Earache

Notes by Shaila Gunn

Differential Diagnosis

1. **Common causes**

Diagnosis	Presentation	Diagnosis
Acute Otitis Media (AOM)	- Acute onset pain - Middle ear effusion - Irritability - Fever - Often follows a viral upper respiratory tract infection due to Eustachian tube dysfunction	CPS diagnostic criteria (2016) is: 1. Acute onset of otalgia or suspected otalgia, within 48 hours 2. Middle ear fluid, and 3. Significant inflammation of the middle ear (often see budging tympanic membranes)
Otitis media with effusion	- No acute symptoms - Occurs post AOM in up to 40% of cases	- Pneumatic otoscopy (70-90% sensitive) and tympanometry (60-70% sensive) will show little or no mobility - Poor man's version = sucking in and blowing against a closed mouth and nose, which can move the tympanic membrane and mimic what you would see with a pneumatic otoscope. - May also see loss of bony landmarks behind the tympanic membrane and presence of air-fluid levels
Acute otitis externa	- Otalgia - Itching - Fullness - Hearing loss - Ear canal pain with chewing	- Tenderness of tragus when pushed and pinna when pulled - Ear canal inflammation +/- otorrhea - Look out for lymphadenitis, tympanic membrane erythema, and cellulitis of the pina

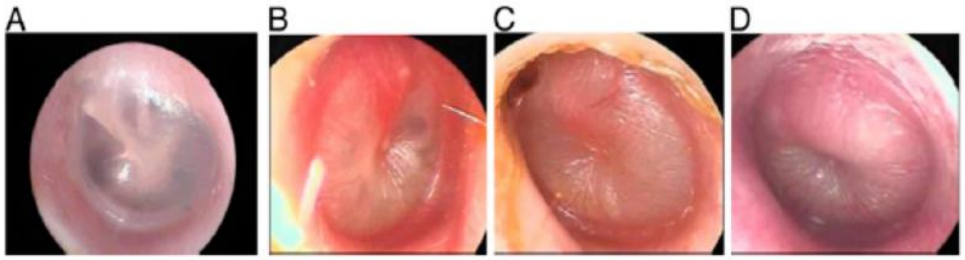
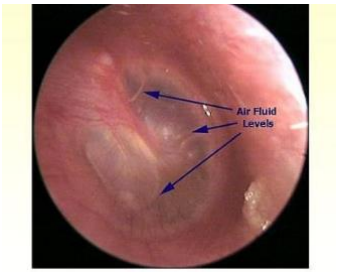


FIGURE 2
A, Normal TM. B, TM with mild bulging. C, TM with moderate bulging. D, TM with severe bulging. Courtesy of Alejandro Hoberman, MD.



2. **Serious causes**

Diagnosis	**Presentation**
Mastoiditis	Most common complication of AOM (mastoid air cells are connected directly to the inner ear) - Ear pain - Swelling - Redness and tenderness of mastoid - Protrusion of ear - Fever
Temporal Arteritis	- Temporal Pain - Jaw claudication - Scalp tenderness - Constitutional symptoms - May have otalgia - Polymyalgia rheumatica in 50% - Women > 60 years old
Meningitis	- Can be a complication of untreated AOM - Headaches, fever, neck stiffness - Unvaccinated
Malignant Otitis Externa	- Complication when AOM spreads to surrounding bones of the skull case - Intense, deep-seated ear pain - Systemically unwell - Temporal bone tenderness - Facial nerve palsy
Venous Sinus Thrombus	- Can be a complication of untreated AOM - Severe headaches, often worse with lying down or learning forward - Often will have other neurologic features such as vision changes, syncope, seizures, of focal deficits
Cholesteatoma	- Rare but serious complication of chronic otitis media - Epithelial mass forms behind tympanic membrane - Produces osteolytic enzymes which can erode into the bone of the ear canal
Tumours	- Includes rhabdomyosarcoma, lymphoma, eosinophilic granulomatous mass - Suspect if relapsing/persistent otitis externa or perforated otitis media and evaluate with a CT head

3. **Referred Pain**

1. Pharyngitis
2. Stomatitis
3. Dental infection
4. Auricular lymphadenopathy or lymphadenitis
5. Sinusitis (usually maxillary)
6. Parotitis
7. TMJ arthritis
8. Trigeminal neuralgia
9. Facial nerve palsy (AKA Bell's palsy)
10. Psychogenic
11. Cervical spine injury

Utility of Antibiotics

Most of the time, otitis media can be treated conservatively if:

1. There is no middle ear effusion, otorrhea, inflammation, fever, or pain >48 hours
2. The child is >6 months old with mild unilateral symptoms
3. The child is > 2 years old with mild bilateral symptoms

In these cases, parents can catch and wait for symptoms resolution in 48 hours (i.e. always arrange for follow up in 2 days) or provide a prescription to be filled if there is no improvement in 48 hours for reliable families.

Indications for antibiotics

1. Otorrhea
2. Perforated tympanic membrane
3. Moderate or severe otalgia
4. Otalgia lasting for at least 48 hours
5. Temperature about 39 degrees

Antibiotic Selection

The most common bacteria involved in acute otitis media are streptococcus pneumoniae (>90%), haemophilus influenzae, and moraxella catarrhalis.

Thus, the most appropriate choices are:

- Amoxicillin 45-60mg/kg/day in 3 divided doses (low dose) or 75-90 mg/kg/day in 2 divided doses (high dose) for
    - 10 days in children <2 years old or
    - 5 days for children older ≥2 years of age and adults

Remember, amoxicillin covers S. pneumoniae, group A strep, and some strains of haemophilus influenzae, and moraxella catarrhalis.

Low dose vs High dose

From Bugs & Drugs:

- Low/standard dose = 40 mg/kg/d PO divided TID and high dose = 90 mg/kg/d PO divided BID-TID.
    - High dose amoxicillin should be used if recurrent (≥3 episodes in 6 months or ≥4 episodes in 12 months with at least 1 in the last 6 months) if it is greater than 6 weeks since the last bout.
    - If it is less than 6 weeks since the last bout of AOM, this is considered a failure of first line agents.
    - High dose can also be considered for healthy children ≥6 mos.

Penicillin Hypersensitivity

If they have a hypersensitivity to penicillins, then choose:

1. Cefuroxime-axetil 30mg/kg/day 2-3 divided doses
2. Cefprozil
3. A 3rd generation cephalosporin
4. Clarithromycin
5. Azithromycin

Symptoms should improve within 24h and resolve within 2-3 days of starting antimicrobials; if persistent or worsening symptoms the patient should be evaluated again for persistent AOM or complications.

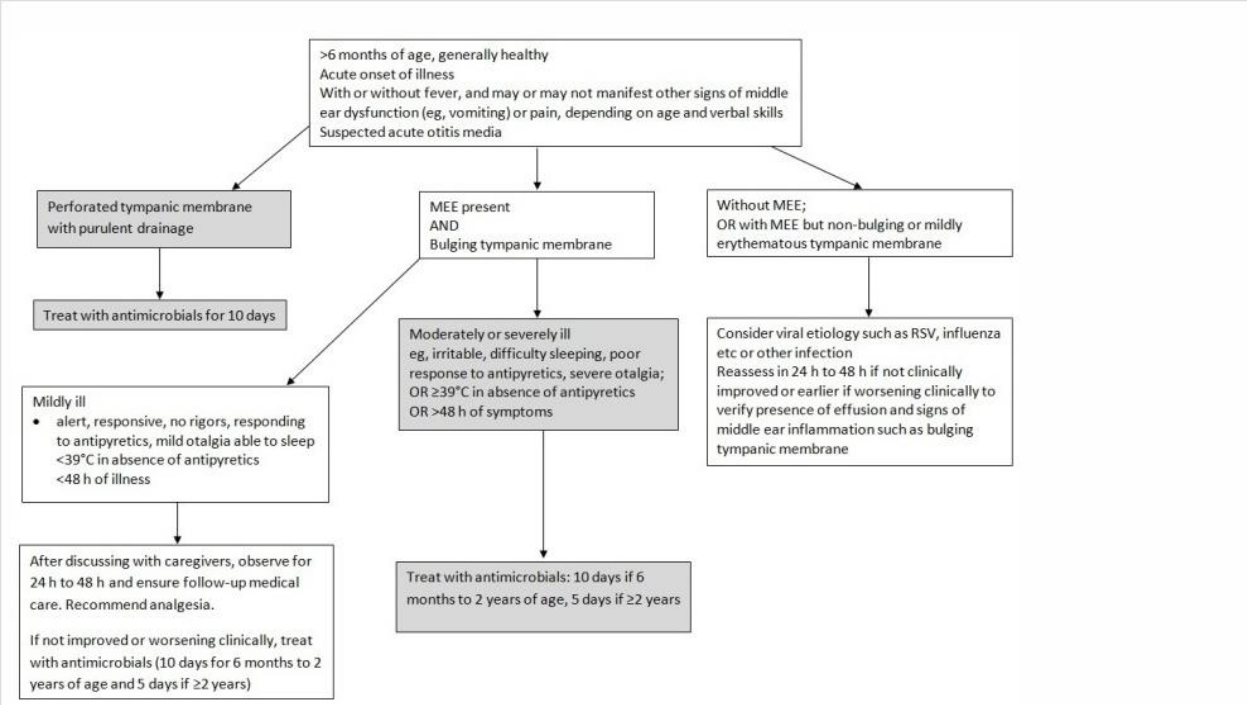


Figure 1) Flow diagram for the management of children with suspected and confirmed acute otitis media. MEE Middle ear effusion; RSV Respiratory syncytial virus

Symptom Management

- Analgesia for pain, fever, and irritability
    - Especially important at bedtime to improve sleep
    - Ibuprofen is preferred due to longer duration of action and lower toxicity in case of overdose
    - Acetaminophen can also be effective and can be used in conjunction with ibuprofen

Follow up

1. Follow up in 48 hours to assess need for antibiotics in the watchful waiting approach
2. A hearing test is indicated if a child has otitis media with effusion for >/= 3 months after acute otitis media
3. An ENT referral is indicated if hearing loss persists 1-2 weeks after resolution of an infection or if hearing loss is >/= 40 dB

Resources

1. https://www.uptodate.com/contents/evaluation-of-earache-in-children?search=earache&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1
2. https://cps.ca/en/documents/position/acute-otitis-media
3. https://cps.ca/en/documents/position/acute-otitis-externa