



1-2011

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Running Head: TREATMENT OF PEDIATRIC OTITIS MEDIA

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Pediatric Otitis Media Clinical Evidence

By

Lisa Stay

A project submitted in partial fulfillment of
Requirement for the Master of Science Degree

College of Nursing

University of North Dakota

May, 2011

PERMISSION

Title: Pediatric Otitis Media Clinical Evidence

Department: Nursing

Degree: Master of Science

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Abstract

Clinical question: When should antibiotics be used in the treatment of otitis media in children?

Acute otitis media is a common illness among children. Over the past three decades acute otitis media has been treated with antibiotics. In the past ten years multiple evidence-based studies have been performed and results have shown that treatment with antibiotics provides little benefit in a large portion of the pediatric population.

The purpose of this paper is to explore the current literature available on treatment of pediatric patients presenting to primary care with acute otitis media, critique the evidence found, and summarize the findings. The majority of the research found was quantitative with the focus on observational treatment versus antibiotic treatment of acute otitis media. Two qualitative studies reviewed the reasoning why health care providers still are providing antibiotics as their first choice of treatment of acute otitis media. The final portion of this paper describes the plan for implementing the information gained regarding the treatment options for acute otitis media.

Introduction

One of the most common infections in pediatric patients is acute otitis media (AOM), and it continues to be one the most common reasons for provider visits. For many providers, antibiotics continue to be the first choice of treatment for otitis media. There have been many research studies conducted to help achieve a better understanding of when antibiotic treatment should be used in the treatment of AOM in children. Treatment of otitis media seems black and white, but this review of literature demonstrates a lot of grey area. In 2004, a well-publicized clinical practice guideline to help in the management of AOM in children 6 months through 12 years was developed by the American Academy of Pediatrics (AAP) and the American Academy of Family Physicians (AAFP) (Coco, Vernacchio, Horst, & Anderson, 2010). This was the first time observation was found to be an appropriate treatment option for pediatric patients.

The clinical question of interest is as follows: When should antibiotics be used in the treatment of otitis media in children? Over the past two decades the concern of many providers has been antibiotic over-use in children with AOM. Although research suggests there is only marginal benefit, if any, for most children, health care providers continue to treat AOM with antibiotics. This causes concern for the ever-developing increase of antibiotic resistance. A meta-analysis

done by Del Mar, Glasziou, and Hayem (1997) found conservative care in the first seventy-two hours resulted in eighty percent of the cases resolving spontaneously with no antibiotic treatment. Upon completing this project, the objective would be to educate parents and healthcare providers on what the evidence is showing as the best possible treatment for pediatric patients with AOM.

Purpose

New literature regarding practices in treating AOM is constantly being published, so it is imperative to stay current with recent evidence-based findings. Friedman and Whilney (2008) found that reducing antimicrobial use has reduced the incidence of resistant infections. Despite the increased knowledge that most cases of AOM resolve without antibiotic treatment, healthcare providers continue to treat AOM with antibiotics. The purpose of this project is to gain a better understanding through evidence based research of which high-risk group of pediatric patients should have antibiotic treatment, and which group should not. The knowledge gained from this project should then be applied to clinical practice in primary care. Education of other healthcare professionals as well as parents can then be provided through a brochure containing the current information on when to treat and when not to treat AOM.

Significance

The most common treatment of AOM is antibiotics, although evidence has shown that the majority of AOM cases in pediatric patients resolve, if only observational treatment is used (Coco, Vernacchio, Horst, & Anderson 2010). Research shows that in the first five years of life approximately 80 percent of children have had at least one episode of AOM (Coco et al., 2010). Adherence to the American Academy of Pediatrics guidelines (2004) for treatment of AOM has been minimal (Coco et al., 2010). This continues to be an important problem because of the development of antibiotic resistance.

Theoretical Framework

One of the challenges that is facing advanced practice nurses (APN) with evidenced based practice is changing old habits or in this case treatment of AOM. The Modeling and Role-Modeling Theory (MRM) can help to accomplish this goal. It provides a nursing theory that helps APNs have a framework to follow by modeling the wait and see approach and being a role-model for other APNs in the treatment of AOM.

Using the MRM theory is complex. It is based on biological and psychological theories. This theory allows the APN to see individuals holistically and will help the APN develop appropriate interventions from the information gathered. The MRM Theory can be used in all nursing and patient care settings

by helping to integrate the art and science of nursing and in the clinical setting, in education, and in research.

The MRM Theory has been found to be useful and valuable in creating better and better outcomes for patients (Erickson, 2006). When developing interventions, the APN needs to promote patients' or caregivers' strengths, build rapport, and gain trust. When this theory is understood and utilized in practice, the client or parents in the case of AOM in pediatrics should feel a sense of control.

The MRM Theory suggests that the patient or caregiver needs to be a part of the team and give their input to the plan of care. If this is lacking, then the interventions or treatment plan will not be completed (Erickson, 2006). APNs need to understand the patients' or caregivers' perception in order to utilize the correct resources and develop interventions that will get the client back to a state of well-being (Erickson, 2006).

Definitions

Acute Otitis Media - The American Academy of Pediatrics (2004) defines AOM as "abrupt onset of signs and symptoms of middle-ear inflammation and middle ear effusion. This is indicated by bulging of the tympanic membrane, limited or absent mobility of the tympanic membrane, air fluid level behind the tympanic membrane, otorrhea, distinct erythema of the tympanic membrane,

or otalgia (discomfort referable to the ear[s] that result in the interference with normal activity or sleep) (p.1453)".

Otitis Media with Effusion is defined as the "presence of fluid in the middle ear without signs of symptoms of acute ear infection. This may occur because of poor eustachian tube function or as a response following AOM" (AAP, 2004, p.1452).

Review of Literature

Many families present to healthcare facilities looking for the quick fix to their acute medical problems. The area chosen to research is AOM. In the last ten years there has been an increase in research done in regards to treatment of AOM. Educating the parents and healthcare providers of the findings in the following research is a necessity.

Effects of Unnecessary Antibiotic Treatment

According to the AAP/AAFP practice guidelines (2004), there have been rising rates of antibacterial resistance and an increase in the cost of antibacterial prescriptions. The increase in the use of broader-spectrum and more costly antibiotics for treatment of AOM is partially due to the increased resistant pathogens causing AOM. These guidelines put forth were developed by conducting a comprehensive review of evidence based literature related to AOM.

Rawof and Upadhye (2009) performed a meta-analysis that collected research from randomized control trials in AOM and

found that antibiotics are commonly used needlessly for the management of AOM resulting in growing resistance and can result in side effects such as diarrhea, vomiting and rash. They argued that the majority of cases of AOM resolve spontaneously.

According to Little et al. (2001) prescribing antibiotics immediately to children with AOM increased the number of children who developed diarrhea. This finding is similar to the above study. Another study done by Bezakova et al, (2009) which was a prospective three year follow up study including 168 children found evidence that the use of antibiotic treatment early in AOM may impair natural immune response and weaken protection against further episodes.

Antibiotics for AOM were found to be less relevant for western populations and the outcome for untreated AOM less severe. The benefit of not treating was influenced by the found potential for increased antibiotic resistance for the child. This study was a double blind study which consisted of 103 subjects (Leach, Morris, & Mathews 2008).

The effects of providing a prescription of antibiotics for children not needing treatment of their AOM may include antibiotic resistance, increased revisit rates, and increased likelihood of seeking unnecessary medical care for future self-limiting illnesses (Rovers et al., 2007)

Provider Practice

According to Rawof and Upadhye (2009) children with bilateral AOM and otorrhea regardless of age benefited from and warranted antibiotics. Providers should be aware of the need to treat the above cases. Coco et al. (2010) conducted a quantitative study, which consisted of 1114 children aged six months to twelve years with AOM. They argued that like AAP/AAFP guidelines suggest, children with AOM who are not prescribed antibiotics are more likely to have milder infections.

Providers need to shift thinking about AOM from a condition that requires antibiotic treatment to one that calls for symptomatic care and reevaluation if not improving (Chao, Kunkov, Reyes, Lichten, & Crain 2008). Little et al. (2001) agree that prescribing early for a self-limiting illness may fuel expectations for parental demand for antibiotics which can cause a development of antibiotic resistance.

A descriptive qualitative study done by Philp and Winfield (2010) looked at the prescribing practices of nurse practitioners. Nurse practitioners found that withholding antibiotics against what was expected by the parents developed with experience. They found that exploring parents' concerns with the symptomatic treatment plan relieved some of the anxiety by educating them on the evidence that has been found with treating AOM. Another quantitative study done by Goolsby (2007)

found that out of 479 nurse practitioners questioned the majority implemented watchful waiting with symptomatic treatment as their first strategy for treatment of AOM and if this was not the chosen treatment it was due to unaccepting parents of the treatment plan.

According to a meta-analysis including 6 randomized control trials consisting of 824 children done by Rovers et al, (2007) found the presence of fever and vomiting increased the course of AOM. Antibiotic treatment should be considered, if a child presents with the symptoms stated above. Del Mar, Glasziou, and Hayem (1997) found that the best approach as a practitioner to treating AOM is knowing antibiotic treatment is there for patients who are not improving with only symptomatic treatment.

Parent Compliance

According to the AAP/AAFP guidelines (2004) the adult caring for a child using the observation treatment needs to be reliable and able to recognize signs of serious illness, and provide prompt medical care if no improvement is seen. Meropol (2008) found that a barrier of parents agreeing with observational treatment may be loss of time at work due to a child with AOM that may not resolve with symptomatic treatment. Consequently the parent may demand for antibiotics. This is where education regarding antibiotic use and its resistance should be discussed. Leach and Morris (2009) found that parents

must balance possible antibiotic side effects and the cost and inconvenience associated with taking antibiotics with the benefits of treatment. Goolsby (2007) found that symptomatic treatment was better accepted by parents who were provided adequate education and given a plan for follow-up if symptoms of AOM were not improving.

Effects of Not Treating

The AAP/AAFP guidelines (2004), found that the concern for serious infection among children under the age of six months should influence providers to treat this age group with immediate antibacterial therapy. They also suggested that observation without use of antibacterial agents in a child older than 6 months is a good option for children based on diagnostic certainty, age, illness severity, and assurance of patient follow-up. The current evidence that went into developing these guidelines does not suggest a clinically important increased risk of mastoiditis in children when AOM is managed only with symptomatic treatment.

According to the AHRQ evidence report (2001) done by Marcy et al., on AOM concluded that mastoiditis is not increased with initial observation, as long as these children are monitored closely and antibiotics are initiated in those who do not improve. This study pooled data from six randomized trials and two cohort studies.

Buchem, Peeters, and Hof (1985) studied 4860 Dutch children two and older only given symptomatic treatment and found that of these children studied only 131 developed severe illnesses, defined as persistent fever, pain, or discharge after three to four days. Only two children developed mastoiditis and no cases of bacterial meningitis were observed. The recommendations for management of AOM following this study include symptomatic treatment without antibiotics for twenty-four hours for patients 6-24 months and seventy-two hours for those children more than 24 months and only adding antibacterial if no improvements.

A quantitative study done by McCormick et al. (2005) with a total of 233 pediatric patients with AOM found that the number of days of work lost by parents did not differ between the group of patients that were treated with antibiotics and those only treated symptomatically. They argue that benefits of observational treatment are attractive because of eliminating the cost, inconvenience and adverse effects of antibiotic treatment. This treatment option also helps avoid colonization and proliferation of multidrug-resistant organisms.

A Cochrane review done by Sanders, Glasziou, Del Mar, and Rovers (2010), which pooled eight trials consisting of 2287 children, found that there was no benefit from antibiotic treatment in pediatric patients with uncomplicated AOM and that over eighty percent resolved with conservative care. It was

suggested that in developed countries, where the risk of mastoiditis is low, early antibiotic treatment is not justified.

According to a study by Chao et al. (2008), which used a prospective, randomized trial involving 232 subjects, it was found that observational therapy considerably improves adherence and decreases antibiotic exposure. Damoiseaux, Van Balen, Hoes, Verheij, and Melker (2000) also used a quantitative study with 240 subjects, and found that symptomatic treatment proved to provide proper resolution of symptoms.

Little et al. (2001), organized an open randomized controlled trial of 315 children who were put into two groups one with immediate antibiotic treatment and the other symptomatic treatment. They found that using the wait and see (symptomatic) treatment approach was accepted by most parents and resulted in a seventy-six percent reduction in use of antibiotics.

Summary

- Observation therapy improved adherence and reduced antibiotic exposure.
- Management of AOM without antibiotics did not increase after the AAP/AAFP clinical practice guidelines were put in place in 2004.

- It was found that recurrent AOM occurred in children originally treated with amoxicillin.
- Evidence shows that children over the age of six months who have AOM fair well and do not usually require antibiotics for treatment.

Methods

Selecting the pediatric population helped to narrow the search from the start. The search began in the Cochrane Library, as it is up to date on systematic reviews. When searching terms used were "otitis media" AND antibiotics, "otitis media" AND treatment, "ear infections" AND antibiotics, all of which yielded a plethora of information related to this topic. CINHALL was searched using the same search topics as listed above, and an abundance of information regarding otitis media and treatment was found. Using the advanced search properties, helped focus the search to a manageable number of evidence-based research articles. Changing the search to "otitis media" AND antibiotics instead of "otitis media" AND treatment helped reduce the number of research articles by 400. Also searched was PubMed using the terms "otitis media" AND antibiotics, and then narrowed to pediatrics.

The plan for affecting a change in clinical practice is educating the parents and providers of the extensive evidence-

based literature regarding over-use of antibiotics and resistance. There is an abundant amount of literature, which states that using the "wait and see" approach with most children who have AOM is as effective as treatment with antibiotics. The observational approach will also help in decreasing the resistance of antibiotics. An educational poster that can be presented to providers and dispersed to parents through clinic visits, Early Childhood Family Education (ECFE), and Women, Infant, and Children's Clinics (WIC) will be developed.

Discussions and Implications for Nursing

The overall body of evidence suggests that AOM can be treated by observation for the majority of cases. Evidence has shown the best treatment option for children less than two years of age with AOM is antibiotics because of underdeveloped antibodies. Even with the AAP and AAFP guidelines that were put in place in 2004, and all the evidence based research against antibiotic treatment of children over two years of age for AOM, there continues to be a high incidence of providers continuing to prescribe antibiotics for treatment of AOM and an increase in antibiotic resistance.

Practice

This study will have a direct impact on my practice as a Family Nurse Practitioner. The knowledge and evidence gained regarding treatment of Otitis Media in pediatric patients will

be useful in evaluating whether to treat or to use conservative measures. I expect the treatment of children with AOM will continue to be the basis of future studies. This, in turn, will improve the care of children with AOM.

Research

Additional research is needed to define the reasoning why providers continue to prescribe antibiotics, even though research-based evidence suggests otherwise. Clearer parameters need to be developed to give health care providers a better picture of when it is appropriate for observational treatment verses antibiotic treatment.

Education

More education needs to be provided to healthcare professionals related to the evidence that exists. It is essential that providers be given the time to educate themselves on the current evolving evidence based practices that are available.

Health Policy

As Stated by Philip and Winfield (2010), "until limiting the prescription of antibiotics fits firmly with the agenda of providers, and government recommendations are fully embraced, changes in practice are likely to be limited" (p.18). I think continual evidence-based research needs to be carried out to

evaluate the importance of the wait and see approach in reducing antibiotic resistance.

Summary / Conclusions

In conclusion the treatment of otitis media still varies greatly among healthcare providers. Further qualitative studies need to be done to help gain a better understanding of the reasons providers choose antibiotic treatment versus observational treatment of AOM. It is very important as Advanced Practice Nurses that we stay current on evidence-based research regarding the effective treatment options regarding AOM. Upon completion of this independent project my intentions will be to share with other healthcare providers and parents the most current research regarding AOM treatment in children.

References

- American Academy of Pediatrics and American Academy of Family Physicians (2004). Clinical practice guideline. Diagnosis and management of acute otitis media. *Pediatrics*, 113(5), 1451-1465.
- Bezakova, N., Damoiseaux, R., Hoes, A. W., Schilder, A. G., & Rovers, M. M. (2009). Recurrence up to 3.5 years after antibiotic treatment of acute otitis media in very young Dutch children: Survey of trial participants. *British Medical Journal*, 339, 1-4. doi:10.1136/bmj.b2525
- Chao, J. H., Kunkov, S., Reyes, L. B., Lichten, S., & Crain, E. F. (2008). Comparison of two approaches to observation therapy for acute otitis media in the emergency department. *Journal of the American Academy of Pediatrics*, 121, e1352-e1356. doi:10.1542/peds.2007-2278
- Coco, A., Vernacchio, L., Horst, M., & Anderson, A. (2010). Management of acute otitis media after the publication of the 2004 AAP and AAFP clinical practice guidelines. *Journal of the American Academy of Pediatrics*, 125, 214-220. doi:10.1542/peds.2009-1115
- Damoiseaux, R., Van Balen, F., Hoes, A. W., Verheij, T., & De Melker, R. A. (2000). Primary care based randomized, double blind trial of amoxicillin versus placebo for acute otitis

- media in children aged less than two years. *British Medical Journal*, 320, 350-354.
- Del Mar, C., Glasziou, P., & Hayem, M. (1997). Are antibiotics indicated as initial treatment for children with acute otitis media? A meta-analysis. *British Medical Journal*, 314, 1526-1529.
- Erickson, H.C. (2006). *Modeling and role-modeling: A theory and paradigm for nursing*. Lexington, SC: Pine Press.
- Friedman, C. R. & Whitney, C. G. (2008). It's time for a change in practice: Reducing antibiotic use can alter antibiotic resistance. *The Journal of Infectious Diseases*, 197, 1082-1083. doi:10.1086/533450
- Goolsby, M. J. (2007). Antibiotics prescribing habits of nurse practitioners treating pediatric patients: AntiBUGS pediatrics. *Journal of the American Academy of Nurse Practitioners*, 19, 332-334. doi:10.1111/j.1745-7599.2007.00226.x
- Little, P., Gould, C., Williamson, I., Moore, M., Warner, G., & Dunleavy, J. (2001). Pragmatic randomized controlled trial of two prescribing strategies for childhood acute otitis media. *British Medical Journal*, 322, 336-342.
- Leach, A. J. & Morris, P. (2009). Antibiotics for the prevention of acute and chronic suppurative otitis media in children.

- Cochrane Database of Systematic Reviews, 4(CD004401).
doi:10.1002/14651858.CD004401.pub2.
- Leach, A. J., Morris, P.S., & Mathews, J. D. (2008). Compared to placebo, long-term antibiotics resolve otitis media with effusion (OME) and prevent acute otitis media with perforation (AOMwIP) in a high-risk population: A randomized controlled trial. *British Medical Journal*, 8(23), 1-9. doi:10.1186/1471-2431-8-23
- Marcy, M., Takata, G., Chan, L.S., et al. (2001) Management of acute otitis media. Evidence report/ technology assessment. *Agency for Healthcare Research and Quality Publication*, 15, 1-16.
- McCormick, D. P., Chonmaitree, T., Pittman, C., Saeed, K., Friedman, N. R., Uchida, T., & Baldwin, C. D. (2005). Nonsevere acute otitis media: A clinical trial comparing outcomes of watchful waiting versus immediate antibiotic treatment. *Journal of the American Academy of Pediatrics*, 115, 1455-1465. doi:10.1542/peds.2004-1665
- Meropol, S. B. (2008). Valuing reduced use for pediatric acute otitis media. *Journal of the American Academy of Pediatrics*, 121, 669-673. doi:10.1542/peds.2007-1914
- Meropol, S. B., Glick, H. A., & Asch, D. A. (2008). Age inconsistency in the American academy of pediatrics guidelines for acute otitis media. *Journal of the American*

- Academy of Pediatrics*, 121, 657-668. doi:10.1542/peds.2007-1913
- Philp, A. & Winfield, L. (2010). Why prescribe antibiotics for otitis media in children? *Nurse Prescribing*, 8(1), 14-19.
- Rawof, S. & Upadhye, S. (2009). Antibiotics for acute otitis media: Which children are likely to benefit? *Canadian Journal of Emergency Medicine*, 11(6), 553-557.
- Rovers, M. M., Glasziou, P., Appelman, C. L., Burke, P., McCormick, R. A., Damoiseaux, R. A., . . . Hoes, A. W. (2007). Predictors of pain and/or fever at 3 to 7 days for children with acute otitis media not treated initially with antibiotics: A meta-analysis of individual patient data. *Journal of the American Academy of Pediatrics*, 119, 579-585. doi:10.1542/peds.2006-2092
- Sanders, S., Glasziou, P. P., Del Mar, C., & Rovers, M. M. (2010). Antibiotics for acute otitis media in children. *Cochrane Database of Systematic Reviews*, 1(CD000219). doi:10.1002/14651858.CD000219.pub2.
- Van Buchem, F.L., Peeters, M.F., Van't Hof, M.A. (1985). Acute otitis media: a new treatment strategy. *British Medical Journal*, 290, 1033-1037.