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Ear and Sinus Emergencies

• Objectives
  – Describe the evaluation and treatment of ear disorders
  – Describe the evaluation and treatment of sinus disorders
Ear Anatomy

Iain, Wikimedia Commons
External Ear

Cerumen Impaction

- Cerumen
  - Cerumen glands
  - Sebaceous glands
  - Desquamated epidermis

- Normal clearing
  - Hair follicles
  - Epidermal migration
  - Chewing
External Ear

Cerumen Impaction

- Cerumen accumulation that is
  - Symptomatic
  - Sufficient to prevent adequate ear examination

- Causes
  - Canal obstruction
  - Foreign body
  - Canal instrumentation
  - Aging

Ear Anatomy

Iain, Wikimedia Commons
External Ear

Cerumen Impaction

- Cerumenolytic agents
  - Saline/water
  - Hydrogen peroxide
  - Mineral oil

- Irrigation
  - Syringe
  - Syringe plus butterfly

- Mechanical removal
  - Curettes

Ear Anatomy

Iain, Wikimedia Commons
External Ear

External otitis

- Inflammation of the external ear
- Breakdown of normal skin/cerumen barrier
  - Excessive cleaning
  - Swimming
  - Foreign body
    - Hearing aids
External Ear

Otitis Externa

- 41% Pseudomonas
- 15% S. aureus
- 22% Peptostreptococcus
- 11% Bacteroides
External Ear

External otitis

• Symptoms
  – Pain
  – Discharge
  – Hearing loss

• Exam
  – Swelling
  – Redness
  – Drainage
  – Distinguish from otitis media with perforation
External Ear

External otitis

• Treatment
  – Remove debris in canal
  – Topical treatments
    • Acidifying agents
    • Antiseptics
    • Anti-inflammatory
    • Antibiotics
  – Control pain
  – Consider culture if severe
  – Prevent further injury
External Ear

**Acidifying agents**
- Acetic acid
  - VoSol
  - VoSol HC
- Boric Acid
  - Domeboro Otic
- Sulfuric acid
- Hydrochloric acid

**Antiseptic**
- Alcohol
- Thimerosal
- Thymol
- Gentian Violet
External Ear

Anti-inflammatory
• Hydrocortisone
• Prednisolone
• Dexamethasone
  – Decadron Ophthalmic Solution

Antibiotics
• Multiple agents
<table>
<thead>
<tr>
<th>Product name (preparation)</th>
<th>Antibiotic</th>
<th>Anti-inflammatory</th>
<th>Acid</th>
<th>Antiseptic</th>
<th>pH</th>
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<tbody>
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External Ear

• Cochrane Database Systematic Review 2010
• 19 RCT with 3382 patients
• Trials were of low quality
• Conclusions
  – Topical antimicrobials + steroids vs. Placebo
    • OR 11 (2.0 – 60.57)
  – In general, no difference in cure rate related to topical agent
  – Acetic acid less effective than antibiotics/steroids OR 0.29 (0.13 – 0.62) at 2 weeks
  – Antibiotics + steroids quicker symptomatic relief
External Ear

• External Otitis
  – Mild disease
    • Topical drops
    • 20 minute dwell time
    • 7 day course, continue additional 7 days as needed
    • Treat pain
  – Severe disease
    • Consider wick
    • Consider systemic antibiotics
    • Consider alternate diagnoses
External Ear

Malignant (Necrotizing) OE

- Invasion of infection beyond the ear
  - Elderly diabetics
  - Immunocompromised
- Severe pain
- Significant drainage
- Granulation tissue
- CT/MRI
- Admission, anti-pseudomonas antibiotics
Tympanic Membrane

Barotrauma

• Pressure difference between middle ear and external ear
• Flying
• SCUBA diving
• Direct blow to ear
• Blast injury

Ear Anatomy

Iain, Wikimedia Commons
Tympanic membrane

Barotrauma

• Ruptured TM
  – Pain
  – Bleeding from canal
  – Hearing loss
  – Tinnitus
  – Inspection identifies tear

• Treatment
  – Avoid water to the ear
  – Decongestants
  – Outpatient referral
Middle Ear

**Otitis Media**

- Eustachian tube blockage
  - Fluid build-up
  - Secondary bacterial infection
- Symptoms
  - Prodromal symptoms
  - Pain
  - +/- Fever
  - +/- Hearing loss
  - Rupture of TM
- Exam
  - Dull/red/bulging TM

*Ear Anatomy*

Iain, [Wikimedia Commons](https://commons.wikimedia.org/wiki/File:Middle_Ear_Ana.png)
Middle Ear

• Otitis Media
  – Treatment
    • Antibiotics
      – Amoxicillin 500 mg BID
      – Amoxicillin 875 mg BID
    • If penicillin allergy
      – Cephalosporins – 2nd generation
      – Azithromycin
    • Treatment failure
      – Augmentin
      – Cephalosporins – 2nd generation
Middle Ear

- Otitis Media with TM rupture
  - Add topical antibiotic
    - Avoid
      - Alcohol
      - Aminoglycoside
  - Avoid water in the ear until healed
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Middle Ear

• Otitis Media with Effusion
  – Fluid in middle ear without infection
  – Oral decongestants
  – Most resolve

• Mastoiditis
  – Pre-antibiotic complication of AOM in 20%
  – Modern era incidence of 0.5%
  – CT scan for diagnosis
  – Admission and IV antibiotics
Paranasal Sinuses

Arcadian, [Wikimedia Commons](https://commons.wikimedia.org/wiki/File:Human_face_with_labelled_sinuses.jpg)
Paranasal Sinuses
Sinusitis

• Acute inflammation of the para-nasal sinuses

• Rhinosinusitis
  – Acute rhinosinusitis
  – Acute viral rhinosinusitis
    • Rhinovirus, Influenza, Parainfluenza
    • Acute bacterial rhinosinusitis as complication in 0.5% to 2% of cases
    • 85% to 98% of patients prescribed antibiotics (2001)
Acute Rhinosinusitis

• Symptoms of ARS
  – Nasal congestion and obstruction
  – Purulent nasal discharge
  – Maxillary tooth discomfort
  – Facial pain or pressure, worse when bending forward
  – Fever
  – Fatigue
  – Cough
  – Hyposmia or anosmia
  – Ear pressure or fullness
  – Headache
Acute Rhinosinusitis

  - American Academy of Family Physicians
  - American College of Physicians
  - American Society of Internal Medicine,
  - Centers for Disease Control,
  - Infectious Diseases Society of America

- **Diagnosis of ABRS with**
  - >= 7 days of symptoms
  - maxillary pain or tenderness in the face or teeth (especially when unilateral)
  - purulent nasal secretions

- **Observation for ARS and mild ABRS**

- **Antibiotic therapy**
  - moderately severe symptoms
  - clinical diagnosis of ABRS
  - severe rhinosinusitis symptoms regardless of duration
Acute Rhinosinusitis


- American Academy of Otolaryngology
  - Diagnosis of ABRS with presence of symptoms for 10 days or less than 10 days with worsening of symptoms after initial improvement
  - Symptomatic treatment for AVRS
  - May treat ABRS symptomatically for mild disease:
    - Mild pain, temperature < 38.3 (101)
  - No imaging required
  - First line treatment is amoxicillin; macrolide if allergic
  - Reassess if worse or no improvement at 7 days
Acute Rhinosinusitis

• Treatment
  – Analgesics/NSAIDs
  – Mechanical irrigation of sinuses
  – Topical corticosteroids
  – Decongestants
    • Topical
    • Oral
  – Antihistamines
  – Mucolytics
  – Zinc preparations
Acute Rhinosinusitis
Acute Rhinosinusitis

• Treatment
  – Analgesics/NSAIDs
  – Mechanical irrigation of sinuses
  – *Topical corticosteroids
  – *Decongestants
    • * Topical
    • (*) Oral
  – Antihistamines
  – Mucolytics
  – (-) Zinc preparations
Acute Rhinosinusitis

• Complications of ABRS
  – Rare
  – Local extension
    • Meningitis
    • Peri-orbital cellulitis
    • Orbital cellulitis
Rhinosinusitis

• Acute Rhinosinusitis
• Subacute Rhinosinusitis 4-12 weeks
• Chronic Rhinosinusitis >12 weeks
• Recurrent ARS 4+ episodes in one year