

Acute otitis media in adults

What is acute otitis media?

Acute otitis media (AOM) is common in children but much less so in adults. Where the aetiology is bacterial, *Haemophilus influenzae* and *Streptococcus pneumoniae* are the most common organisms found, with the former organism dominating more since more widespread pneumococcal vaccination was introduced. Rhinoviruses and respiratory syncytial viruses are the main viral pathogens in adults as well as in children. [1] [2]

Spectrum of otitis media^[3]

Otitis media (OM) is an umbrella term for a group of complex infective and inflammatory conditions affecting the middle ear. All OM involves pathology of the middle ear and middle ear mucosa. OM is a leading cause of healthcare visits worldwide and its complications are important causes of preventable hearing loss, particularly in the developing world. [4]

There are various subtypes of OM. These include AOM, OME, chronic suppurative otitis media (CSOM), mastoiditis and cholesteatoma. They are generally described as discrete diseases but in reality there is a great degree of overlap between the different types. OM can be seen as a continuum/spectrum of diseases:

- AOM is acute inflammation of the middle ear which typically causes severe otalgia. It may be caused by bacteria or viruses. A subtype of AOM is acute suppurative OM, characterised by the presence of pus in the middle ear. In around 5% the eardrum perforates.
- OME is a chronic inflammatory condition without acute inflammation, which often follows a slowly resolving AOM. There is an effusion of glue-like fluid behind an intact tympanic membrane in the absence of signs and symptoms of acute inflammation.

- CSOM is long-standing suppurative middle ear inflammation, usually with a persistently perforated tympanic membrane.
- Mastoiditis is acute inflammation of the mastoid periosteum and air cells occurring when AOM infection spreads out from the middle ear.
- Cholesteatoma occurs when keratinising squamous epithelium (skin) is present in the middle ear as a result of tympanic membrane retraction.

How common is acute otitis media? (Epidemiology)^[2]

- AOM is seen frequently in children but is less common in adults. This is because children are more prone to viral infections, and have shorter and more horizontal Eustachian tubes. The incidence of otitis media in adults is widely quoted as 0.25% per annum.^[5]
- Smoking is a recognised risk factor.
- Otitis media (OM) occurs more in the winter than in the summer months, as it is usually associated with an upper respiratory tract infection.^[6]
- AOM is a particular issue in the developing world. A 2012 literature review suggested that the annual global incidence of AOM is 10.85%, comprising around 709 million cases per year, about half in under-5s. Incidence varies by a factor of ten or more between high-income and low-income countries. Of these, chronic suppurative OM develops in 4.76%. The authors estimated that 33 per 10 million die due to complications of OM, most in developing countries and most under 1 year of age.^[7]

Otitis media risk factors

Risk factors for otitis media in adults are similar to those in children:

- Eustachian tube dysfunction.
- Upper respiratory infection.
- Allergies.
- Chronic sinusitis.

- Craniofacial abnormalities – eg, cleft palate, Down's syndrome.
- Immunosuppression.
- Active or passive smoking.

Acute otitis media symptoms (presentation)^[2]

The symptoms and signs are very similar to those of AOM seen in childhood, with hearing loss, otalgia and fever. In adolescents and adults, otalgia is a more common presenting symptom than in children under the age of 2 years.^[1] Indeed, in adults, otalgia may occur without fever or hearing loss and may be the only presenting feature.

See the separate [Acute Otitis Media in Children](#) and [Otolgia \(Earache\)](#) articles for more details.

Differential diagnosis

This is essentially as for AOM in children. However, in adults temporomandibular joint dysfunction and associated differential diagnoses should be considered. These might include:

- [Giant cell arteritis](#).
- Dental problems, including ill-fitting dental appliances.
- [Trigeminal neuralgia](#).
- [Migraine](#) and other causes of [headache](#).
- [Herpes zoster](#).
- Trauma.
- Other ENT disorders – eg, [salivary gland disorders](#) and ENT neoplasms.

See the separate [Temporomandibular Joint Dysfunction and Pain Syndromes](#) article for more details.

Investigations^[8]

- Investigations in the acute phase are unlikely to be helpful.

- Microscopy and culture of discharge may be helpful if chronic perforation is suspected.
- CT or MRI scanning may be indicated to exclude complications if symptoms are persistent or not responsive to antibiotics in cases of bacterial AOM (however, complications in adults are rare – see below).
- Tympanocentesis (piercing of the eardrum to obtain fluid from the middle ear) may be indicated in certain situations (eg, patients who are immunocompromised, or where local or systemic complications have developed as a result of antimicrobial failure).

Otitis media treatment and management^[2]

- Analgesics and antipyretics should be used as appropriate.
- Consider prescribing if the patient is systemically unwell (fever, vomiting), if symptoms are ongoing for four days or more, or if to those at high risk of complications.
- Antibiotic guidelines are as for children (see below for further detail relating to antibiotic choice).
- Nasal and oral steroids are sometimes indicated for adults with persistent AOM against a background of allergies.
- More invasive interventions – eg myringotomy – are virtually unheard of in adults since the advent of antibiotics.

Admit for immediate assessment

- Patients with suspected acute complications of AOM, such as meningitis, mastoiditis, or facial nerve paralysis.

Consider admitting

- People who are systemically very unwell for intravenous therapy and analgesia.

For all other people with AOM

- Treat pain and fever with paracetamol or a non-steroidal anti-inflammatory drug (NSAID) such as ibuprofen.

- For most people, adopt a no antibiotic prescribing strategy, or a delayed antibiotic prescribing strategy:
 - No antibiotic prescribing strategy – reassure that antibiotics are likely to make little difference to symptoms but may have adverse effects and can contribute to antibiotic resistance.
 - Delayed antibiotic prescribing strategy – provide a delayed antibiotic prescription. Advise that antibiotics should be started if symptoms are not improving within four days of onset of symptoms or if there is a significant worsening at any time.
 - For both strategies, advise review if the condition worsens or if symptoms are not improving within four days of the onset of symptoms.

Offer an immediate antibiotic prescription

- To patients who are systemically unwell (eg, with fever or vomiting) but do not require admission.
- To those at high risk of complications because of significant heart, lung, kidney, liver or neuromuscular disease, or to those who are immunocompromised.
- To those whose symptoms have lasted for four days or more and are not improving.

If an antibiotic is required:

- Prescribe a five to seven day course of amoxicillin.
- For people who are allergic to penicillin, prescribe a five-day course of erythromycin or clarithromycin. Erythromycin is preferred in pregnant women. Note that erythromycin has been found to prolong the Q-T interval on ECG, and should be avoided in individuals with a history of QT interval prolongation or ventricular cardiac arrhythmia, including torsades de pointes, or electrolyte disturbances.

Other treatments

- Antihistamines, decongestants and echinacea are of no benefit. ^[9]
- A warm compress over the affected ear may help reduce the pain.

- Topical ear drops, Phenazone 40 mg/g with lidocaine 10 mg/g, can be prescribed to all children and young people under the age of 18 to relieve pain. However use should be avoided in the context of tympanic membrane perforation due to risk of potential ototoxicity.

If an episode of AOM fails to improve or worsens

- Reassess and re-examine.
- Admit for immediate specialist assessment if there are suspected acute complications of AOM (eg, meningitis, mastoiditis).
- Consider admitting people who are systemically very unwell.
- Exclude other causes of middle ear inflammation.
- If admission or referral is not necessary and the person has not taken an antibiotic:
 - Prescribe a five-day course of amoxicillin.
 - For people who are allergic to penicillin, prescribe a five-day course of clarithromycin or erythromycin.
- If admission or referral is not necessary and the person has taken a first-line antibiotic, offer a second-line antibiotic:
 - Prescribe a five-day course of co-amoxiclav.
 - If allergic to penicillin, check your local guidelines.
- If symptoms persist despite two courses of antibiotics, seek specialist advice from an ENT specialist via the on-call team.

Treatment of recurrent AOM

- Refer urgently to an ENT specialist if nasopharyngeal cancer (rare) is suspected in adults, especially in the presence of any one of the following:
 - Persistent symptoms not responding to treatment, particularly if symptoms are unilateral.
 - Persistent cervical lymphadenopathy.
 - Unilateral epistaxis.

- Consider routine referral to an ENT specialist, especially if:
 - The person has a craniofacial abnormality.
 - Recurrent episodes are very distressing or associated with complications.

Complications^[1] ^[2] ^[10]

As with children, common complications include:

- Tympanic membrane perforation.
- [Chronic suppurative OM](#).
- OME.

AOM can be complicated by infratemporal and intracranial infection. These are conditions of significant morbidity. However, the incidence of severe complications is much lower in adults (1 in 100,000 children compared to 1 in 300,000 adults per year).

Most (around 80% of) severe complications are infratemporal (mainly mastoiditis). The remaining severe complications are intracranial (mainly intracranial abscess and meningitis). Most severe complications are due to acute rather than chronic OM. Around 1 in 4 of cases of complications result in permanent hearing loss.

Severe complications include:

- Infratemporal:
 - [Mastoiditis](#).
 - [Facial nerve palsy](#).
 - [Acute labyrinthitis](#) or vestibular neuritis
 - Petrositis.
 - Acute necrotic otitis.

- Intracranial
 - Meningitis.
 - Encephalitis.
 - Brain abscess.
 - Otitic hydrocephalus (hydrocephalus associated with AOM, usually accompanied by lateral sinus thrombosis but the exact pathophysiology is unclear).
 - Subarachnoid abscess.
 - Subdural abscess.
 - Sigmoid sinus thrombosis.

Rarely, systemic complications can occur, including:

- Bacteraemia.
- Septic arthritis.
- Bacterial endocarditis.

OME rarely develops in adults (in children it tends to follow AOM when the Eustachian tubes have not drained properly). In adults it is more likely to signify underlying Eustachian tube dysfunction than preceding AOM. It usually follows a significant upper respiratory tract infection such as sinusitis. However, other possible underlying factors include:

- Severe nasal septal deviation.
- Large tonsils and adenoids.
- Nasopharyngeal tumour near Eustachian tube openings.
- Head and neck radiotherapy.
- Radical head and neck surgery.

Persistent middle ear fluid in adults should therefore be treated as suspicious, particularly if unilateral.^[1] Further ENT evaluation should be sought.

Prognosis^[2]

With the exception of the few complications given above, there is usually complete resolution in a few days.

Prevention

In recurrent otitis media (either three or more acute infections of the middle ear in a six-month period, or at least four episodes in a year), strategies for managing the condition include the assessment and modification of risk factors where possible, repeated courses of antibiotics for each new infection and antibiotic prophylaxis. The latter should not be started without specialist advice.

Advise patients to avoid exposure to passive smoking.

Dr Mary Lowth is an author or the original author of this leaflet.

Further reading

- [Otitis media with effusion](#); NICE CKS, June 2021 (UK access only)
- [Otitis externa](#); NICE CKS, November 2023 (UK access only)
- [Otitis media - chronic suppurative](#); NICE CKS, July 2022 (UK access only)

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