

The Reevaluation Visit for Acute Otitis Media

Richard H. Schwartz, MD, William J. Rodriguez, MD, PhD, Gregory F. Hayden MD, and Kenneth M. Grundfast, MD

Washington, DC, and Vienna and Charlottesville, Virginia

Seventy children with acute otitis media diagnosed at a suburban, private primary care practice were examined after a ten-day course of antibiotic therapy and were then monitored closely for an additional 20 days. Parents were advised to seek prompt attention if symptoms of earache, fussiness, or fever recurred at any time during the 30-day study period. Of 14 symptomatic recurrences of acute otitis media, eight (57 percent) occurred within one week of discontinuing antibiotic therapy. Four (10 percent) of 41 children with persistent otitis media with effusion on days 10 to 14 developed symptomatic acute otitis media over the next 18 days, as did four (17 percent) of 23 children who had a normal middle ear examination on days 10 to 14. Early follow-up visits immediately following antibiotic therapy commonly detect persistent otitis media with effusion but appear to have limited value in detecting asymptomatic, posttreatment acute otitis media. The optimal timing of reevaluation visits for children with acute otitis media deserves further study.

The customary treatment for acute otitis media in the United States is a ten-day course of antimicrobial medication. Primary care physicians often request that children with acute otitis media return for follow-up examination at the end of this course to assess the efficacy of medical therapy.¹ The goals of this follow-up visit are to assess (1) whether middle ear effusion is present, and if so, (2) whether any such effusion represents persistent (or recurrent) infection requiring additional antibiotic therapy.

Techniques to identify middle ear effusion include standard otoscopy, pneumatic otoscopy,² tympanometry,³ and acoustic otoscopy.⁴ Without tympanocentesis, however, discrimination between infected and noninfected effusions is challenging. Infection is most likely if the tympanic membrane is discolored (red, yellow, or grey) and bulging (nonvisualization of the handle and short process of the malleus) with impaired mobility of the tympanic membrane to pneumomassage.⁵ Acute symptoms (fever, fussiness, or earache) may also assist in making this determination. If persistent or recurrent infection is sus-

pected in a symptomatic child with a discolored, bulging, poorly mobile tympanic membrane, a second course of a different antimicrobial agent seems justified.

Otitis media with effusion occurs commonly in the weeks following an episode of acute otitis media, especially in white male children aged less than 2 years.⁶ The tympanic membrane in such instances may be opacified, hyperemic or lusterless, and poorly mobile, but not bulging. In a young, squirming, uncooperative child with external auditory canals occluded by cerumen, this distinction may be clinically challenging. Overdiagnosis of persistent infection can lead to unnecessary medical costs for a problem that will usually resolve spontaneously within 90 days without additional medical treatment. Bacteria such as *Hemophilus influenzae* and *streptococcus pneumoniae*, usually in small numbers, have been recovered from 15 to 20 percent of middle ear effusions from children with posttreatment otitis media with effusion, but the desirability of additional antimicrobial therapy remains uncertain.⁷ The possible role of oral corticosteroids as medical therapy for otitis media with effusion remains under investigation.⁸ For the present, most authorities recommend watchful waiting for at least three months before consideration of surgical referral.^{9,10}

The purposes of the small pilot study reported here were (1) to document the clinical benefits, if any, of an early follow-up visit 10 to 14 days after a diagnosed episode of acute otitis media, and (2) to examine critically the potential risks and benefits of delaying this visit.

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From the Research Foundation, Microbiology Section, and the Department of Otolaryngology, Children's Hospital National Medical Center, Washington, DC, The Department of Family Practice Medical College of Virginia, Richmond, The Fairfax Family Practice, Vienna, and the Children's Medical Center, University of Virginia, Charlottesville, Virginia. Requests for reprints should be addressed to Richard Schwartz, MD, 410 Maple Avenue West, Vienna, VA 22180.

METHODS

All children were examined by one of the authors (R.H.S.), with recognized expertise in pneumotoscopic diagnosis.^{2,5,11,12} Children diagnosed as having symptomatic acute otitis media were invited to participate in this study. Parents were asked to bring their children for follow-up ten to 14 days after the diagnosis was made. All diagnoses were based on appearance, color, and mobility of the tympanic membrane as follows:

Acute Otitis Media. Bulging, opaque tympanic membrane with abnormal color (red, yellow, or grey) and limited or no mobility occurring in a child with apparent ear discomfort (pain, fussiness, or tugging at the ear). Children with apparently painless acute otitis media were excluded from this study to increase diagnostic specificity.

Posttreatment Acute Otitis Media. Acute otitis media diagnosed within 20 days after completing a course of antimicrobial therapy for acute otitis media.

Otitis Media With Effusion. Nonbulging, opaque tympanic membrane in neutral or retracted position with poor or absent to-and-fro mobility occurring in a child who was asymptomatic (except for hearing impairment when that could be evaluated). Tympanometry, when performed, showed a type B pattern, supporting the diagnosis of liquid in the middle ear space.

Normal Ear Examination. Nonbulging tympanic membrane with normal mobility and through which the ossicular landmarks were visible. Retracted eardrums with good mobility to negative pressure applied through the sealed pneumatic otoscope were considered normal for purposes of this study.

The diagnostic accuracy of the testing physician has been verified in several previous studies in which clinical diagnoses were confirmed by tympanocentesis.^{13,14} All examinations were performed with a 3.5-V halogen-illuminated, diagnostic otoscope with a chrome-steel pneumatic head fitted at the factory with a rubber gasket adjacent to the lens as a means of ensuring an airtight seal necessary for proper pneumatic otoscopy.

Except for those with a history of penicillin allergy, all children were given a prescription for amoxicillin, 30 to 40 mg/kg/d for ten days. Decongestant medication was prescribed infrequently, and only for management of swollen nasal mucosa. Pharmacologic compliance was not evaluated. No child was included in the study more than once. All parents were instructed to return within 12 hours for reevaluation (once the presenting symptoms had resolved) if the child developed fever, pain (including such

TABLE 1. OTOSCOPIC FINDINGS AT FOLLOW-UP VISIT ON DAYS 10 TO 14 AMONG 70 CHILDREN TREATED FOR ACUTE OTITIS MEDIA

| Otoscopic Findings on Days 10 to 14 | No. (%) |
|---------------------------------------|----------|
| No return visit made | 1 (1) |
| Normal examination | 23 (33) |
| Persistent otitis media with effusion | 41* (59) |
| Posttreatment acute otitis media | 5 (7) |
| Total | 70 (100) |

* Four of this group had another episode of acute otitis media between days 15 and 30, and 3 more patients were lost to further follow-up, as they failed to return as scheduled

behavior as fussiness, irritability, or tugging at the ear), or any other symptoms associated with acute otitis media at any time during the study period.

Children were scheduled for reevaluation by the same pediatrician who diagnosed the initial acute otitis media. Children with persistent otitis media with effusion were not treated with decongestants. Tympanograms were obtained at most scheduled reevaluation visits regardless of the clinical assessment of middle ear status. An electrically plotted tympanometer (American Electromedic model 86AR) was used to test tympanic membrane compliance in children aged more than 2 years; an acoustic impedance meter (Teledyne TA3-D) was used to obtain reproducible, manually plotted tympanograms for children aged less than 2 years. Only flat (type B pattern) tympanograms were considered as supporting the diagnosis of otitis media with effusion. Children with more than three episodes of acute otitis media in the previous year, based on a review of the medical record, were considered to be otitis prone.

RESULTS

Ninety-one children were enrolled in the study over a 14-month study period. Twenty-one patients (23 percent) were excluded from analysis: 9 (10 percent) failed to keep their scheduled appointments, and another 13 (14 percent) returned for the requested follow-up but were seen by other physicians who did not follow the rigid study protocol, ie, they did not perform pneumotoscopy or tympanometry. Some excluded children were treated at follow-up with another ten-day course of antibiotics, but all of these children were evaluated by colleagues who used neither a pneumatic otoscope nor tympanometry. None of the children who were excluded had precisely defined (ie, bulging, immobile eardrum), acute otitis media. Of the 70 (77 percent) children remaining for analysis, the

TABLE 2. TIMING OF APPEARANCE OF SYMPTOMATIC RECURRENCES OF ACUTE OTITIS MEDIA OCCURRING 10 TO 30 DAYS AFTER INITIATION OF DRUG TREATMENT FOR ACUTE OTITIS MEDIA

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|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Day on which recurrent acute otitis media was diagnosed | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Number of patients | — | — | 1 | — | 4 | 1 | — | 2 | 3 | — | — | — | — | — | — | 1 | 1 | — | 1 | — | — |

mean age was 3.8 years (range 2 months to 13 years). Bilateral acute otitis media was diagnosed in 25 children.

At the time of the scheduled follow-up visit, 23 (33 percent) patients had normal pneumatic otoscopy and tympanometry and 41 (59 percent) had persistent otitis media with effusion (Table 1). Only five children developed symptoms of acute otitis media between days 10 and 14 (Table 2). Four (10 percent) of 41 children with persistent otitis media with effusion developed symptomatic acute otitis media over the next 16 days, as did four (17 percent) of 23 children who had a normal pneumatic otoscopic examination on days 10 to 14 (Table 3).

Otitis-prone children were less likely than the other children to have a normal otoscopic examination (13 percent vs 31 percent) and more likely to have posttreatment acute otitis media (47 percent vs 13 percent) during the study period ($P < .02$ by chi-square analysis).

In the four-day period after stopping antibiotic treatment, only 7 percent of children developed symptomatic posttreatment acute otitis media. Eight children with delayed onset posttreatment acute otitis media (between days 15 to 30) did not have symptoms or bulging eardrums at the 10- to 14-day reevaluation visit. Four children had otoscopic and tympanometric evidence of normal middle ear status between days 10 to 14, four children had persistent otitis media with effusion on days 10 through 14 but went on to develop acute otitis media, and one child missed the conventional 10- to 14-day scheduled appointment but returned later with acute otitis media. If the four cases in which posttreatment otitis media with effusion quickly progressed to acute otitis media could possibly have been prevented by a policy of prescribing additional antibiotic therapy for all children with persistent otitis media with effusion, then under such a policy 33 additional children with persistent otitis media with effusion who did not develop posttreatment acute otitis media might have received antibiotic treatment without observable benefits.

DISCUSSION

What are the benefits and risks of postponing the follow-up visit for children with acute otitis media from the current 10 to 14 days after diagnosis until one month after

TABLE 3. OTOSCOPIC FINDINGS AT FOLLOW-UP VISIT ON DAYS 15 TO 30 AMONG 70 CHILDREN TREATED FOR ACUTE OTITIS MEDIA

| Otoscopic Findings on Days 15 to 30 | No. (%) |
|---------------------------------------|-----------------|
| No return visit made* | 28 (40) |
| Normal examination | 19 (27) |
| Persistent otitis media with effusion | 14 (20) |
| Posttreatment acute otitis media** | 9 (13) |
| Totals | 70 (100) |

* Twenty-five of the 28 either were not told to return ($n = 19$) or were re-evaluated again after the 30-day study period ended ($n = 6$)
 ** Four patients had had a normal examination on days 10 to 14. Four patients had persistent otitis media with effusion on the day 10 to day 14 visit, and one patient did not keep the 10 to 14-day visit appointment

diagnosis? One possible advantage of such a delay would be a reduction in the number of office visits with an accompanying lowering of medical costs. Children observed to have persistent otitis media with effusion at an early follow-up visit may be submitted to additional diagnostic testing, such as tympanometry, or be scheduled for additional follow-up visits to document resolution of the effusion. In some instances the effusion may be interpreted erroneously as persistent or recurrent infection, and antimicrobial therapy may be prescribed unnecessarily. These factors would tend to increase the associated medical costs of an episode of acute otitis media without proven medical benefit to the child. Delaying the follow-up visit would allow longer time for persistent otitis media with effusion to resolve spontaneously without premature medical or surgical intervention. Only 10 to 15 percent of middle ear effusions are still present at the end of 90 days.⁶

The major disadvantage of postponing the follow-up visit would be a delay in detecting persistent or recurrent acute otitis media that was asymptomatic. Because apparently painless acute otitis media is most common among children less than 2 years old,¹⁵ this risk would be greater among infants and young children. If a suppurative complication (such as mastoiditis or meningitis) arose from an unrecognized, asymptomatic acute otitis media even in an extremely small proportion of cases, such sup-

purative extraotitic complications would more than counterbalance the estimated cost savings from delayed visits. Such suppurative complications did not arise in this study, and would be most unlikely to develop in the absence of the development of fever or other symptoms. This potential risk of the development of meningitis or brain abscess appears very small, however, because several recent studies have suggested that many episodes of even symptomatic acute otitis media can be managed safely without antibacterial therapy.¹⁶ It is likely that some children and parents would be less apt to comply with a later vs earlier follow-up appointment, but one-month follow-up compliance remains unstudied to date.

Some episodes of posttreatment acute otitis media, especially those occurring soon after therapy is discontinued, represent relapses, whereas other, later recurrences represent instances of reinfection. Recent investigations of children with acute otitis media caused by H influenzae have revealed that recurrent episodes of acute otitis media occurring within 30 days were usually caused by an identical strain of this organism.¹⁷ For recurrent episodes occurring more than 30 days later, a strain different from the initial isolate was usually recovered from the middle ear exudate.

The present study findings apply only to children seen at a suburban, private practice population, and may not pertain to other clinical settings in which the access to health care and the degree of patient compliance might vary greatly. In one university hospital's pediatric, out-patient clinic, the majority of children given a formal follow-up appointment one to three weeks following an episode of acute otitis media failed to keep this routine reevaluation appointment.¹⁸

Although many primary care physicians currently schedule routine reevaluation of children with acute otitis media 10 to 14 days after diagnosis, the results of this small study in a suburban, private practice suggest that in the absence of fussiness, earache, or fever, the reevaluation visit for many children with acute otitis media can safely be delayed for up to 30 days. About 10 percent of children can be expected to develop symptomatic post-treatment acute otitis media during the first week after completing antibiotic therapy, and another 10 percent may develop symptomatic posttreatment acute otitis media between days 18 and 30. Many of these children would not have a bulging or otherwise abnormal tympanic membrane at days 10 to 14. Parents in this practice returned promptly with their symptomatic children, and all responded well to additional antibiotic treatment. Young children at risk for apparently painless acute otitis media and otitis-prone children at increased risk of reinfection may need to be monitored more frequently for evidence

of recurrent infection. Those who are otitis-prone may warrant consideration of a trial of antimicrobial prophylaxis to reduce the likelihood of recurrent acute otitis media.

In summary, delayed reevaluation visits allow the natural history of persistent acute otitis media to unfold, and may help to reduce medical costs and premature surgical intervention. In the absence of fever or earache, delayed reevaluation visits are sensible and safe. Additional research may help to determine whether postponement of the follow-up visit will be safe and cost effective for certain children with acute otitis media.

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