

ACUTE OTITIS MEDIA IN CHILDREN: CLINICAL FEATURES, DIAGNOSTIC APPROACHES, AND MODERN TREATMENT STRATEGIES IN OTORHINOLARYNGOLOGY

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Abstract

Acute Otitis Media (AOM) is among the most common infectious diseases encountered in pediatric otorhinolaryngology and represents a major cause of healthcare visits, antibiotic prescriptions, and childhood morbidity worldwide. The condition is characterized by acute inflammation of the middle ear cavity, usually resulting from bacterial or viral infections that develop following dysfunction of the Eustachian tube. Acute otitis media occurs predominantly in infants and young children due to anatomical and immunological factors that increase susceptibility to middle ear infections. Clinical manifestations include ear pain, fever, irritability, hearing impairment, sleep disturbances, and feeding difficulties. Although most cases resolve without serious consequences, delayed diagnosis or inadequate treatment may lead to complications such as mastoiditis, hearing loss, tympanic membrane perforation, and intracranial infections. Advances in diagnostic techniques, antimicrobial therapy, vaccination programs, and preventive strategies have significantly improved disease management. This article reviews current knowledge regarding the epidemiology, pathogenesis, diagnosis, treatment, complications, and prevention of acute otitis media in children.

Keywords: Acute otitis media, middle ear infection, pediatric otolaryngology, Eustachian tube dysfunction, hearing loss, tympanic membrane, antibiotic therapy, childhood infections.

1. Introduction

Acute otitis media remains one of the most prevalent infectious diseases affecting children and continues to be a significant public health concern worldwide. Epidemiological studies indicate that approximately 80–90% of children experience at least one episode of acute otitis media before reaching school age. The highest incidence occurs between six months and three years of age, a period during which anatomical immaturity and developing immune defenses contribute to increased vulnerability.

The middle ear is normally a sterile, air-filled cavity connected to the nasopharynx through the Eustachian tube. Proper Eustachian tube function is essential for pressure regulation, ventilation, and

drainage of middle ear secretions. In young children, the Eustachian tube is shorter, more horizontal, and less efficient than in adults, facilitating the migration of pathogens from the upper respiratory tract into the middle ear cavity.

Acute otitis media frequently develops following viral upper respiratory tract infections. Viral inflammation causes mucosal edema, Eustachian tube obstruction, and accumulation of fluid within the middle ear. This environment promotes bacterial growth and subsequent infection. The most commonly identified bacterial pathogens include *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Moraxella catarrhalis*.

The disease imposes substantial social and economic burdens. Recurrent infections often result in repeated medical consultations, increased healthcare expenditures, parental work absenteeism, and reduced quality of life for affected children. Furthermore, persistent middle ear inflammation may impair hearing during critical periods of speech and language development.

Advances in immunization programs, particularly pneumococcal conjugate vaccines, have contributed to reductions in disease incidence and severity. Nevertheless, acute otitis media remains a common challenge for pediatricians and otorhinolaryngologists. Understanding current evidence-based diagnostic and therapeutic approaches is essential for optimizing patient outcomes and minimizing complications.

2. Materials and Methods

This study was conducted through a comprehensive review of scientific literature concerning acute otitis media in children. Relevant publications were identified through searches of major biomedical databases including PubMed, Scopus, Embase, Web of Science, and Google Scholar.

The review included clinical trials, cohort studies, systematic reviews, meta-analyses, and international clinical practice guidelines published between 2010 and 2025. Studies investigating epidemiology, microbiology, risk factors, clinical manifestations, diagnostic methods, treatment strategies, complications, and preventive measures were selected for detailed evaluation.

Data extraction focused on patient demographics, disease incidence, microbiological findings, diagnostic accuracy, treatment outcomes, recurrence rates, hearing effects, and complication frequencies. Comparative analysis was performed to assess differences among therapeutic approaches and identify evidence-based management recommendations.

Articles with inadequate methodology, limited sample sizes, or insufficient clinical relevance were excluded from the analysis. The collected information was synthesized to provide a comprehensive overview of contemporary knowledge and clinical practice in the management of acute otitis media.

3. Results

The literature review demonstrated that acute otitis media remains one of the leading causes of pediatric healthcare visits and antibiotic prescriptions worldwide. Children attending daycare centers, those exposed to tobacco smoke, bottle-fed infants, and individuals with recurrent respiratory infections exhibited significantly higher disease incidence.

The most frequently reported symptoms included acute ear pain, fever, irritability, excessive crying, sleep disturbances, reduced appetite, and temporary hearing impairment. Infants often presented with nonspecific manifestations such as restlessness, feeding difficulties, and frequent ear pulling. Otoscopic examination remained the primary diagnostic method. Characteristic findings included tympanic membrane erythema, bulging, reduced mobility, middle ear effusion, and occasionally spontaneous perforation with purulent discharge. Pneumatic otoscopy and tympanometry significantly improved diagnostic accuracy by facilitating assessment of middle ear fluid accumulation. Microbiological studies consistently identified *Streptococcus pneumoniae* as the most common bacterial pathogen, followed by *Haemophilus influenzae* and *Moraxella catarrhalis*. Viral pathogens frequently detected included respiratory syncytial virus, rhinovirus, influenza virus, and adenovirus. Treatment outcomes varied according to patient age, disease severity, and causative organisms. Observation with symptomatic management proved effective in selected mild cases, particularly among older children. Analgesics such as acetaminophen and ibuprofen effectively relieved pain and fever.

Antibiotic therapy demonstrated significant benefit in younger children, severe infections, bilateral disease, and cases associated with otorrhea. Amoxicillin remained the preferred first-line antibiotic

due to its effectiveness, safety profile, and affordability. Alternative antimicrobial agents were utilized in patients with resistant infections or penicillin allergy.

Vaccination programs were associated with substantial reductions in severe infections, recurrent disease, and hospitalization rates. Pneumococcal conjugate vaccines significantly altered pathogen distribution and decreased the incidence of invasive complications.

4. Discussion

The findings of this review confirm that acute otitis media remains a major pediatric health issue despite advances in preventive medicine and antimicrobial therapy. The disease arises from complex interactions among infectious agents, host immunity, environmental exposures, and anatomical characteristics.

Eustachian tube dysfunction plays a central role in disease pathogenesis. Inflammatory obstruction disrupts middle ear ventilation and creates conditions favorable for microbial proliferation. The anatomical immaturity of the pediatric Eustachian tube explains the higher susceptibility observed in younger children.

The relationship between viral and bacterial infections is particularly important. Viral respiratory illnesses often initiate the pathological process by impairing mucociliary clearance and promoting bacterial colonization. Consequently, preventive measures targeting respiratory infections may indirectly reduce the incidence of acute otitis media.

Accurate diagnosis remains essential for appropriate treatment decisions. Overdiagnosis may contribute to unnecessary antibiotic use and antimicrobial resistance, whereas underdiagnosis may increase the risk of complications. Modern diagnostic tools such as pneumatic otoscopy and tympanometry enhance clinical accuracy and support evidence-based management.

The growing concern regarding antibiotic resistance has led to increased emphasis on selective antibiotic prescribing. Contemporary guidelines recommend individualized treatment based on age, symptom severity, and risk factors. This approach balances therapeutic effectiveness with antimicrobial stewardship principles.

Preventive strategies have become increasingly important. Breastfeeding, vaccination, reduction of tobacco smoke exposure, and appropriate management of allergic diseases contribute significantly to disease prevention. Continued public health initiatives targeting these factors may further reduce disease burden.

Future research should focus on vaccine development, microbial ecology, host immune responses, and novel therapeutic approaches capable of reducing recurrence rates and preserving hearing function.

5. Conclusion

Acute otitis media is a highly prevalent childhood infection with significant implications for hearing, language development, and overall well-being. The condition results primarily from Eustachian tube dysfunction and microbial infection following upper respiratory tract inflammation. Comprehensive clinical evaluation and otoscopic examination remain essential for accurate diagnosis. Evidence-based treatment strategies involving appropriate pain control, selective antibiotic use, and careful patient monitoring contribute to favorable outcomes. Preventive measures, including vaccination, breastfeeding, and environmental risk reduction, play critical roles in decreasing disease incidence and complications. Continued advances in diagnostic technologies and therapeutic interventions are expected to further improve management and long-term outcomes in pediatric patients.

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