reviewing CT scans do not prove that “contact points” cannot cause unilateral facial pain in some patients, and this cause should be in the differential diagnosis. This is a rare case of a giant superior turbinate causing facial pain, misdiagnosed as migraine, treated endoscopically with permanent relief.

Poster # P20
Improvement in Nasal Valve Function with Non-Surgical Structural Augmentation

Mohsen Naraghi, MD, Alain Sontou, MD
Iran

Purpose:

The nasal valve is the narrowest area of the nasal airway which is located between the caudal portion of the upper lateral cartilage and the nasal septum; this area has the greatest airflow resistance. Thus when it is compromised or collapsed, it can lead to severe airway obstruction. Small changes in this area can result in significant difference in nasal airflow. A number of surgical approaches are available to overcome nasal valve collapse, most of which are based on using various grafts. However, simple but delicate non-surgical techniques with the use of fillers could also improve the nasal valve function. The aim of this study was to determine the efficacy of non-surgical structural augmentation for internal and external nasal valve reconstruction.

Method:

In this prospective study, we present our experience in 14 patients with the complaint of nasal obstruction due to internal and/or external valve problems. All underwent correction of the anatomic structural defect of nasal valve area by meticulous injections of hyaluronic acid in the areas requiring functional grafts in an office based setting. Questionnaires were provided to patients in order to assess the improvement of symptoms subjectively. Acoustic rhinometry was performed on all patients before and after surgery.

Result:

Based on the subjective and objective evaluation, all patients with nasal valve dysfunction reported improvement in their breathing after intervention with a minimum of 3 months of follow-up. 11 patients were revision rhinoplasty who reported improvement in their nasal breathing and cosmetic appearance.

Conclusion:

Obstruction of the nasal valve which is considered the narrowest area of the nose could be corrected with non-surgical injection of fillers simulating structural grafts which improves the nasal valve function.

Poster # P21**Intranasal Drug Induced Fungal Rhinopharyngitis**

*Allen Seiden, MD, Angela Donaldson, MD, Jeffrey Houlton, MD,
Lee Zimmer, MD
Cincinnati, Ohio USA*

Introduction:

It has long been recognized that intranasal drug abuse can cause significant sinonasal pathology. However, the intranasal use of prescription and nonprescription drugs has surpassed the use of illicit drugs, and the pattern of presentation and required therapeutic intervention appears to be different. We report our experience with these patients, along with a successful treatment algorithm for this disease process.

Methods:

Retrospective chart review of 9 consecutive patients who presented with rhinopharyngitis and a history of intranasal opioid and/or acetaminophen abuse, from 2007-2010, at a tertiary referral center.

Results:

Nine patients were found to have abused intranasal hydrocodone/acetaminophen, oxycodone/acetaminophen, or acetaminophen and were diagnosed with rhinopharyngitis. Sinonasal pain and odynophagia were the most common chief complaints and 8/9 patients reported previous antibiotic failures. On endoscopy, all patients exhibited a thick, white exudative process involving the nasal septum and lateral nasal mucosa. Six of 9 exhibited large septal perforations. Seven of 9 exhibited white, exudative pharyngitis. Eight of 9 patients had identifiable fungal organisms on culture, including 5 with species of *Candida* and 3 with *Aspergillus*. Two patients grew *Staph aureus*. Five patients were compliant with follow up. All 5 showed significant improvement in symptoms and examination, following treatment with oral and topical antifungal therapy and nasal irrigations.

Conclusions:

Intranasal opioid and acetaminophen abuse is often associated with the development of fungal rhinopharyngitis. Recognizing that this process is primarily fungal in origin is paramount to successful treatment, as most patients respond well to antifungal therapy when compliant with treatment.

Poster # P22**Invasive Actinomycosis of Bilateral Facial Bones, A Case Report**

*Nopawan Vorasubin, MD, Arthur Wu, MD
Los Angeles, CA USA*

Introduction:

Invasive actinomycosis is a rare anaerobic bacterial infection typically caused by *actinomyces israelii*. While this anaerobic bacteria is part of normal flora in the oral cavity, respiratory and digestive tracts, it can give rise to pathologic infections most commonly reported in the oral cavity from a dental origin. We present a rare case of invasive actinomycosis of multiple bilateral facial bones. Methods: case presentation.

Results:

A 57 year-old-male, presented with 6 months history of right facial swelling, progressive loss of maxillary dentition and sinus congestion associated with fatigue and unintentional weight loss. His exam revealed irregular bony contour of the scalp, bilateral exposed maxillary bone and loose and missing maxillary teeth without discrete masses or lymphadenopathy. Nasal cavity revealed only mild crusting. CT sinuses showed extensive osseous erosion of multiple bilateral facial bones including maxillary, frontal, nasal and ethmoid bones, which demonstrated increased metabolic activity on PET and bonescan. The right maxilla was biopsied via Caldwell luc approach. The pathology returned as invasive actinomycosis. He is currently being treated with long-term intravenous penicillin.

Conclusions:

Actinomycosis, which has been classically taught to present as a chronically draining cutaneous sinus, can also present as extensive bony destruction. The diagnosis is usually reached only after histopathologic analysis of a biopsy specimen shows characteristic yellow sulfur granules and filamentous gram positive bacteria. The treatment involves debridement and long-term intravenous antibiotics best directed by the guidance of infectious disease specialists.

Poster # P23**Less Invasive Endonasal Approach for Total Removal of Antrochoanal Polyp**

*Yasuyuki Hinohira, MD, Toshiyuki Shimizu, MD, Go Takahashi, MD,
Harumi Suzaki, MD
Tokyo, Japan*

Objectives:

Antrochoanal polyp (ACP) which originates from the maxillary sinus is known as the disease frequently recurring. An extranasal approach is recommended in cases where total removal is difficult using conventional endonasal approaches. We propose a new less invasive endonasal approach to totally remove ACP. The surgical procedure is demonstrated, and the outcomes are presented.

Methods:

Endoscopic endonasal sinus surgery (ESS) was performed on 26 patients with ACP between 1999 and 2010. The new approach via the inferior turbinate to fully access the maxillary sinus interior was employed in 11 of the 26 patients, whose polyps originated from the anterior to lateral-posterior wall of the maxillary sinus. The trans-inferior turbinate approach was added to the conventional middle meatal antrostomy in these patients. Submucous resection of the inferior turbinate bone was performed, and then the maxillary sinus was opened via the base of the inferior turbinate. Removal of polyps was allowed through both the middle nasal meatus and the inferior turbinate. If necessary, inferior meatal antrostomy was added.

Results:

Any surgical complications were not encountered. Postoperative managements including endoscopic observation for whole the maxillary sinus interior were easy. Polyp recurrence was found in only one case, originating from the anterior wall, and was easily removed.

Conclusion:

Conventional ESS approaches are technically difficult to totally remove ACP originating from the anterior to lateral-posterior wall of the maxillary sinus. We conclude that our approach to the maxillary sinus is alternative to extranasal methods, and is less invasive.

Poster # P24**Locally Destructive Skull Base Lesion; IgG4-related Sclerosing Disease**

*Jeremiah Alt, MD, Graham Whitaker, MD, Mikhail Vaysberg, MD
Gainesville, FL, USA*

Introduction:

IgG4 sclerosing disease (IGSD) is a disease characterized histologically by extensive infiltration of IgG4-positive plasma cells and fibrosis. IGSD in the nasal septum and maxillary sinus was first described in 2009, followed by ethmoid sinus involvement a year later. To our knowledge this is the first report describing IGSD isolated within the sphenoid sinus causing skull base bony destruction. Methods: Retrospectively review the medical records and radiographic imaging in a patient with IGSD isolated to the sphenoid sinus. Compare the presentation and treatment to the literature pertaining to IGSD.

Results:

Imaging with CT and MRI demonstrated opacification of the sphenoid sinus with skull base erosion without intracranial extension. The patient underwent a right-sided sphenoidotomy with debridement and biopsy. Pathological evaluation showed a dense plasmacytic infiltrate with >150 IgG4+ cells/hpf, consistent with the diagnosis of IGSD. At her two-month postoperative visit she demonstrated disease recurrence in the sphenoid sinus with partial opacification of the sphenoid sinuses on CT imaging. She was subsequently started on a nasal corticosteroid which cleared her disease without surgical intervention.

Conclusion:

We report an unusual case of IGSD isolated to the sphenoid sinus. We posit that recognition of IGSD is important clinically as IGSD has been proven to be steroid-sensitive, thus potentially obviating the need for surgical management. This case study and literature review adds to the growing literature describing IGSD in the paranasal sinuses with preliminary data implicating local control with topical steroids.

Poster # P25**Lupus Pernio, a Midline Destructive Lesion with Potential for Long-term Sinonasal Complications**

*Roheen Raithatha, MD, Aaron Pearlman, MD
New York, NY, USA*

Introduction:

Midline destructive lesions (MDL) of the face may present with an array of symptoms including nasal discharge and dryness, epistaxis, nasal obstruction, and facial pain and swelling. This can progress to chronic rhinosinusitis refractory to medical treatment due to the underlying process distorting or destroying normal sinonasal anatomy. Lupus pernio, or cutaneous sarcoidosis of the face, is a chronic process that has the potential to cause secondary risks to the paranasal sinuses outside of those typically attributed to the original disease process, specifically mucocele formation.

Methods:

A case report and literature review.

Results:

We present a case of a 73-year-old male with a long standing history of lupus pernio admitted for overlying facial cellulitis. He had no ophthalmologic symptoms; however, he did complain of nasal crusting. His physical examination was significant for total collapse of his nasal dorsum and severe stenosis of his bilateral nasal vestibules. Nasal endoscopy showed total perforation of the nasal septum and absence of bilateral middle turbinates with significant crusting. Of note, CT of the sinuses showed a 1.8cm right anterior ethmoid mucocele with thinning of the lamina papyracea without evidence of bone dehiscence.

Conclusion:

MDL may cause a vast array of complications to the nose and paranasal sinuses with mucocele formation likely resulting from chronic fibrosis of the sinus ostia. There is a potential risk of complications secondary to mucocele formation such as cellulitis, mucopyocele or abscess due to poor wound healing characteristics in this population.

Poster # P26**Molecular Modulation of Upper Airway Ciliary Response to Sneezing**

*Ke-Qing Zhao, MD, Bei Chen, MD, Andrew Cowan, MDPHd,
Noam Cohen, MDPHd
Philadelphia, USA*

Introduction:

Patients with rhinopathology, such as allergic rhinitis and chronic rhinosinusitis, complain of frequent sneezing. To understand the effects of sneezing on the respiratory epithelium we developed an in vitro model which delivers a burst of air to sinonasal epithelial cultures. Our previous work has demonstrated that a "sneeze" can stimulate upper airway cilia beat frequency (CBF), however the signaling pathways responsible for this response is unknown. The goal of this study was to determine the molecular modulation of the ciliary response to sneezing.

Methods:

Compressed air was delivered to murine nasal epithelial air-liquid interface cultures (ALIs) following pharmacologic manipulation of purinergic signaling, calcium mobilization and protein kinase A (PKA) activation.

Results:

Purinergic signaling blockade with Apyrase, which hydrolyzes extracellular ATP, and Suramin, a purine receptor antagonist, blunted ciliary sneeze stimulation from 1.80 ± 0.18 , to 1.12 ± 0.04 ($p < 0.01$), and 1.62 ± 0.06 to 1.10 ± 0.03 ($p < 0.01$) respectively. Chelating extracellular Ca^{++} with EGTA, yielded a minute stimulation of 1.09 ± 0.04 , compared to the control group which yielded a stimulation of 1.67 ± 0.10 ($p < 0.01$). A similar result was evident following chelation of intracellular Ca^{++} with BAPTA-AM which yielded a maximal stimulation of 1.16 ± 0.04 compared to control maximal stimulation of 1.52 ± 0.11 ($p < 0.01$). Inhibition of PKA activity with H-89 also blunted the sneeze stimulation 1.19 ± 0.11 compared to 1.81 ± 0.14 for control ($p < 0.01$).

Conclusion:

Our previous findings demonstrated that sneezing increases upper airway CBF. The data presented in these studies demonstrate that multiple signaling cascades including ATP release, calcium flux and PKA activation are recruited in the sinonasal epithelial response to sneezing.

Poster # P27**Nasal Lobular Capillary Hemangioma: A Rare Cause of Epistaxis in Children**

*Jordan Virbalas, MD, John Bent, MD, Sanjay Parikh, MD
Bronx, NY USA*

Objective:

We report two new cases of pediatric lobular capillary hemangioma (LCH) of the nasal cavity. We review the current theories regarding the etiology, diagnosis, and treatment of nasal LCH.

Study Design: Retrospective chart review.

Cases:

We describe the cases of two adolescent females evaluated and treated at a tertiary care children's hospital. The patients presented with symptoms of recurrent epistaxis, nasal obstruction, and epiphora. Both patients were diagnosed after undergoing computed tomography imaging and biopsy of the intranasal mass. The tumors were endoscopically resected under image-guidance.

Discussion:

LCH is a benign vascular growth of the skin and mucous membranes commonly affecting the head and neck. Since it was first described in the 19th century, this entity has been variously known as "human botryomycosis" and "pyogenic granuloma." This shifting nomenclature reflects an evolving understanding of the underlying pathogenesis. We review the epidemiology and histology of LCH which suggests that the development of these lesions may involve a hyperactive inflammatory response augmented by endocrine factors. In our review of the literature, we discovered seven cases of nasal LCH reported in the pediatric population. We present a table summarizing these cases.

Conclusion:

Nasal LCH is a rare cause of an intranasal mass in children and is associated with unilateral epistaxis, nasal obstruction, epiphora, and purulent rhinorrhea. We advocate for image-guided endoscopic excision for the treatment of nasal LCH.

Poster # P28**Nasal Septal Pleomorphic Adenoma Presenting as Recurrent Epistaxis**

*Laura Shively, MD, Giridhar Venkatraman, MD
Lebanon, NH USA*

Background:

A 36 year old male with right septal pleomorphic adenoma is presented. He initially presented for a six month history of recurrent epistaxis. On examination he was found to have what appeared to be an inflamed inferior turbinate with prominent vessels which were cauterized and all non-steroidal anti-inflammatory medications were discontinued. His epistaxis resolved but he continued to have nasal congestion which was unresponsive to topical nasal steroids. He was re-examined and found to have a persistent nasal mass.

Methods:

Diagnosis was made with endoscopic biopsy in the operating room which revealed a septal pleomorphic adenoma which was occupying the entire anterior nasal cavity. Definitive treatment was performed with endoscopic resection of the anterior septum with septal flap elevation for reconstruction.

Results:

Clear margins were obtained and the specimen was removed en bloc. Additional margins were taken separately. The patient has been followed for six months with no postoperative complications or evidence of recurrence.

Conclusion:

Healthy patients with unilateral, recurrent epistaxis should prompt the examiner to consider further diagnostic workup including search for nasal and septal masses. Although uncommon, pleomorphic adenoma should be included in the differential diagnosis. We present a case of conservative management of this benign growth which can be treated appropriately with endoscopic resection.

Poster # P29**Nontraumatic Posterior Ischemic Optic Neuropathy (PION)
Following Uncomplicated Functional Endoscopic Sinus
Surgery**

*Roheen Raithatha, MD, Freddy Escoria, BA, Marc Dinkin, MD,
Ashutosh Kacker, MD
New York, NY USA*

Posterior ischemic optic neuropathy (PION) is an uncommon form of optic nerve ischemia that results from damage to the retrobulbar portion of the optic nerve. It has been reported perioperatively, in association with systemic vasculitis, and in the nonsurgical setting with no identifiable cause. The main risk factors for it are hypotension, intraoperative anemia, and systemic conditions such as hypertension, diabetes, or renal failure. We report PION development following uncomplicated functional endoscopic sinus surgery (FESS) in a patient with a history of cocaine abuse. A 46-year-old male with a history of cocaine abuse underwent uncomplicated bilateral FESS and awoke with immediate post-operative loss of vision in his left eye.

Examination initially showed a left afferent papillary defect and only light perception in his left eye. A CT scan showed an unremarkable orbit; however, an MRI showed diffusion weighted signal hyperintensity in the left optic nerve, suggestive of optic nerve ischemia. He was started on IV steroids and pentoxifylline with improvement of his central vision back to 20/20; however, over the course of months, he had persistent peripheral vision loss and evidence of thinning of his left retinal nerve fiber layer on examination. Although it is rare condition, it is important for otolaryngologists to recognize that PION may occur after uncomplicated sinus surgery and that immediate ophthalmologic consultation is needed.

Poster #P30**Olfactory Improvement with the Use of the Ball Tracheotomy Speaking Valve**

*Alan Shikani, MD, Keith Kuhlemeier, PhD
Baltimore, Maryland USA*

Objective:

To obtain a controlled (intra- and inter-subject) subjective and objective in vivo clinical comparison of the Passy-Muir, Shiley and Shikani ball speaking valves, with a focus on olfaction, acoustic and perceptual analyses.

Study Design:

Prospective clinical study.

Methods:

Ten patients free of laryngeal pathology but dependent on tracheotomy for respiration. Olfaction for each patient was assessed using the University of Pennsylvania Smell Identification Test. Oxygen saturation was also assessed. Acoustic and perceptual analyses included subjective assessments, non-instrumental objective assessments (including maximum phonation time, S: Z ratio) and instrumental objective assessments (including fundamental frequency: maximum phonation range, vocal intensity, perturbation, shimmer, jitter naturalness, turbulence and spectrogram).

Results:

There was a highly significant statistical difference in olfaction, in favor of the ball valve. The percent improvement in the ball valve, averaged over the nine above parametric measures, was 11.4% for the Shiley valve ($P < 0.003$, paired t-test) and 12.5% ($P < 0.003$, paired t-test) for the Passy-Muir valve. The ball valve proved to be superior (though not always significantly) to both the Passy-Muir and Shiley valves in six of the seven parameters measured (naturalness, maximum phonation, S:Z ratio, jitter, noise, turbulence). Both the Passy-Muir and Shiley valves were superior to the ball valve in acoustic intensity, but not significantly so. There were no differences among the valves in baseline arterial blood oxygen saturation levels.

Conclusions:

Collectively, these data illustrate that olfaction is significantly superior and speech quality is generally superior with the ball valve, as compared to both the Passy-Muir and Shiley valves.

Poster # P31**Ophthalmologic Complications as Unusual Presentations of Sinonasal Wegener's Granulomatosis**

*Philip Chen, MD, Spencer Payne, MD
Charlottesville, VA, USA*

Wegener's granulomatosis (WG) is a vasculitis that affects multiple parts of the body. Classically, tissues affected by WG form necrotizing granulomas and are usually found in the upper respiratory tract, lungs, and kidneys. The disease can also affect single organ systems, including manifestations in the head and neck. We report 2 unusual cases that manifested with ocular complaints due to disease in the paranasal sinuses and orbit.

Case 1: 52 y/o female with chronic sinusitis status post sinus surgery developed headaches, nasal congestion, and intermittent blurry vision and dry eye. Intraoperative exam showed necrotic lesion along the posteromedial roof of the maxillary sinus with biopsy showing WG.

Case 2: 49 y/o male with otalgia and eye pressure was treated with antibiotics for concern of sinusitis. Endoscopy was significant for crusting, ulceration, and a polypoid mass at the posterior septum. Biopsy demonstrated inflammation with focal granulomatous inflammation, consistent with WG. Ocular abnormalities are less common presenting complaints in WG, but cases have been reported. Often, these cases involve the globe with episcleritis, keratitis, retinal vasculitis, or even epiphora from nasal duct obstruction. It is rare that a sinonasal lesion will lead to ophthalmologic complaints. However, a majority of patients experience their first symptoms associated with WG with head and neck manifestations; thus, a high index of suspicion is required when no ocular pathology is identified. Cases such as these are important in demonstrating this fact.

Poster #P32

Oxidative Stress Induces *Pseudomonas aeruginosa* (PAO1) Biofilm Growth

*John Chi, MD, Marcelo Antunes, MD, Jennifer Kofonow, MS,
Noam Cohen, MD
Philadelphia, PA USA*

Introduction:

Chronic rhinosinusitis is an inflammatory disease of unknown etiology. Multiple factors have been implicated in the pathogenesis of the disease including mucosal bacterial biofilm formation. Tobacco exposure has also been suggested as a risk factor for the aggravation and prolongation of rhinosinusitis and other infections. Our previous work demonstrated that bacteria collected from smokers, when grown in the presence of exogenous tobacco smoke, yield more robust biofilms compared to bacteria collected from non-smokers, leading to the conclusion that tobacco smoke exposure induces biofilm formation. We now hypothesize that tobacco smoke mediated oxidative stress drives biofilm formation. Thus, we investigated the effect of oxidative stress in the form of hydrogen peroxide (H₂O₂) on biofilm formation using *Pseudomonas aeruginosa* (PAO-1)

Methods:

Pseudomonas aeruginosa (PAO-1) was exposed to varying concentrations of H₂O₂ solution (0.3%, 0.03%, 0.003%) at several different time intervals (0, 90, and 180 minutes). Biofilm mass was assessed after 24 hours of incubation using a standard plate-based biofilm assay.

Results:

PAO-1 given serial exposures to H₂O₂ demonstrated a dose and time dependent induction of biofilm formation compared to control conditions. At 0.3% all exposures yielded a statistically significant increase in biofilm formation compared to control, while at 0.03% multiple exposures were required to achieve a statistically significant increase in biofilm formation (p<0.05).

Conclusion:

Oxidative stress in the form of H₂O₂ induces biofilm growth in PAO-1. This may explain increased biofilm formation in microbes isolated from smokers. Furthermore, host defenses that utilize an oxidative burst may encourage microbial biofilm formation in-vivo.

Poster #P33**Paragesia Following Pine Nut Ingestion**

*Bruce Tan, MD, David Conley, MD, Marissa Vandermeeden, PA-C
Chicago, IL, USA*

Background:

Persistent paragesias, defined as a bad taste elicited by nutritional intake, resulting from toxic exposures in food are uncommon and generally rapidly reversible. Recently, there have been two isolated reports in the medical literature of a reversible paragesia following pine nut ingestion.

Objective:

To describe our experience with treating four patients presenting with paragesia, defined as a bad taste elicited by nutritional intake, following pine nut ingestion and review the medical and lay literature regarding this phenomenon.

Methods:

A retrospective review of the medical records of four patients presenting for a taste disturbances between January 2009 and December 2010. An additional questionnaire was sent to these patients to further elicit descriptions of their symptoms. Available medical literature and an internet-based search was also performed to further identify trends.

Results:

Four patients (3 Male, 1 Female; Ages 36-61) were identified based on medical histories. All four patients presented to our practice with a chief complaint of a bilateral taste disturbance starting between 10 hours and 2 days following their last pine nut ingestion. Based on medical history, olfactory dysfunction was excluded and all uniformly reported an exacerbation of symptoms with food ingestion. The form of pine nut ingestion was variable, affecting both cooked and raw pine nuts. The symptom descriptors used were "bitter", "salty" and "metallic". These symptoms lasted between 14 days and 3 months following pine nut ingestion.

Conclusion:

Paragesia following pine nut ingestion is widely reported in the lay press and on the internet but is under-recognized in the medical literature. It occurs hours to days following ingestion and can linger for several months. Pine nut ingestion should be considered in the differential diagnosis of taste disturbances.

Poster # P34

Pedicled Nasoseptal Flap for Reconstruction of Skull Base Defects: Incidence of Post-Operative Cerebrospinal Fluid Leak

*Arjuna Kuperan, MD, Sanaz Harirchian, MD, Jean Eloy, MD, James Liu, MD
Newark, NJ USA*

Introduction:

We conducted a retrospective study evaluating the incidence of postoperative cerebrospinal fluid (CSF) leaks in patients undergoing skull base repair with a pedicled nasoseptal flap (PNSF).

Methods:

A retrospective analysis was performed at our tertiary care medical center on patients who underwent skull base surgery with CSF leak repaired with a PNSF between December 2008, and March 2011. Repair materials, incidence of postoperative CSF leaks, and demographic data were collected.

Results:

Fifty-nine skull base defects and CSF leaks were repaired with a PNSF. One delayed leak occurred in a patient who had a PNSF repaired with tissue glue. No cerebrospinal fluid (CSF) diversion was used intra-operatively or postoperatively. Our overall postoperative CSF leak rate was 1.7%. Conclusions: The use of a PNSF for repair of skull base defect with CSF leaks is supported by our data. Meticulous surgical technique and proper positioning of the PNSF seem to obviate the need for CSF diversion which carries inherent risk of infection and drain removal complications. The overall leak rate of 1.7% highlights the reproducible efficacy and durability of the PNSF for closure of skull base defects with CSF leaks

Poster #P35
Posterior Nasal Neurectomy for Treatment of Allergic Rhinitis

*Takeo Kanaya, MD, Toru Kikawada, MD, Kenji Kawano, MD
Tokyo, JAPAN*

Objectives:

Severe nasal obstruction caused by allergic rhinitis refractory to medical therapy remains a challenge. Finding an appropriate and effective treatment for young children with sleep-disordered breathing has proven even more difficult. Radiofrequency of the inferior turbinate has been shown to be safe and effective in volumetric tissue reduction of the inferior turbinate. However, in our experience, this surgery seldom produces significant improvement of nasal obstruction, particularly in severe cases. This is a pilot report of our endoscopic posterior nasal neurectomy for the treatment of sleep-disordered breathing in children with nasal obstruction caused by allergic rhinitis.

Methods:

From April 2011 to June 2011, a total of 5 children under 8 years of age underwent posterior nasal neurectomy. The procedure was performed as outpatient surgery (with an overnight stay in 1 case) under general anesthesia. Submucosal radiofrequency ablation, tissue reduction of the inferior turbinate, middle turbinoplasty, and radiofrequency adenoidectomy were applied as necessary.

Results:

No adverse effects-including bleeding, crusting, infection, adhesion, and dry eye-were reported. Post-treatment discomfort was well-controlled with acetaminophen. Two weeks after treatment, all patients experienced complete recovery from sleep-disordered breathing, including obstructive sleep apnea.

Conclusion:

Posterior nasal neurectomy improves the symptoms of nasal obstruction and sleep-disordered breathing in children with allergic rhinitis.

Poster # P36**Posterior Nasal Neurectomy for Treatment of Allergic Rhinitis in Children with Sleep-disordered Breathing: A Pilot Study**

*Toru Kikawada, MD, Takeo Kanaya, MD, Kenji Kawano, MD
Tokyo, JAPAN*

Objectives:

Severe nasal obstruction caused by allergic rhinitis refractory to medical therapy remains a challenge. Finding an appropriate and effective treatment for young children with sleep-disordered breathing has proven even more difficult. Radiofrequency of the inferior turbinate has been shown to be safe and effective in volumetric tissue reduction of the inferior turbinate. However, in our experience, this surgery seldom produces significant improvement of nasal obstruction, particularly in severe cases. This is a pilot report of our endoscopic posterior nasal neurectomy for the treatment of sleep-disordered breathing in children with nasal obstruction caused by allergic rhinitis.

Methods:

From April 2011 to June 2011, a total of 5 children ages 4 to 8 underwent posterior nasal neurectomy. The procedure was performed as outpatient surgery (with an overnight stay in 1 case) under general anesthesia. Submucosal radiofrequency ablation, tissue reduction of the inferior turbinate, middle turbinoplasty, and radiofrequency adenoidectomy were applied as necessary.

Results:

No adverse effects-including bleeding, crusting, infection, adhesion, and dry eye-were reported. Post-treatment discomfort was well-controlled with acetaminophen. Two weeks after treatment, all patients experienced complete recovery from sleep-disordered breathing, including obstructive sleep apnea.

Conclusions:

Posterior nasal neurectomy improves the symptoms of nasal obstruction and sleep-disordered breathing in children with allergic rhinitis.

Poster # P37**Pre-Pontine Abscess: A Rare Complication of Bacterial Rhinosinusitis**

*Arjuna Kuperan, MD, Alejandro Vazquez, MD,
Teckchand Ramchand, MS, Jean Eoy, MD
Newark, NJ USA*

Background:

Intracranial complications of acute bacterial rhinosinusitis are relatively uncommon. Extension of suppurative disease into the pre-pontine cistern specifically is a rare and life-threatening event, with only two previous cases reported in the literature. We present an unusual case of a pre-pontine abscess complicating rhinosinusitis in a young immunocompetent patient.

Methods:

Case report and review of the literature.

Results:

A 22 year-old woman presented with headache, fever, nausea and vomiting, and right-sided sixth nerve palsy. Radiographic imaging with contrast-enhanced CT and Gadolinium enhanced MR revealed pansinusitis and a 1.5 cm pre-pontine collection. She was successfully treated with broad-spectrum intravenous antibiotics and endoscopic-endonasal-transclival image-guided drainage of the abscess. Culture of the abscess contents grew group F beta-hemolytic streptococcus. The patient showed remarkable improvement postoperatively, including complete resolution of her sixth nerve palsy.

Conclusion:

Pre-pontine abscess is an exceedingly rare complication of rhinosinusitis. However, this entity can be life-threatening and needs emergent medical and surgical intervention. In this report, we present a review of the literature on intracranial complications of acute bacterial rhinosinusitis, with a special emphasis on the diagnosis and management of pre-pontine abscesses.

Poster # P38**Prognostic Factors in Sinonasal Sarcomas: Analysis of the SEER Database**

*Arthur Wu, MD, Jeffrey Suh, MD, Ralph Metson, MD,
Marilene Wang, MD
Los Angeles, CA USA*

Introduction:

Sinonasal sarcomas are rare and often aggressive malignant tumors. Although tumor histology and location are the only prognostic indicators for this disease reported in the literature, additional clinical factors may influence patient survival.

Methods:

Cases of sinonasal sarcomas from 1973-2008 were extracted from the Surveillance, Epidemiology and End Result (SEER) database. The influence of patient age, gender, race, and prior irradiation, as well as tumor histology and subsite, was calculated by the Kaplan-Meier method.

Results:

A total of 352 patients with sinonasal sarcomas were identified. Histology, subsite, and age were found to influence patient survival. Specifically, increased age, frontal and maxillary sinus subsites, and rhabdomyosarcoma and Kaposi sarcoma histologies were associated with a significant increase in mortality rate.

Conclusion:

This study is the largest study of sinonasal sarcomas to date. The analysis of a large cohort of patients with sinonasal sarcomas demonstrates impact of patient age and tumor histology and location on the overall survival of individuals with these rare malignancies.

Poster # P39**Propionibacterium Acnes as a Sinus Pathogen**

*Kristen Boyle, MD, Whitney Cowman, MS, Lucy Karnell, PhD,
Erin O'Brien, MD*
USA

Introduction:

The severity and chronicity of sinus disease clearly affects pathology and microbiology of sinus disease. The role of anaerobic bacteria as pathogens in sinus disease has been emphasized in chronic sinusitis, however it's less clearly defined for other sinus diagnoses. Propionibacterium acnes has been described as anaerobic pathogen in acute exacerbations of chronic sinusitis, with other descriptions being contaminant or commensal organism.

Objectives:

A descriptive evaluation of a population of patients with positive P.acnes sinus cultures.

Methods:

A total of 107 P.acnes sinus cultures were identified in 92 patients over a 3-year period from January 2008 until December 2010. A retrospective chart review was undertaken and the following demographic and clinical variables were recorded: age, gender, smoking status, diagnoses at time of culture, other organisms cultured, imaging of sinuses, and history of sinus surgery. CT imaging of the sinuses within one year from date of positive culture was evaluated and scored using the Lund-Mackay scoring system.

Results:

Patients ranged from 14 to 80 years (mean 52). 51 were male and 41 were female. 12 patients had more than one culture positive for P.acnes. 82% were non-smokers. Lund-McKay scores were evenly distributed with an average score of 9.25. 12% of those with CT scan did not have evidence of sinusitis by CT. 49% subjects had documented chronic sinusitis, 33% had nasal polyposis, 11% had mucocele, 10% had acute sinusitis, 8% had orbital cellulitis. Coagulase negative staphylococci was the most common other microbe cultured, followed by MSSA, MRSA, and other anaerobes, in decreasing frequency.

Conclusion:

No studies have investigated P acnes' role in sinus disease. These findings illustrate patient characteristics associated with P.acnes sinus growth.

Poster # P40

Radiofrequency Coblation of Encephaloceles

*Kevin McLaughlin, MD
Mandeville, LA, USA*

Objective:

Compare the efficacy of radiofrequency coblation to bipolar cauterization in the endoscopic management of encephaloceles.

Study Design:

Outcomes study.

Methods:

63 patients with 72 encephaloceles underwent endoscopic resection. 52 were reduced with radiofrequency coblation and 20 were removed with bipolar cauterization. The main outcome measure was duration of encephalocele removal and bleeding. Age, gender, race, BMI, location of encephalocele, size of skull base defect, size of encephalocele, and complications were recorded.

Results:

Average duration of coblation removal was 14 minutes compared to 42 minutes with bipolar cautery. All other recorded data was similar between the two groups.

Conclusions:

Radiofrequency coblation effectively removes encephaloceles significantly faster than bipolar cauterization.

Poster # P41**Raeder's Syndrome: A Unique Presentation of Chronic Sinusitis**

*Cedric Pritchett, MD, Andrew Shuman, MD, Hilary Grabe, MD,
Mark Zacharek, MD
Ann Arbor, MI USA*

Introduction/Background:

Raeder's syndrome (paratrigeminal oculosympathetic syndrome) is a rare clinical entity consisting of ipsilateral ptosis and miosis, without anhidrosis, accompanied by pain in the trigeminal distribution. Originally described by Raeder in 1918, this constellation of physical exam findings has historically been associated with intracranial pathology involving the middle cranial fossa. The pathophysiology involves interruption of the postganglionic oculosympathetic neural pathway. We present an unusual case of Raeder's syndrome associated with bacterial sinusitis.

Study design:

Case report with review of medical literature.

Methods:

A 64 year-old female with a history of chronic bacterial sinusitis presented with a six week history of left-sided headache, orbital pain and ptosis. On physical exam, she demonstrated left ptosis and anisocoria with hypoesthesia along V2 in the absence of orbital cellulitis. Apraclonidine pupillary testing produced reversal of anisocoria. Imaging revealed opacification of the left maxillary and ethmoid sinuses without intraorbital, cervical or intracranial abnormalities.

Results:

Broad spectrum antibiotics, intravenous steroids and nasal irrigations were initiated, with improvement in her symptoms. She underwent left endoscopic maxillary antrostomy and anterior ethmoidectomy; purulent secretions were cultured and subsequently grew *Streptococcus milleri*. By postoperative day four, her hypoesthesia, pain and ptosis had completely resolved.

Conclusions:

Complications of chronic bacterial sinusitis may present uncharacteristically, requiring careful documentation of clinical findings both before and after treatment. A pathophysiologic understanding of head and neck anatomy provides insight into the variability in disease presentation.

Poster # P42**Residual Chloride Secretion in Freshly Excised Epithelia from Cystic fibrosis Patients**

*Do-Yeon Cho, MD, Peter Hwang, MD, Beate Illek, PHD,
Horst Fischer, PHD
Stanford, CA, USA*

Introduction:

The CFTR (cystic fibrosis transmembrane conductance regulator) chloride (Cl) channel participates in the control of the mucosal viscosity by regulating the extracellular Cl concentration and fluid balance in the ASL (air surface liquid) in support of airway clearance. We evaluated the CFTR function in CF (cystic fibrosis) patients with several genotypes by measuring cAMP-mediated Cl currents recorded in freshly excised sinonasal epithelia and compared these to non-CF patients.

Method:

A total of five CF patients (M:F = 2:3) with chronic rhinosinusitis (CRS) and eight non-CF patients with CRS were enrolled in the study. CFTR function was measured as cAMP-stimulated Cl secretion in freshly excised sinonasal tissues. Cl secretion was sequentially activated with L-ascorbic acid or forskolin (cAMP agonist).

Results:

All CF nasal tissues showed Cl secretion when stimulated. CF tissues with the stop codon mutations (R553X/N1303K), homozygous deltaF508, and G544S/deltaF508 expressed 110% (n = 1), 65.3% (n = 2), and 66.0% (n = 2), respectively, of non-CF responses (which were $25.9 \pm 4.7 \mu\text{A}/\text{cm}^2$). The Cl secretory response was effectively blocked by the Cl ion transport inhibitors (glibenclamide and bumetanide).

Conclusion:

We detected residual Cl secretion in stimulated, freshly excised CF sinonasal tissue, which may be carried by residual CFTR activity or a parallel, non-CFTR Cl conductance. The factors other than CFTR-mediated Cl secretion may seem to play a role in the pathogenesis of CF disease.

Poster # P43**Sinonasal Tumor with Two Distinct Histologies**

*Henry Barham, MD, Sherif Said, MD, Vijay Ramakrishnan, MD
Aurora, CO USA*

Introduction:

Sinonasal tumors comprise only 3% of all head and neck malignancies. Synchronous and metachronous tumors of the head and neck have been described, but rarely have there been reports of a single tumor with two distinct histologies.

Method:

Case report and literature review.

Results:

We present a case of paranasal sinus neoplasm involving two malignant cell types. An 83 year-old female presented with a several year history of symptoms consistent with chronic sinusitis, including nasal congestion and intermittent maxillary pressure. With symptom progression and the onset of epistaxis, she was found to have a unilateral mass in the maxillary and ethmoid regions, which was diagnosed as a squamous cell carcinoma on biopsy. She underwent complete resection of the lesion through an extended endoscopic approach. Final pathologic analysis demonstrated two distinct malignant histologies: moderately differentiated squamous cell carcinoma and small blue neuroendocrine carcinoma. Review of the English language literature showed few cases of head and neck malignancy with two distinct histologies with only three cases located in the paranasal sinuses. Recommendations for adjuvant therapy and etiologic theories are presented.

Conclusion:

Appropriate diagnosis and treatment of head and neck malignancy depends on tumor histology and staging. We present a case of a sinonasal tumor with two distinct tumor histologies and review the literature. We discuss the challenges in planning the optimal approach to management in this scenario.

Poster # P44**Symptom Scores Equally Improved after Treatment with a Novel Device Delivering Fluticasone Propionate in Patients with Chronic Rhinosinusitis with Nasal Polyps Irrespective of Prior Surgery**

*Per Djupesland, MD, PhD, Ramy Mahmoud, MD, MPH,
John Messina, PharmD
Yardley, PA USA*

Introduction:

We recently reported that previous sinus surgery did not influence the reduction in polyp size in patients with CRSwNP after treatment with a novel device delivering fluticasone (OptiNose Fluticasone Propionate - OptFP). Opt-FP uniquely utilizes bi-directional nasal delivery to deliver medication to the middle meatus.

Methods:

109 patients were randomized to 12 weeks with OptFP vs placebo. A post-hoc comparison of daily mean morning and evening combined symptom scores at 4, 8 and 12 weeks is reported for subgroups of all patients with and without prior nasal/sinus surgery and by treatment group.

Results:

No statistically significant difference in the mean baseline combined symptom scores for all patients (no surgery/surgery= $3.4\pm 0.4/4.2\pm 0.3$) or by surgical status for treatment subgroups (no prior surgery - OptFP/Placebo= $3.5\pm 0.5/3.6\pm 0.5$, prior surgery OptFP/Placebo = $4.6\pm 0.4/3.9\pm 0.5$). The change in mean symptom scores for OptFP (n=31) and Placebo (n=40) in those with prior surgery was significant at 4, 8 and 12 weeks (OptFP/Placebo = $-1.2\pm 0.4/+0.6\pm 0.2$ at 12 weeks; $p<0.0001$). A much smaller numbers of patients without prior surgery (OptFP/Placebo; n=23/14) showed a similar trend (OptFP/Placebo = $-1.0\pm 0.3/+0.2\pm 0.6$; $p=0.1$). Directionally, placebo patients with prior surgery may worsen more than placebo patients without prior surgery.

Conclusions:

A significant reduction in symptoms was observed at 4, 8 and 12 weeks in post-surgical patients, and a similar trend in patients without prior surgery. Post-hoc analysis suggests OptFP reduces polyp size and improves subjective symptoms in CRSwNP with and without prior surgery.

Poster # P45**The Bacterial and Fungal Burden in Chronic Rhinosinusitis: Molecular Detection, Biofilm, and Conventional Culture.**

*Sam Boase, MD, Lor Wai Tan, MD, Peter-John Wormald, MD, Andrew Foreman, MD
Woodville South, Adelaide, Australia*

Introduction:

The interplay between bacteria and fungi in chronic rhinosinusitis (CRS) is still debated. Progress has been impeded by difficulties identifying mucosal organisms due to variable culture rates using conventional methods, non culturable biofilm phenotypes, and variable fungal viability using conventional culture. We have analysed 38 CRS patients and 6 control patients using conventional bacterial and fungal culture, biofilm detection, and molecular detection using the state of the art Ibis T1000 biosensor.

Methods:

44 consecutive patients were enrolled, comprising 25 CRS with polyps (CRSwNP), 13 CRS without polyps (CRSSNP) and 6 control patients. All samples were analyzed using conventional culture for fungus and bacteria, fluorescence in situ hybridization for fungi and *S. aureus*, and tissue analyzed on the Ibis T1000 biosensor.

Results:

Staphylococcus aureus was the most commonly detected organism in CRS patients with all analysis types, followed by the anaerobic organism *Propionibacterium acnes*. The biosensor was able to detect *S. aureus* in biofilm positive patients with a sensitivity of 82%, specificity of 77%. Fungi were detected in 4 CRS patients only. 3 of these had concomitant *S. aureus*.

Conclusion:

The use of rapid, high throughput instruments such as the Ibis biosensor have sensitivity for the clinical detection of biofilms in CRS patients in non-research units without access to confocal microscopy. It can detect slow growing, anaerobic organisms which can be missed by conventional culture. Anaerobes were commonly found in CRS patients and may play a pathogenic role, which merits further investigation. Fungi may play a role in a select group of patients and may have a synergistic relationship with *S. aureus*.

Poster # P46**The Gold Laser in Management of Concha Bullosa: First Description of a Novel Technique**

*Ryan Winters, MD, N Worley, MD
New Orleans, LA USA*

Introduction:

Concha bullosa is the most common anatomic abnormality of the lateral nasal wall, and inflammation or infection of the concha bullosa can result in headaches and nasal obstruction. Endoscopic sinus surgery is the treatment of choice for refractory or recurrent symptoms despite medical management, and can present a challenge to the otolaryngologist due to the vascularity of the concha bullosa, as well as the potential for scarring postoperatively, which may lead to nasal stenosis. Presented here is a safe, novel technique for surgical management of the concha bullosa.

Methods:

The Gold Laser (Medical Energy, Pensacola, FL) is a 980nm laser containing gallium, indium and gold. The delivery system incorporates a suction handpiece with the laser fiber, allowing simultaneous cutting/coagulation and smoke/blood evacuation. The chisel-tip of the fiber allows cutting and ablation of soft tissue and thin bone in contact mode, and coagulation of bleeding tissue in noncontact mode.

Results:

Long-term follow-up data on 33 patients treated with the Gold Laser are presented. All patients reported improved symptoms postoperatively, with decreased nasal obstruction and headaches, and fewer episodes of sinusitis. There were no postoperative complications such as scarring or significant bleeding.

Conclusions:

The Gold Laser is a safe, facile means to treat concha bullosa. The excellent hemostasis afforded allows for better visualization and safer surgery, and the symptomatic improvements are maintained for years postoperatively.

Poster # P47**The Pattern and Extent of Sphenoid Sinus Pneumatization May Influence Location of the Sphenoid Ostium**

*April Landry, MD, Joseph Hoxworth, MD, Devyani Lal, MD
Phoenix, Arizona USA*

Objectives:

Study influence of different patterns of sphenoid pneumatization on sphenoid ostium location.

Background:

Understanding sphenoid anatomy is key in endoscopic sinonasal and skull-base surgery. Sphenoid pneumatization can extend laterally beyond the body and inferiorly into the clivus. The influence of such pneumatization patterns on sphenoid ostium location has not been studied.

Study Design: Radio-anatomic study.

Methods:

High resolution normal sinus CT scans of 50 patients were studied. Standardized measurements of lateral and clival pneumatization were conducted in 100 sphenoid sinuses. Pneumatization lateral to the vidian-rotundum line was measured. Sphenoid height was measured from the planum to the floor and clival pneumatization from the planum to the most inferior clival extension. Measurements for sphenoid ostium included: rostrum to medial aspect of ostium, planum to inferior border of ostium and superior border of choana to inferior aspect of ostium.

Results:

Clival pneumatization was present in 41% of sinuses and was associated with a lower location of the ostium (choana to ostium distance 12.55 mm vs. 14.42 mm; $p=0.006$). Sphenoid sinus height ($r=0.39$), as well extent of pneumatization into the clivus ($r=0.48$) also had weakly positive correlation in rostro-caudal location. Lateral pneumatization past the vidian-rotundum line was present in 57% of sinuses and did not influence ostium location ($p=0.68$). The extent of lateral pneumatization had poor correlation with more lateral location ($r=0.16$). The median sphenoid ostium location was half-way up the sphenoid height (53%).

Conclusions:

The extent and pattern of pneumatization of the sphenoid sinus may affect location of its ostium.

Poster # P48**Three Cases of Inverted Tooth in the Nasal Cavity**

*Go Takahashi, MD, Yasuyuki Hinohira, MD, Toshiyuki Shimizu, MD,
Harumi Suzaki, MD
Tokyo, Japan*

Introduction:

Ectopic teeth are relatively common disease. However, eruption of the inverted tooth into the nasal cavity is rare. We report three cases of inverted tooth in the nasal cavity. Endoscopic endonasal removal of the tooth was successfully performed in the three cases.

Case:

The first case was a 34-year-old man. He was referred to our department, complaining of the intermittent left nasal bleeding. A foreign body in the left nasal cavity had been suspected by a prior doctor. The CT scan showed a smooth mass with a homogeneous high attenuation equivalent to that of the teeth. The diagnosis was done as an inverted tooth in the nasal cavity. We extracted the inverted tooth via the left nasal cavity with endoscope under local anesthesia as office surgery because the tooth completely erupted to a nasal cavity without impaction. The pathological examination revealed a dental organism. The second case was a 16-year-old boy. He came to us complaining of the left nasal obstruction. Submucous round protrusion was observed on the floor of the left nasal cavity. The CT scan indicated the teeth-like lesion. Endoscopic endonasal removal was performed under general anaesthesia. The molar-like inverted tooth was present, encapsulated by the nasal mucosa without impaction. The third case was a 24-year-old woman. She came to our department complaining of the right nasal bleeding. Endoscopic endonasal removal was performed.

Discussion:

In the three cases, it was considered that a supernumerary tooth erupted to the nasal cavity because their dentitions were normal.

Poster # P49**Transsphenoidal Meningocele with Intranasal Extension: Case Report and Literature Review**

*Maria Godoy, MD, Nelson Melo, MD, Fábio Pinna, PhD,
Richard Voegels, PhD
São Paulo - SP, Brazil*

Introduction:

Meningocele of the lateral recess of the sphenoid sinus are rare and originate from a bony dehiscence in its lateral wall called Sternberg's canal. This condition may be associated with female, obese and middle-aged patients. The aim of this study is present a case of a large transsphenoidal meningocele with intranasal extension in an adult patient and review of the literature.

Methods:

Case report.

Results:

A 35-year-old female patient with history of hypertension and obesity class I complaining of right hyaline continuous rhinorrhea 1 year 6 months ago. No previous history of trauma, surgery or meningitis. Nasal endoscopic examination revealed a pulsatile mass in the right nasal cavity. CT and MRI showed an expansive lesion of liquid content, with well-defined limits and without post-contrast enhancement in sphenoid sinus and right sphenoidal recess, communicating with ipsilateral middle cranial fossa. Opted for endonasal transpterygoid endoscopic approach, held resection of meningocele and repair of fistula in the lateral recess of right sphenoid, with use of fascia lata, abdominal fat tissue and middle turbinate's nasal mucosa graft. Patient developed on the third post operative day with recurrence of cerebrospinal fluid drainage. Submitted to surgical retreatment using posterior nasal-septal flap for repair of the failure, evolving without recurrences so far.

Conclusion:

Transpterygoid approach definitely provides wider visibility of the lateral recess. The use of posterior nasal-septal flap is an effective option for recurrent cerebrospinal fluid leaks due to small skull base defects, especially in sphenoid lateral recess.

Poster # P50

Treatment of Recalcitrant Chronic Snusitis with Topical Irrigation of a Povidone-Iodine / Budesonide Suspension

Belachew Tessema, MD, Seth Brown, MD, Joel Correa de Rosa, MD USA

Introduction:

A combination of dilute povidone-iodine (PVP-I) and budesonide has been employed in our practice for the treatment of chronic recalcitrant rhinosinusitis through sinonasal irrigation. A retrospective review of our clinical experience with this regimen was undertaken to evaluate the tolerability and efficacy of this therapy.

Methods:

An IRB-approved retrospective chart review of all patients employing this therapy in our practice for at least 2 weeks was completed. Clinical examination findings, patient-reported symptoms and microbiological culture results were analyzed for all patients before and after completion of at least two weeks of therapy.

Results:

A total of nine patients were identified and included in this report. None discontinued use due to intolerance. There were no reported adverse events. The mean pre and post-treatment scores as measured by a validated sinonasal outcomes test was 51 and 27 ($p < 0.012$). Pre-treatment cultures were positive for 9/9 patients with the majority having multi-resistant species including MRSA, Enterococcus, Acenitobacter, Pseudomonas, Propionobacterium, S.viridans, Klebsiella, Citrobacter and Serratia. There was a 67.7% reduction in post-treatment positive cultures.

Conclusion:

In this retrospective review, patients treated via sinonasal irrigation with a dilute PVP-I / budesonide suspension have subjective and objective evidence of improvement. Further investigation in a prospective, controlled study is warranted.

Poster # P51**Two Cases of Organized Hematoma of the Maxillary Sinus**

*Toshiyuki Shimizu, MD, Yasuyuki Hinohira, MD, Go Takahashi, MD,
Harumi Suzuki, PF
Tokyo, Japan*

Introduction:

Organized hematoma of the sinonasal tract is a rare clinical disease, which requires differential diagnosis from neoplastic diseases. We reported two cases of organized hematoma of the maxillary sinus, who required surgical intervention for diagnosis.

Case:

66 year-old female visited our clinic, complaining of oral bleeding. The easily bleeding tumor-like lesion was found in the left gingiv-abuccal sulcus. Computed tomography (CT) demonstrated well-defined expansive soft tissue shadows with bone erosion. The lesion showed intermingled high intensity in T1 and intermediated low intensity in T2-weighted magnetic resonance imaging (MRI). • @Caldwell-Luc operation for total removal of the tumor was performed because biopsy samples had been suspected to the malignant disease. The pathological diagnosis was organized hematoma. 28 year-old female visited our clinic, complaining of the right nasal bleeding from polyps in the middle nasal meatus. CT and MRI showed the mass lesion existing from the right nasal cavity to the maxillary sinus with bone erosion. Caldwell-Luc operation for total removal of the tumor was performed. The pathological diagnosis was organized hematoma. No recurrent lesion has been seen in the two cases.

Discussion:

Organized hematoma in the maxillary sinus is a very rare lesion. The progressive expansion of the tumor causes the demineralization of adjacent structures. In many patients with organized hematoma, the findings of CT and MRI are similar to neoplastic diseases. Therefore, surgical intervention is required in order to distinguish from malignant tumors

Poster #P52**Use of CT imaging for Rhinosinusitis Care: Variations Based on Physician Type**

*Giant Lin, MD, Rodney Dunn, MS, Melissa Pynnonen, MD
Ann Arbor, MI USA*

Background/Hypothesis:

The management of chronic rhinosinusitis (CRS) represents a significant health care burden, with an estimated 5.8 billion dollars spent annually. Guidelines have been established to improve care, but wide variations exist in contemporary treatment. We hypothesize that physician training, specialty, and practice type affect utilization of ancillary resources such as radiographic imaging.

Methods:

Public data files from the National Ambulatory Medical Care Survey (NAMCS) were reviewed. We identified all chronic rhinosinusitis-related visits between 2005 and 2008 based on ICD coding. Patient data, physician profiles, and rates of imaging were recorded. Statistical analysis was performed on tabulated data to determine rates of imaging and endoscopy according to physician- and practice-specific factors.

Results:

Between the years 2005 and 2008, there were 50.8 million visits for chronic rhinosinusitis in the United States. Otolaryngology specialty visits accounted for 11.4% of all CRS appointments. Patients presenting to the otolaryngologist have a higher rate of comorbid asthma diagnosis (13.5% versus 5.56%, $p < 0.001$) and lower rate of COPD diagnosis (0.78% versus 12.1%, $P < 0.001$). Use of advanced radiographic imaging was significantly higher among otolaryngologists versus primary care physicians (16.03% versus 1.93%, $p < 0.001$).

Conclusion:

Primary care providers and otolaryngologists utilize advanced radiographic imaging for chronic rhinosinusitis at different rates. Newer protocols and guidelines might address these differences with more stringent criteria to standardize care.

Poster # P53**Use of Enterprise Data Warehouse to Study the Management of Chronic Sinusitis**

*Joseph Raviv, MD, Ewa Schafer, MD, Chad Konchak, MBA,
Ari Robicsek, MD
Northbrook, IL, USA*

Introduction:

Chronic rhinosinusitis (CRS) is often unrecognized. Frequently, primary care practitioners (PCPs) misdiagnose CRS as acute sinusitis or rhinitis, leading to inappropriate therapy. Conversely, PCPs refer many patients with CRS to sinus specialists for management before initiating medical treatment. Both errors lead to increased morbidity and unnecessary costs. There is a need to improve the ability of PCPs to recognize and manage CRS. However, little large-scale work has attempted to characterize the extent of CRS misdiagnosis and mismanagement in primary care.

Methods:

A set of queries were written against the NorthShore University HealthSystem (NorthShore) Enterprise Data Warehouse (EDW) for January 1, 2006 - June 21, 2010 to identify patients with characteristics suggestive of CRS. Patients who had seen an allergist or ENT were excluded. Algorithms were iteratively validated against structured record review and expert patient examination until they could retrospectively identify CRS with positive predictive value >70%.

Results:

176,787 patient records and 2,135,024 encounters were reviewed. Our algorithm identified 2,869 (1.6 %) patients as having CRS. Patients were seen by an average of 2.3 physicians (range 1-26). The average number of encounters was 5.0 (range 2-29). Only 265 patients (9.9%) had received a diagnosis of CRS by a physician. Large inter- and intra-physician variability in treatment patterns was observed.

Conclusions:

We developed a novel method to identify patients with CRS. Our observations demonstrate frequent under-diagnosis and under-treatment of patients with CRS. Future studies will assess the effectiveness of a fully-electronic clinical decision support tool within the Electronic Health Record to improve CRS recognition and management.

Poster # P54

Utilization of Image Guidance System during Endoscopic Procedures

*Joseph Han, MD, Brad Rawlings, MD, Kevin Choi MD
Norfolk, VA USA*

Introduction:

The use of image guided system (IGS) has increased in the past few years. While preoperative CT images are most commonly used, additional modalities have been introduced including intraoperative CT, CT-MRI fusion, and pseudointraoperative MRI. Our objective is to review our experience with IGS.

Methods:

A retrospective chart review was conducted on patients who underwent procedures using IGS between 2007 and 2010. Charts were assessed for demographics, radiographic findings, image-guidance modality, surgical indications, and operative procedures performed.

Results:

791 endoscopic procedures were performed. Image guidance was used in 528 cases (66.8%) procedures. Fifty percent of the endoscopic sinus cases were revision surgeries. Preoperative CT images were used in 91% of the cases, CT-MRI fusion in 6.1%, intraoperative CT images in 2.3%, and pseudointraoperative MRI in 1.1%. 73% were complex sinus cases, 25% were skull base pathology, and 2% were other indications.

Conclusions:

The most common indications for IGS included revision endoscopic sinus surgery. Image guidance system was also used for excision of tumor, mucoceles, and CSF leak repair. CT-MRI fusion has been helpful for soft tissue pathology. Intra-operative CT was beneficial for complete resection of bony tumor or when there was soft tissue movement during the procedure. Our use of IGS supports the current AAO-HNS statement for intraoperative use of computer aided surgery.

Poster # P55**Dermoid Cyst in the infratemporal fossa**

Marco Fornazieri, MD, MPH, Alexandre Ordones, MD, Fabio de Rezende Pinna, MD, Richard Voegels, MD

Objectives:

Describe a rare location of a dermoid cyst arising from pterygoid fossa with reduced visual acuity, excised by a transnasal transpterygoid endoscopic surgery.

Methods:

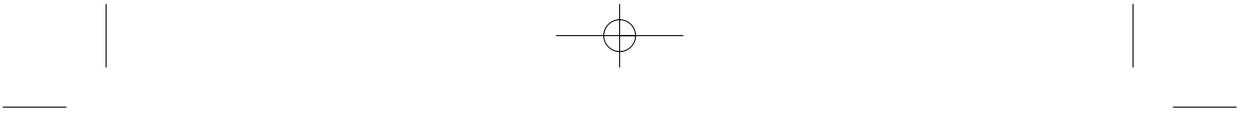
Case report and review in Pubmed and Lilacs with the keywords "pterygoid fossa", "infratemporal fossa", "teratoma" and "dermoid cyst".

Results:

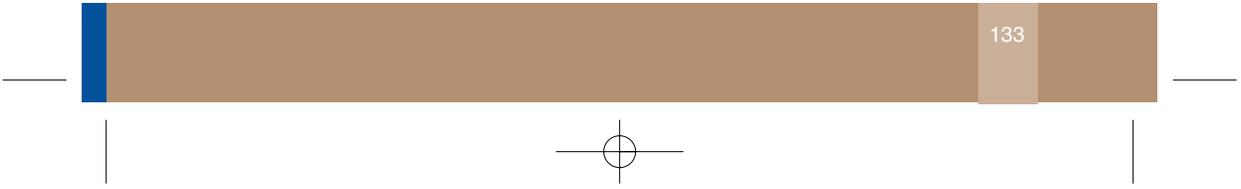
A 23-year-old man suffered a car accident 2 years ago, which progressed to tracheostomy secondary to prolonged intubation. He also produced the first episode of tonic clonic seizure. Besides, he presented reduced left visual acuity. During neurologic investigation, magnetic resonance imaging showed an heterogeneous ovoid lesion in pterygopalatine fossa, hyperintense in T2. Endoscopic transpterygoid resection of the lesion was performed. Initially, a puncture of the lesion showed a transparent thick liquid. Unexpectedly, hair and sebaceous were found inside the cyst capsule. The cyst was excised completely. Histological examination revealed a dermoid cyst. The patient's postoperative course was unremarkable.

Conclusion:

Although rare, dermoid cysts should be considered in the differential diagnosis of expansive lesions in the pterygopalatine fossa. Other differential that should be thought are schwannoma, angiofibroma, esthesioneuroblastoma, osteochondroma, cholesterol granuloma, hemangioma, lymphoma and osteoma..an accurate diagnosis and review the optimal approach to management.



Awards



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 Mucooliary
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 Rhinometry 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.

2009

Efficacy of a Novel Chitosan Gel on Hemostasis and Wound Healing Following ESS

Rowan Valentine, MD, Adelaide, Australia

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. Agura, Mexico

B

Pat A. Barelli, US
Fred W. Beck, US*
Carlos G. Benavidez, 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 Del Gaudio, US
H.A.E. van Dishoeck, The Netherlands*
George H. Drumheller, US*
Glen W. Drumheller, US
Larry E. Duberstein, US

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
Peter John Wormald,
Germany

** Deceased*

New Investigator Award — (CORE)

2011 -Office-Sclerotherapy for Epistaxis due to Hereditary Hemorrhagic Telangiectasia

Holly Boyer, MD

2010 - Characterization of Human Sinonasal Intercellular Junctional Proteins

Sarah Wise, MD

2009 - Novel Flavonoid Compounds for Cystic Fibrosis Chronic Rhinosinusitis

Bradford Woodworth, MD

2009 - Mucin expression in Paranasal Respiratory Epithelium Cell Culture

David Poetker, MD

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

2002 - 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

2011 (COSM) -Upfront Point-of-Care Sinus CT Scanning is a Cost-Effective Diagnostic Alternative to Empiric Medical Therapy for Chronic Rhinosinusitis

Randy Leung, MD

2010 (COSM) - Endoscopic Sinus Surgery Reduces Antibiotic Utilization in Rhinosinusitis

Naveen D. Bhandarkar, MD

2009 (Rhino World) - The Comparative Disease Burden of Rhinosinusitis

Neil Bhattacharyya, MD

2008 (COSM) - Construct Validation of a Low-Fidelity Endoscopic Sinus Surgery Model

R Leung MD

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

2011 (COSM) -Polyhydrated Ionogen Accelerates in vitro Respiratory Epithelial Healing

Noam Cohen, MD

2010 (Annual Meeting) -A Sheep Model to Investigate the Role of Fungal Biofilms in Sinusitis: Fungal & Bacterial Synergy

Sam Boase, MD

2010 (Spring Meeting) - Presence of Dendritic Cells Expressing Pro-TH2 is Increased in AFRS

Jennifer Mulligan, MD

2009 (Annual Meeting) - TNF-Alpha Inhibits Olfactory Regeneration in a Transgenic Model of CRS-Associated Olfactory Loss

Justin Turner, MD

2009 (Rhinology World) - Treatment-Recalcitrant Chronic Rhinosinusitis with Polyps is Associated with Altered Epithelial cell expression of interleukin-33

Andrew Lane, MD

2008 (Annual Meeting) - Interleukin 1 Receptor-like 1 Gene is Associated with Chronic Rhinosinusitis

Roberto Castano, MD, Yohan osse, MD, Leandra Mfuna, MD, Martin Desrosiers, MD

2008 (Annual Meeting) - Olfactory Function and Disease Severity in Chronic Rhinosinusitis

Jamie Litvack, MD, Jess Mace, MPH, Kenneth James, PhD, Timothy Smith, MD

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

Resident Research Grant Award (CORE)

2011

Inflammatory Role of Fibroblasts in Chronic Rhinosinusitis

Samuel Oyer, MD

Manuka Honey for Management of CRS - An In Vitro and In Vivo Analysis

Nicholas C. Sorrel, MD

2010

Inflammatory Cytokine Modulation of Sinonasal Cilary Dynamics

Jessica Shen, MD

Single vs. Combined Anti-leukotriene Therapy in the Treatment of CRS

Marika Russell, MD

Nasal Packing as a Drug Delivery System Post Operatively in Chronic Sinusitis

Garrett Griffin, MD

2009

No Awards

2008

Mechanisms of B-cell Recruitment in Chronic Rhinosinusitis with Nasal Polyps

Monica Patadia, MD

Microarray Analysis of Chronic Rhinosinusitis

Frederick Roediger, MD

2007

In Vivo Laser Tissue Welding in the Rabbit Paranasal Sinus

Benjamin S. Bleier, MD

Virtual Surgical Rehearsal for Pre-op Planning in Frontal Recess Sinus Surgery

Sachin Parikh, MD

2006

The Role of Non-IgE Inflammatory Pathway in Allergic Fungal Rhinosinusitis

Amber Luong, MD

The Electro-olfactogram (EOG) in the Diagnosis of Olfactory Dysfunction

Sumana Jothi, MD

2005

Nasal Airway Physiology During Stages of Sleep

Luc G. T. Morris, MD

The Role of Roll-Like Receptors In Chronic Sinusitis

Murugappan Ramanathan Jr., MD

2004

Electrical Olfactory Responses after Axotomy in Mice

Joseph R. Raviv, B.A., M.D.

Aerosol Deposition Efficiency in the Paranasal Sinuses

Michele St. Martin, M.D.

2003

Nasal Mucosal Sensitivity in Young and Old

Alex G. Bien, MD

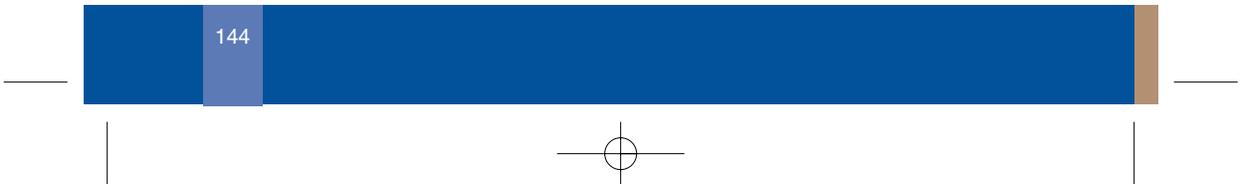
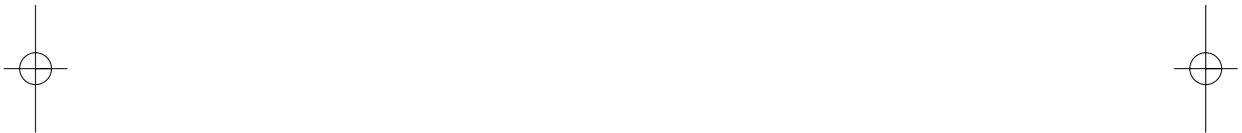
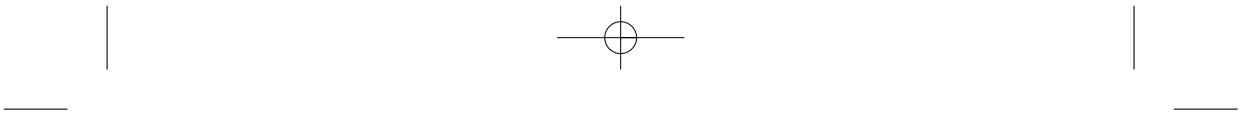
Evaluation of Biofilms in Chronic Sinusitis

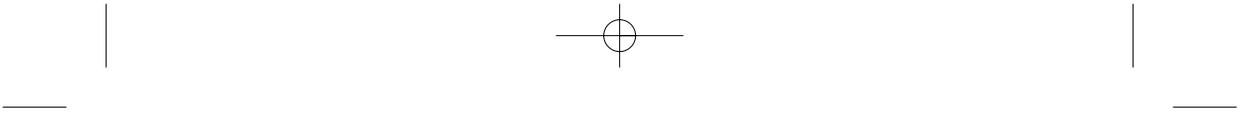
Joel R. Perloff, MD

2001

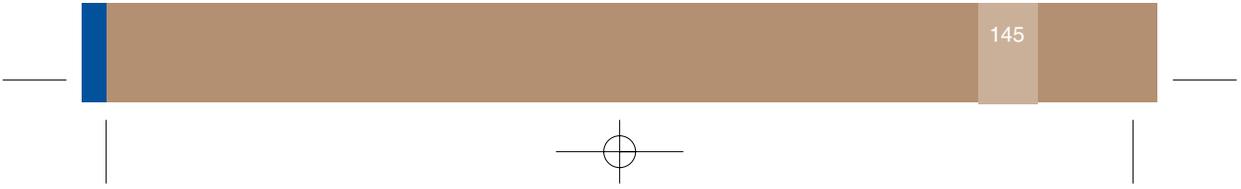
The Immune Response to Fungi in Chronic Sinusitis and Allergic Rhinitis

Larry K. Burton, MD





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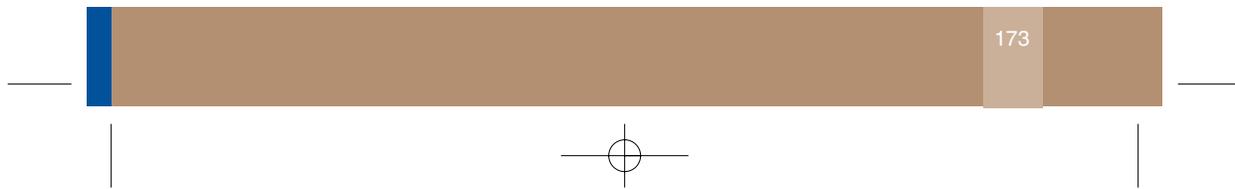
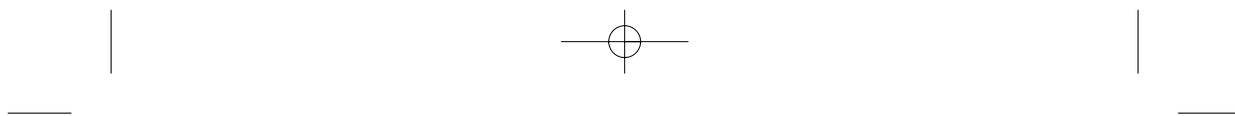
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