Otitis Externa - Acute (1 of 6)

1. Patient presents w/ symptoms suggestive of acute otitis externa

2. DIAGNOSIS
   Do history & physical exam suggest acute otitis externa?
   - No
   - Yes

   DETERMINE CAUSE OF OTITIS EXTERNA

   A. ACUTE DIFFUSE BACTERIAL INFECTION
      - Non-pharmacological Therapy
        - Effective ear toilet
        - Patient education
      - Pharmacotherapy
        - Supportive Therapy
          - Analgesics
        - Topical Therapy
          - Acetic acid ear drops
          - Anti-infective agents
            - Aminoglycosides
            - Quinolones (consider antipseudomonal effect)
          - Corticosteroids

   B. SUPERFICIAL FUNGAL INFECTION
      - PHARMACOTHERAPY
        - Supportive Therapy
          - Analgesics
        - Local application of heat

   C. LOCALIZED BACTERIAL INFECTION (FURUNCULOSIS)
      - Consider expert referral

   D. CHRONIC DIFFUSE BACTERIAL INFECTION
      - Treat underlying skin disorder
      - Remove precipitating antigen or irritant for contact dermatitis

   Consider expert referral

   Non-pharmacological Therapy
   - Effective ear toilet
   - Patient education
   - Consider sensitivity to previous topical agent

   Pharmacotherapy
   - Symptomatic Therapy
     - Analgesics (oral/topical)
   - Topical Therapy
     - Consider Acetic acid ear drops + corticosteroid ear drops x 7 days

Not all products are available or approved for above use in all countries. Specific prescribing information may be found in the latest MIMS.
**DIAGNOSIS**

**History**
- Ear pain ranging from pruritus to severe pain; may be exacerbated by movement of the ear or jaw
- Symptoms occur rapidly within 48 hr in the last 3 wk

**Physical Exam**
- Tenderness of the tragus &/or pinna is elicited; pain may be exacerbated with jaw movement
- Edema &/or erythema of the ear canal
- Otorrhea, lymphadenitis & cellulitis may or may not be present
- Conductive hearing loss may be present
- Besides thorough exam of the ear, head & neck should also be examined to look for possible complications of otitis externa
  - Sinuses, nose, mastoids, temporomandibular joints, mouth, pharynx & neck
- If the tympanic membrane can be visualized & is red, a tympanometry should be used to determine if associated otitis media is present

**Causes of Otitis Externa**

**Localized Bacterial Infection**
- Localized swelling of the ear canal
- Mild fever (≤38°C)
- Preauricular lymphadenopathy

**Acute Diffuse Bacterial Infection**
- The external ear &/or ear canal appears red, swollen or eczematous
- There is usually shedding of scaly skin & discharge in the ear canal
- Ear drum, if it can be seen, looks inflamed
- Tender regional lymphadenitis may be present
- Mild fever (≤38°C)
- Etiology
  - Pseudomonas aeruginosa & Staphylococcus aureus

**Chronic Diffuse Bacterial Infection**
- Cerumen may be absent
- Skin of ear canal is usually dry, hypertrophic, with variable swelling often resulting in partial stenosis
- May be exorated with mucopurulent discharge

**Malignant (or Necrotizing) Otitis Externa**
- Rare complication of bacterial otitis externa wherein there is life-threatening extension of infection into mastoid or temporal bone
- Affects elderly, diabetics & immunocompromised
- Most common pathogen isolated is P. aeruginosa
- Foul smelling ear discharge, otalgia, hearing loss, itching & fever may be present
- Granulocytic tissue in the canal, especially at the bone-cartilage junction

**Superficial Fungal Infection**
- May occur when topical antibiotics or steroids are used long-term
- Acute or subacute onset
- Itching, discomfort, scaling, discharge, if present, varies in color
- Hyphae may be visible

**Dermatitis**
- Otitis externa may also be caused by dermatologic conditions eg contact dermatitis, seborrheic dermatitis & atopic dermatitis

**Differential Diagnosis**
- These conditions can usually be differentiated by history & clinical exam
  - Foreign body, esp in children (Mastoiditis)
  - Impacted cerumen (Neoplasia)
  - Cholesteatoma (Referred pain)
**NON-PHARMACOLOGICAL THERAPY**

**Effective Ear Toilet**
- The ear should be cleared of all debris & discharge; the meticulous & repeated clearing of the ear canal is the cornerstone of effective therapy
- Cleansing of the ear should be done in order to visualize the tympanic membrane to exclude otitis media
  - Infected debris can lower the pH of the ear canal which can decrease the activity of aminoglycoside antibiotics
- Ear toilet should be done under direct visualization & can be performed using suction, if available, gently syringing or dry mopping
  - Flushing the ear canal should not be done unless it can be assured that the tympanic membrane is intact
  - Flushing the ear when there is a perforated tympanic membrane can disrupt the ossicles & cause significant cochlear-vestibular damage, resulting in hearing loss, vertigo, tinnitus & dizziness
  - Flushing can also cause further trauma to the ear canal
- If pain or swelling prevent cleansing, the patient should be evaluated frequently until the secretions can be removed
- If the ear canal is very swollen, a cotton wick may be placed to ease drainage & permit the application of topical medications

**Patient Education**

**Treatment**
- Patient should be advised to instill ear drops while lying down w/ the affected ear in the uppermost position
  - This position should be retained for 10 min after the instillation of drops

**Prevention**
- Methods to prevent recurrence of otitis externa should be discussed
- Patient should be advised to keep the ear dry & to avoid scratching & cleaning the ear canal w/ cotton buds
- Insertion of plugs (eg cotton wool) should be avoided since this will block drainage
  - If patient insists on using plug, advise loose application w/ frequent changing
- To prevent water from entering the ear when washing, plug the ear w/ cotton wool covered w/ petroleum jelly
- To avoid water entering the ear canal while swimming tight fitting bathing cap that covers ears is preferred over ear plugs
  - Ear plugs can traumatize & aggravate inflamed skin in the ear canal

**PHARMACOTHERAPY**

**Supportive Therapy**

**Analgesics**
- Paracetamol or Ibuprofen can provide effective pain relief; if pain is severe Paracetamol w/ Codeine may be considered

**Topical Therapy**
- Topical therapy is generally effective unless the patient has signs of systemic infection or there is evidence of spreading disease eg cellulitis
- Topical antibiotics are considered 1st-line treatment choices in uncomplicated acute otitis externa
- Patients should be informed on administration of topical drops
  - In the case of an obstructed ear canal, application of topical medication should be done w/ aural toilet &/or use of a wick
- Non-ototoxic topical medication should be used for patients w/ tympanostomy tube or a perforated tympanic membrane

**General Therapeutic Principles**
- There is not enough evidence to recommend one treatment over another; therefore choice of agent will be based on patient preference, risk of adverse effects, cost, availability & simplicity of administration
Acetic Acid Ear Drops
- May be used as 1st-line therapy for acute bacterial or fungal infections
- Action: Reduces edema & inflammation by creating an acidic environment that is hostile to pathogenic bacteria
- May be used in combination w/ corticosteroid drops; treatment seems to be more effective when combined w/ corticosteroid
- Preparations w/ Aluminium acetate are also available
- Because of the acidity, may sting the inflamed ear canal, this may decrease patient compliance
- Risk of contact dermatitis may be lower than the aminoglycosides & the risk of superinfection may be lower than w/ corticosteroids

Topical Anti-infective Ear Drops
Aminoglycosides
- Many single agent & anti-infective combination products are available; also available are products combined w/ corticosteroids
  - Neomycin is effective against Staphylococcus aureus & Proteus sp but has limited activity against Pseudomonas sp, anaerobes & all streptococci
  - Polymyxin is effective against Pseudomonas sp as well as organisms covered by Neomycin
- Efficacy has remained consistent over the past couple of decades
- Contact sensitivity reactions may occur & are most commonly due to the aminoglycoside or preservatives
- Potential risk of ototoxicity
- Risk of ototoxicity is negligible w/ an intact tympanic membrane

Quinolones
- Eg Ciprofloxacin (ear/eye preparation), Ciprofloxacin w/ Hydrocortisone & Ofloxacin
- Highly effective w/o causing local irritation or sensitization & no ototoxicity risk
- The quinolones are effective against Streptococcus pneumoniae, Haemophilus influenzae, Moraxella catarrhalis, Staphylococcus sp strains & Pseudomonas sp
- May be preferred when tympanostomy tube is present or tympanic membrane is ruptured since quinolone drops offer increased safety
- Cost & availability also need to be considered
- Patient compliance may be increased because twice daily dosing may be used
- Use is associated w/ increased community exposure of an important class of antibiotics w/ potential for causing resistance

Antifungals
- Clotrimazole 1% soln
  - used when fungal otitis externa (OE) is resistant to acetic acid ear drops
  - not recommended in perforated tympanic membrane
- Tolnaftate 1% soln
  - used in fungal OE with perforated tympanic membrane

Topical Corticosteroids
- The addition of topical corticosteroids to Acetic acid or antibiotics may decrease the inflammation & edema of the ear canal
- Symptoms may resolve more quickly
- Topical corticosteroid can be a topical sensitizer

Systemic Anti-infectives
- Rarely needed but are used in persistent OE & in cases of OE with concommitant otitis media
- Also used when infection has spread locally or systemically
- Malignant OE is treated with systemic antibiotics

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### DURATION OF THERAPY

- Length of therapy recommendations vary
  - If the condition fails to improve or respond to initial treatment within 48-72 hr, reassess to confirm the diagnosis of diffuse acute otitis externa.
- May consider administering drops for 3 days beyond cessation of symptoms (usually 5-7 days).
- Therapy with antibacterial or corticosteroid ear drops lasting >7 days increases the risk of secondary fungal infection or sensitization of the ear canal.

### Dosage Guidelines

#### EAR ANTI-INFECTIVES & ANTISEPTICS

<table>
<thead>
<tr>
<th>Drug</th>
<th>Available Strength</th>
<th>Dosage</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aminoglycosides</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gentamicin</td>
<td>0.3% ear &amp; eye drops</td>
<td>2-4 drops bid-qid</td>
<td>Adverse Reactions: Hypersensitivity reactions; ototoxicity can occur</td>
</tr>
<tr>
<td>Polymyxin B (Polymyxin B sulfate)</td>
<td>10,000 u x 10 mL ear drops</td>
<td>3 drops tid-qid</td>
<td>Special Instructions: Use with caution if the ear drum is perforated</td>
</tr>
<tr>
<td><strong>Polymyxin B</strong></td>
<td>10,000 u x 10 mL ear drops</td>
<td>3 drops tid-qid</td>
<td>Adverse Reactions: Hypersensitivity reactions; ototoxicity can occur</td>
</tr>
</tbody>
</table>

**Chloramphenicols**

<table>
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</thead>
<tbody>
<tr>
<td>Chloramphenicol</td>
<td>0.5%, 5% ear drops</td>
<td>2-3 drops bid-qid</td>
<td>Adverse Reactions: Possible bone marrow hypoplasia; ototoxicity; perforation of tympanic membrane</td>
</tr>
</tbody>
</table>

**Quinolones**

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<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciprofloxacin</td>
<td>0.3% ear/eye drops</td>
<td>3-4 drops bid-qid</td>
<td>Adverse Reactions: Local burning or discomfort</td>
</tr>
<tr>
<td>Ofloxacin</td>
<td>0.3% ear drops</td>
<td>Child: 3-5 drops bid Adults: 6-10 drops bid</td>
<td>Adverse Reactions: Occasionally taste perversion; pruritus</td>
</tr>
</tbody>
</table>

**Antifungals**

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</thead>
<tbody>
<tr>
<td>Clotrimazole</td>
<td>1% soln</td>
<td>3-4 drops bid</td>
<td>Adverse Reactions: Irritation, pruritus &amp; contact dermatitis</td>
</tr>
<tr>
<td>Tolnaftate</td>
<td>1% soln</td>
<td>3-4 drops bid</td>
<td></td>
</tr>
</tbody>
</table>

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1 Many ear anti-infectives & antiseptics, including products with local anesthetics are available. Please see the latest MIMS for the available formulations.

All dosage recommendations are for non-pregnant & non-breastfeeding women, & non-elderly adults with normal renal & hepatic function unless otherwise stated. Not all products are available or approved for above use in all countries. Products listed above may not be mentioned in the disease management chart but have been placed here based on indications listed in regional manufacturers’ product information. Specific prescribing information may be found in the latest MIMS.
## EAR ANTISEPTICS W/ CORTICOSTEROIDS

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciprofloxacin/ hydrocortisone otic susp</td>
<td>3 drops bid</td>
<td>Adverse Reactions: Headache, pruritus</td>
</tr>
<tr>
<td>Framycetin/gramicidin/ dexamethasone eye/ear drops</td>
<td>2-3 drops tid-qid</td>
<td>Special Instructions: Use w/ caution if the ear drum is perforated</td>
</tr>
<tr>
<td>Gentamicin/betamethasone eye/ear drops</td>
<td>3-4 drops bid-qid</td>
<td>Adverse Reactions: Hypersensitivity reactions, ototoxicity can occur</td>
</tr>
<tr>
<td>Neomycin/gramicidin/ nystatin/triamcinolone ear drops</td>
<td>2-3 drops tid-qid</td>
<td>Special Instructions: Use w/ caution if the ear drum is perforated</td>
</tr>
<tr>
<td>Neomycin/dexamethasone ear drops</td>
<td>3-4 drops bid-tid</td>
<td></td>
</tr>
<tr>
<td>Neomycin/polymyxin B/ fluocinolone acetonide ear drops</td>
<td>4-5 drops bid-qid</td>
<td></td>
</tr>
<tr>
<td>Neomycin/polymyxin B/ furaladone/fludrocortisone/ lidocaine ear drops</td>
<td>3-4 drops bid-qid</td>
<td></td>
</tr>
<tr>
<td>Neomycin/polymyxin B/ hydrocortisone ear drops</td>
<td>3 drops tid-qid</td>
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</tr>
</tbody>
</table>

1Please see comprehensive list of available ear antiseptics w/ corticosteroids in the latest MIMS.

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Otitis Externa - Acute

Hannley MT, Denneny JC, Sedory Holzer S. Consensus panel report: use of ototopical antibiotics in treating 3 common ear
otitis.externa.html?&contentInstanceId= 255293. June 12, 2009.
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vан Бален ФАМ, Смит ВМ, Зултхоф НПА, et al. Clinical efficacy of three common treatments in acute otitis externa in primary