

# Acute otitis media in children

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**Clinical question:** What is the best treatment for acute otitis media in children?

**Results:** Watchful waiting, followed by amoxicillin treatment, if necessary, is the best first-line treatment for acute otitis media in children aged six months or older.

**Keywords:** acute otitis media, antibiotics, watchful waiting

**Definition:** Acute otitis media (AOM) is an acute bacterial infection of the middle ear fluid. It must be clearly distinguished from middle ear effusion, which is noninfected middle ear fluid.

**Etiology:** Mostly *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Moraxella catarrhalis*. Since the introduction of the PCV7 vaccine, there has been an increase in *H. influenzae* and nonvaccine serotypes of *S. pneumoniae*.

**Incidence:** AOM is the most frequent diagnosis in sick children visiting the physician's office. The incidence is maximal at the age of 6–24 months and decreases with age. It is infrequent in school-aged children.

**Economics:** In 2000, it was estimated that AOM accounted for \$5 billion of annual expenditure in the US.

**Level of evidence:** Systematic reviews, meta-analyses, randomized controlled trials. Because this pathology is very frequent, there are hundreds of papers (from 2001 to current, 260 reviews, 23 meta-analyses, 31 randomized controlled trials) and it is impossible to give results and a reference for each individual paper.

**Search sources:** PubMed, Cochrane Library, UptoDate (2001 to current)

**Outcomes:** Time to resolution of symptoms, avoidance of recurrent AOM, avoidance of middle ear effusion, avoidance of other complications.

**Consumer summary:** AOM in children is the most frequent reason for visiting a physician. It is self-limiting in most cases, and its complications are rare. There is good evidence that watchful waiting for two days followed by antibiotic treatment if necessary is the best treatment. No other treatments help, except for the usual pain remedies.

## The evidence

### Antimicrobial treatment versus watchful waiting?

In children aged six months to 12 years, 7–14 days of antibiotic treatment compared with placebo or watchful waiting provided a more favorable short-term clinical course, but a higher incidence of diarrhea. The treatment effect was small.

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There was no difference in disease complications, development of persistent middle ear effusion, or recurrence of AOM,<sup>1-11</sup> and a very slight difference for the risk of mastoiditis (0.7 versus 2.0/10000).<sup>10</sup>

Children younger than two years of age with bilateral AOM and children with AOM and otorrhea have a higher risk of an extended course of disease.<sup>2</sup> There is no statistically significant effect of antibiotic therapy in preventing development of asymptomatic middle ear effusion at one month.<sup>12</sup>

## Choice of antimicrobial treatment?

There are no significant differences in antibiotic effectiveness, except in a few individual studies. Almost all of the studies conclude that amoxicillin is the first-choice antibiotic, except in children with penicillin allergy or those who previously did not improve after a course of amoxicillin. See below for choice in these situations.

The doses for amoxicillin and amoxicillin-clavulanate require consideration of the geographic area where patients are treated. A high dose of amoxicillin or amoxicillin-clavulanate or three doses of ceftriaxone are necessary for recurrent or nonresponsive AOM because they are often caused by intermediate-resistant *S. pneumoniae*.<sup>13,14</sup>

## The practice

### Potential pitfalls

It is important to be trained in otoscopy and have a good otoscope, preferably a pneumatic otoscope.

### Management

AOM is usually managed by nonspecialists. Indications for specialist referral are given below.

### Assessment

It is important to recognize that AOM is frequently overdiagnosed. Most symptoms described by parents correlate poorly with AOM and may simply result from a cold. In terms of otoscopic signs, bulging, a cloudy aspect, an immobile eardrum on pneumatic otoscopy, and redness (from best to worst) have a good association with AOM. Look for risk factors, i.e. day care in large groups, use of a pacifier, feeding in a supine position, tobacco smoke and air pollution, bottle feeding, family history, and underlying disease (eg, cleft palate, Down syndrome, immunity problems).

### Treatment

Treat every child younger than six months, children six months to two years with bilateral AOM, and children with

## Duration of antimicrobial treatment?

Risk of treatment failure is slightly higher with short courses of antibiotics (<7 days versus ≥7 days) one month after initiation of therapy (difference of 3% between groups) except for ceftriaxone and azithromycin.<sup>15,16</sup>

## Other treatments?

The 7-valent PCV administered during infancy has marginal beneficial effects. Administering 7-valent PCV in older children with a history of AOM appears to have no benefit in preventing further episodes.<sup>17</sup> In children 1–7 years of age this does not change the rate of recurrent AOM.<sup>18</sup> It is not clear if administration of influenza vaccine to children does or does not reduce occurrence of AOM.<sup>19-21</sup> Probiotics do not prevent the occurrence of AOM in children aged 10 months to six years, but might help in the first year of life.<sup>22,23</sup> Echinacea purpurea during colds and manipulative osteopathic treatment do not prevent the occurrence of AOM in children aged 1–5 years.<sup>2</sup> Decongestants and antihistamines are useless.<sup>25</sup> Ventilation tube insertion leads to a mean reduction of 1.5 episodes of acute otitis media in the first six months.<sup>26</sup> Adenoidectomy does not prevent recurrent AOM.<sup>27</sup>

otorrhea with antibiotics. Give pain remedies and schedule an appointment or at least a telephone follow-up in 48–72 hours for all other children with AOM. Treat them with antibiotics only if they do not improve.

The first-choice antibiotic is amoxicillin 50 mg/kg/day. In countries with a high proportion of intermediate-resistant *S. pneumoniae*, give 90 mg/kg/day (maximum 3 g/day).

For children who have been treated in the previous 30 days, those with concurrent conjunctivitis, and treatment failure after 48–72 hours, choose amoxicillin-clavulanate 90 mg/kg/day in two divided doses. Treat children older than two years for five days and children two years or younger for 10 days.

In the event of penicillin allergy with non-type 1 reactions, give cefdinir 14 mg/kg/day (maximum 600 mg/day), cefpodoxime 10 mg/kg/day (maximum 800 mg/day), or cefuroxime 30 mg/kg/day (maximum 1 g/day), all in two divided doses. With type 1 reactions, give a macrolide, i.e. azithromycin 10 mg/kg/day in one dose (maximum 500 mg/day) for three days or clarithromycin 15 mg/kg/day (maximum 1 g/day) for five days. However, none of these agents can eradicate penicillin-resistant *S. pneumoniae*.

An alternative treatment is a single intramuscular dose of ceftriaxone 50 mg/kg. If there is no improvement after 48 hours, a second dose and even a third dose can be administered.

Give ibuprofen 10 mg/kg three times per day. Check for disappearance of middle ear effusion after three months.

## Indications for specialist referral

Contact an Ear, Nose and Throat specialist for any child with AOM and signs of mastoiditis, facial palsy, sudden vertigo, or sudden important hearing loss. Routine referral to an Ear, Nose and Throat specialist is advised if middle ear effusion has not disappeared after three months.

## Further reading

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