

## Otitis media, otitis externa, and mastoiditis

Author: J Nguyen (Paed ST3), P Das (Consultant ENT Surgeon), C Bevan (Consultant Paediatrician). Edited by M Lazner  
Approved by: Antimicrobial Stewardship Group July 2020 and Medicines Governance Group Oct 2020  
Publication date: October 2020  
Review date: October 2022

---

To skip straight to otitis externa, click [here](#)

To skip straight to acute mastoiditis, click [here](#)

### Acute Otitis Media (AOM)

---

#### Background

- Presence of inflammation in the middle ear associated with an effusion and rapid onset of symptoms of an ear infection.
- Children more likely to develop AOM because they a) have more viral infections b) have shorter, more horizontal eustachian tubes.
- **Peak incidence:** 6 – 18 months
- **Risk factors:**
  - Smoking and/or passive smoking, Craniofacial abnormalities (such as cleft palate), Family history of otitis media, Lack of pneumococcal vaccination, Gastro-oesophageal reflux, Prematurity, Recurrent upper respiratory tract infection
- **Common pathogens:**
  - Bacterial: *Haemophilus influenzae*, *Streptococcus pneumoniae*, *Moraxella catarrhalis*, *Streptococcus pyogenes*
  - Viral: *Respiratory syncytial virus*, *rhinovirus*, *adenovirus*, *influenza virus*, and *parainfluenza virus*
- Recurrent AOM:  $\geq 3$  separate AOM episodes in 6 months, or  $\geq 4$  episodes in 12 months with at least one episode in the past 6 months.

#### Assessment

Symptoms, including:

- Earache, holding or tugging ear, or non-specific symptoms such as fever, crying, poor feeding, cough, rhinorrhoea.

On otoscopy:

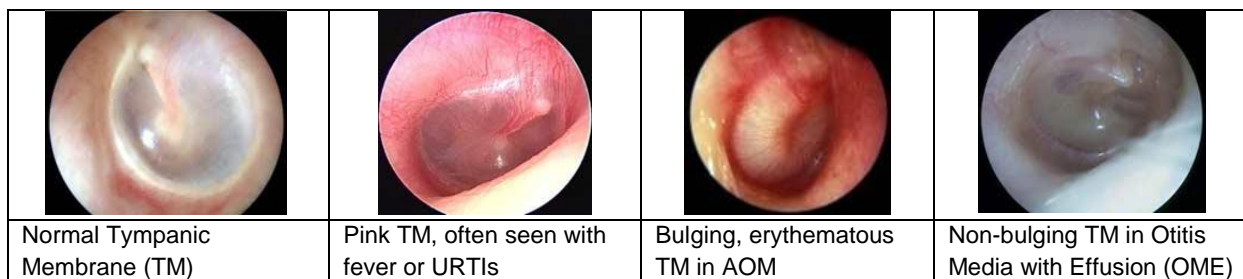
- Red, yellow, or cloudy tympanic membrane
- Bulging of the tympanic membrane, with loss of normal landmarks
- Air-fluid level behind the tympanic membrane
- Perforation of tympanic membrane  $\pm$  discharge in external auditory canal.

## Differential Diagnosis

Common causes of ear pain also include eustachian tube dysfunction, otitis externa (see below), mastoiditis (see below), and referred pain from dental problems.

Other causes of middle ear inflammation or effusion include:

- **Otitis Media with Effusion (OME) AKA 'glue ear'**
  - AOM is *NOT* the same as OME, which is fluid in the middle ear without signs and symptoms of infection and is often asymptomatic, other than transient (conductive) hearing loss
  - Antibiotics are not routinely required, as most occur after an episode of AOM and resolve spontaneously with no long term effects.
- **Chronic suppurative otitis media (CSOM) ± Cholesteatoma**
  - Persistent inflammation and perforation of the tympanic membrane with draining discharge for ≥2 weeks.
  - Cholesteatoma occurs when keratinising squamous epithelium (skin) is present in the middle ear as a result of TM retraction.
  - May have hearing loss or tinnitus. May not have ear pain or fever.
  - Should be referred for routine outpatient ENT assessment



## Management

See [management flow chart](#) on next page

- **60% will improve within 24 hours without antibiotics**
- Usual course of AOM is about 3 days, but can be up to 1 week.
- Serious complications are rare and the numbers needed to treat with antibiotics to prevent them are very high
- There is no evidence to support the use of decongestants or antihistamines

### Antibiotics for acute otitis media

See BNFC for doses

First line:

**Amoxicillin** PO 5 days

Penicillin allergic: **Clarithromycin** or **Erythromycin** PO 5 days (Erythromycin preferred for pregnant patients)

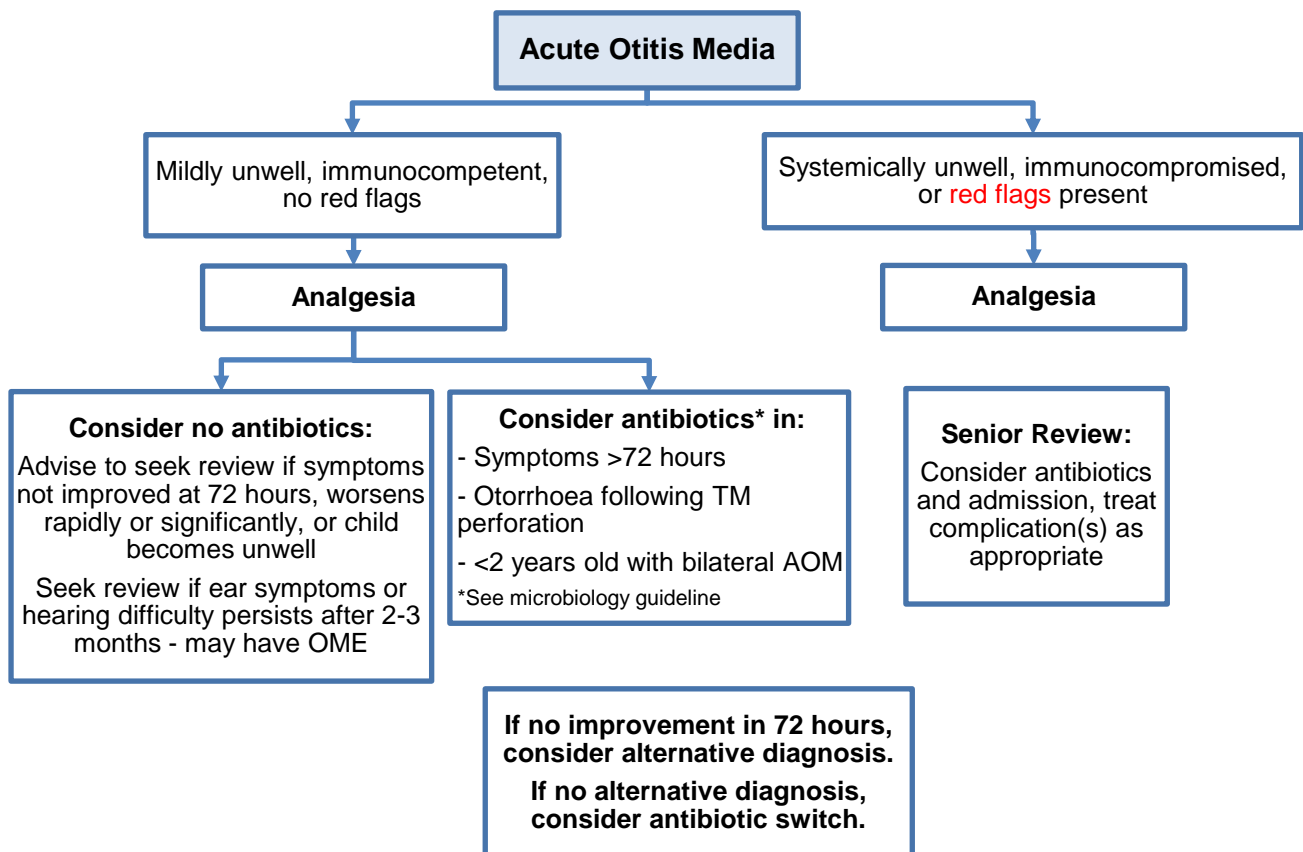
Second line only if amoxicillin has failed:

**Co-amoxiclav** PO 5 days

Penicillin allergic: Consult microbiologist

If IV treatment required: **Ceftriaxone**

### Management flow chart



## Acute Otitis Externa

### Background

- Inflammation of the external ear canal
  - Acute if  $\leq 3$  weeks duration
  - Can be a localised folliculitis that can progress to a boil in the ear canal
  - Can be diffuse (aka swimmer's ear), with widespread inflammation of the skin/subdermis
- **Peak incidence:** 7-12 years old
- **Common causes:**
  - Bacterial: *Pseudomonas aeruginosa*, *Staphylococcus aureus*
  - Fungal: *Aspergillus* species, *Candida albicans*
  - Local irritation: Trauma (scratching, aggressive cleaning, hearing aids), contact dermatitis (local medication use), swimming in polluted water

## Assessment

- Itchy and painful, may have hearing impairment if severe, pain when moving tragus/pinna
- Discharge may be present
- Ear canal and/or external ear are red, swollen, or eczematous, with scaly shedding skin.
- Inflamed tympanic membrane, which may be difficult to see if canal is narrow or filled with debris



## Management

- Analgesia
- Consider topical treatment
  - First line:  
**Ciprofloxacin 0.3% w/v** (eye drops used in the ear) TOP 5 drops BD 1-2 weeks
- Oral antibiotics rarely indicated
  - Consider in spreading cellulitis, immunocompromised, or systemic signs of infection
- If no improvement for review at ENT Emergency Clinic

## Acute Mastoiditis (AM)

---

### Background

- Acute mastoiditis (AM) is a suppurative infection of the mastoid air cells, with symptoms of  $\leq 1$  month duration.
- It is the most common suppurative complication of acute otitis media (AOM).
- **Common pathogens:**
  - *Strep. Pneumoniae*, *Group A Strep.*, *Staph. Aureus*.
  - For those with recurrent AOM, consider *Pseudomonas aeruginosa*

### Assessment

#### Clinical features

- Post-auricular inflammation (erythema, oedema, tenderness, fluctuance)
- A protruding auricle/external auditory canal oedema
- Signs of AOM (fever, discharge, ear pain, irritability)



## Complications

- Meningitis
- Intracranial abscesses
- Venous sinus thrombosis
- Facial nerve paralysis
- Permanent hearing loss due to damage of inner ear structures
- Osteomyelitis
- Bezold abscess (neck abscess, beneath the sternocleidomastoid/digastric muscles)

## Management

- Analgesia
- All cases require antibiotics, most need IV antibiotics and admission
- All cases should be referred to ENT for joint care
  - More severe cases with complications may require mastoidectomy
- Indications for imaging (contrast-enhanced CT):
  - Features suggestive of complications (e.g. retro-orbital pain, meningism, cranial nerve deficits, focal neurology, altered consciousness)
  - Severe illness or toxic appearance

## Antibiotics in mastoiditis

See BNFC for doses

First line:

Ceftriaxone IV + Metronidazole IV/PO 10-14 days

Non-IgE penicillin allergic: as above

IgE Penicillin allergic: Ciprofloxacin IV + Metronidazole IV/PO + Vancomycin  
IV 10-14 days

Consider early IV to PO switch once improving, to complete 10-14 day course:

Co-amoxiclav PO

Penicillin allergic: discuss with Microbiologist

If associated with venous sinus thrombosis, will require minimum of 4 weeks antibiotic treatment (2 weeks IV + 2 weeks PO)