External Ear Disorders

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OBSTRUCTIONS

1

CERUMEN (EARWAX) IMPACTION ................................. 1

Treatment .................................................................. 1

FOREIGN BODY ................................................................. 1

EXTERNAL OTITIS ............................................................... 2

Clinical Features ............................................................. 2

Treatment .................................................................. 2

PRETERHONDRITIS ............................................................ 2

Treatment .................................................................. 2

MALIGNANT EXTERNAL OTITIS .................................... 3

Clinical Features ............................................................. 3

Diagnosis .................................................................. 3

Treatment .................................................................. 3

TRAUMA .......................................................................... 3

SUPRATRANCHIONAL HEMATOMA ................................. 3

LACERATIONS .................................................................. 3

FRACTURES ..................................................................... 4

TUMORS .......................................................................... 4

CERUMEN (EARWAX) IMPACTION

Cerumen (earwax) - naturally occurring substance that cleans, protects, and lubricates external auditory canal and is expelled by self-cleaning mechanism.

- causes symptoms and / or prevents ear examination.

N.B. definition of cerumen impaction does not require complete obstruction!

- affects in USA - 10% children, 5% healthy adults, 57% older persons in nursing homes, 36% those with mental disabilities.

- symptoms – itching, otalgia, odor, discharge, tinnitus, fullness, cough, temporary conductive hearing loss.

N.B. patients must not remove earwax (using cotton-tipped swabs or oral jaw irrigations).

- evaluate patients with hearing aids for cerumen impaction q 6-12 months (cerumen can cause feedback, reduced sound intensity, or damage to hearing aid).

- complications – infection.

TREATMENT

- removal by:
  a) IRRIGATION (contraindicated in positive otologic history, esp. otosclerosis or TM perforation – water may exacerbate chronic otitis media!); direction of jet must be backward & upward, pressurized irrigation entails risk of trauma!
  b) SPECİALITY INSTRUMENTS (blunt curette, loop, hook, probe, forceps, suction) - preferred for narrow / distorted ear canals*, TM perforation or tube, immune deficiency, diabetes mellitus.
  c) EAR CANDLING - ineffective and potentially dangerous.

FOREIGN BODY

- children, mental handicaps.
- if present for long time, may cause discharge.
- best removed by raking it out with blunt hook or suction tip.
- forceps tend to push smooth objects deeper into canal!

- foreign body lying medial to tensor is difficult to remove without injuring tympanic membrane and ossicular chain!
- metal and glass heads can sometimes be removed by irrigation; HYDROSCOPIC foreign body (e.g. bean) swells when water is added to it, complicating its removal.

*binocular microscope with microinstrumentation may be needed


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Ear40 (1)
EXTERNAL EAR DISORDERS

EXTERNAL OTITIS

- infectious dermatitis of耳道

a) LOCALIZED (furuncle), usually due to S. aureus
b) DIFFUSE, affecting entire canal (diffuse external otitis).

- predisposing causes: swimming (so-called swimmer's ear), forceful cleaning of ear, trauma.
- dermatologic persons (allergies, psoriasis, eczema, seborrheic dermatitis) are particularly prone.
- normally, ear canal cleanses itself by moving desquamated epithelium, as on conveyor belt, from tympanic membrane outward; cotton applicators interrupt self-cleansing mechanism; debris and cerumen trap water allowed into canal → skin maceration sets stage for invasion of pathogenic bacteria.

- antibiotic + steroid drops prevent infection and reduce inflammation.

EXTERNAL OTITIS - infectious dermatitis of ear canal

a) LOCALIZED (furuncle); usually due to S. aureus
b) DIFFUSE, affecting entire canal (diffuse external otitis).

- itching, pain (worse on jaw movement), foul-smelling discharge.
- hearing loss (if canal becomes swollen or filled with purulent debris).
- tenderness on traction of pinna and on pressure over tragus (vs. in otitis media).
- OTOSCOPY - skin of ear canal is red, swollen, littered with moist, purulent debris.

TREATMENT Diffuse external otitis:
1) infected debris is gently and thoroughly removed from canal with suction or dry cotton wipes.
2) topical 2% acetic acid
3) topical antibiotics (NEOMYCIN + POLYMYXIN B) + corticosteroids (1% HYDROCORTISONE)
4) ANALGESIC (up to narcotic!)
5) spreading cellulitis → systemic antibiotics.

Furuncles - allow to drain spontaneously (incision may lead to spreading perichondritis of pinna!!!).
- oral antistaphylococcal antibiotics (topical antibiotics are ineffective!).
- analgesics.
- dry heat.

PREVENTION - irrigating ears with 1:1 mixture of rubbing alcohol (helps remove water) and vinegar immediately after swimming.

PERICHONDritis

- infection of perichondrium of pinna

- etiology - trauma, insect bites, incision of superficial infections of pinna; usually Gr. rod.
- pus accumulates between cartilage and perichondrium → avascular necrosis → deformed pinna.
- clinical course: indolent, long-lasting, destructive.

TREATMENT - wide incision and suction drainage (to approximate blood supply to cartilage).
- systemic antibiotics.
MALIGNANT EXTERNAL OTITIS

- Pseudomonas (95%) OSTEOMYELITIS of ear canal and temporal bone.

**CLINICAL FEATURES**

- 50% cases have been reported to be preceded by traumatic aural irrigation!
- Begins as EXTERNAL OTITIS that progresses into SKULL BASE OSTEOMYELITIS.
  1. persistent severe deep-seated earache
  2. foul-smelling purulent otorrhea
  3. marked tenderness in soft tissue between mandible ramus and mastoid tip.
  4. ± conductive hearing loss
  5. CN7 (± other nerves) paralysis in severe cases.

*Pain is out of proportion to physical examination findings!!*

- fever is uncommon
- osteomyelitis spreads along skull base and may cross midline!
- MALIGNANT (without a/b) aggressive clinical behavior (→ purulent meningitis), poor treatment outcome (poorer in AIDS than in diabetes), high mortality (40-50%; < 10% with appropriate antibiotics).
- 9-27% can recur (as long as one year after treatment is completed).

**DIAGNOSIS**

- **OTOSCOPY**:
  - granulation tissue in ear canal (granulation tissue at floor of osseocartilaginous junction is virtually pathognomonic).
  - may reveal exposed bone.
  - tympanic membrane is usually intact.

- **imaging**:
  a) fine-cut CT of skull base and temporal bone (30-50% of bone destruction is required to detect osteomyelitis by CT!).
  b) gadolinium-enhanced MRI provides poor bone resolution.
  c) SPECT scan is sensitive but not specific; application of SPECT improves poor spatial resolution.
  - Technetium Tc 99m methylene diphosphonate, Gallium citrate Ga 67, Indium In 111-labeled leukocyte.

- **BIOPSY of ear canal (to differentiate from malignant neoplasm + to identify causative organism).**

- **ESR ↑↑ can be used to support clinical diagnosis since acute external otitis or ear canal malignancy do not cause elevation!**

**TREATMENT**

- diabetes control
- antipseudomonal IV antibiotic therapy (6-12 weeks):
  a) FLUOROQUINOLONE
  b) 3rd generation CEPHALOSPORIN
  c) semisynthetic PENICILLIN + AMINOGYCOSIDE.

- aural toilet, hyperbaric oxygen therapy.
- response should be evaluated with Ga-67 scan q4-6 weeks during treatment;
  - CT / MRI cannot determine osteomyelitis resolution!, antibiotics are continued for 1 week after Ga-67 scan becomes normal.

- surgery is usually not helpful or necessary (reserved for granulation tissue and bony sequestra).

**TRAUMA**

- Anesthesia: raise wheal with LIDOCAINE (without EPINEPHRINE!!!) about entire base of ear - anesthetizes all but external canal and concha (require direct infiltration).

**SUBPERICHONDRIAL HEMATOMA**

- blunt trauma to pinna.
- pinna becomes shapeless, reddish purple mass.
- avascular cartilage necrosis may occur.
- "cauliflower ear" (wrestlers, boxers) results from organized, calcified hematoma.

- treatment – promptly evacuate clot through incision (or aspirate with 18 G needle) + approximate skin and perichondrium to cartilage with suction drainage or pressure bandage for 5-7 days (to keep cartilage close to its blood supply).

- often reaspiration is necessary.

**LACERATIONS**

**EXTERAL EAR DISORDERS**

- [Image: A: Coronal CT, left temporal bone - inflammatory mass (arrows) has destroyed ossicles and walls of external canal. B: Axial CT, right temporal bone - destruction of anterior and posterior canal walls (arrows).]

- [Image: A: Granulation tissue in ear canal (granulation tissue at floor of osseocartilaginous junction is virtually pathognomonic). B: May reveal exposed bone. C: Tympanic membrane is usually intact.].
EXTERNAL EAR DISORDERS

- managed surgically
  - skin margins are sutured (sutures should not extend into cartilage!)
  - use absorbable sutures on medial surface (to avoid having to bend ear back to remove those sutures)
  - if cartilage is involved, minimal debridement and approximation of cartilage and perichondrial layer with fine absorbable suture should precede skin closure
  - if there is skin loss, small amount of cartilage may be removed to allow skin coverage
  - if skin loss is significant, remaining cartilage is removed and saved in subcutaneous pocket for later use
  - all significant ear injuries should be splinted following repair: wet (benzoin-impregnated) cotton balls are packed about ear to give support; ear and head are then wrapped with circumferential protective dressing.
  - staphylococcal antibiose (relative avascularity of cartilage - risk of smoldering chondritis).
  - EXTERNAL CANAL: lacerations - managed by microscopically placing any skin flaps in their normal position, packing ear canal, administering topical antibiotic drops.

FRACURES

- forceful blows to mandible may be transmitted to anterior wall of ear canal.
- displaced fragments (may cause canal stenosis) must be reduced / removed.

TUMORS

Sebaceous cysts, osteomas, exostoses, keloids may occlude ear canal:
1) retention of cerumen → conductive hearing loss.
2) retention of water → external otitis.
- excision is treatment of choice.

Basal cell, squamous cell carcinomas on pinna after regular sun / radiation exposure; in ear canal after persistent inflammation in chronic otitis media.
- EARLY LESIONS: cautery and curettage or radiation therapy.
- ADVANCED LESIONS:
  - pinna → V-shaped excision.
  - ear canal → resection:
    - tumor 5 mm lateral to eardrum → external ear canal excision.
    - tumor impinges on eardrum without middle ear invasion → lateral temporal bone resection.
    - tumor invades middle ear → total en bloc temporal bone resection.
- cartilage invasion makes radiation therapy less effective and surgery preferred treatment.