

Infections of the External Ear

Michael Underbrink, MD

Faculty Advisor: Jeffrey Vrabec, MD

The University of Texas Medical Branch

Department of Otolaryngology

Grand Rounds Presentation

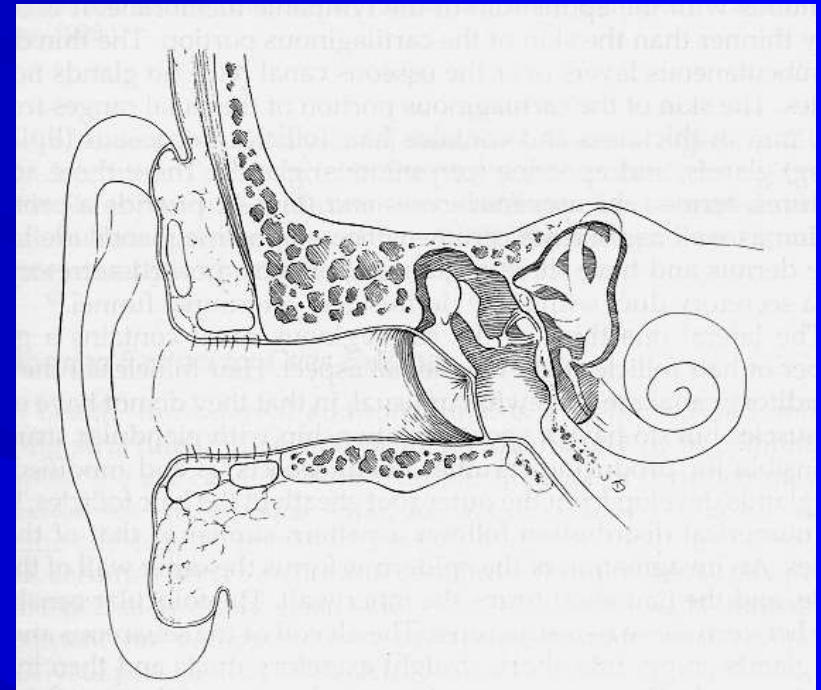
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Anatomy and Physiology

- 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

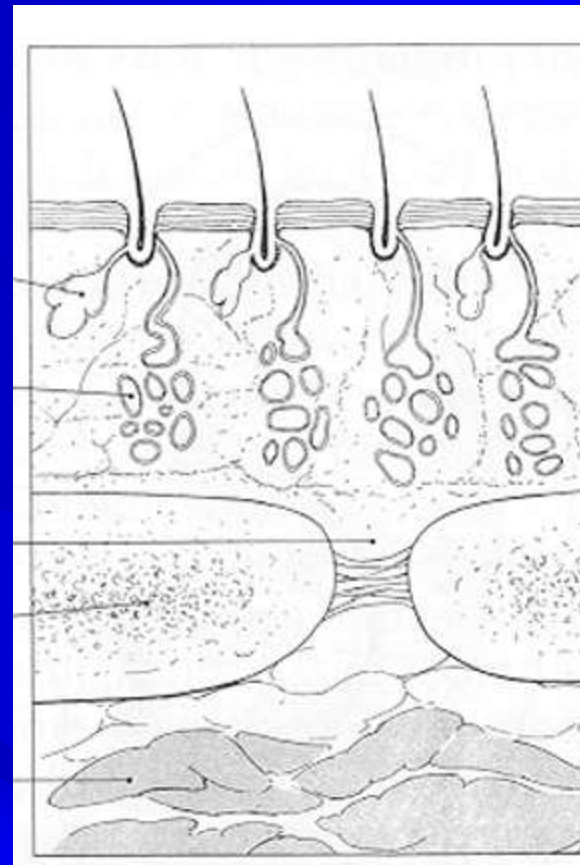


Anatomy and Physiology

- 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)

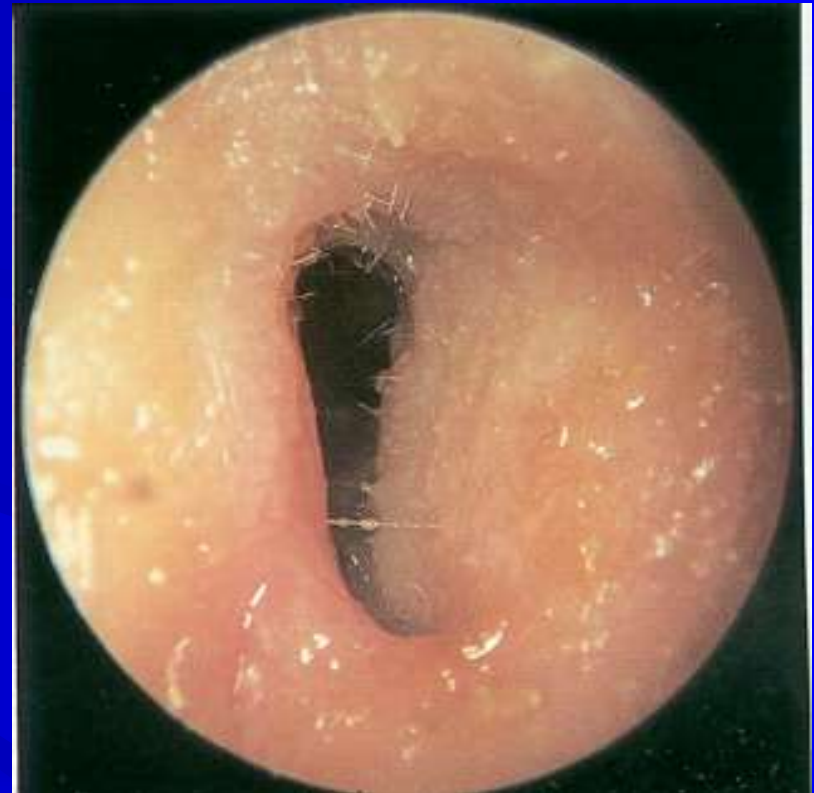
- “swimmer’s ear”
- Preinflammatory stage
- Acute inflammatory stage
 - Mild
 - Moderate
 - Severe

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

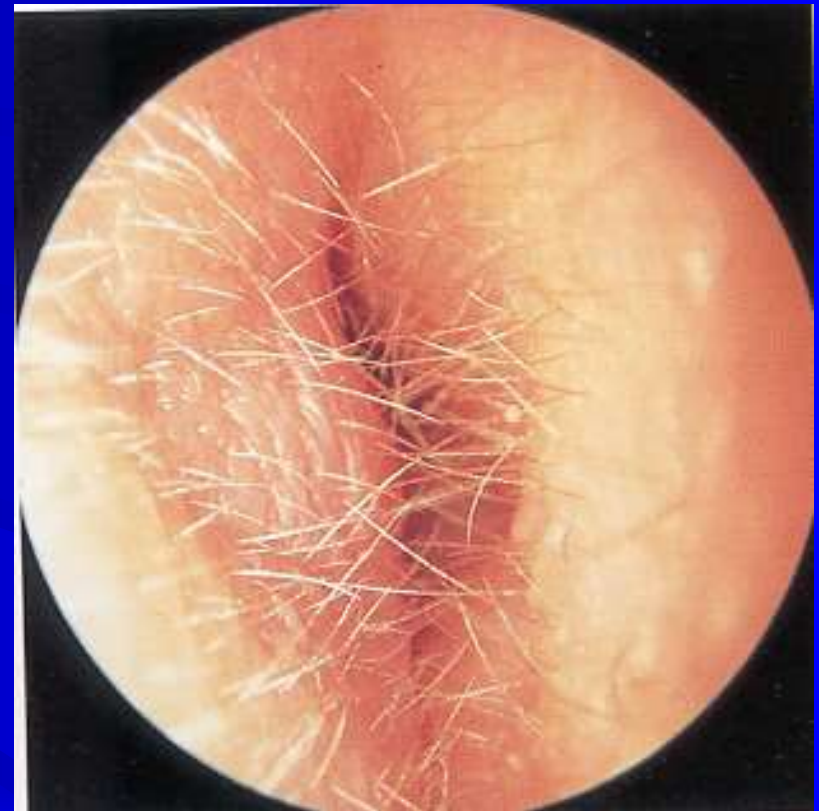
AOE: Mild to Moderate Stage

- 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*

Otomycosis: Symptoms

- Often indistinguishable from bacterial OE
- Pruritus deep within the ear
- Dull pain
- Hearing loss (obstructive)
- Tinnitus

Otomycosis: Signs

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



Otomycosis



Otomycosis: Treatment

- Thorough cleaning and drying of canal
- Topical antifungals

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

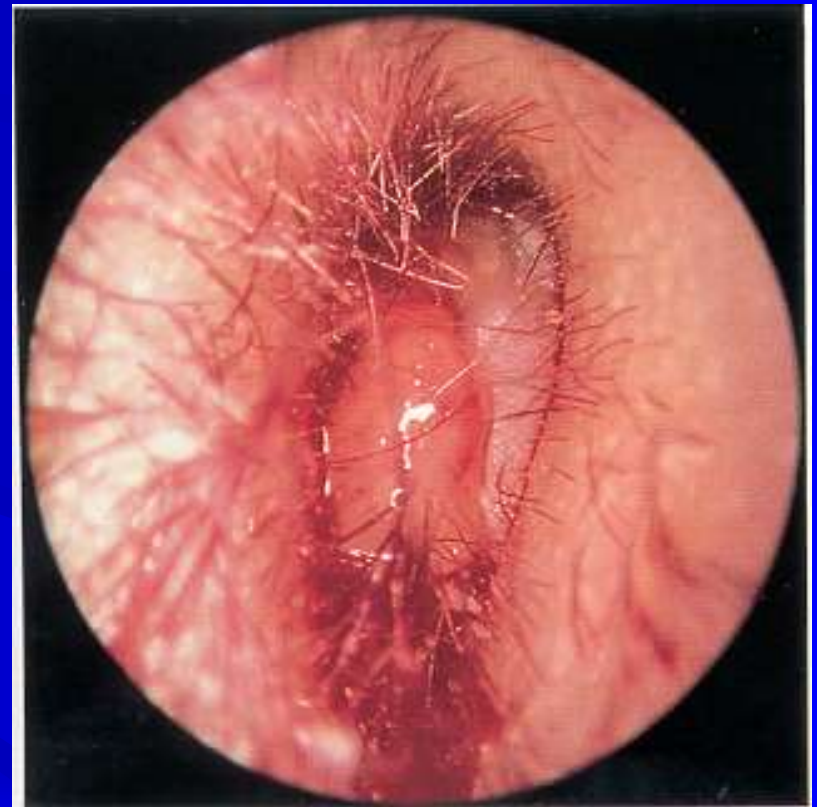
- Meltzer and Kelemen, 1959
- Chandler, 1968 – credited with naming

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