Otitis Media

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KEYWORDS

• Otitis media • Antibiotics • Aminopenicillins • Cephalosporins
• Pneumococcal conjugate vaccine • *Streptococcus pneumoniae*
• *Haemophilus influenzae* • Tympanocentesis

KEY POINTS

- The diagnosis of acute otitis media (AOM) requires visualization of a tympanic membrane that is full or bulging, with middle ear effusion present.
- Recent antibiotic pressure and vaccination with the pneumococcal conjugate vaccine have resulted in the emergence of β-lactamase–producing *Haemophilus influenzae* and *Moraxella catarrhalis* as the leading organisms causing AOM, followed by *Streptococcus pneumoniae.*
- Current American Academy of Pediatrics guidelines endorse amoxicillin as the preferred treatment of AOM, but the recent increase in amoxicillin-resistant *H influenzae* and *M catarrhalis* would suggest high-dose amoxicillin-clavulanate as a preferred treatment.
- Cefdinir, cefuroxime, and cefpodoxime proxetil are the preferred oral cephalosporins for the treatment of AOM. Among these, cefdinir is the most palatable.
- Recent evidence suggests cellular and humoral immunodeficiency against AOM-causing organisms in children with recurrent AOM.
- Antibiotic prophylaxis is no longer recommended as a preventative strategy for AOM recurrences.

DEFINITIONS

Otitis media is a broad term that includes acute otitis media (AOM), otitis media with effusion (OME), and chronic otitis media with effusion. This article focuses on AOM and OME.

EPIDEMIOLOGY

AOM is an infectious disease that primarily affects young children. Onset of AOM in the first 6 months is not common because infants in this age group are still protected from infection by maternal antibodies acquired transplacentally. If a child experiences AOM in the first 6 months of life, then frequent AOM likely will occur throughout the first few years of life.[1] Most AOM occurs between 6 and 24 months of age; the peak incidence

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is between 9 and 15 months of age.[1] AOM occurs with modest frequency between 2 and 3 years of age but its appearance quickly diminishes between 3 and 5 years of age.[1] AOM can occur at any age, including adolescence and adulthood, but it is not a common infectious disease in those years of life. The frequency of AOM and OME events in children is shown in **Fig. 1**.[2]

ORIGIN

The bacteria that cause AOM vary from country to country because of vaccination and antibiotic prescribing habits. In North America virtually all vaccinations against pneumococcus in children are with the 13-valent pneumococcal conjugate vaccine (PCV13). Most children are treated with antibiotics, predominantly amoxicillin in a standard dose (40 mg/kg/d divided twice daily) or a high dose (80 mg/kg/d divided twice daily) for 10 days. As a consequence of PCV and amoxicillin use, the etiology of AOM continues to change over time.[3]

Health care providers must be cautious when they read reports of the etiology of AOM if the study was conducted outside of North America. The availability and extent of use of 7-valent pneumococcal conjugate vaccine (PCV7) varies and the introduction of PCV13 varies. The use of antibiotics at all (observation option), and the primary choice, dose, and routine duration of antibiotics all influence the bacterial etiology and the extent of antibiotic resistance.

The most recent data on the distribution of bacteria causing AOM in North America are shown in **Table 1** (J Casey and ME Pichichero, unpublished data). The mix of organisms and the resistance to amoxicillin among the otopathogens as shown in **Table 1**, and the in vitro activity of antibiotic choices available (**Fig. 2**)[4] suggest that a β-lactamase–stable aminopenicillin (amoxicillin/clavulanate) in high dosage would be the preferred treatment (discussed later).

Much confusion surrounds the role of upper respiratory infection (URI) viruses as a cause of AOM and OME. Although no doubt exists that viral URI plays a key role in the pathogenesis of AOM and OME, the role is more facilitation of bacterial AOM than a primary origin for these viruses (see section on Immunology). Respiratory syncytial virus, influenzae, parainfluenzae, rhinovirus, metapneumovirus, and others can be detected in the nasopharyngeal secretions of children with an URI, followed by AOM or OME. The nasopharyngeal secretions can reflux from the nasopharyngeal region via the eustachian tube into the middle ear space. Therefore, detection of the

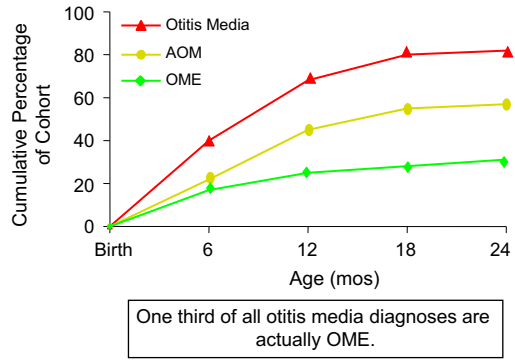

Fig. 1. Frequency of the anticipated diagnosis of AOM compared with the frequency of anticipated diagnosis of OME in children from birth to 2 years of age. (*From* Faden H, Duffy L, Boeve M. Otitis media: back to basics. Pediatr Infect Dis J 1998;17:1105–13; with permission.)