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

The Sinuses
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>

Pathogens in ABRS
from AAO/HNS series, 2006

Streptococcus pneumoniae and Haemophilus influenzae are the predominant pathogens in adults, with Moraxella catarrhalis joining such in children

Factors Predisposing to Bacterial RS
from AAO/HNS series, 2006

- 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

- **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


- Penicillin nonsusceptible
- TMP/SMX nonsusceptible
- Macrolide nonsusceptible
- Doxycycline nonsusceptible
- Clindamycin nonsusceptible
- Resp FQs nonsusceptible

Common Treatments

- N = 2,432
- Penicillin: 37%
- TMP/SMX: 37%
- Macrolide: 29%
- Doxycycline: 21%
- Clindamycin: 10%
- Resp FQs: 3%
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>Cefactor</td>
<td>20</td>
<td>4</td>
<td>9</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

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

Pathogenesis of CRS: Role of Bacteria

- **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.
  - Propionibacterium sp.

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


Predominant Cellular Infiltrate in Inflammatory Chronic Rhinosinusitis

<table>
<thead>
<tr>
<th>Eosinophilic</th>
<th>Neutrophilic</th>
<th>Other</th>
</tr>
</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>- Eosinophilic fungal RS</td>
<td>- Vasculitis</td>
<td>- Sarkoidosis</td>
</tr>
<tr>
<td>- Eosinophilic mucin RS</td>
<td>- Churg-Strauss syndrome</td>
<td>- Unusual infections</td>
</tr>
<tr>
<td>- Nasal polyps (superantigen, bacterial allergy, etc.)</td>
<td>- Systemic lupus erythematosus</td>
<td></td>
</tr>
<tr>
<td>- Aspirin sensitivity, asthma</td>
<td>- Foreign body</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?

**Bacteria**
**Osteitis**
**Fungi**
**Allergy**

**CRS**

IL-5, IL-4
IL-8, IF-\gamma
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”

**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

**Decongestants**
- Topical vasoconstrictors
- Pseudephedrine

**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

Things that Mimic Chronic Sinusitis

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

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

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

**Epistaxis**

- **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

- 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)
Adam Politzer (1835-1920)

"Politization"

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

Left Ear Normal Anatomy

Right Ear Normal Anatomy
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
Acute Otitis Media Treatment

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

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

<table>
<thead>
<tr>
<th><strong>Extracranial</strong></th>
<th><strong>Intracranial</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholesteatoma</td>
<td>Extradural / perisinus abscess</td>
</tr>
<tr>
<td>Ossicular Erosion</td>
<td>Lateral sinus thrombosis</td>
</tr>
<tr>
<td>Facial Nerve Dysfunction</td>
<td>Subdural abscess</td>
</tr>
<tr>
<td>Sensorineural Hearing Loss</td>
<td>Cerebral abscess</td>
</tr>
<tr>
<td>Sensorineural Hearing Loss</td>
<td>Otitic meningitis</td>
</tr>
<tr>
<td>Labyrinthine disorders</td>
<td>Otitic hyrodcephalus</td>
</tr>
<tr>
<td>Postauricular Abscess</td>
<td>Brain Herniation</td>
</tr>
<tr>
<td>Zygomatic abscess</td>
<td>DEATH</td>
</tr>
<tr>
<td>Bezolds Abscess</td>
<td></td>
</tr>
<tr>
<td>Extramastoid Cholesteatoma</td>
<td></td>
</tr>
</tbody>
</table>

**Tympanic Membrane Perforation, dry**

1. Image 1
2. Image 2
3. Image 3
4. Image 4
Subtotal & Total Tympanic Membrane Perforations

Treatment TM Perforations

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

Atelectasis

Atelectasis pathogenesis
Atelectasis Grade I

Atelectasis Grade II

Atelectasis Grade II

Atelectasis Grade III

Grade IV
Atelectasis Grade IV

Treatment Atelectasis

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

Cholesteatoma

Middle Fossa

Mastoid
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

Mastoiditis - uncomplicated

Axial CT

Coronal CT

Coalescent Mastoiditis
Coalescent Mastoiditis

Coalescent Mastoiditis w/ Sigmoid Sinus Thrombosis

MRA Sigmoid Sinus Thrombosis complicating mastoiditis

Boerice, 1929
Subperiosteal Abscess

"Bezold’s" Abscess

Freidrich Bezold (1842-1908)

*Bezold’s Abscess*


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 Pus
  - (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!
**Presbycusis:**

- “Elder Hearing”
- Age-related hearing loss
- Unable to isolate ‘age’ from confounding influences
  - Medical conditions
  - Genetics
  - Environment

**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
Joe Hawkins Presbycusis Formula:

\[
\int_{\text{Sound}} R_1 \, dR + \int_{\infty}^{\text{dB}} dB = \text{PTS} - \text{dB}
\]

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>

From: Schuknecht HF. Pathology of the Ear, 1993: 416-436

ARHL: Treatment
Hearing Aids

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

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

Fully Implantable CI’s

- Within 10 years
- Battery life 1st obstacle

Future Advances?
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!