New Guidelines Improve Treatment of Otitis Media

Acute otitis media (AOM), usually referred to as an ear infection, is the most common infection diagnosed in children today. It is also the most common pediatric infection to be treated with antibiotics. The estimated number of antibiotic prescriptions written for otitis media is 809 per 1,000 visits, translating to more than 20 million prescriptions each year. This led to concerns regarding overuse and inappropriate use of antibiotics, as well as the increasing resistance to antibiotics in the United States. In response to these concerns, the American Academy of Pediatrics (AAP) in conjunction with the American Academy of Family Physicians (AAFP) recently released new guidelines for the management of AOM in children ages 2 months to 12 years.

Many countries in Europe have already adopted the practice of treating symptoms only in uncomplicated cases of AOM to cut back on the unnecessary usage of antibiotics. Indeed, without actual aspiration (tympanocentesis) and culture of a red, bulging tympanic membrane (TM), it cannot be ascertained whether the infection is bacterial or viral. As a result, the treatment of AOM with an antibiotic may not occur unless symptoms fail to abate or worsen.

The AAP and AAFP took the cue from Europe and devised these guidelines to apply to uncomplicated otitis media in children where no signs of a more serious systemic infection or concomitant infection are evident, and in children who do not have other comorbid conditions that may make them more susceptible to complications of AOM. Potential comorbid conditions include, but are not limited to, cleft palate, Down’s syndrome, immunodeficiency syndromes, cochlear implants, and recurrence (less than 30 days) of AOM in the presence of chronic otitis media with effusion. Mastoiditis, which was the reason to initiate antibiotics for AOM, has not increased in countries where the “watch and wait” philosophy has been instituted. The current guidelines outline the following six recommendations for AOM management.

### Symptoms of middle-ear inflammation include erythema of the TM or distinct otalgia that interferes with normal activity such as sleep.

#### Accurate Diagnosis

First, the practitioner must be able to clinically diagnose AOM. The clinical definition and diagnosis of AOM are: acute onset of signs and symptoms, presence of middle-ear effusion (MEE), and signs and symptoms of middle-ear inflammation. Signs and symptoms of AOM include otalgia, irritability, otorrhea, and/or fever. The guidelines suggest that in infants, otalgia may be represented by pulling/tugging the ear. Note, however, that these signs and symptoms are not specific for AOM, with the exception of otorrhea, and may represent an uncomplicated upper respiratory infection (URI). Because symptoms associated with AOM are, for the most part, nonspecific for AOM, symptoms and history do not have adequate predictive value for the diagnosis of AOM.

Signs associated with the presence of MEE include a bulging TM, limited or absent mobility of the TM, air-fluid level behind the TM, and otorrhea. Mobility of the TM should be ascertained via the use of pneumatic otoscopy, which may be difficult in an infant or younger child due to cooperation problems. Also, in order to correctly use pneumatic otoscopy, several factors are necessary: the correct speculum size to create a seal, and the otoscope must have good lighting. The canal also must be free of cerumen. Tympanometry and acoustic reflectometry can also be used to help establish TM mobility.

Signs and symptoms of middle-ear inflammation also include erythema of the TM or distinct otalgia that interferes with normal activity such as sleep. The guidelines state that when combined with erythema and mobility, bulging is the best predictor of AOM. Other causes of erythema should be considered, including crying and fever.
It must also be determined if the child has otitis media with effusion or AOM. Otitis media with effusion, or serous otitis media, is more common than AOM and may accompany URIs, allergic rhinitis, and elevation changes such as when flying.

■ **Treatment of Pain**
The second recommendation of the guideline states that management of AOM should include treatment of pain. Treatment of pain may include over-the-counter (OTC) analgesics, home remedies, topical agents, homeopathic agents and narcotics, as well as tympanostomy or myringotomy. Undoubtedly, tympanostomy and myringotomy must only be performed by those skilled in the procedure.

■ **Antibiotics: When to Prescribe**
The third recommendation of the guideline calls for observation and withholding antibiotics in children with uncomplicated AOM and no comorbid factors. The withholding of antibiotics is also based on diagnostic certainty, age, severity of the illness, and means for adequate follow-up. Observation, or the “wait and see” approach, involves monitoring the child for resolution of symptoms within 48 to 72 hours. However, there are exceptions. For infants younger than 6 months of age, it is still recommended to prescribe antibiotics even if the diagnosis of AOM is uncertain.

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and see” approach, involves monitoring the child for resolution of symptoms within 48 to 72 hours. However, there are exceptions. For infants younger than 6 months of age, it is still recommended to prescribe antibiotics even if the diagnosis of AOM is uncertain, due to the increased risk of complications in this age group. If the diagnosis of AOM is uncertain in children aged 6 months to 2 years, and if the child is severely ill, having a fever ≥ 39.0°C or moderate-to-severe otalgia, antibiotics should be considered. Again, one reason for these exceptions to observation is that acute mastoiditis is more common in infants and young children and may even be the initial presentation of AOM. Note, however, that even with increased use of antibiotics, the incidence of mastoiditis is the same as using observation for 48 to 72 hours. There is also no compelling evidence that supports withholding antibiotic treatment of suspected AOM increases the incidence of bacterial meningitis or pneumonia.

If the wait-and-see approach is taken, the parent(s) or caregiver(s) of the child must be responsible enough to return to the clinic or call the clinic if symptoms worsen or are unchanged by the 72-hour mark. A planned follow-up visit to the clinic at 72 hours is also an option. Parents and/or caregivers can also be given a prescription for an antibiotic and instructed not to fill the antibiotic unless symptoms worsen or do not improve in 72 hours. An expiration date should be placed on the prescription. Prescriptions should only be used in this manner when the family in question is reliable and well known to the prescriber.

The third guideline is further divided into subdivision B, which states that if antibiotic therapy is used, in most cases the drug of choice should be amoxicillin at 80 to 90 mg/kg/day in two divided doses. Amoxicillin is the drug of choice for many reasons: it has coverage against the major bacterial causes of AOM, especially *Streptococcus pneumoniae*; it has a narrow spectrum, lessening resistance by other microbes; it is inexpensive and it has an acceptable taste. If beta-lactam resistance to the other major organisms of AOM (*Haemophilus influenzae* and *Moraxella catarrhalis*) is a concern, or if the patient is more severely ill (having a fever of ≥39.0°C), then high-dose amoxicillin-clavulanate (90 mg/kg/day amoxicillin plus 6.4 mg/kg/day clavulanate in two divided doses) is recommended. It is estimated that approximately 50% of *H. influenzae* and 100% of *M. catarrhalis* AOM infections are beta-lactamase positive. On average, resistance of *S. pneumoniae* to penicillin is approximately 30% and is related to alteration of penicillin-binding proteins rather than beta-lactamase. *S. pneumoniae* resistance is geographically dependent in the U.S., and occurs with penicillins and cephalosporins. The increase in the suggested dose of amoxicillin to 80 to 90 mg/kg/day has helped make 80% of *S. pneumoniae* susceptible to penicillins. Other factors to consider when determining if a child has an increased likelihood of penicillin-resistant *S. pneumoniae* include day care attendance, if the child has been taking antibiotics in the past 30 days, or if the child is younger than 2 years of age.

If the child has a documented allergy to penicillins, but the reaction was not a type I hypersensitivity reaction, cephalosporins may be used instead. If the child has a type I hypersensitivity reaction to penicillin, then a macrolide or sulfa antibiotic can be used. Clindamycin may also be considered for the penicillin-allergic child, if the infectious organism is known to be penicillin-continued on p. 13.
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resistant *S. pneumoniae*.

Data regarding the duration of antimicrobial therapy for the treatment of AOM is not entirely conclusive. The guideline suggests that children younger than 5 years be treated for 10 days, and that a 5- to 7-day course is adequate for children 6 years and older with mild- to-moderate disease. In children older than 6 years, if a more severe illness is present, then a treatment of 10 days is appropriate.

### Patient Reassessment

The fourth recommendation in the guideline is to reassess a patient who has not responded adequately to antibiotic therapy; and to begin antibiotic therapy in the patient who has not improved or who has worsened during the wait-and-see period. If the patient was receiving antibiotic therapy and has shown no improvement, then a change in antibiotic should be made.

If observation was initially utilized, the prescription of choice is amoxicillin at 80 to 90 mg/kg/day in two divided doses. For the child who started amoxicillin and had no improvement, the recommendation is to change to a beta-lactamase agent such as amoxicillin-clavulanate at 90 mg/kg/day of amoxicillin plus 6.4 mg/kg/day of clavulanate in two divided doses. Other antibiotic choices, especially for those who are allergic to penicillins, are the same as under recommendation 3b, with the exception of ceftriaxone. Ceftriaxone administered at 50 mg/kg/day for 3 days, either intravenously or intramuscularly, is more effective than one dose in the potentially antibiotic-resistant AOM. Trimethoprim-sulfamethoxazole or erythromycin-sulfisoxazole is not recommended in patients who may be experiencing antibiotic-resistant AOM due to increased resistance to these two agents in eradicating pneumococcal infections.

If the patient fails amoxicillin and then fails amoxicillin-clavulanate, the next step is to initiate the aforementioned 3-day course of ceftriaxone. If after 3 days of ceftriaxone treatment, AOM persists, then tympanocentesis with identification of the offending organism should be done.

Follow-up after AOM depends upon symptom and infection resolution. Keep in mind that the presence of MEE may continue in 60% to 70% of children at 2 weeks, in 40% of children at 1 month, and in 10% to 25% at 3 months. Continued presence of MEE indicates that monitoring is needed, but antibiotic therapy does not necessarily need to continue, and hearing loss associated with MEE is transient.

### Prevention of Risk Factors

The fifth recommendation in the guideline suggests that the reduction of AOM-associated risk factors may prevent AOM. This recommendation does, however, acknowledge that certain risk factors cannot be prevented, such as genetic predisposition, premature birth, being male, being Native American/Inuit, having a family history of AOM, presence of other children in the household, and low socioeconomic status.

Some preventable risk factors to consider include keeping children out of day care centers when ill, breastfeeding for the first 6 months of life, eliminating exposure to second-hand smoke, and eliminating “bottle propping,” or feeding supine. Some pediatric vaccines have also been shown to reduce risk. For example, the influenza intranasal vaccine reduced AOM by 30% in children older than 2 years, but did not show an appreciable difference in children aged 6 to 23 months. In addition, the pneumococcal vaccine has decreased the incidence of pneumococcal AOM, but only by 6%.

#### Complementary and Alternative Medicines

The sixth recommendation of the guideline addresses the use of complementary and alternative medicines (CAM) in the treatment of AOM. At this time, because of limited and controversial data, the guidelines do not support the use of CAM therapies.

The purpose of the new guideline is to make clinical recommendations on the identification and treatment of AOM in children aged 2 months to 12 years who do not have signs or symptoms that might suggest other pathology besides AOM. The recommendation that the U.S. should adopt the observational period of 48 to 72 hours, which has been successfully used in Europe, is of great significance. The observational period is only recommended for children older than 6 months who have an uncertain diagnosis or who have an AOM without severe signs and symptoms. In all age groups, treatment of pain should be addressed.

If parents and practitioners are educated on the current AOM treatment guidelines, perhaps the overuse of antibiotics will be avoided, along with adverse effects of antibiotic use and increasing bacterial resistance.

### Reference