



Pediatric Pearl

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Introduction: Ear infections (Acute Otitis Media or AOM) are the leading cause of clinic visits and antibiotic prescriptions in kids. These infections peak at ages 6-24 months and are rare in older kids, adolescents, and adults. If a child has not had an episode of AOM by age 3, they are unlikely to develop an ear infection. Episodes of AOM have declined since routine vaccination of children for pneumococcus (PCV vaccination) became standard; the rate of multiple episodes of AOM by age 4 years dropped from 83 to 64% after immunizations started. This is a classic example of the benefits of vaccines. While structural and genetic risk factors are known for AOM, the most important modifiable risk factors include attendance at day care, exposure to environmental tobacco smoke, and breast feeding (which is protective). Infections are often caused by a combination of viruses and bacteria, the most common of which are Strep pneumoniae, non-typable H. influenza (NTHi), and moraxella catarrhalis.

Clinical Characteristics and Diagnosis: Symptoms of AOM in children include ear pain, ear rubbing, hearing loss, and ear drainage. Fever occurs in one- to two-thirds of children with AOM. Although common, ear pain was absent in 17 percent of cases, mostly in younger children.

The diagnosis of AOM requires middle ear effusion (MEE) and acute signs of middle ear inflammation. Children who have MEE without evidence of acute inflammation have otitis media with effusion (OME), uninfected fluid in the middle ear. A clinical diagnosis of AOM can be made in children with either:

- Bulging of the tympanic membrane; distinct fullness or bulging of the tympanic membrane is the most specific and reproducible sign of acute inflammation. Pneumatic otoscopy is not necessary in children with bulging of the tympanic membrane.
- Perforation of the tympanic membrane with acute purulent drainage (otorrhea) if acute otitis externa has been excluded.

A red or hemorrhagic tympanic membrane may indicate acute inflammation, but it is nonspecific for AOM and antibiotics should not be prescribed for a red tympanic membrane without evidence of middle ear effusion and clinical evidence of inflammation, like pain or fever.

Treatment: The acute symptoms and signs of AOM often resolve within three days whether or not children are treated with antibiotics though use of antibiotics has been shown to slightly hasten the resolution of pain.

Pain management is a mainstay of the treatment of AOM in children. Ibuprofen or acetaminophen (or occasionally both) should be used to reduce ear pain in children whether or not they are treated with antibiotics.

Strategies for initial management of AOM in children include immediate treatment with antibiotics or initial observation with delayed initiation of antibiotic therapy if the symptoms and signs worsen or fail to improve after 48 to 72 hours. Immediate antibiotic therapy hastens symptom resolution and

reduces the occurrence of treatment failure, but it increases the occurrence of antibiotic-related side effects (diarrhea, rash).

For children at increased risk of severe infection, complications, and/or recurrent AOM (infants <6 months of age, patients who are immunocompromised, are toxic appearing, or with cleft palate), immediate antibiotic therapy rather than initial observation is recommended.

For children not at increased risk of severe infection, complications, and/or recurrent AOM, immediate antibiotic therapy rather than initial observation is also recommended since in trials, antibiotic therapy hastened symptom resolution and reduced the likelihood of treatment failure. However, the absolute benefits are small and antibiotic-related side effects are common. Thus, some families may reasonably choose initial observation over antibiotic therapy, particularly if the child is ≥ 2 years old and has unilateral AOM without severe symptoms or otorrhea.

Treatment:

- For children with AOM without risk factors for beta-lactamase-producing NTHi (receipt of a beta-lactam antibiotic in the previous 30 days, purulent conjunctivitis, history of recurrent AOM unresponsive to [amoxicillin](#)), [amoxicillin](#) is recommended.
- Because of the increased prevalence of penicillin-nonsusceptible *S. pneumoniae* in the United States, a dose of 90 mg/kg per day orally divided in two doses is suggested (maximum of 3 g/day)
- For children at increased risk for beta-lactamase-producing NTHi, [amoxicillin-clavulanate](#) is recommended
- Because of the increased prevalence of penicillin-nonsusceptible *S. pneumoniae* in the United States, a dose of 90 mg/kg per day of [amoxicillin](#) and 6.4 mg/kg per day of clavulanate orally divided in two doses (a maximum daily dose of the amoxicillin component of 3 g). Adolescents ≥ 16 years who can take large tablets can use extended-release [amoxicillin-clavulanate](#) 1 to 2 g of amoxicillin and 62.5 to 125 mg of clavulanate orally every 12 hours.

Duration:

- Ten days for children <2 years of age and children (of any age) with tympanic membrane perforation or history of recurrent AOM.
- Five to seven days for children ≥ 2 years with intact tympanic membrane and no history of recurrent AOM.

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