

Acute otitis media in children 6 months to 2 years of age

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Abstract

Question Acute otitis media (AOM) is one of the most common findings among children in our family medicine office, and we frequently see this illness during seasons with high rates of upper respiratory tract infections. With more widespread pneumococcal immunization, has the rate of AOM declined? What are the current recommendations for antibiotic treatment?

Answer Although rates of the infection have declined over time with better uptake of vaccines against *Streptococcus pneumoniae*, AOM is still prevalent in the pediatric population and may be associated with serious complications that affect hearing and quality of life. Once a diagnosis has been made (based on a combination of acute onset of symptoms, signs of middle ear inflammation, and effusion), treatment of children 6 months to 2 years of age depends on physical examination findings. Children with perforated tympanic membranes and purulent discharge should receive 10 days of systemic antibiotics. For children with more mild symptoms or early AOM, primary care providers should consider either treatment or watchful waiting.

L'otite moyenne aiguë chez les enfants de 6 mois à 2 ans

Résumé

Question L'otite moyenne aiguë (OMA) est l'un des problèmes les plus communs observés chez les enfants dans nos cliniques de médecine familiale, et nous voyons souvent cette maladie durant les saisons où les taux d'infections des voies respiratoires supérieures sont élevés. Compte tenu de l'immunisation plus généralisée contre les pneumocoques, les taux d'OMA ont-ils connu une baisse? Quelles sont les recommandations actuelles concernant l'antibiothérapie?

Réponse Même si les taux de cette infection ont connu un déclin avec le temps grâce à une meilleure vaccination contre le *Streptococcus pneumoniae*, l'OMA est encore prévalente dans la population pédiatrique et pourrait être associée à des complications sérieuses qui nuisent à l'ouïe et à la qualité de vie. Une fois le diagnostic posé (en se fondant sur l'apparition aiguë de symptômes, combinée à des signes d'inflammation de l'oreille moyenne et à un épanchement), le traitement des enfants de 6 mois à 2 ans dépend des constatations à l'examen physique. Les enfants dont les membranes tympaniques sont perforées et qui ont un écoulement purulent devraient recevoir des antibiotiques systémiques pendant 10 jours. Pour les enfants qui ont des symptômes plus légers ou qui sont au début d'une OMA, les professionnels des soins primaires devraient envisager un traitement ou encore une attente vigilante.

Acute otitis media (AOM) is one of the most common conditions in childhood. The incidence rates of AOM in the United States in 2011 were reported as 476, 204, and 284 episodes per 1000 children who were aged 2 or younger, 3 to 9 years, and 9 or younger, respectively, and although these rates declined between 2011 and 2016, the average number of antibiotic prescriptions per AOM visit remained stable (0.89 in 2011 and 0.86 in 2016).¹ While most children recover from AOM, in some it may lead to serious complications and affect hearing, education, and quality of life.²

Acute otitis media can be caused by viruses or bacteria. A systematic review from 2016 confirmed that *Streptococcus pneumoniae* and *Haemophilus influenzae* remain the predominant bacterial pathogens over time.³ Over the past 2 decades, pneumococcal vaccinations

have been an effective means of protection against the pneumococcal serotypes causing AOM, and pneumococcal conjugate vaccines have dramatically reduced the incidence of *S pneumoniae*.⁴

Accurately diagnosing AOM can be challenging and requires a combination of acute onset of symptoms, signs of middle ear inflammation, and effusion. The symptoms of AOM include otalgia, ear rubbing, fever, irritability, restless sleep, diminished appetite, and excessive crying. However, none is sensitive or specific, and these symptoms are not helpful in distinguishing AOM from a respiratory tract infection.⁵

Lack of cooperation of the young child and visualization difficulty owing to cerumen or dry skin are added barriers, and these factors may be associated with overdiagnosis of AOM.⁶ Examination of the tympanic

membrane (TM) for colour, position, mobility, and translucency is important, and diagnosing AOM based on red TM alone should be discouraged. Recent developments in artificial intelligence have resulted in several applications to ease the detection of AOM, allowing for better use of telemedicine for common pediatric conditions.⁷

In a recent Dutch population-based prospective cohort study following 7863 children (from birth to 10 years of age) and their mothers, male sex (odds ratio [OR]=1.26, 95% CI 1.11 to 1.43) and day-care attendance (OR=1.31, 95% CI 1.06 to 1.60) were each associated with increased odds of AOM until 3 years of age (early AOM). Having been breastfed was beneficial both for children with early AOM and for children with persistent AOM (OR=0.78 and 0.77, respectively), with persistent AOM referring to children who remained prone to AOM after age 3 years. Having been born in the summer or autumn was associated with decreased odds of persistent AOM compared with having been born in spring. Half of all AOM-prone children recovered after the age of 3 years.⁸

Treatment

The Infectious Diseases and Immunization Committee of the Canadian Paediatric Society recently affirmed⁹ its recommendations for children older than 6 months.¹⁰

In children with symptoms of AOM in whom the TM is likely perforated and purulent discharge is seen in the external canal, primary care providers should start systemic antibiotics for 10 days and arrange for follow-up to ensure their symptoms resolve and they do not suffer from complications of AOM.¹⁰

For children with middle ear effusion, clear bulging of the TM on otoscopy, and symptoms including fever ($\geq 39^{\circ}\text{C}$), irritability, difficulty sleeping, and symptoms persisting for more than 2 days, treatment with antibiotics for 10 days is recommended. However, if the child is seen shortly after the onset of symptoms, they are calm on physical examination, and their fever is lower than 39°C , physicians can recommend symptomatic relief, monitoring at home, and reconsideration of antibiotic treatment 48 hours later; providing caregivers with clear guidance on signs of worsening is important in those cases.¹⁰

Finally, for children who have either middle ear effusion or bulging of the TM (but not both), watchful waiting (ie, observation of children for 48 to 72 hours before making another decision on systemic antibiotics) may be prudent. While this technique is underused in many communities,¹¹ waiting to assess progression of illness is cost-effective, reduces health care expenditures, and improves outcomes.¹²

Recommended first-line therapy in Canada continues to be 75 to 90 mg/kg/d of amoxicillin divided twice a day. For those not tolerating the drug or those with penicillin allergies, 30 mg/kg/d of cefuroxime axetil divided twice or 3 times a day is recommended. Follow-up for children who receive systemic antibiotics is important to ensure recovery and to monitor for adverse events.

For children with treatment failure and ongoing symptomatic AOM, amoxicillin-clavulanate suspension with a 7:1 formulation is recommended at a 45 to 60 mg/kg/d dose, divided 3 times a day. This combination will likely result in more gastrointestinal side effects (eg, nausea, vomiting, headache, diarrhea, abdominal pain), so providing caregiver guidance is imperative.

Conclusion

In summary, accurate AOM diagnosis is important in the primary care provider office setting. Using watchful waiting versus immediately starting systemic antibiotics for children 6 months to 2 years of age will result in improved comfort and reduce the rate of complications among children.

Competing interests

None declared

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Can Fam Physician 2022;68:589-90. DOI: 10.46747/cfp.6808589.



Child Health Update is produced by the Pediatric Research in Emergency Therapeutics (PRETx) program (<http://www.pretx.org>) at the BC Children's Hospital in Vancouver, BC. Dr Ran D. Goldman is Director of the PRETx program. The mission of the PRETx program is to promote child health through evidence-based research in therapeutics in pediatric emergency medicine.

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