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PEDIATRIC ACUTE OTITIS MEDIA: THE CASE FOR DELAYED ANTIBIOTIC TREATMENT

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□ **Abstract—Acute otitis media (AOM) is both a commonly diagnosed condition and a frequent indication for antibiotic use in children. Recent literature suggests that antibiotics are not needed in many children with AOM, as most cases resolve spontaneously without complication. However, a majority of AOM infections in children are still treated with antibiotics. The American Academy of Pediatrics and American Academy of Family Physicians released a guideline for treatment of AOM in children. We review the guideline as well as scientific evidence related to AOM treatment options. We support a set of evidence-based guidelines employing a delayed prescription option for antibiotic therapy in selected children. If used appropriately, these cost-effective guidelines will reduce the amount of antibiotics prescribed, increase parental satisfaction, and may lower rates of antibiotic resistance while producing similar rates of resolution of AOM.** © 2007 Elsevier Inc.

□ **Keywords—acute otitis media; therapy; delayed antibiotics; pediatrics; treatment options**

INTRODUCTION

Acute otitis media (AOM) is one of the most commonly diagnosed conditions in the United States and the most common indication for antibiotic use in children (1). In 2002, an estimated 2.65 million visits were made to Emergency Departments and 16.7 million visits were made to physician offices across the country for otitis media. It was the sixth most common Emergency Department (ED) discharge diagnosis (2,3). Recent studies from the National Hospital Ambulatory Medical Care Survey and the Agency for Healthcare Research and Quality (AHRQ) have shown that AOM costs between 3 and 5 billion dollars per year with a large portion of this coming from antibiotic costs (2,4,5). However, the costs in these studies are based on a lower number of diagnoses of otitis media, and if extrapolated to account for all diagnoses of AOM, these costs may be much higher.

Several recent investigations, including a Cochrane systematic review from 2004, demonstrated limited benefit to the routine prescribing of antibiotics for all children with AOM (6–19). The primary bacterial pathogens for AOM include *Streptococcus pneumoniae, Haemophilus influenzae,* and *Moraxella catarrhalis,* with *S. pneumoniae* being the most common cause. Viral etiologies may be found in up to 30% of cases (20). Although *S. pneumoniae* was universally susceptible to penicillin in the 1960s, recent surveillance data found 34.2% of *S. pneumoniae* to be penicillin non-susceptible, and 22.4% to be multi-drug-resistant (21). Recently, a committee composed of the American Academy of Pediatrics (AAP) and the American Academy of Family Practice (AAFP) developed a consensus guideline on the diagnosis and management of AOM (Table 1) (22). The goals of this article are twofold: first, to review the consensus recommendations and guideline relating to therapeutic

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Table 1. American Academy of Pediatrics and American Academy of Family Physicians Acute Otitis Media Treatment Guidelines – Summary*

1. To diagnose AOM the clinician should confirm a history of acute onset, identify signs of middle ear effusion, and evaluate for the presence of signs and symptoms of middle ear inflammation.
   Criteria:
   a. Recent or abrupt onset of symptoms
   b. Middle ear effusion (bulging TM, limited mobility of TM, air-fluid level behind TM, or otorrhea)
   c. Middle ear inflammation (erythema of TM, or otalgia)
2. If pain is present, the clinician should recommend treatment to reduce pain, with oral or topical analgesics.
3. (A) Observation without use of antimicrobial agents in a child with uncomplicated AOM is an option for selected children based on diagnostic certainty, age, illness severity, and assurance of follow-up. (B) If a decision is made to treat with an antibacterial agent, the clinician should prescribe amoxicillin for most children. The dose should be 80–90 mg/kg/day.
4. If the patient fails to respond to initial management within 48–72 h, the clinician must reassess the patient to confirm AOM and exclude other causes of illness. If AOM is confirmed in the patient initially managed with observation, the clinician should begin antibacterial therapy. If the patient was initially managed with an antibacterial agent, the clinician should change the antibacterial agent.
5. Clinicians should encourage the prevention of AOM through reduction/modification of risk factors (day care, supine bottle feeding, prolonged pacifier use, second-hand smoke); additionally recommend influenza and pneumococcal vaccinations.
6. No recommendations for complementary and alternative medicine for treatment of AOM are made.

* Derived from Reference (22).

options, specifically 3(A); second, to summarize an approach to management options in the ED setting.

LITERATURE REVIEW

A literature search of Medline was accessed in October 2002 and again in October 2004. The search strategy included the terms "otitis media," "pediatrics," "therapy," and "delayed antibiotics." Additional references from these articles were reviewed. Articles referenced in the Cochrane review and the AAP/AAFP consensus statement were also included.

THE EVIDENCE RELATED TO GUIDELINE 3 (A)

Several studies have directed their attention to the effect of antibiotics on the time to resolution of pain and infection vs. placebo. The Cochrane Library recently published an updated review on the effects of antibiotics in children with AOM (6). Eight of 10 eligible trials were analyzed with a total of 2287 children. Pain resolved in two-thirds of children by 24 h whether they had received antibiotics or placebo. By 7 days, 80% of children had recovered in the placebo controlled groups, only 7% less than in the antibiotic-treated group, resulting in a number needed to treat (NNT) of 15 (95% confidence interval [CI] 11–24). Rosenfeld performed a meta-analysis of 33 randomized trials and found that 81% of AOM spontaneously resolved at 7 days. Resolution was improved by 13.7% (NNT = 7) in with antibiotic treatment compared to placebo (23). More recently, another meta-analysis found an absolute benefit of 5.6% fewer children treated with antibiotics experiencing pain at 2 to 7 days (NNT = 17) (24). It should also be noted that for each child that benefits from the use of antibiotics, an equal number or more will develop nausea, diarrhea, or rash associated with the antibiotic (number needed to harm (NNH) is 10) (6,25).

As shown in Table 2, if a "certain diagnosis" (i.e., all three criteria are met, from Table 1) is made of AOM, the guideline states all children under age 2 years should be treated with antibiotics, and there is an "option" of observation in those over age 2 years. It is unclear why the authors draw a distinction between a "certain" and an "uncertain" diagnosis. Inherent in the diagnosis of

Table 2. Guideline 3(A) – Summary*

Age	Certain Diagnosis	Uncertain Diagnosis
< 6 months	Antibacterial therapy	Antibacterial therapy
6 months to 2 years	Antibacterial therapy	Severe illness: antibacterial therapy Non-severe illness: Observation option*
≥ 2 years	Severe illness: antibacterial therapy Non-severe illness: observation option*	Observation option*
	Defer antibiotic treatment for 48–72 h and treat symptomatically in selected children*	

* Derived from Reference (22).