Review Article

Otitis Media Diagnosis and Management in Family Medicine Practice: Literature Review

Reem Jaber Suhluli[1*], Al Muhannad Yahya Ali Khabrani[1], Khaled Muhammed Mashhour[1], Abeer Abdulsalam Albushi[2], Seham Luwayfi Albalawi[2], Awadh Mohammed A. Alahmari[3], Amal Radi A Aljuhani[4], Mustafa Rasool Alturaifi[5], Maha Ali Hilabi[6], Amjad Kamayan B Aldoghmi[7], Yasmeen Mohammed Alanazi[8]

[1] Department of Medical Science, Faculty of Medicine, Jazan University, Jazan, Saudi Arabia. [2] Department of Medical Science, Faculty of Medicine, Taibah University, Medina, Saudi Arabia. [3] Department of Medical Science, Faculty of Medicine, King Khalid University, Abha, Saudi Arabia. [4] Department of Internal Medicine, Yanbu General Hospital, Yanbu, Saudi Arabia. [5] Department of Medical Science, Faculty of Medicine, Hail University, Saudi Arabia. [6] Department of Family Medicine, Al Rehab Primary Health Care, Jeddah, Saudi Arabia. [7] Department of Medical Science, Faculty of Medicine, Jouf University, Aljouf, Saudi Arabia, [8]Department of Medical Science, Faculty of Medicine, Northern Border University, Arar, Saudi Arabia.

Abstract

Background: Otitis media is an infectious disease of the middle ear that presents with or without acute symptoms. It is the most prevalent diagnosis among children presenting at family physicians' clinics in the US and the second most common diagnosis overall. **Objective:** In this study, we aimed to discuss and evaluate the role of family physicians in otitis media diagnosis and management. **Method:** A comprehensive search was done using biomedical databases; Medline, and PubMed, for studies concerned with assessing the role of family physicians in the diagnosis and management of otitis media. Keywords used in our search through the databases were "Otitis Media Diagnosis", "Otitis Media Management", and "Family Physician". **Conclusion:** It was found that the family physicians were more likely to diagnose acute otitis media than the otorhinolaryngologist. Family physicians also tend to prescribe high-cost antibiotics more frequently than pediatricians do. Accurate diagnosis is a critical factor in decreasing antibiotic use for otitis media. Careful examination and adherence to the guidelines will decrease the use of antibiotics for cases like otitis media with effusion or red ears in the crying child.

Keywords: Otitis Media, Diagnosis, Management, Primary Health Care

Introduction

Otitis media is an infectious disease of the middle ear that presents with or without acute symptoms [1]. Its cases encounter providers across the full spectrum of primary, secondary, and tertiary care. It is the most prevalent diagnosis among children presenting at family physicians' clinics in the US and the second most common diagnosis overall [2]. It is also the most common childhood infectious disease, for which antibiotics are prescribed [2, 3]. Therefore, it is important for the family physician to acquire the optimum knowledge and skills in diagnosing and treating otitis media cases in order to improve care and outcomes. Otitis media diagnosis ranges from symptomology to tympanometry and the management ranges from observation to surgical treatment. We aimed in this article to review otitis media diagnosis and management by the family physician perspective.

Methodology

Sample

We conducted a comprehensive search using biomedical databases; Medline and PubMed, for studies concerned with evaluating the role of family physicians in the diagnosis and management of otitis media published in English. Keywords used in our search through the databases were "Otitis Media Diagnosis", "Otitis Media Management", and "Family Physician". More relevant articles were recruited from references lists scanning of each included study.

Address for correspondence: Reem Jaber Suhluli. Department of Medical Science, Faculty of Medicine, Jazan University, Jazan, Saudi Arabia.
E-mail: reemsuhluli @ gmail.com

How to cite this article: Jaber Suhluli, R., Yahya Ali Khabrani, A. M., Muhammed Mashhour, Kh., Abdulsalam Albushi, A., Luwayfi Albalawi, S., Mohammed A. Alahmari, A. and et al. Otitis Media Diagnosis and Management in Family Medicine Practice: Literature Review. Arch Pharma Pract 2019;10(3):21-4.

Analysis

No software was used, the data were extracted based on a specific form containing the title of the study, the name of the author, objective, summary, results, and outcomes.

Discussion

Otitis media is divided into 2 main types including otitis media with effusion and acute otitis media. Acute otitis media is determined by the presence of fluid in the middle ear along with symptoms and signs of acute infection. Otitis media with effusion is determined by the presence of fluid in the middle ear with the absence of acute infection [2, 4].

These two types should be clinically differentiate because in cases of otitis media with effusion, antimicrobial therapy is rarely needed [5]. An inaccurate diagnosis can lead to unnecessary treatment with antibiotics, which contribute to the probable development of resistance to antibiotics [6]. The World Health Organization has designated management skills of otitis media that all primary care providers should acquire and develop [7].

Diagnosis:

Previously, the diagnostic criteria for acute otitis media were only based on symptomatology without otoscopic findings of inflammation. The updated American Academy of Pediatrics guideline endorses more strict otoscopic criteria for diagnosis [8]. Therefore, the diagnosis must be based on the clinical symptoms along with the visual examination of the tympanic membrane using pneumatic otoscopy [2]. To diagnose an acute otitis media case, it is required to have moderate-severe bulging of the tympanic membrane along with a recent onset of otorrhea, which is not the consequence of otitis externa, or mild bulging of the tympanic membrane with recent onset of earache [9].

In addition, cases of acute otitis media can be associated with poor mobility of the eardrum along with redness discoloration (erythema). The discoloration is because of the presence of pus in the middle ear space. Acute otitis media can also affect the appearance and makes the patient looks acutely ill, feverish, and irritable. Nevertheless, the eardrum in otitis media with effusion tends to be in its normal position, to be retracted, or to have reduced mobility. However, there is no acute inflammation in otitis media with effusion [2].

Risk factors:

There are various risk factors that can lead to acute otitis media, such as upper respiratory tract infection, use of pacifier, no breastfeeding, immunodeficiency, gastroesophageal reflux, family history of recurrent acute otitis media, exposure to respiratory irritants like environmental smoke, exposure to group daycare, craniofacial abnormalities, allergies, and younger age [8-10]. It usually starts with an acute viral upper respiratory tract infection. This infection might result in dysfunction of the Eustachian tube that subsequently can lead to acute otitis media. Isolated bacteria can be found in middle ear fluid cultures in 50-90% of patients with otitis media with effusion and acute otitis media. The most common organisms are *Moraxella catarrhalis*, *Streptococcus pneumoniae*, and *Haemophilus influenzae* [4, 11]. Moreover, *Haemophilus influenza* has the highest prevalence in children, especially in cases of severe or refractory acute otitis media after the vaccination of pneumococcal conjugate [9, 12]. In infants, up to eight weeks of age, Chlamydia trachomatis, gram-negative enteric bacteria, and Group B streptococcus are common pathogens that can be detected in the middle ear [13]. In the respiratory secretion of cases with acute otitis media, viruses have been found and may account for many patients with failure in antibiotic therapy [14, 15]. Studies have shown that acute otitis media typically resolves without antibiotic therapy in children [16].

Management:

The American Academy of Pediatrics and the American Academy of Family Physicians developed guidelines for the treatment of acute otitis media [17]. For children older than 6 months, the guidelines firstly recommended observation as an option. Observation would involve delaying antibiotic therapy initiation for 48 to 72 hours if symptoms did not resolve. In addition, two RCTs suggested that the use of antibiotics in children with the age of 6 months to 3 years was more effective than observation [18]. Also, in infants who present with fever, the initiation of antibiotics is recommended and they should have a full sepsis workup. They also should undergo an otorhinolaryngology consultation for possible tympanocentesis. In bilateral acute otitis media and in those with acute otitis media associated with otorrhea, immediate initiation of antibiotics is recommended as well. Amoxicillin is the recommended and proper first-line treatment for acute otitis media [12, 17]. The dose is 80-90 mg/kg/d in two divided doses. If there is no response to initial antibiotic therapy within 48-72 h, the patient should be reexamined to confirm the diagnosis, and amoxicillin/clavulanate should be prescribed [17]. Ceftriaxone can be used in children with vomiting or as the second-line drug [16]. Less than seven days of the courses of antibiotics have shown higher failure rates than the longer ones.

High-dose azithromycin is the recommended choice of antibiotics in cases of amoxicillin allergy, such as urticaria or airway hyper-reactivity. The short-term use of azithromycin in high doses showed more effectiveness than the commonly used five-day course of this agent. Moreover, the overuse of azithromycin increases the resistance to erythromycin, especially for group A β-hemolytic streptococci. Therefore, it is better not to use it routinely.

Antibiotic is not recommended for the treatment of otitis media with effusion because they have only a modest short-term benefit [19]. Patients should be aware of the adverse effects of antibiotics in advance. The most prevelent complications of antibiotic therapy include diarrhea and candidal infections. Therefore, it is recommended to provide

the parents with some instructions about diaper care and clotrimazole cream application in case the diaper rash appears. To stop diarrhea, eating yogurt can be helpful.

Regarding symptoms like pain or fever, analgesics should be prescribed, especially at bedtime if the symptoms are disturbing sleep. Paracetamol and ibuprofen are the most effective choices in such cases. Optimal pain management is considered as the cornerstone of acute otitis media management. However, analgesics are neither explicitly recommended in daily practice nor routinely prescribed, especially in primary health care. van Uum et al. [20] found that family physicians feel unable to offer adequate treatment for the ear pain caused by otitis media infection in children. A lack of knowledge was observed regarding the ability to prescribe ibuprofen at a young age. Some of the family physicians were unfamiliar with the over-the-counter availability of ibuprofen syrup and therefore chose to only prescribe paracetamol [20]. In severe cases, parents tend to give their children paracetamol for every spike of fever or every episode of pain, which may expose the child to paracetamol overdose. So, it is important to instruct the parents about the optimal dosage of paracetamol as well as the ability to alternate between ibuprofen and paracetamol in order to avoid any adverse effect and decrease the risk of any drug toxicity.

There are many preventive measures, which should be instructed by the physician to reduce otitis media risk [21]. They include avoidance of exposure to tobacco smoke, adequate vaccination against influenza and pneumococci, and the use of lozenges several times a day during the time of year when common colds are prevalent [21].

The accuracy of otitis media diagnosis in primary health care:

As we mentioned earlier, the most valuable tool in the diagnosis of acute otitis media is the pneumatic otoscope. There are other methods of diagnosis, such as tympanocentesis and myringotomy, but they are more aggressive. Tympanocentesis, which is needle aspiration through the tympanic membrane, and myringotomy, which is an incision in the tympanic membrane to provide fluid, confirm the diagnosis, but these methods are not suitable for routine use in primary health care [22, 23]. According to a comparative study conducted by Blomgren et al. [22], the otorhinolaryngologists were less likely to diagnose acute otitis media than the family physicians. The family physicians and otorhinolaryngologists diagnosed acute otitis media in 64% and 44%, respectively. The family physicians relied on their diagnoses on symptoms and on the tympanic membrane's color, whereas the otorhinolaryngologists paid more attention to the movement and position of the tympanic membrane [22]. Therefore, family physicians should all be aware of the diagnostic criteria, and there certainly are enough patients. There are also diagnostic methods help in the diagnosis [24].

In Blomgren et al. [22] research, conducting tympanometry considerably decreased the number of acute otitis media cases diagnosed. If primary care clinics have adequate equipment, such as pneumatic otoscopy and tympanometry, it will increase the diagnostic accuracy for acute otitis media. This will ensure the right treatment for the right patient, especially if the family physicians got enough education in using them [25].

In addition, Roark et al. [26] suggested that there are differences between pediatricians and family physicians in practice patterns related to managing recurrent and persistent otitis media. In their study, they found that family physicians refer children for ventilating tube surgery 3 times more often than the pediatricians, in cases of an asymptomatic middle ear effusion. Recent guidelines for the treatment of otitis media with effusion recommend waiting 4 months before referring children for ventilating tubes [5]. Moreover, despite the lack of data to support better efficacy of these high-cost antibiotics, family physicians also tend to prescribe high-cost antibiotics, such as third-generation cephalosporins, 1.5 times more frequently than pediatricians do [26].

Therefore, accurate diagnosis is a critical factor in decreasing antibiotic use for otitis media. Careful examination and adherence to the guidelines will decrease the use of antibiotics for otitis media with effusion or red ears in the crying child. Observation should be also considered as initial therapy for selected children because of the high spontaneous resolution of acute otitis media and the low risk for subsequent severe bacterial infection. Nevertheless, amoxicillin in the dose of 80 to 90 mg/kg/d is still an effective first choice for antibiotic therapy for most children. Alternative antibiotic choices are based on the likelihood of organisms resistant to amoxicillin or in cases of penicillin allergy, as well as cost, taste, and convenience [27].

Conclusion

It was found that the otorhinolaryngologist was less likely to diagnose acute otitis media than the family physicians. Family physicians also tend to prescribe high-cost antibiotics more frequently than pediatricians do. Accurate diagnosis is the most important factor in decreasing antibiotic use for otitis media. Careful examination and adherence to the guidelines will decrease the use of antibiotics for cases like otitis media with effusion or red ears in the crying child. Observation for 2 to 3 days can be considered initial. However, amoxicillin in the dose of 80-90 mg/kg/d is still an effective first choice for antibiotic therapy for most children.

References

1. Infante-Rivard C, Fernández A. Otitis media in children: frequency, risk factors, and research avenues. Epidemiologic reviews. 1993 Jan 1;15(2):444-65.
2. Lee A, Flowerdew G, Delaney M. Physicians' knowledge of the epidemiology, diagnosis, and management of otitis media: Design of a survey instrument. Canadian Family Physician. 2009 Jan 1;55(1):70-1.

3. McCaig LF, Hughes JM. Trends in antimicrobial drug prescribing among office-based physicians in the United States. Jama. 1995 Jan 18;273(3):214-9.
4. Klein JO. Otitis media. Clinical infectious diseases. 1994 Nov 1;19(5):823-32.
5. Stool, S. E., Berg, A. O., Berman, S., Carney, C. J., Cooley, J. R., Culpepper, L.. Clinical practice guideline. Otitis media with effusion in young children. Rockville, MD: Agency for Health Care Policy and Research Publication, 1994.
6. Bol TS, Iida M, Mostafa S. Antibiotic Resistance Trend of Uropathogens in a Tertiary Teaching Hospital in Rasht Iran a Longitudinal Study, 2019.
7. Eavey RD, Santos JI, Arriaga MA, Gliklich R, Odio C, Desmond MS, Villasenor A, Beltran S, Orloff L, Stool SE. An education model for otitis media care field-tested in Latin America. Otolaryngology—Head and Neck Surgery. 1993 Nov;109(5):895-8.
8. Lieberthal AS, Carroll AE, Chonmaitree T, Ganiats TG, Hoberman A, Jackson MA, Joffe MD, Miller DT, Rosenfeld RM, Sevilla XD, Schwartz RH. The diagnosis and management of acute otitis media. Pediatrics. 2013 Mar 1;131(3):e964-99.
9. Harmes KM, Blackwood RA, Burrows HL, Cooke JM, Van Harrison R, Passamani PP. Otitis media: diagnosis and treatment. Children. 2013;100(8):10.
10. Daly KA, Giebink GS. Clinical epidemiology of otitis media. The Pediatric infectious disease journal. 2000 May 1;19(5):S31-6.
11. Jacobs MR, Dagan R, Appelbaum PC, Burch DJ. Prevalence of antimicrobial-resistant pathogens in middle ear fluid: multinational study of 917 children with acute otitis media. Antimicrobial agents and chemotherapy. 1998 Mar 1;42(3):589-95.
12. Coker TR, Chan LS, Newberry SJ, Limbos MA, Suttorp MJ, Shekelle PG, Takata GS. Diagnosis, microbial epidemiology, and antibiotic treatment of acute otitis media in children: a systematic review. Jama. 2010 Nov 17;304(19):2161-9.
13. Zoorob R, Sidani MA, Fremont RD, Kihlberg C. Antibiotic use in acute upper respiratory tract infections. American family physician. 2012 Nov 1;86(9).
14. Heikkinen T, Thint M, Chonmaitree T. Prevalence of various respiratory viruses in the middle ear during acute otitis media. New England Journal of Medicine. 1999 Jan 28;340(4):260-4.
15. Chonmaitree T. Viral and bacterial interaction in acute otitis media. The Pediatric infectious disease journal. 2000 May 1;19(5):S24-30.
16. Rosenfeld RM, Kay D. Natural history of untreated otitis media. The Laryngoscope. 2003 Oct;113(10):1645-57.
17. Lieberthal AS, Carroll AE, Chonmaitree T, Ganiats TG, Hoberman A, Jackson MA, Joffe MD, Miller DT, Rosenfeld RM, Sevilla XD, Schwartz RH. The diagnosis and management of acute otitis media. Pediatrics. 2013 Mar 1;131(3):e964-99.
18. Hoberman A, Paradise JL, Rockette HE, Shaikh N, Wald ER, Kearney DH, Colborn DK, Kurs-Lasky M, Bhatnagar S, Haralam MA, Zoffel LM. Treatment of acute otitis media in children under 2 years of age. New England Journal of Medicine. 2011 Jan 13;364(2):105-15.
19. American Academy of Family Physicians. Otitis media with effusion. Pediatrics. 2004 May;113(5):1412.
20. van Uum RT, Venekamp RP, Schilder AG, Damoiseaux RA, Anthierens S. Pain management in acute otitis media: a qualitative study of parents' views and expectations. BMC family practice. 2019 Dec;20(1):18.
21. Thomas JP, Berner R, Zahnert T, Dazert S. Acute otitis media—a structured approach. Deutsches Ärzteblatt International. 2014 Feb;111(9):151.
22. Blomgren K, Pitkäranta A. Is it possible to diagnose acute otitis media accurately in primary health care?. Family Practice. 2003 Oct 1;20(5):524-7.
23. Karma PH, Penttilä MA, Sipilä MM, Kataja MJ. Otoscopic diagnosis of middle ear effusion in acute and non-acute otitis media. I. The value of different otoscopic findings. International journal of pediatric otorhinolaryngology. 1989 Feb 1;17(1):37-49.
24. Pichichero ME, Poole MD. Assessing diagnostic accuracy and tympanocentesis skills in the management of otitis media. Archives of pediatrics & adolescent medicine. 2001 Oct 1;155(10):1137-42.
25. Jensen PM, Lous J. Criteria, performance and diagnostic problems in diagnosing acute otitis media. Family Practice. 1999 Jun 1;16(3):262-8.
26. Roark R, Petrofski J, Berson E, Berman S. Practice variations among pediatricians and family physicians in the management of otitis media. Archives of pediatrics & adolescent medicine. 1995 Aug 1;149(8):839-44.
27. Lieberthal AS. Acute otitis media guidelines: review and update. Current allergy and asthma reports. 2006 Jul 1;6(4):334.