

MANAGING PAEDIATRIC OTITIS MEDIA WITH EFFUSION: SYSTEMATIC REVIEWK. Arumugam¹¹Assistant Professor, Department of Otorhinolaryngology, Government medical college, Pudukkottai, Tamilnadu, India

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**Abstract**

Background: Otitis media (OM) is a common condition affecting young children, causing hearing loss and requiring medical consultation, antibiotic prescription, and surgery. This systematic review aims to evaluate the current evidence and provide an overview of the management strategies for paediatric otitis media with effusion (OME). **Materials and Methods:** A thorough search was performed in PubMed, Science Direct, covering studies published between 1995 and 2023. The search terms focused on paediatric otitis media with effusion and its management. Two reviewers independently conducted the study's eligibility screening and quality assessment using predetermined criteria. The gathered data were synthesized using a narrative method. **Result:** Out of the initial 1,542 articles identified, 32 studies met the inclusion criteria for the review. These studies encompassed randomized controlled trials, observational studies, and systematic reviews. Different management strategies for paediatric otitis media with effusion (OME) were identified, including watchful waiting and medical and surgical interventions. Watchful waiting, which involves regular monitoring and assessment without immediate treatment, was frequently recommended, especially for mild or self-limiting cases. Medical interventions like antibiotics, nasal corticosteroids, and antihistamines had limited evidence of effectiveness in improving OME outcomes. Surgical interventions such as tympanostomy tube insertion or adenoidectomy showed a higher likelihood of short-term improvement and resolution of OME. **Conclusion:** Paediatric otitis media with effusion involves a thorough assessment of several aspects, including symptom intensity, length of effusion, and influence on the child's quality of life. Watchful waiting may be beneficial in certain circumstances, although medicinal or surgical procedures may be recommended based on specific patient features and clinical judgment.

INTRODUCTION

Otitis media (OM) is an umbrella term that encompasses acute OM (AOM), OM with effusion (OME; 'glue ear'), and chronic suppurative OM (CSOM). These conditions are linked and may overlap. One of the most prevalent illnesses in young children is OM. It is also a prominent cause of medical consultation, antibiotic prescription, and surgery in high-income nations.^[1] Otitis Media with Effusion (OME, sometimes known as 'glue ear') is the most prevalent cause of juvenile hearing loss. Due to the fluctuating nature of the condition, the initial therapy of otitis media with effusion is audiometric confirmation and quantification of any hearing loss involved, explanation to parents or caregivers, and cautious waiting with ongoing audiometric monitoring. Commonly used medical treatments and "complementary or alternative" therapies are useless in treating otitis media with effusion. However, nasal

balloon auto-inflation looks promising, with some evidence of benefit in many older children.^[2] The otitis media with effusion (OME) clinical practice guideline provides evidence-based recommendations for diagnosing and treating OME in children. This is an update to the Agency for Healthcare Policy and Research's (now the Agency for Healthcare Research and Quality) clinical practice guideline "Otitis Media with Effusion in Young Children," created in 1994. The updated guideline applies to children aged two months to 12 years with or without developmental disabilities or underlying conditions that predispose to OME and its sequelae, as opposed to the previous guideline, which was limited to children 1 to 3 years old with no craniofacial or neurologic abnormalities or sensory deficits.^[3]

Antimicrobial treatment should be administered to babies and children with acute otitis media. Because it is safe and effective against most pathogenic bacterial infections, amoxicillin is the mainstay of care for babies and children with acute otitis media.

Amoxicillin has also been demonstrated to be beneficial in treating children with otitis media with effusion ("secretory" otitis media). It is the recommended preventive antibacterial medication to prevent recurrent acute otitis media. However, during the last decade, there has been an increase in the number of bacteria resistant to amoxicillin, mainly beta-lactamase-producing *H. influenzae* and *B. catarrhalis*.^[4] OME can impact even the smallest children: 50% of instances include children under one, and 60% involve infants under two.^[5] The majority of instances of OME are identified clinically after an otoscopic examination. Using a pneumatic otoscope allows the physician to detect middle ear effusion and examine the tympanic membrane's appearance. Otoscopy may be improved by using a binocular microscope or telescopic video-otoscopy, especially in youngsters. A liquid layer, bubbles, opacity, an ochre or blue colour, and central tympanic membrane retraction may be seen. If the same symptoms occur three months later, the diagnosis of OME is established.^[6] Otitis media with effusion is a common disease in children; if not adequately controlled, the illness can develop into cholesteatomatous chronic otitis. During a consultation, the diagnosis can be made quite readily (through otoscopy). Hearing loss must be assessed both before and after therapy. Although pharmacological therapies may have short-term symptomatic efficacy, the lack of long-term efficacy (especially about the auditory threshold), the associated side effects, and the expense make them unsuitable for treating OME.^[7]

Different sorts of OM manifest in various ways. Acute OM (AOM) often affects children under the age of two, with acute onset symptoms and indications of otalgia and fever in a youngster who is systemically ill. It is an acute inflammatory condition caused by bacteria or viruses. Acute suppurative OM is a form of AOM distinguished by pus in the middle ear. If the eardrum perforates (around 5% of the time, though greater rates have been observed), there will be ear discharge; the perforation normally heals independently.^[8] Approximately half to nearly nine out of ten children encounter at least one acute otitis media (AOM) occurrence before age three, with the highest frequency observed between six and fifteen months.^[9]

This systematic review aims to evaluate the current evidence regarding managing paediatric OME with effusion. By systematically examining and synthesizing the existing literature, we intend to provide an up-to-date overview of the various treatment modalities, their efficacy, and potential adverse effects. Additionally, this review will explore the factors influencing treatment choices, such as age, severity of symptoms, and presence of comorbidities, to assist clinicians in tailoring interventions to individual patients. The review will encompass a wide range of interventions, including medical treatments (e.g., antibiotics, nasal decongestants, intranasal steroids), surgical interventions (e.g.,

myringotomy with or without tube insertion), and non-invasive management strategies (e.g., watchful waiting, behavioural interventions). Furthermore, considerations will be given to the impact of treatment on hearing outcomes, speech and language development, and the overall quality of life of children with OME. By critically appraising the available literature, we aim to provide a comprehensive synthesis of evidence that will aid clinicians, researchers, and policymakers in making informed decisions regarding the management of paediatric OME. This review will help identify gaps in knowledge, highlight areas requiring further investigation, and provide valuable insights into the most effective strategies for managing this common childhood condition. Ultimately, we aim to improve patient outcomes, reduce morbidity, and enhance the overall well-being of children affected by OME.

MATERIALS AND METHODS

A systematic review was conducted to explore the management of paediatric otitis media with effusion (OME). A comprehensive search strategy was developed, encompassing electronic databases such as PubMed, and Science Direct, using appropriate keywords and medical subject headings (MeSH) terms. Studies published in English were included from the databases' inception. Two independent reviewers screened titles, abstracts, and full-text articles based on predetermined eligibility criteria. Inclusion criteria were considered studies focusing on medical, surgical, or non-invasive management interventions for paediatric OME, reporting outcomes related to hearing improvement, speech and language development, or quality of life in children aged 0-18 years. Data extraction was performed using a standardized form, and the methodological quality and risk of bias of included studies were assessed. A narrative synthesis of the findings was conducted, and a meta-analysis was performed if feasible. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed to ensure transparent reporting.

Treatment /Management of OME

Otitis media with effusion often goes away on its own with careful observation. Myringotomy with tympanostomy tube insertion is considered a successful therapy if it is chronic. A ventilation tube is used in this procedure to get air into the middle ear, which prevents fluid from building up again. Due to the growth and expansion of the Eustachian tube angle, which enables drainage, many patients won't require further therapy after this surgery. The development of chronic otorrhea is the most frequent side effect. Nearly 1 in 6 (16%) children get otorrhea within four weeks of surgery, and 26% of children experience it the whole time the tube is in place.^[10] The key factor driving surgical consideration in OME is persistent hearing loss. It is done to enhance

hearing and reduce the possibility of OME recurring. The risks and advantages of surgical intervention must be weighed before being chosen. Before surgery, it is important to identify any medical issues that may exclude the patient from general anaesthesia, such as bleeding disorders. After three months of persistent OME, surgical intervention should be considered when children have hearing loss greater than 25 dB (at three frequency average) or anatomical alterations to the tympanic membrane or middle ear. The preferred and secure method is myringotomy with VT insertion. Additionally, simultaneous adenoidectomy should be considered in children with chronic OME and hypertrophied adenoids next to the torus.^[11]

Non-surgical management options for paediatric otitis media with effusion (OME):

Non-surgical and surgical procedures are used to treat OME. Active observation, medicinal treatment, auto-inflation, and hearing aids are examples of non-surgical interventions. Non-surgical intervention is advantageous if it may hasten an OME episode resolution. Active observation is a three-month period during which a newly diagnosed OME patient is monitored before surgical intervention. It refers to educational and behavioural efforts to reduce the impact of hearing loss before considering surgical surgery. This includes speaking to or with the child (explaining pictures and asking questions), facing the child when speaking, getting the child's attention before beginning to speak, reducing background noise to a minimum, speaking clearly with normal rhythm and volume, using visual cues (such as hands and pictures) in addition to speech, reading to or with the child (explaining pictures and asking questions), repeating words, phrases, and questions when misunderstood, and placing the child near the teacher in the classroom. Intranasal steroids can be utilized for OME with concomitant allergic rhinitis and adenoid hypertrophy for a short period (less than six weeks). Using oral steroids, extended intranasal steroids, antibiotics, antihistamines/decongestants, auto inflation, homoeopathy, or mucolytics is not suggested. Topical ear drops have no significance in the treatment of OME. Hearing aids may be recommended in cases with chronic bilateral OME and hearing loss when surgery is either contraindicated or not an option.^[11]

According to research, the treatment's effects were more varied in the non-surgical group than in the surgical group. Ten children in the non-surgical group experienced no recurrence for a full year (365 days). Still, about the same number (n=7) also experienced no recurrence for less than 30 days and nine experienced no recurrence for more than 60 days. Both the certainty of the surgical therapy and the number of days without recurrence were considerably greater in the first group than in the second group, respectively. Children in the non-surgical group received treatment with oral or topical antibiotics, topical or intranasal steroids, antihistamines, expectorants, and other types of

medications (such as herbal preparations). Pharmacological therapy and careful observation were used instead of surgical intervention.^[12] The worldwide agreement on managing paediatric otitis media with effusion, released in 2018, claims that non-surgical therapy for OME does not adequately address the underlying issue. It was strongly advised against using nasal steroids, antibiotics, antihistamines, or decongestants to treat OME due to adverse effects, a lack of solid evidence of their long-term efficacy, and economic considerations. Additionally, placing tympanostomy ventilation tubes (VTs) might be significant since it can lessen the frequency of recurrent AOM episodes and improve overall hearing issues.^[13,14]

DISCUSSION

Paediatric otitis media with effusion (OME) is a common condition that poses significant challenges in management decisions. This systematic review aimed to provide an overview of the current evidence on the management strategies for paediatric OME. The review identified various management approaches, including watchful waiting and medical and surgical interventions.

Despite several antibiotics being tested, none have successfully treated OME symptoms. In reality, a recent Cochrane Collaboration assessment of 23 studies found no improvement in hearing or a decrease in the frequency of tympanostomy tube (TT) implantation. The antibiotic treatment regimens in these trials ranged from 10 days to 6 months. Similarly, the effusion only subsided in 13% of instances.^[15] A recent study showed that macrolides such as erythromycin, clarithromycin, azithromycin, and roxithromycin effectively reduced inflammation in guinea pigs with middle ear effusion. The researchers proposed that OME might be treated with antibacterial and anti-inflammatory macrolide antibiotics.^[16] Antihistamines and nasal decongestants, administered alone or in combination, effectively treat OME in 16 trials (1880 patients). However, this study did not highlight any therapeutic benefits. In the six studies investigating medication-related side effects, a pooled data analysis revealed a frequency of 17% in the treatment group and 6% in the placebo group.^[17] It is advised to use careful waiting or delayed antibiotic prescription (only submitted when symptoms of AOM continue for 48–72 hours) in children with uncomplicated, non-severe AOM who are not at elevated risk of sequelae. The caretakers must carefully monitor the disease's progression while giving precise instructions to return if the child's symptoms persist or worsen.^[18] Priority should be given to high-calibre studies assessing the utilization of OME screening and the efficacy of various treatment approaches in these at-risk kids. Topical antibiotics for AOM with ear discharge from a spontaneous rupture of the tympanic membrane are some current methods that still require

improvement. Although the topical antibiotic strategy has been quite successful in children with breathing tubes, it is unclear if the same outcomes hold for kids without tubes. Additionally, there is promising current research on medication administration through the tympanic membrane without tubes or perforations.^[1]

A study of 122 children with bilateral OME lasting at least three months or unilateral OME lasting at least six months despite therapy with one or more beta-lactamase stable drugs was conducted. It was determined that oral steroids should be tried before surgical surgery in selected children with chronic OME. One out of every four youngsters whose caregiver agrees to this therapy may be able to avoid or postpone surgery for at least six months.^[19] Significant improvements in tympanogram type and pure tone hearing thresholds were observed in the study after using corticosteroid medication, whether systemic or topical, highlighting their effective therapeutic role, which could be attributed to their combined antiallergic and anti-inflammatory actions. Furthermore, the outcomes' consistency throughout six months of follow-up suggested an etiologic rather than a symptomatic improvement. The minor improvement in hearing thresholds in the placebo group might be attributed to the initial antibiotic medication in the three management regimes or the improvement of the mucosal lining by frequent saline solution wash.^[20] The innovative auto inflation device shows encouraging outcomes in treating chronic OME in youngsters. In a four-week randomized controlled cross-over study, the device effectively reduced middle-ear pressure and hearing thresholds in most youngsters. Young children well tolerated the device, and no problems were noted. During the careful waiting phase, it may be reasonable to examine this approach of auto inflation in children with chronic OME.^[21] In most circumstances, if the kid has no aberrant medical history, the only suggested formal test is an age-appropriate hearing test, which should be performed before any tube implantation. Other than auto inflation, non-surgical therapy does not adequately address the underlying issue of an age-dependent malfunctioning Eustachian tube. There is strong advice against treating OME with steroids (oral or intranasal), antibiotics, decongestants, or antihistamines, all of which have not been proven to improve OME resolution but have adverse effects and may be expensive. Concerning surgery, choices to install tympanostomy ventilation tubes should be adjusted to the kid, considering hearing impairments in the previous months, the child's setting, and repeatable hearing tests.^[21]

Medical interventions, such as antibiotics, nasal corticosteroids, and antihistamines, were explored in this review. However, the evidence regarding their effectiveness in improving OME outcomes was limited. While antibiotics have traditionally been prescribed to treat OME, their use has become increasingly controversial due to concerns about

antibiotic resistance and limited evidence of long-term benefits. Nasal corticosteroids and antihistamines also lacked substantial evidence supporting their efficacy in OME management. Further research is needed to determine the optimal role of medical interventions in specific subgroups of paediatric OME patients. Surgical interventions, specifically tympanostomy tube insertion or adenoidectomy, were associated with a higher likelihood of short-term improvement and resolution of OME. Tympanostomy tube insertion aims to equalize middle ear pressure and facilitate drainage, while adenoidectomy addresses potential obstructive causes of OME. These interventions have shown promising results regarding symptom relief and hearing improvement. However, their benefits must be weighed against potential risks, such as the need for anaesthesia and the possibility of tube-related complications. It is important to note that the management of paediatric OME should be individualized, considering factors such as the child's age, severity of symptoms, impact on hearing, and associated comorbidities. Shared decision-making between healthcare professionals and parents/guardians is crucial in determining the most appropriate management approach.

CONCLUSION

Managing paediatric otitis media with effusion necessitates careful consideration of several issues. Some situations, especially those with little symptoms or a self-limiting course, may require watchful waiting. Surgery, such as tympanostomy tube insertion or adenoidectomy, may temporarily relieve OME, whereas medical therapies have little evidence of their efficacy. Personalized decision-making based on joint talks between medical experts and parents/guardians is essential for the best treatment results. Additional research is required to fill information gaps and offer more conclusive management advice for paediatric OME.

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