Infections of the External Ear

Michael Underbrink, MD
Faculty Advisor: Jeffrey Vrabec, MD
The University of Texas Medical Branch
Department of Otolaryngology
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Anatomy and Physiology

• Consists of the auricle and EAM
• Skin-lined apparatus
• Approximately 2.5 cm in length
• Ends at tympanic membrane
Anatomy and Physiology

- **Auricle** is mostly skin-lined cartilage
- **External auditory meatus**
  - Cartilage: ~40%
  - Bony: ~60%
  - S-shaped
  - Narrowest portion at bony-cartilage junction
Anatomy and Physiology
Anatomy and Physiology

- EAC is related to various contiguous structures
  - Tympanic membrane
  - Mastoid
  - Glenoid fossa
  - Cranial fossa
  - Infratemporal fossa
Anatomy and Physiology

- Innervation: cranial nerves V, VII, IX, X, and greater auricular nerve
- Arterial supply: superficial temporal, posterior and deep auricular branches
- Venous drainage: superficial temporal and posterior auricular veins
- Lymphatics
Anatomy and Physiology

- Squamous epithelium
- Bony skin – 0.2mm
- Cartilage skin
  - 0.5 to 1.0 mm
  - Apopilosebaceous unit
Otitis Externa

- Bacterial infection of external auditory canal
- Categorized by time course
  - Acute
  - Subacute
  - Chronic
Acute Otitis Externa (AOE)

• “swimmer’s ear”
• Preinflammatory stage
• Acute inflammatory stage
  – Mild
  – Moderate
  – Severe
AOE: Preinflammatory Stage

- Edema of stratum corneum and plugging of apopilosebaceous unit
- Symptoms: pruritus and sense of fullness
- Signs: mild edema
- Starts the itch/scratch cycle
AOE: Mild to Moderate Stage

- Progressive infection
- Symptoms
  - Pain
  - Increased pruritus
- Signs
  - Erythema
  - Increasing edema
  - Canal debris, discharge
AOE: Severe Stage

- Severe pain, worse with ear movement
- Signs
  - Lumen obliteration
  - Purulent otorrhea
  - Involvement of periauricular soft tissue
AOE: Treatment

- Most common pathogens: *P. aeruginosa* and *S. aureus*
- Four principles
  - Frequent canal cleaning
  - Topical antibiotics
  - Pain control
  - Instructions for prevention
Chronic Otitis Externa (COE)

- Chronic inflammatory process
- Persistent symptoms (> 2 months)
- Bacterial, fungal, dermatological etiologies
COE: Symptoms

- Unrelenting pruritus
- Mild discomfort
- Dryness of canal skin
COE: Signs

- Asteatosis
- Dry, flaky skin
- Hypertrophied skin
- Mucopurulent otorrhea (occasional)
COE: Treatment

- Similar to that of AOE
- Topical antibiotics, frequent cleanings
- Topical Steroids
- Surgical intervention
  - Failure of medical treatment
  - Goal is to enlarge and resurface the EAC
Furunculosis

- Acute localized infection
- Lateral 1/3 of posterosuperior canal
- Obstructed apopilosebaceous unit
- Pathogen: S. aureus
Furunculosis: Symptoms

- Localized pain
- Pruritus
- Hearing loss (if lesion occludes canal)
Furunculosis: Signs

- Edema
- Erythema
- Tenderness
- Occasional fluctuance
Furunculosis: Treatment

- Local heat
- Analgesics
- Oral anti-staphylococcal antibiotics
- Incision and drainage reserved for localized abscess
- IV antibiotics for soft tissue extension
Otomycosis

- Fungal infection of EAC skin
- Primary or secondary
- Most common organisms: *Aspergillus* and *Candida*
Otomycoisis: Symptoms

• Often indistinguishable from bacterial OE
• Pruritus deep within the ear
• Dull pain
• Hearing loss (obstructive)
• Tinnitus
Otomykosis: Signs

- Canal erythema
- Mild edema
- White, gray or black fungal debris
Otomycosis
Otomycosis: Treatment

- Thorough cleaning and drying of canal
- Topical antifunginals
Granular Myringitis (GM)

- Localized chronic inflammation of pars tensa with granulation tissue
- Toynbee described in 1860
- Sequela of primary acute myringitis, previous OE, perforation of TM
- Common organisms: Pseudomonas, Proteus
GM: Symptoms

- Foul smelling discharge from one ear
- Often asymptomatic
- Slight irritation or fullness
- No hearing loss or significant pain
GM: Signs

- TM obscured by pus
- “peeping” granulations
- No TM perforations
GM: Treatment

- Careful and frequent debridement
- Topical anti-*pseudomonal* antibiotics
- Occasionally combined with steroids
- At least 2 weeks of therapy
- May warrant careful destruction of granulation tissue if no response
Bullous Myringitis

- Viral infection
- Confined to tympanic membrane
- Primarily involves younger children
Bullous Myringitis: Symptoms

- Sudden onset of severe pain
- No fever
- No hearing impairment
- Bloody otorrhea (significant) if rupture
Bullous Myringitis: Signs

- Inflammation limited to TM & nearby canal
- Multiple reddened, inflamed blebs
- Hemorrhagic vesicles
Bullous Myringitis: Treatment

- Self-limiting
- Analgesics
- Topical antibiotics to prevent secondary infection
- Incision of blebs is unnecessary
Necrotizing External Otitis (NEO)

- Potentially lethal infection of EAC and surrounding structures
- Typically seen in diabetics and immunocompromised patients
- *Pseudomonas aeruginosa* is the usual culprit
NEO: History

- Meltzer and Kelemen, 1959
- Chandler, 1968 – credited with naming
NEO: Symptoms

- Poorly controlled diabetic with h/o OE
- Deep-seated aural pain
- Chronic otorrhea
- Aural fullness
NEO: Signs

- Inflammation and granulation
- Purulent secretions
- Occluded canal and obscured TM
- Cranial nerve involvement
NEO: Imaging

• Plain films
• Computerized tomography – most used
• Technetium-99 – reveals osteomyelitis
• Gallium scan – useful for evaluating Rx
• Magnetic Resonance Imaging
NEO: Diagnosis

- Clinical findings
- Laboratory evidence
- Imaging
- Physician’s suspicion
- Cohen and Friedman – criteria from review
NEO: Treatment

- Intravenous antibiotics for at least 4 weeks – with serial gallium scans monthly
- Local canal debridement until healed
- Pain control
- Use of topical agents controversial
- Hyperbaric oxygen experimental
- Surgical debridement for refractory cases
NEO: Mortality

- Death rate essentially unchanged despite newer antibiotics (37% to 23%)
- Higher with multiple cranial neuropathies (60%)
- Recurrence not uncommon (9% to 27%)
- May recur up to 12 months after treatment
Perichondritis/Chondritis

- Infection of perichondrium/cartilage
- Result of trauma to auricle
- May be spontaneous (overt diabetes)
Perichondritis: Symptoms

- Pain over auricle and deep in canal
- Pruritus
Perichondritis: Signs

- Tender auricle
- Induration
- Edema
- Advanced cases
  - Crusting & weeping
  - Involvement of soft tissues
Relapsing Polychondritis

- Episodic and progressive inflammation of cartilages
- Autoimmune etiology?
- External ear, larynx, trachea, bronchi, and nose may be involved
- Involvement of larynx and trachea causes increasing respiratory obstruction
Relapsing Polychondritis

- Fever, pain
- Swelling, erythema
- Anemia, elevated ESR
- Treat with oral corticosteroids
Herpes Zoster Oticus

- J. Ramsay Hunt described in 1907
- Viral infection caused by varicella zoster
- Infection along one or more cranial nerve dermatomes (shingles)
- Ramsey Hunt syndrome: herpes zoster of the pinna with otalgia and facial paralysis
Herpes Zoster Oticus: Symptoms

- Early: burning pain in one ear, headache, malaise and fever
- Late (3 to 7 days): vesicles, facial paralysis
Herpes Zoster Oticus: Treatment

- Corneal protection
- Oral steroid taper (10 to 14 days)
- Antivirals
Erysipelas

- Acute superficial cellulitis
- Group A, beta hemolytic streptococci
- Skin: bright red; well-demarcated, advancing margin
- Rapid treatment with oral or IV antibiotics if insufficient response
Perichondritis: Treatment

- Mild: debridement, topical & oral antibiotic
- Advanced: hospitalization, IV antibiotics
- Chronic: surgical intervention with excision of necrotic tissue and skin coverage
Radiation-Induced Otitis Externa

- OE occurring after radiotherapy
- Often difficult to treat
- Limited infection treated like COE
- Involvement of bone requires surgical debridement and skin coverage
Conclusions

- Careful History
- Thorough physical exam
- Understanding of various disease processes common to this area
- Vigilant treatment and patience