Common Otolaryngologic Problems

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Otolaryngology/Head and Neck Surgery

- SINUSITIS
- EPISTAXIS
- HOARSENESS
- HEARING LOSS/TINNITUS
Common Problems
Sinusitis

- 30 million office visits for “sinusitis” per year
- Most common chronic complaint for which a patient seeks the advice of a physician
- OTC medications: multi-billion dollar business
- Advertising perpetuates mythology
Diagnosis of Sinusitis

- History
- Physical Examination
  - Nasal examination
  - Transillumination
  - Palpation??? (Really?)
- Imaging
  - Plain films (don’t waste your time and money)
  - CT scan
    - Limited CT of the paranasal sinuses

Common Cold - Causative Viruses
from AAO/HNS series, 2006

<table>
<thead>
<tr>
<th>Virus</th>
<th>Percentage</th>
<th>Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhinovirus</td>
<td>50%</td>
<td>(Fall / Late Spring)</td>
</tr>
<tr>
<td>Coronavirus</td>
<td>10%-15%</td>
<td>(Winter / Spring)</td>
</tr>
<tr>
<td>RSV</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Adenovirus</td>
<td>5-10%</td>
<td></td>
</tr>
<tr>
<td>Influenza</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Parainfluenza</td>
<td>3%</td>
<td></td>
</tr>
</tbody>
</table>
Streptococcus pneumoniae and Haemophilus influenzae are the predominant pathogens in adults, with Moraxella catarrhalis joining such in children.

Factors Predisposing to Bacterial RS

- Viral URI
  - 0.5–2% become bacterial in adults; 2–5% in children
- Allergic rhinitis
  - inhalant sensitivities raise incidence 4.5X
- Anatomic ostiomeatal obstruction
- Air pollution
  - smoking raises incidence (1.22X); work-related factors in cotton mills, bakeries, photo developing establishments, etc.
- Nasal polyposis
  - Samter’s triad, AFS, inhalant / food allergies
- Medication effects
  - rhinitis medicamentosa, cocaine, antihypertensives, BCPs, most nasally delivered topical agents
- Other causes
  - GERD, pregnancy, immune deficiency, asthma, diabetes mellitus, maxillary dental disease, mucociliary disorders, etc.
Types of Rhinosinusitis Based on Duration of Symptoms

- **ACUTE** – lasting up to 4 weeks, with total resolution of symptoms
- **SUBACUTE** – persisting more than 4 weeks, but less than 12 weeks, with total resolution of symptoms
- **RECURRENT ACUTE** – 4 or more episodes per year, with resolution of symptoms between attacks
- **CHRONIC** – 12 weeks or more of signs / symptoms

Proposed Progression of Pathophysiology of ABRS

from AAO/HNS series, 2006

Uncomplicated

Mild – Infection confined to the involved paranasal sinus

Moderate – Infection with recruitment of local or systemic inflammatory mechanisms, or risk factors

Complicated – Infection spread to local or distant anatomic site
Complications of Sinusitis

- Meningitis
- Orbital Abscess
- Cavernous Sinus Thrombosis
- Epidural Abscess
- Subdural Abscess
- Brain Abscess


From AAO/HNS series, 2006

<table>
<thead>
<tr>
<th>Common Treatments</th>
<th>Penicillin nonsusceptible</th>
<th>TMP/SMX nonsusceptible</th>
<th>Macrolide nonsusceptible</th>
<th>Doxycycline nonsusceptible</th>
<th>Clindamycin nonsusceptible</th>
<th>Resp FQs nonsusceptible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonsusceptible (%)</td>
<td>37%</td>
<td>37%</td>
<td>29%</td>
<td>21%</td>
<td>10%</td>
<td>3%</td>
</tr>
<tr>
<td>N = 2,432</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Susceptibility of Isolates at PK/PD Breakpoints: The Paradox of Broad Spectrum Coverage!

<table>
<thead>
<tr>
<th>Agent</th>
<th>S. pneumoniae</th>
<th>H. influenzae</th>
<th>M. catarrhalis</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD Amox/clav</td>
<td>95</td>
<td>99</td>
<td>100</td>
</tr>
<tr>
<td>HD Amoxicillin</td>
<td>95</td>
<td>72</td>
<td>7</td>
</tr>
<tr>
<td>Cefaclor</td>
<td>20</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Cefixime</td>
<td>66</td>
<td>99</td>
<td>100</td>
</tr>
<tr>
<td>Cefpodoxime</td>
<td>75</td>
<td>99</td>
<td>85</td>
</tr>
<tr>
<td>Cefprozil</td>
<td>72</td>
<td>23</td>
<td>9</td>
</tr>
<tr>
<td>Cefuroxime</td>
<td>73</td>
<td>99</td>
<td>51</td>
</tr>
<tr>
<td>Cefdinir</td>
<td>69</td>
<td>79</td>
<td>78</td>
</tr>
<tr>
<td>Macrolides</td>
<td>71</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Clindamycin*</td>
<td>91</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>80</td>
<td>25</td>
<td>96</td>
</tr>
<tr>
<td>TMP/SMX</td>
<td>64</td>
<td>78</td>
<td>19</td>
</tr>
<tr>
<td>Resp. Quinolones</td>
<td>99</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>


Causes of Rhinosinusitis – Time Course

from AAO/HNS series, 2006

- Viral
- Aerobes
- Resistant aerobes, anaerobes, and fungi

Percent of Patients

Time

7–10 Days
3 Months
Pathogenesis of CRS: Role of Bacteria
from AAO/HNS series, 2006

No prior surgery

Aerobes – 75–100%
- Coag- neg. Staphylococci
- Staph. Aureus
- Strep. Pneumonia
- Strep. viridans
- H. Influenza
- Corynebacterium
- Moraxella catarrhalis

Anaerobes – 0–25%
- Fusobacterium sp.
- Provotella sp.
- Peptostreptococcus sp.
- Propionibacterium sp.

Prior Surgery
- Pseudomonas sp.
- Klebsiella sp.
- Enterobacter sp.
- Coag- neg. Staphylococci
- S. Aureus


Predominant Cellular Infiltrate in Inflammatory Chronic Rhinosinusitis
from AAO/HNS series, 2006

<table>
<thead>
<tr>
<th>Eosinophilic</th>
<th>Neutrophilic</th>
<th>Other</th>
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</thead>
<tbody>
<tr>
<td>• Inhalant allergic rhinitis (intermittent, persistent)</td>
<td>• Bacterial</td>
<td>• Viral (mixed response)</td>
</tr>
<tr>
<td>• Other allergen-specific (e.g., foods)</td>
<td>• Ciliary dyskinesias</td>
<td>• Granulomas</td>
</tr>
<tr>
<td>• Allergic fungal sinusitis</td>
<td>• Cystic fibrosis</td>
<td>• Wegener’s granulomatosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Sarcoïdosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unusual infections</td>
</tr>
<tr>
<td>• Eosinophilic fungal RS</td>
<td>• Foreign body</td>
<td>• Vascularitis</td>
</tr>
<tr>
<td>• Eosinophilic mucin RS</td>
<td></td>
<td>• Churg-Strauss syndrome</td>
</tr>
<tr>
<td>• Nasal polyps (superantigen, bacterial allergy, etc.)</td>
<td></td>
<td>• Systemic lupus erythematosus</td>
</tr>
<tr>
<td>• Aspirin sensitivity, asthma</td>
<td></td>
<td>• Pemphigoid</td>
</tr>
</tbody>
</table>
Possible Strategies for Treating CRS
from AAO/HNS series, 2006

**Treat Etiology**
- Antibiotics
- Antifungals
- Surgery

**Attenuate Inflammation**
- Steroids
- Anti-IgE or IL-5
- Immunotherapy
- Antileukotrienes
- Macrolides
- Who knows what else?

**CRS**
- Bacteria
- Fungi
- Super-antigen
- Osteitis
- Allergy

**IL-5, IL-4**
**IL-8, IF-γ**
**GM-CSF**

Acute Sinusitis
History

- Pressure, congestion
- May have headache or severe facial pain
- Copious discharge, possibly purulent
- Often begins as a URI that stagnates or as a toothache
- Physical Exam:
  - Purulent discharge
  - Fever, “SICK”
Acute Sinusitis

- Management
- CT if diagnosis is in doubt
- CT if complication is suspected
  - CT of the brain and sinuses with contrast
  - Picket fence fever, obtundation, meningismus, papilledema
- Antibiotics
  - Staph, Strep, H. Flu, Moroxella
  - Consider I.V. antibiotics and admission

Acute Sinusitis

- Management
- Decongestants
  - Topical vasoconstrictors
    - Pseudoephedrine
- Antihistamines?
- Ipratropium Bromide?
- Steroids?????
Chronic Sinusitis
Definition

• 12 weeks of symptoms despite treatment
  – CT evidence of disease
• More than 4 episodes of acute sinusitis per year
  – CT may be negative
  – CT is typically obtained 4 weeks after treatment

Chronic Sinusitis

• History
• Variable
  – Pain: usually not an overriding symptom
  – Chronic cough
  – Nasal congestion
  – New onset of or poor control of asthma
  – Nasal congestion
  – Fatigue
Things that Mimic Chronic Sinusitis

• Pregnancy rhinitis
• Side effects from medication
  – Beta blockers
  – Hormonal medication
• Hypothyroidism
• Allergic rhinitis
• Viral Rhinitis
• Migraines
• Depression

A Word About Allergic Rhinitis…

• Antihistamines
• Mast Cell Stabilizers
• Topical Steroid
• Oral Steroid
• Decongestants
  – Oral
  – Topical
• Allergy Testing
  – Environmental Avoidance
Things that Mimic Chronic Sinusitis

- Sarcoid
- Rhinoscleroma
- Wegener’s
- Cocaine abuse
- Samter’s triad
- Chemical exposure
- Cystic fibrosis
- Primary ciliary dyskinesia

Epistaxis

- History
  - Time
  - Quantity
  - Family history
  - Medication history
  - Trauma history
  - Associated symptoms
    - Fatigue? Bruising?
    - Nasal obstruction?
Epistaxis

- **Physical Examination**
  - Anterior exam
    - Kisselbach’s plexus
      - Little’s area (anterior septum)
    - R/O Septal Hematoma in Fracture Patients!
  - Posterior examination
    - Endoscope
    - NPCA
      - Especially Asian population

- **Laboratory studies**
  - CBC with platelet’s
  - PT/PTT
  - LFT’s
  - Type and Cross
Epistaxis

- Emergency Setting
  - IV
  - BP control
  - Labs
  - Procedures
    - Afrin, Cocaine, Lidocaine with epinephrine 1:100,000
    - Cautery
    - Packing
      - Anterior
      - Posterior
    - Freak out

However, run of the mill epistaxis...

- Hydration
- Humidification
- Decongestant spray (3 days)
- Bacitracin ointment on a Q-tip

- Don’t forget about HHT/Weber, Osler Rendu
Hoarseness

- **History**
  - Time
  - Associated behaviors
    - Profession
    - Partying
  - Smoking history!!
  - Weight loss and dysphagia
  - Otalgia
  - Shortness of breath
  - Reflux symptoms?
    - Nocturnal cough?

- **Physical Examination**
  - Ear
  - Oral Cavity, Oropharynx
  - Neck
    - Mass
    - Jugular venous distension
  - Chest

And of course…. 
Hoarseness

- Laryngeal Examination
  - Flexible fiberoptic scope
    - Paralysis
    - Nodule
    - Mass
    - Erythema/Edema/Inflammation

Hoarseness: Differential

- Paralysis
  - Malignancy
  - Lesion along vagus
    - Thyroid
    - Skull base
    - Chest

- Lesion
  - Papilloma
  - Squamous cell carcinoma
    - Smoking
Hoarseness: Differential

- Benign Lesion
  - Vocal cord nodules
  - Intra-cordal cyst
  - Reinke’s edema
  - Granuloma
    - GERD

Hearing Loss: Otitis Media
OM: Scope of the Problem

- $5 Billion / year
- 600,000 operations / year
- Leading cause of hearing loss in children
- 85% individuals have >1 episode
Risk Factors

- URI
- Smoking in the home
- Children
- Ethnicity (e.g., Native American)
- Nasopharyngeal pathology
- Ciliary dysmotility

Otitis Media Pathogenesis

- Eustachian Tube
- Ciliary Clearance
- Pressure Differential
Chronic OM Pathogenesis

- Secretory changes in middle ear are due to chronic infections
- Most begin as AOM
- Resulting inflammation in ET and ME mucosa lead to persistence of effusion
- ET obstruction is secondary to the infection

Epistola de Auditus Organis, 1562
First Description of the Eustachian Tube

Bartholomeas Eustachio (1520-1574)
The Surgeon using the Otoscope.
The Surgeon using the Eustachian Catheter and the Explorer.
Adam Politzer (1835-1920)  
“Politzerization”  
“Heilverfahren gegen Schwerhörigkeit in Folge von Unwegsamkeit der Eustachischen Ohr trompete.” Wien med Wohenshr, 1863.

Fig. 104.—Politzer’s Method.

Eustachian Tube Catheterization. McAuliff, 1929
Terms

• Serous Otitis Media = Otitis Media with Effusion
• Acute Otitis Media
• Recurrent Acute Otitis Media
• Chronic Otitis Media with Effusion
• Chronic Otitis Media
Serous Otitis Media = Otitis Media with Effusion

Otitis Media with Effusion = Serous Otitis Media
Otitis Media with Effusion Treatment:

*Viral, mechanical etiology*

- Amoxicillin x 10 d
- *No proven benefit of nose sprays, antihistamines, decongestants*
- Autoinsufflation
- Watch & Wait
- PE tubes if no resolution in 6 weeks or patient desire
Tympanostomy Tubes

Right Ear
Acute Otitis Media
Acute Otitis Media Treatment

*S. pneumoniae, H. influenzae, Moraxella catarrhalis*

- Amoxicillin x 10 d
- 2nd or 3rd gen ceph’s, TMP-SMX, augmented penicillins (Augmentin)
## Complications of Otitis Media

### Extracranial
- Cholesteatoma
- Ossicular Erosion
- Facial Nerve Dysfunction
- Sensorineural Hearing Loss
- Labyrinthine disorders
- Postauricular Abscess
- Zygomatic abscess
- Bezold's Abscess
- Extramastoid Cholesteatoma

### Intracranial
- Extradural / perisinus abscess
- Lateral sinus thrombosis
- Subdural abscess
- Cerebral abscess
- Otitic meningitis
- Otitic hydrocephalus
- Brain Herniation
- DEATH

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**Tympanic Membrane Perforation, dry**
Tympanic Membrane Perforation, dry
Subtotal & Total Tympanic Membrane Perforations

Treatment TM Perforations

- Do Nothing
- Water precautions
- Tympanoplasty
- Tympanoplasty + Mastoidectomy
Atelectasis

Atelectasis pathogenesis
Atelectasis Grade II

Atelectasis Grade III

Grade IV
Atelectasis Grade IV

Treatment Atelectasis

- Underlying allergies/ET pathology
- Autoinsufflation
- PE Tubes
- Tympanoplasty
- Tympanoplasty with Mastoidectomy
Epitympanic Cholesteatoma

Cholesteatoma w/ HSC Fistula
Cholesteatoma w/ labyrinthine Fistula & Middle fossa tegmen erosion

Cholesteatoma, presents as EAC polyp
labyrinthine erosion with middle fossa extension
Large EAC polyp
Petrosus Apex cholesteatoma

Petrosus Apex Cholesteatoma
Aural Polyp
C. 1700's

Cholesteatoma Treatment

- Tympanoplasty + mastoidectomy
- Ossicular chain reconstruction
- Canal wall intact vs Canal wall down mastoidectomy
- Repair of other complications
Complications of Acute Otitis Media
Coalescent Mastoiditis

Coalescent Mastoiditis w/ Sigmoid Sinus Thrombosis
MRA
Sigmoid Sinus Thrombosis complicating mastoiditis

Boericke, 1929
Subperiosteal Abscess

“Bezold’s” Abscess
**Freidrich Bezold (1842-1908)**

*Bezold’s Abscess*

“A New Route for the Extension of Mastoid Inflammation to Neighboring Tissues and the Necessary Treatment in their Cases.”


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CT MRI

Mastoiditis complicated by cerebellar abscess & meningitis
Biggest problem with Mastoid Abscesses = Diagnosis

- 75% without previous ear disease
- young, male, cholesteatoma, short period of otorrhea?
- Rarely present in modern era

Mastoid Abscess

- “...none of the physicians on the medical staff with the exception of my associate in Otolaryngology had ever heard of Bezold’s disease and he had never seen a case himself.”

F.T. Hill, M.D., 1968
Treatment of Acute Mastoiditis

- Antibiotics
- Emergent Mastoidectomy
- Surgical Drainage of Puss
  - (superficial, neck, intracranial)
- Anticoagulation? (sinus thrombosis)

HEARING LOSS: PRESBYCUSIS

- Very Common Problem
- Many of your elderly patients
- Some Pitfalls and Important Clinical Scenarios to Discern!
Adult Onset HL Outline

- Epidemiology
- Etiology
- Current Therapy

Adult onset hearing loss = PRESBYCUSIS
Sir Francis Gaulton

• 1822-1911
• Inventor of fingerprint ID
• 1st description of HL in the elderly
• Variable high-pitched whistle
• Theorized link between cognition and hearing

Gaulton F, Inquiries into Human Faculty and Its Development, Macmillan: London, 1883

Presbycusis:

• “Elder Hearing”
• Age-related hearing loss
• Unable to isolate ‘age’ from confounding influences
  – Medical conditions
  – Genetics
  – Environment
Joe Hawkins Presbycusis Formula:

\[
\left\{ \int_{\text{Sol}}^{\text{NM}} dR + \int_{\text{NM}}^{\text{HO}} dE \right\} + \int_{A}^{B} dt = \text{PTS} - dB
\]

Hawkins, 1973 © Karger

Genetics

Symptoms of Presbycusis

- Decreased speech intelligibility
- Inability to hear in a noisy background
- Decreased sound localization
- Social isolation & depression
Epidemiology

- 10% of population hearing impaired
- 40% impaired > 65 years
- 80% HL occurs in elderly

*Davis AC. Acta Otolaryngol Suppl 1990*

Number of People 65 yrs and older (in millions)
*US Bureau of Census Statistics, 1988*
Classification of Presbycusis

<table>
<thead>
<tr>
<th>Type</th>
<th>Audiogram</th>
<th>Histopathology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory</td>
<td>Hi tone loss</td>
<td>HC Loss</td>
</tr>
<tr>
<td>Neural</td>
<td>Dec’d Word Discrim</td>
<td>SG cell loss</td>
</tr>
<tr>
<td>Strial</td>
<td>Flat loss</td>
<td>Stria atrophy</td>
</tr>
<tr>
<td>Mixed</td>
<td>Combo</td>
<td>Combination</td>
</tr>
<tr>
<td>Intermediate</td>
<td>Flat and/or hi tone loss</td>
<td>? Impaired cellular function</td>
</tr>
</tbody>
</table>

Adapted from Bailey B. Head & Neck Surgery-Otolaryngology, volume 2, 1993.

From: Schuknecht HF. Pathology of the Ear, 1993: 416-436
ARHL: Treatment
Hearing Aids

- For All Nearly Types of Hearing Loss
- Acoustic vs. Electronic
Hearing Aids

Cochlear Implant
Nucleus® Hybrid™ cochlear implant

- Based on the Nucleus Freedom cochlear implant
  - Electrically equivalent
  - Short array (10 mm) composed of 6

Additional Treatments

- Calorie Restriction?
- Antioxidants & Vitamin Supplements?
- Noise Protection
Future Advances?

Fully Implantable CI’s

- Within 10 years
- Battery life 1º obstacle
**Inner Ear Drug Delivery**

- via Cochlear Implant
- Transtympanic
- Steroids
- Antioxidants
- Growth Factors

**Gene Therapy of the Inner Ear**

- Localized application
- Growth Factors
- Neural Preservation
- Replace defective genes
Thank You!