



Complicated Otitis Externa

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Embryology

Auricle:

1. Begins development during the 6th week of gestation
2. Derived from mesoderm of the 1st and 2nd branchial arches, forming 6 His hillocks
3. Reaches adult shape by the 20th week of gestation, but the adult size is not reached until age 9 years



Embryology cont.

EAC:

1. Begins to form during the 8th week of gestation, when the surface ectoderm of the 1st pharyngeal groove thickens and grows toward the middle ear. This core of tissue begins to resorb by the 21 weeks' gestation to form a channel that is complete by 28 weeks' gestation. The canal reaches adult size by age 9 years and ossifies completely by age 3 years.



Introduction to Otitis Externa

- Most ear canal infections are due to excessive moisture providing suitable conditions for bacterial overgrowth
- Acute otitis externa occurs in 4 of every 1000 people per year
- Otitis externa is defined as chronic when the duration of the infection exceeds 4 weeks or when more than 4 episodes occur in 1 year



In the patient history:

- 1 to 2 days of progressive ear pain
- Exposure to water
- Itching
- Purulent discharge
- Conductive hearing loss
- Feeling of fullness or pressure



On physical exam:

- sine qua non of otitis externa = *pain on gentle traction of the external ear*
- Periauricular adenitis
- Speculum examination reveals erythema, edema of the epithelium, and accumulation of moist debris in the canal
- Spores and hyphae may be seen in the external canal, if etiology is fungal
- Eczema of the pinna may be present
- (CN) involvement is **not** associated with simple otitis externa.



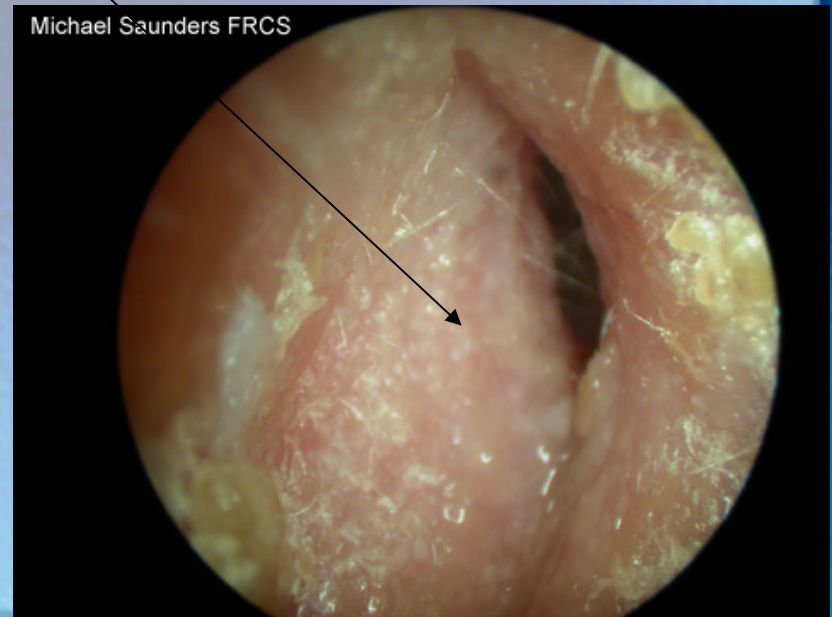
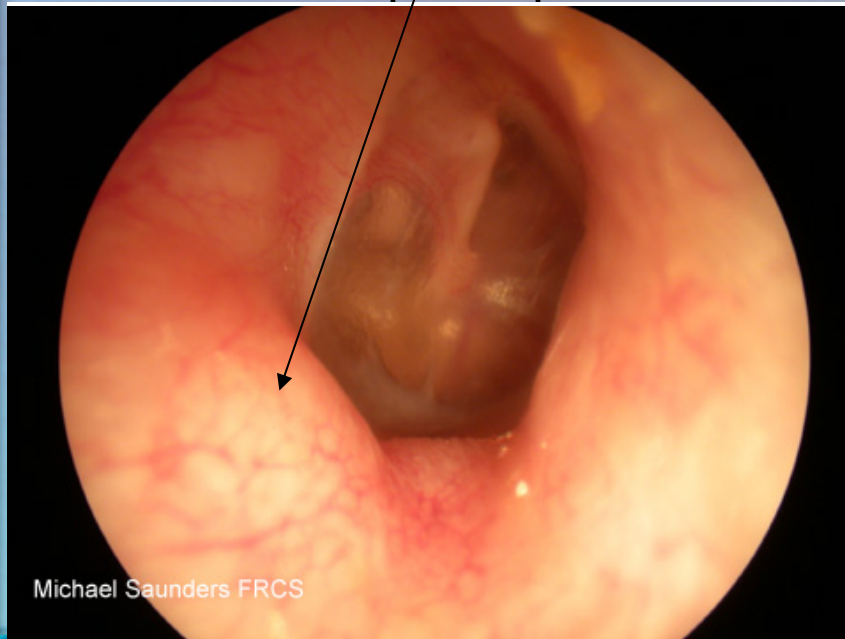
Eczema

- External clue to OE



Speculum findings:

- the canal may be so swollen that a view into the ear is impossible
- In swimmers, divers and surfers, chronic water exposure can lead to the growth of bony swellings in the canal known as *exostoses*. These can interfere with the drainage of wax and predispose to infection



Differential diagnoses:

- Otitis media
- Ramsay Hunt syndrome
- Furuncle
- Skull base osteomyelitis
- Preauricular cyst and fistula
- Lacerations
- Atopic dermatitis
- Cerumen impaction
- Exostosis and osteoma
- Foreign body
- Acute (bullous) and chronic (granular) myringitis



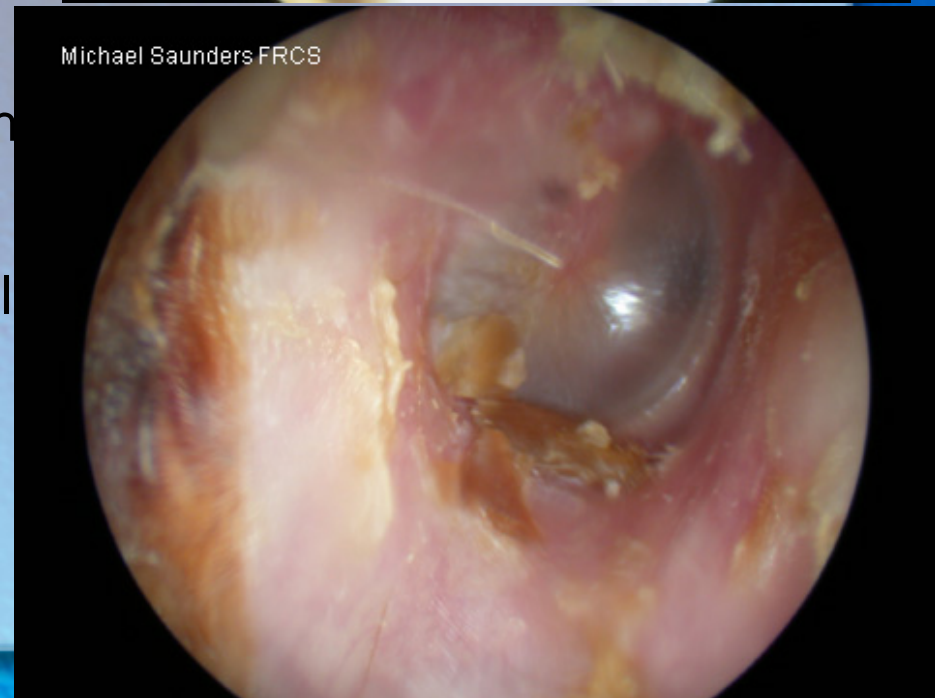
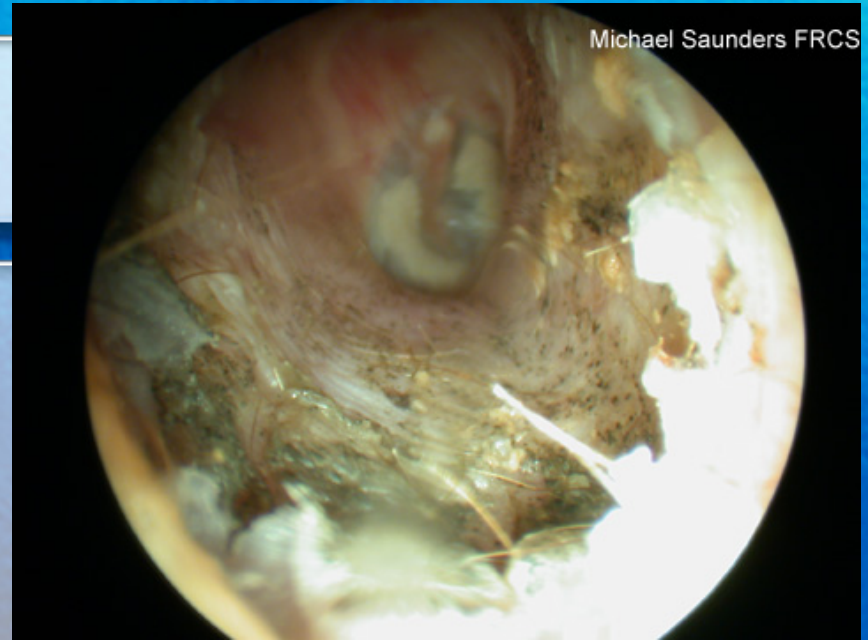
Organisms

1. *Pseudomonas* species
2. Staphylococci
3. Streptococci/Gram negative rods
4. Fungi (*Aspergillus*/*Candida* species)



Identify:

- These black dots (spores) are the appearance of fungal infection (*aspergillus niger*), with other fungi the spores may be white or yellow
- *chronic otitis externa*: Although the canal wall is not swollen, the skin is excoriated and red. The drum is essentially normal



Labs/workup

Usually after failed empiric therapy:

- bacterial and fungal culture
- Adults with otitis externa: screening blood glucose and/or a urine dipstick test to rule out occult diabetes.
- Additional tests (if available):
 - Gram stain of d/c
 - KOH prep smear (within 10 min)



Imaging

- Imaging studies are not required for simple otitis externa
- However, in patients with suspected malignant otitis media (diabetic or immunocompromised):

- **scan using CT with contrast**

Additional/Optional:

- MRI of the temporal bone
- triple-phase bone scanning using Technetium-99m
- gallium scanning



Topical Treatment (assumes intact TM)

- Acetic acid with and without hydrocortisone (EarSol HC, VoSoL HC, Acetasol HC)
 - Apply in affected ear TID
- Neomycin, polymyxin B, and hydrocortisone (Cortisporin Otic)
 - Apply in affected ear TID
- Ciprofloxacin (Ciloxan)
 - Apply gtt in affected ear BID
- Ofloxacin (Floxin)
 - Apply in affected ear BID or 10 drops in affected ear QD
- Nystatin powder (Mycostatin, Nilstat)/Boric acid powder
 - 1-2 puffs from handheld nebulizer q1wk



Case Presentation: ER consult

- Mr. A.T is a 53 y/o Hispanic male with PMHx sig. for well controlled DM (HbA1C 6.5) and severe fungal otitis externa 7 yrs ago requiring gross debridement and hospitalization. CC = clear, non-purulent, non-odorous d/c from his left ear for the past 10 days following an URI. Pt. denies dizziness, increasing pain, or fever.
- On exam,
 - Right Ear: right TM intact, non-erythematous, no fluid present
 - Left Ear: EAC appears white and wet with friable cheesy material present. Non-bloody. Large central perforation present.



Next step in management?

- Labs?
- Imaging?
- Empiric therapy with f/u?
 - What will you prescribe?



Treatment plan

- Obtain fungal and bacterial cultures
- No imaging necessary
- Tolnaftate 1% topical in L ear BID x 7 days (he didn't use)
- Ofloxacin 0.3% otic, 4 gtts in L ear BID x 7 days
- F/U in 2 wks



What if's discussion:

On arriving in the ER for simple EO consult you find pt has:

- Severe, unrelenting, deep-seated otalgia
- Temporal headaches
- Purulent otorrhea
- Dysphagia, hoarseness, and/or facial nerve dysfunction



Suspecting Malignant EO

Physical exam:

- Inflammatory changes are observed in the external auditory canal and the periauricular soft tissue
- The pain is out of proportion to the physical examination findings
- Marked tenderness is present in the soft tissue between the mandible ramus and mastoid tip
- Granulation tissue is present at the *floor of the osseocartilaginous junction*. This finding is virtually pathognomonic of malignant external otitis (MEO).
- Fever is uncommon, but if present, usu > 39C



Orders?

- Labs
 - Cultures (bacteria & fungi)
 - Glucose monitoring
- Imaging
 - **CT scanning** or MRI of the temporal bone
 - triple-phase bone scanning
 - gallium scanning



Next step

- Admit patient
- Place on empiric IV Antibiotics until organism is isolated through culture
- pain relief
- Once organism isolated, treat appropriately
- Consult Infectious Disease
- Use decreased severe pain as marker of improvement
- Surgery is necessary only if necrosis is present



Treatment

- meticulous glucose control if diabetic
- aural toilet
- systemic and ototopic antimicrobial therapy (fluoroquinolone)
- hyperbaric oxygen therapy
- debridement



Treatment options

- Ciprofloxacin 1500-2250 mg/d PO/IV divided bid/tid
 - Resistance seen in up to 33% of pts with MOE who fail OP treatment
- Ceftazidime 1-2 g IV q8h
- Ticarcillin/clavulanate (Timentin) 3.1 g IV q6h

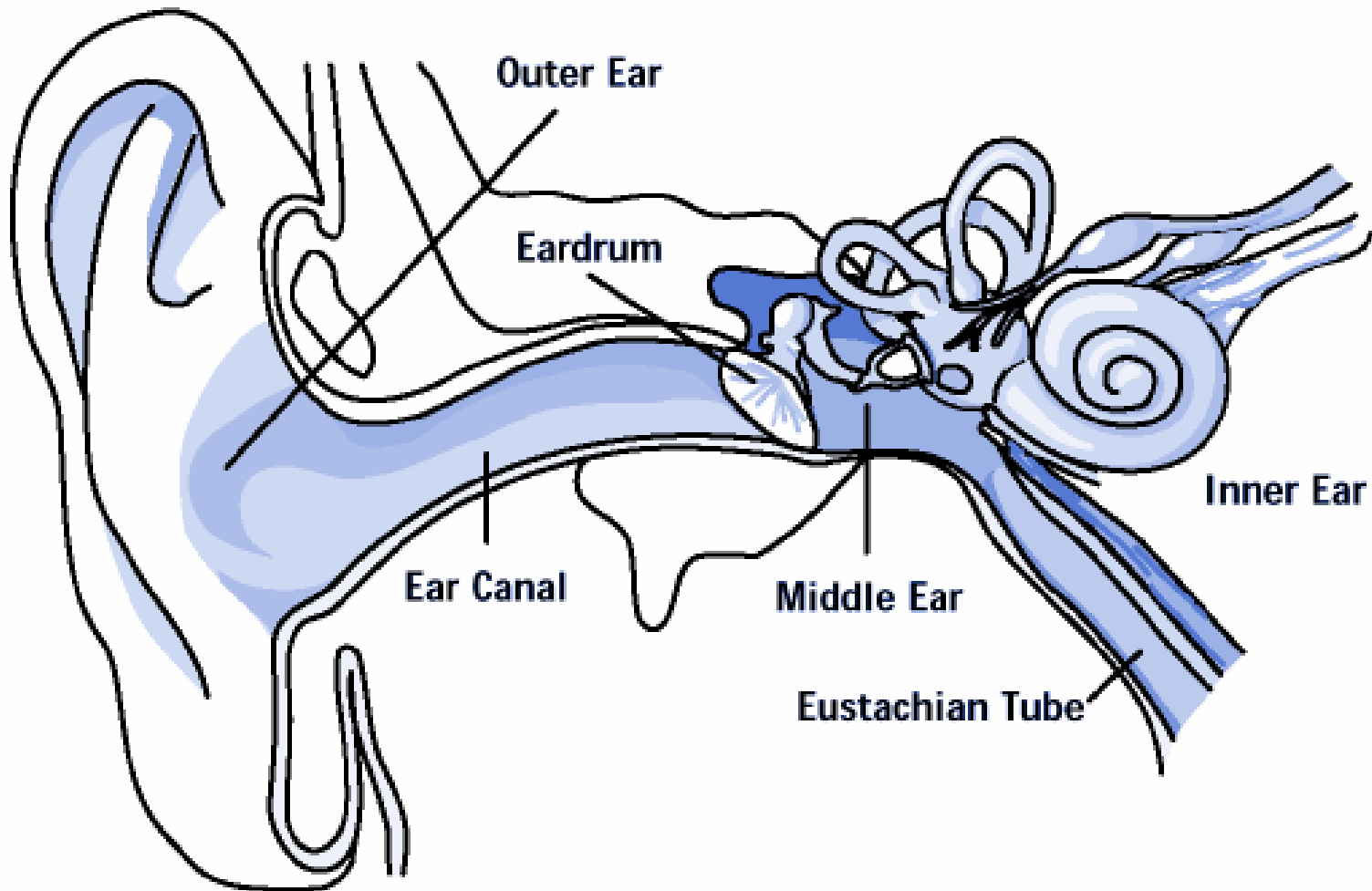


Duration of Treatment and F/U

- Treatment response should be evaluated with a gallium citrate (Ga 67) scan every 4-6 weeks during treatment.
- Benecke recommended ending treatment 1 week after the gallium citrate Ga 67 scan findings return to normal and confirming this with a repeat scan 1 month after the treatment is stopped.
- Using this protocol, average duration of treatment was 8.8 weeks with a range of 4-17 weeks.
- Study followed 13 pts gathered over 4 yrs in the Los Angeles area



Questions/Comments?



References:

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