Common Otolaryngologic Problems

Andrew H. Murr, MD FACS
Professor
Chief of Service
San Francisco General Hospital

Roger Boles, M.D., Endowed Chair in Otolaryngology Education
Department of Otolaryngology-Head and Neck Surgery
University of California-San Francisco School of Medicine

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

Otolaryngology/Head and Neck Surgery

- SINUSITIS
- EPISTAXIS
- HOARSENESS
- HEARING LOSS/TINNITUS

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

<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

*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
- Santer’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

<table>
<thead>
<tr>
<th>Mild</th>
<th>Moderate</th>
<th>Complicated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncomplicated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild – Infection confined to the involved paranasal sinus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate – Infection with recruitment of local or systemic inflammatory mechanisms, or risk factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complicated – Infection spread to local or distant anatomic site</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Complications of Sinusitis

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


<table>
<thead>
<tr>
<th>Common Treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillin nonsusceptible</td>
</tr>
<tr>
<td>TMP/SMX nonsusceptible</td>
</tr>
<tr>
<td>Macrolide nonsusceptible</td>
</tr>
<tr>
<td>Doxycycline nonsusceptible</td>
</tr>
<tr>
<td>Clindamycin nonsusceptible</td>
</tr>
<tr>
<td>Resp FQs nonsusceptible</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nonsusceptible (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillin: 37%</td>
</tr>
<tr>
<td>TMP/SMX: 37%</td>
</tr>
<tr>
<td>Macrolide: 29%</td>
</tr>
<tr>
<td>Doxycycline: 21%</td>
</tr>
<tr>
<td>Clindamycin: 10%</td>
</tr>
<tr>
<td>Resp FQs: 3%</td>
</tr>
</tbody>
</table>

N = 2,432
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

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

No prior surgery
- Anaerobes – 0–25%
  - Fusobacterium 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

<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 allergens specific (e.g., foods)</td>
<td>Ciliary dyskinesias</td>
<td></td>
</tr>
<tr>
<td>Allergic fungal sinusitis</td>
<td>Cystic fibrosis</td>
<td></td>
</tr>
<tr>
<td>Eosinophilic fungal RS</td>
<td>Vasculitis</td>
<td></td>
</tr>
<tr>
<td>Eosinophilic mucin RS</td>
<td>Churg-Strauss syndrome</td>
<td></td>
</tr>
</tbody>
</table>
| Nasal polyps (superantigen, bacterial allergy, etc.) | Systemic lupus erythematosus
| Aspirin sensitivity, asthma           | Foreign body                          |                                |
|                                       | Pemphigoid                            |                                |

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**

**Super-antigen**

**Osteitis**

**Allergy**

**Fungi**

**IL-6, IL-4**

**IL-8, IF-γ**

**GM-CSF**

CRS

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**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

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**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

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-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)

"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
Acute Otitis Media Treatment

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

- Amoxicillin x 10 d
- 2nd or 3rd gen cephalosporins, 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

Tympanic Membrane Perforation, dry
Subtotal & Total Tympanic Membrane Perforations

Treatment TM Perforations

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

Atelectasis pathogenesis

Atelectasis
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
Petrous Apex cholesteatoma

Aural Polyp
c. 1700’s

Petrus Apex Cholesteatoma

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

Complications of Acute Otitis Media
Coalescent Mastoiditis

Coalescent Mastoiditis w/ Sigmoid Sinus Thrombosis

Boericke, 1929

MRA
Sigmoid Sinus Thrombosis complicating mastoiditis

Coalescent Mastoiditis w/ Sigmoid Sinus Thrombosis
Mastoiditis complicated by cerebellar abscess & meningitis

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.”


“Bezold’s” Abscess
**Biggest problem with Mastoid Abscesses = Diagnosis**

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

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**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

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**Treatment of Acute Mastoiditis**

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

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**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

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

Presbycusis: Elder Hearing

Adult onset hearing loss = PRESBYCUSIS
Joe Hawkins Presbycusis Formula:

\[
\left\{ \int_{\text{Ototoxic drugs}} d\mathcal{R} + \int_{\text{Noise exposure}} d\mathcal{E} \right\} + \int_{\text{Age}} dt = \text{PTS (dB)}
\]

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

Year (as of July 1)
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

Future Advances?

Fully Implantable CI’s

- Within 10 years
- Battery life 1st 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!