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

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

### Pathogens in ABRS
- **Streptococcus pneumoniae**
- **Haemophilus influenzae**
- **Moraxella catarrhalis**
- **Staphylococcus aureus**
- **Other bacteria**

### Common Cold - Causative Viruses
- **Rhinovirus**
  - 50%
  - (Fall / Late Spring)
- **Coronavirus**
  - 10%-15%
  - (Winter / Spring)
- **RSV**
  - 7%
- **Adenovirus**
  - 5-10%
- **Influenza**
  - 6%
- **Parainfluenza**
  - 3%

### Factors Predisposing to Bacterial RS
- **Viral URI**
  - 0.5–2% become bacterial in adults; 2–5% in children
- **Allergic rhinitis**
  - Inhaled 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 polypsis**
  - Samter’s triad, AF, inhalant / food allergies
- **Medication effects**
  - Rhinitis medicamentosa, cocaine, antihypertensives, BCPs, most nasally delivered topical agents
- **Other causes**
  - GED, 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

Complications of Sinusitis

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

Proposed Progression of Pathophysiology of ABRS

- **Uncomplicated**
  - **Mild**
  - **Moderate**
  - **Complicated**

  - **Complicated** – Infection spread to local or distant anatomic site


- **Nonsusceptible (%)**
  - Penicillin nonsusceptible
  - Macrolide nonsusceptible
  - Clindamycin nonsusceptible
  - Doxycycline nonsusceptible
  - TMP/SMX nonsusceptible
  - Resp FQs nonsusceptible

N = 2,432
Susceptibility of Isolates at PK/PD Breakpoints:
The Paradox of Broad Spectrum Coverage!!

<table>
<thead>
<tr>
<th>Agent</th>
<th>Percentage Strain Susceptible</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>S. pneumoniae</td>
</tr>
<tr>
<td>HD Amoxiclav</td>
<td>95</td>
</tr>
<tr>
<td>HD Amoxicillin</td>
<td>95</td>
</tr>
<tr>
<td>Cefalixar</td>
<td>20</td>
</tr>
<tr>
<td>Cefepoxide</td>
<td>66</td>
</tr>
<tr>
<td>Cefpizil</td>
<td>75</td>
</tr>
<tr>
<td>Cefuroxime</td>
<td>73</td>
</tr>
<tr>
<td>Celdinir</td>
<td>69</td>
</tr>
<tr>
<td>Moxalide</td>
<td>71</td>
</tr>
<tr>
<td>Clindamycin*</td>
<td>91</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>80</td>
</tr>
<tr>
<td>TMP/SMX</td>
<td>64</td>
</tr>
<tr>
<td>Resp. Quinolones</td>
<td>99</td>
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</table>


Causes of Rhinosinusitis – Time Course
from AAO/HNS series, 2006

Pathogenesis of CRS: Role of Bacteria
from AAO/HNS series, 2006

<table>
<thead>
<tr>
<th>No prior surgery</th>
<th>No prior surgery</th>
<th>Prior Surgery</th>
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</thead>
<tbody>
<tr>
<td>Aeroes – 75–100%</td>
<td>Anaerobes – 0–25%</td>
<td></td>
</tr>
<tr>
<td>Staph. Aureus</td>
<td></td>
<td>Staphylococci</td>
</tr>
<tr>
<td>Strep. Pneumonia</td>
<td>Prsophobacterium sp.</td>
<td></td>
</tr>
<tr>
<td>Strep. viridans</td>
<td>Peptostreptococcus sp.</td>
<td></td>
</tr>
<tr>
<td>H. Influenza</td>
<td>Propionibacterium sp.</td>
<td></td>
</tr>
<tr>
<td>Moraxella catarrhalis</td>
<td>Pseudomonas sp.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Klebsiella sp.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enterobacter sp.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coag. neg. Staphylococci</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S. Aureus</td>
<td></td>
</tr>
</tbody>
</table>


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

<table>
<thead>
<tr>
<th>Eosinophilic</th>
<th>Neutrophilic</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalian allergic rhinitis (intermittent, persistent)</td>
<td>Bacterial</td>
<td>Viral (mixed response)</td>
</tr>
<tr>
<td>Other allergic-specific (e.g., foods)</td>
<td>Utiar dyskinesias</td>
<td>Granulomas</td>
</tr>
<tr>
<td>Allergic fungal sinusitis</td>
<td>Cystic fibrosis</td>
<td>Wegener’s granulomatosis</td>
</tr>
<tr>
<td>Allergic fungal sinusitis</td>
<td>Vasculitis</td>
<td>Sarcoidosis</td>
</tr>
<tr>
<td>Eosinophilic fungal RS</td>
<td>Churg-Strauss syndrome</td>
<td>Unusual infections</td>
</tr>
<tr>
<td>Eosinophilic mucin RS</td>
<td>Systemic lupus erythematosus</td>
<td></td>
</tr>
<tr>
<td>Nasal polyposis (superantigen, bacterial allergy, etc.)</td>
<td>Aspirin sensitivity, asthma</td>
<td>Foreign body</td>
</tr>
<tr>
<td>Aspirin sensitivity, asthma</td>
<td>Pemphigoid</td>
<td></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

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

IL-5, IL-4
IL-8, IF-γ
GM-CSF

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 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
- 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

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

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?

Hoarseness

- 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-cordial 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)

“Politzerization”


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
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

<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>Labyrinthine disorders</td>
<td>Otitic meningitis</td>
</tr>
<tr>
<td>Postauricular Abscess</td>
<td>Otitic hydrocephalus</td>
</tr>
<tr>
<td>Zygomatic abscess</td>
<td>Brain Herniation</td>
</tr>
<tr>
<td>Bezold's Abscess</td>
<td>DEATH</td>
</tr>
<tr>
<td>Extramastoid Cholesteatoma</td>
<td></td>
</tr>
</tbody>
</table>

**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 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
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
Petrus Apex cholesteatoma

Petrous 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

Axial CT

Coronal CT

Mastoiditis - uncomplicated

Coalescent Mastoiditis
Coalescent Mastoiditis

MRA
Sigmoid Sinus Thrombosis complicating mastoiditis

Coalescent Mastoiditis w/
Sigmoid Sinus Thrombosis

Boericke, 1929
Frederich 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.”


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!
Theorized link between cognition and hearing

Variable high-pitched whistle

1st description of HL in the elderly

Inventor of fingerprint ID

1822-1911

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

Presbycusis:

“Elder Hearing”

Age-related hearing loss

Unable to isolate ‘age’ from confounding influences
- Medical conditions
- Genetics
- Environment
**Joe Hawkins Presbycusis Formula:**

\[
\int_{R_1}^{R_2} dR + \int_{P_0}^{P_m} dP + \int_{n}^{n} dt = PTS - dB
\]

**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>
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<tbody>
<tr>
<td>Sensory</td>
<td>Hi tone loss</td>
<td>HC Loss</td>
</tr>
<tr>
<td>Neural</td>
<td>Dec’d Word Discrn</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
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 1º 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!