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Acute Otitis Media

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DISCLAIMER

IAEM recognises that patients, their situations, Emergency Departments and staff all vary. These guidelines cannot cover all clinical scenarios. The ultimate responsibility for the interpretation and application of these guidelines, the use of current information and a patient's overall care and wellbeing resides with the treating clinician.

Revision History

Date	Version	Section(s)	Summary of changes	Author
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GLOSSARY OF TERMS

AOM	Acute Otitis Media
CRP	C-Reactive Protein
ED	Emergency Department
ENT	Ear Nose and Throat (service)
FBC	Full Blood Count
MEE	Middle Ear Effusion
OE	Otitis Externa
OME	Otitis Media with Effusion
TM	Tympanic Membrane
URTI	Upper Respiratory Tract Infection
U&E	Urea and Electrolytes

Acute Otitis Media

INTRODUCTION

Acute Otitis Media (AOM) is an infection of the middle ear, characterized by the rapid onset of inflammation and fluid collection (effusion) in the middle ear cavity. It is a common childhood problem that can occur at any age, but is most prevalent between 6 and 24 months. Over 80% of children will experience at least one episode of AOM by school age.¹⁻²

AOM usually results from a viral infection of the upper airways that leads to inflammatory changes in the eustachian tube, producing a negative pressure in the middle ear cavity and subsequent accumulation of fluid secretions containing causative viral and bacterial pathogens. Microbial growth and suppuration in the middle ear secretions produces clinical picture of AOM: presence of Middle Ear Effusion (MEE) and erythematous, bulging Tympanic Membrane (TM), indicating an acute inflammatory process in the middle ear.

The aetiology of AOM can be bacterial, viral or mixed in the majority of cases.³ The most common bacterial pathogens in AOM are *Streptococcus pneumoniae*, *Haemophilus influenzae* and *Moraxella catarrhalis*.⁴⁻⁵ Risk factors for AOM include younger age (incidence peaks between 6 and 12 months), family history, contact with older siblings, day care attendance, exposure to tobacco smoke and pacifier use. Breastfeeding is protective against AOM.⁶

AOM is a clinical diagnosis based on history, examination and otoscopy findings.

PARAMETERS

Target audience Healthcare professionals in acute care settings engaged in evaluation and management of children with Acute Otitis Media.

Patient population Patients under the age of sixteen presenting to Emergency Department with suspected Acute Otitis Media.

Exclusion criteria Neonates up to 3 months of age.
Children post internal or external ear surgeries with the exception of myringotomies.

AIMS

To provide an evidence-based guidance for the assessment and management of paediatric patients presenting to the Emergency Department with Acute Otitis Media.

ASSESSMENT

History

AOM is often preceded by a recent upper respiratory tract infection (URTI). Ear pain is the most common symptom and the best predictor of AOM, although it is not always present. In preverbal children, otalgia is suggested by tugging/rubbing of the ear, excessive crying, vomiting or changes in the child's behaviour.

Common symptoms	Severe disease
Fever	Temp $\geq 39^{\circ}\text{C}$
Otalgia	Systemically unwell
Otorrhoea	Severe otalgia
Hearing loss	Otalgia lasting ≥ 48 hours

Examination (Otoscopy)

- Bulging, opaque TM – key diagnostic finding in AOM, indicating inflammation and MEE.
 - Red TM – acute inflammation (non-specific)
 - White/yellow TM – pus in the middle ear cavity
 - Loss of light reflex and anatomical landmarks of TM (handle of malleus, incus)
- Perforated TM with evidence otorrhoea (yellow/purulent discharge in the ear canal) – confirms diagnosis of AOM, unless Otitis Externa is suspected (see below).

DIAGNOSTIC CRITERIA

AOM is a clinical diagnosis based on history, examination and otoscopy findings. The American Academy of Paediatrics recommends that diagnosis of AOM should be made in children presenting with:

- Moderate to severe bulging of TM or new onset of otorrhoea not due to otitis externa, OR
- Mild bulging of the tympanic membrane AND recent onset (<48 hours) of ear pain or intense erythema of the TM.

DIFFERENTIAL DIAGNOSIS

Condition	Signs & Symptoms	Otoscopy findings
Myringitis (Inflammation of the TM)	<ul style="list-style-type: none">• Commonly associated with fever and viral URTI• May have no pain or hearing loss	<ul style="list-style-type: none">• TM erythematous &• Transparent• Preserved anatomical landmarks
Otitis Media with Effusion	<ul style="list-style-type: none">• Hearing problems, poor balance• Sensation of ringing, 'popping' or 'fullness' in the ear• Often asymptomatic	<ul style="list-style-type: none">• Air-fluid level or bubbles• Retracted or bulging TM• Light reflex and anatomical landmarks preserved
Otitis Externa	<ul style="list-style-type: none">• Itching, pain +/- ear discharge• Ear feels swollen or blocked• Not associated with fever	<ul style="list-style-type: none">• Tragus and ear canal very tender on exam• TM often cannot be seen

Table 1. Differential diagnosis of AOM.

INVESTIGATIONS

AOM is a clinical diagnosis. There is no role for routine diagnostic investigations in the ED.

Consider laboratory studies (FBC, U&E, CRP and Blood Cultures) in children who appear systemically unwell, have features of severe disease and infants younger than 3 months. Bacterial culture of the middle ear contents may be appropriate in cases presenting with recurrent purulent otorrhoea.

Imaging is not required unless there is a concern for mastoiditis or intracranial complications.

COMPLICATIONS

Tympanic Membrane perforation – common consequence of AOM, often accompanied by otorrhoea. Perforation may bring the relief of pain and usually heals spontaneously within days. Can result in scar tissue formation or become chronic if it persists for 3 months or longer. Chronic perforation is unlikely to heal spontaneously, and should be referred to ENT.

Otitis Media with Effusion – persistent presence of fluid in the middle ear without signs or symptoms of infection that often occurs after an episode of AOM. Associated with transient hearing deficits. Most cases resolve spontaneously within 3 months. Children with OME persistent beyond 3 months should be referred for hearing assessment and ENT follow-up.

Bullous Myringitis – inflammation and bullae on the TM. Can occur in association with AOM. Microbial pathogens, prognosis and treatment is the same as AOM.

Labyrinthitis – extension of infection into cochlear and vestibular apparatus. Children with frank vertigo associated with systemic illness or hearing loss should be discussed with ENT.

Acute Mastoiditis – rare complication of AOM, resulting in suppurative infection of the mastoid air cells. Mastoiditis is suggested by the signs of post-auricular inflammation: erythema, tenderness and swelling over the mastoid process, with protrusion of the auricle and systemic illness. Facial nerve palsy may occur. Prompt diagnosis is essential, followed by ENT consultation and treatment with IV antibiotics, as it can be associated with other intracranial complications.

Intracranial complications – intracranial spread of infection can result in meningitis, abscess formation and venous sinus thrombosis. These complications are rare in developed countries.

Long-term complications – may result from unresolved or recurrent episodes of AOM. These include: chronic perforation, atelectasis, retraction or collapse of the TM, cholesteatoma and chronic suppurative otitis media.

Cases of recurrent otitis media (≥ 3 episodes in 6 months or ≥ 4 episodes in 12 months) and associated long-term complications should be referred to ENT for further management.

MANAGEMENT

Approach

AOM is a self-limiting condition with most cases resolving spontaneously without antibiotics. Significant complications are rare. Early and effective pain control is an essential part of treatment which is particularly important at night, in order to minimize sleep disturbance. Antibiotics do not produce significant pain reduction and make little difference to the rate of AOM complications including perforation, hearing loss and recurrence of infection. Antibiotic use is associated with increased risk of vomiting, diarrhoea and other adverse events.⁷

Analgesia

Use of regular analgesics is recommended for children with otalgia, fever, and irritability.

- Analgesia can generally be achieved with oral paracetamol and ibuprofen.
- Ensure dose is appropriate for child's age and weight.
- Application of 2% lignocaine drops can be effective in severe pain, if TM is intact.
- Consider non-pharmacological methods as an adjunct.
- Refer to IAEM guideline on [Pain Management in Paediatric Emergency Care](#).

Patient education

Provide patient education ([Patient information leaflet](#)) and general advice about the course of illness:

- Symptoms usually last for about 3 days but can persist up to 1 week.
- Most children will get better without antibiotics.
- Simple analgesia is the mainstay of treatment.
- Steroids, decongestants and antihistamine have no role in the treatment of AOM.
- Parents should seek medical help if symptoms do not start to improve after 3 days, worsen significantly at any time or if their child becomes very unwell.

Antibiotics

Antibiotics should not be prescribed routinely for AOM in children over 6 months of age.

Tables 2 and 3 below provide guidance on commencing antibiotic treatment appropriately.

Offer an immediate antibiotic	<p>Children with signs of severe disease:</p> <ul style="list-style-type: none"> • Systemically unwell • Temp $\geq 39^{\circ}\text{C}$ • Severe otalgia • Otolgia lasting ≥ 48 hours 	<p>Children at risk of complications:</p> <ul style="list-style-type: none"> • Age <6 months • Age <2 years with bilateral AOM • AOM with otorrhoea • Immunocompromised • Cochlear implant recipients.
Consider no antibiotic or delayed prescription	<p>Children over 6 months of age with:</p> <ul style="list-style-type: none"> • No evidence of severe disease • No risk of complications • Follow-up is available if required and parents understand when to seek it. 	<p>When writing a delayed prescription, provide clear instructions that it should only be used:</p> <ul style="list-style-type: none"> • If there is no improvement in symptoms within 3 days; • Worsening of symptoms occurs.

Table 2: immediate vs delayed / no antibiotic treatment.

Use the highest end of dose range available. Consult local formulary for dosing particulars.

Presentation	Antibiotic	Dose* & Duration	
First episode	Amoxicillin PO	30 mg/kg TDS	10 days
Recurrent / Failure to respond in 3/7	Co-Amoxiclav PO	30 mg/kg TDS	10 days
Penicillin allergy	Clarithromycin PO	7.5 mg/kg BD	10 days
Severe/unresponsive to oral therapy	Ceftriaxone IV/IM	50 mg/kg OD	3 days

Table 3. Antibiotic recommendations in AOM. Based on 2021 CHI Antimicrobial Guidelines.

MANAGEMENT OF COMPLICATIONS

Please refer to table 4 for management of complications of acute otitis media.

Complication	Management	Referral
Tympanic Membrane (TM) perforation with otorrhoea	<ul style="list-style-type: none">• Treat with oral antibiotics• Avoid using antibiotic drops and other topical agents	Chronic perforation (persists beyond 3 months) should be referred to ENT service.
Otitis Media with Effusion	<ul style="list-style-type: none">• Antibiotics are usually not required	Refer persistent effusion (beyond 3 months) for hearing assessment and ENT follow-up.
Mastoiditis / Labyrinthitis / Intracranial complications	<ul style="list-style-type: none">• IV antibiotics +/- imaging	Urgent consultation with ENT and admission are required.

Table 4. Management of complications of AOM

SPECIAL CONSIDERATIONS

- **Always exclude more serious causes in febrile, immunocompromised or systemically unwell young children before diagnosis of AOM is made.**
- Cochlear implant recipients with suspected AOM require prompt diagnosis and treatment due to the small risk of progression to meningitis.
- Children with Myringotomy Tubes (grommets) and suspected AOM are treated with topical antibiotics. Management of those patients is outside the scope of this guideline.

COMPANION DOCUMENT

- [Patient Information leaflet](#)

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