

ACUTE OTITIS MEDIA IN CHILDREN: ETIOPATHOGENESIS, SYMPTOMS, AND TREATMENT

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Abstract

Objective: Acute otitis media (AOM) is a common reason for primary care visits in children. Yet, there is considerable debate over the most effective treatment. Therefore, we purpose to determine which is the best treatment for AOM. **Methods:** We conducted a systematic review and aimed to answer the following clinical questions: what are the main reasons for devolving AOM, how is its diagnosis, what are the clinical symptoms, and what are the effects of treatments in children with AOM? We searched Medline, PubMed, Scopus, Embase, The Cochrane Library, and other important databases. **Result:** We identified more than ten studies that fulfilled our inclusion criteria. We used GRADE to assess the quality of evidence for treatments. **Conclusion:** In this systematic review, we present information relating to the effectiveness and safety of the following interventions: the main etiological factors, the basic diagnostic analyses, analyses, and the successful treatment.

Keywords: acute otitis media, tympanic membrane, H. influenza, otoscopic examination

Introduction:

Acute otitis media (AOM) is the viral illness that causes children to interact with the healthcare system most frequently (1,2). It is defined by the presence of middle ear fluid and an acute start of signs and symptoms caused by middle ear inflammation (3). Ear discomfort, otorrhea, fever, and upper respiratory infection symptoms are among the symptoms. The objective findings include an enlarged tympanic membrane, abnormal tympanometry, and tympanic membrane opacity, redness, or yellowness. Acute symptoms can sometimes resolve on their own, especially in children older than two. However, otitis media with effusion, a more gradual illness that lasts for weeks to months, commonly follows the acute phase. Mastoiditis, labyrinthitis, facial nerve palsy, meningitis, and brain abscesses are examples of



infectious consequences resulting from AOM. There have been reports of long-term effects such as cholesteatoma, chronic tympanic membrane perforation, and middle ear atelectasis (4).

Epidemiology

Acute Otitis media is a worldwide issue that affects men somewhat more frequently than women. It is challenging to pinpoint the precise number of instances that occur each year because of a dearth of reporting and varying occurrences in several geographic areas. Otitis media peaks in six to twelve months of infancy and then starts to reduce around five years of age. In their lives, about 80% of children will suffer from otitis media, and before they reach school age, between 80% and 90% of children will experience otitis media with an effusion. Though it is more prevalent in some subpopulations, such as those with a history of recurrent AOM in infancy or cleft palates, otitis media is less common in adults than in children (5,6).

Etiology

S. pneumoniae, nontypeable *H. influenzae*, and *M. catarrhalis* are the most prevalent bacteria that cause AOM. Since the advent of pneumococcal conjugate vaccinations, the leading cause of AOM has shifted from *S. pneumoniae* to nontypeable *H. influenzae*. AOM is mostly associated with group child care and passive smoking. Pacifier usage and having a family history of AOM are further risk factors. Breastfeeding for three months or more has beneficial effects (7). In addition, there are several reasons for developing acute otitis media: immunity due to human immunodeficiency virus (HIV), diabetes, and other immuno-deficiencies; mucins that include abnormalities of this gene expression, especially upregulation of MUC5B; anatomic abnormalities of the palate and tensor veli palatine; ciliary dysfunction; cochlear implants; vitamin A deficiency; allergies; and daycare attendance(8,9,10,).

In the development of acute otitis media, we can see how bacteria, viruses, and allergens cause the disease in the picture below.



OTITIS MEDIA is typically caused by an allergic reaction, a viral infection or a bacterial infection

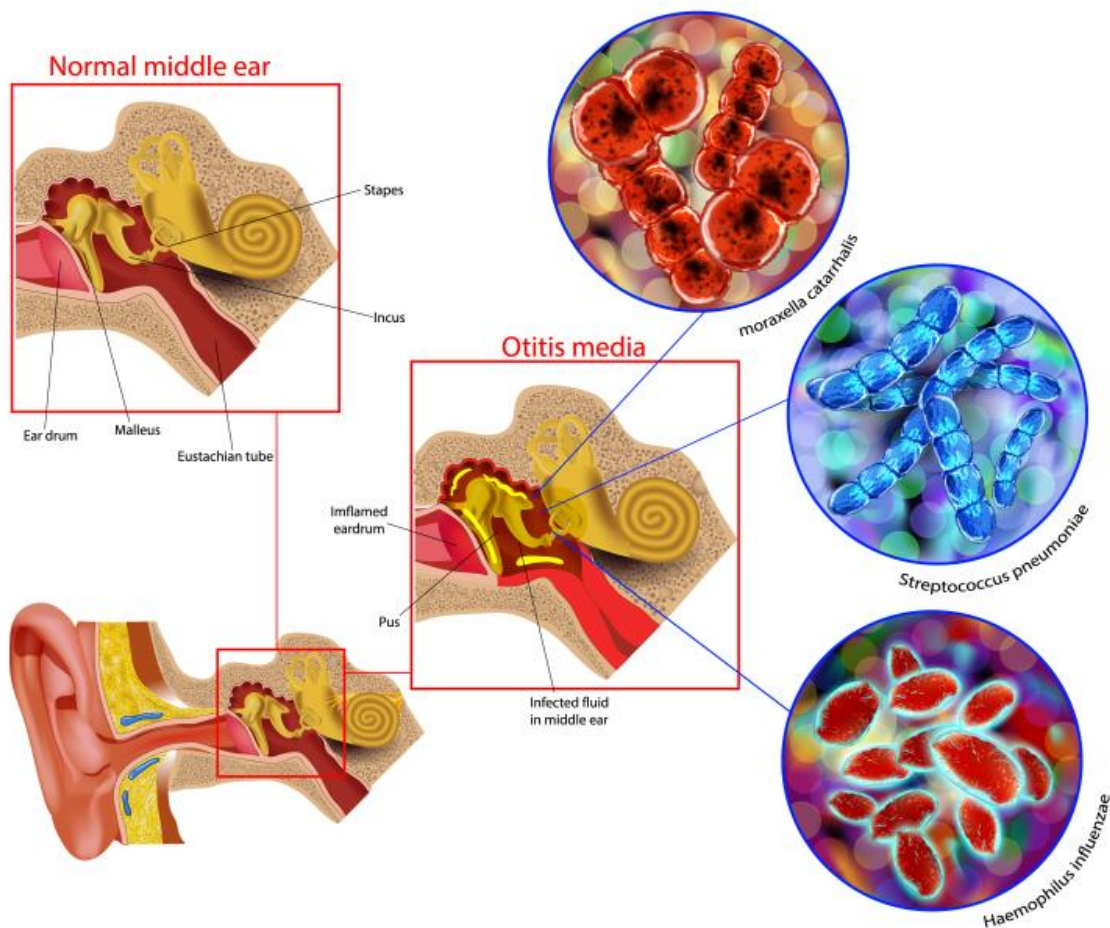


Figure 1. Acute Otitis Media Pathophysiology. This illustration shows the common etiologies and pathophysiology of acute otitis media. Purchased from Shutterstock

Clinical symptoms

Older children with AOM may experience sudden ear pain, while young pre-verbal children may exhibit signs and symptoms such as otalgia, irritability, excessive crying, otorrhea, fever, or changes in sleep or behavior patterns as observed by caregivers. Apart from otorrhea, these signs are vague and usually coincide with those of an uncomplicated viral upper respiratory infection (URI). Other viral URI symptoms, such as cough and nasal discharge or stuffiness, may precede or

accompany AOM and are nonspecific as well. As a result, clinical history alone is a poor predictor of the existence of AOM, particularly in young children (11).

Diagnosis

Current methods for the diagnosis of AOM rely entirely on the performance of accurate otoscopy (12). Adequate otoscopic illumination is crucial for diagnosing acute otitis media. Many studies of otoscopes used by practicing physicians indicated that they had an inadequate light output. To accurately diagnose AOM, a thorough otoscopic examination is necessary (see Fig. 2 for typical findings).

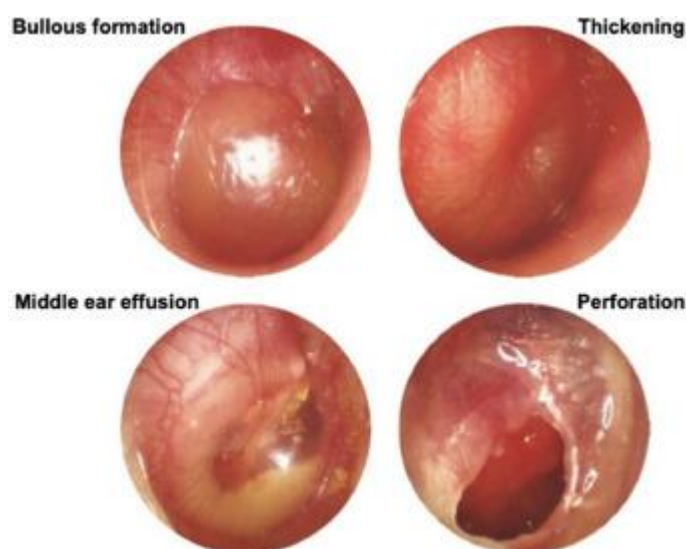


Fig 2. Typical otoscopic findings of AOM (13)

- Representative otoscopic features of AOM include redness (erythema, hyperemia), bulging (protrusion), and otorrhea; however, not all of these abnormalities are usually present. Supportive findings for AOM include an unclear light reflex of the TM, thickening of the TM, bullous formations on the TM, a cloudy (dull or opaque) TM, and TM perforation.
- Perforation of the TM by myringotomy may result in edematous middle ear mucosa, indicating significant inflammation. However, this finding should only be used as a reference, as it may not be present in all cases with AOM.
- It is highly desirable to use an otomicroscope and/or otoendoscope for precise evaluation of TM findings. A pneumatic otoscope could be an alternative device. (14)

Treatment

Medical care of otitis media (OM) is a hotly discussed topic in the medical literature, owing to a major rise in (AOM) prevalence over the last decade caused by drug-resistant *S pneumoniae* (DRSP) and beta-lactamase-producing *H influenzae* or *M catarrhalis*.

Beta-lactamases are enzymes that hydrolyze amoxicillin and some, but not all, oral cephalosporins, causing in-vitro resistance to these medications. Currently, 90% of *M. catarrhalis* isolates and 40-50% of *H. influenzae* isolates in the United States generate beta-lactamases. As a result, empiric antibiotic treatment for this condition has grown more complicated. Many people have stated their perspectives on which medications are better for first- and second-line therapy, as well as whether antibiotics should be provided to all patients with AOM.

- The guidelines endorsed the use of amoxicillin as the first-line antibacterial agent of choice in AOM patients. The panel advised raising the amount used for empiric therapy from 40-45 mg/kg/day to 80-90 mg/kg/day due to concerns about more resistant strains of *S pneumoniae*, which should be amenable to this higher dose.

- Ceftriaxone 50 mg/kg/dose IM (maximum single dosage 1000 milligrams) daily for three days. For children who are vomiting, unable to swallow oral medicine, or are unlikely to follow the initial antibiotic doses. If clinical improvement is seen within 24 hours, an oral antibiotic can be used to finish the course of medication. Children who remain considerably feverish or unwell after 24 hours may require extra parenteral doses before transitioning to oral medication.

The appropriate duration of therapy for AOM patients is unknown; the standard 10-day course of therapy was based on the duration of streptococcal pharyngotonsillitis treatment. Several studies have shown that the conventional 10-day course of antibiotics is preferred for children under the age of two, and smaller children may take longer to improve clinically than older children. A 10-day course of antibiotics is also suggested for children with severe symptoms. A 7-day treatment of oral antibiotics appears to be similarly beneficial in children aged 2 and above with mild to severe AOM(15).

The use of tympanostomy tubes for treating ear disorders, including AOM, is contentious. There is less research on surgery for recurrent AOM. However,



typanostomy tubes are still often utilized in clinical practice for OME and recurring OM. AOM is still a prevalent reason for referral to an otolaryngologist.

Adenoidectomy without myringotomy and/or typanostomy tubes does not lower the number of episodes of AOM(15).

Pain should be assessed as part of the AOM management process. If pain is evident, the doctor should propose therapy to alleviate it. The child's symptoms may deteriorate somewhat within 24 hours after receiving an AOM diagnosis. The patient's symptoms should gradually improve during the following 24 hours. If initially febrile, the fever should decrease within 48-72 hours. Irritability, fussiness, and irregular sleep and drinking patterns should improve. Pain control is crucial during the first 24 hours of an AOM episode, regardless of the use of antibiotics. Several therapies for otalgia have been utilized, but none have been investigated. Pain treatment should be chosen in consultation with the child's caregiver, taking into account the advantages and hazards. The American Academy of Pediatrics (AAP) recommends analgesics for pain management, regardless of antibiotic prescription, and should be continued as long as pain continues(16).

Conclusion

During the writing of this article, we found out that they are the main etiological factors and risk factors of acute otitis media, clinical symptoms, methods of diagnosis and effective treatment measures.

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