CLINICAL AND EPIDEMIOLOGICAL CHARACTERISTICS OF CHRONIC OTITIS MEDIA IN ADULTS AND CHILDREN

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INTRODUCTION

Chronic otitis media (COM) is a widespread inflammatory disease of the middle ear that presents substantial clinical and epidemiological challenges in both pediatric and adult populations. It is estimated that between 65 and 330 million people worldwide are affected, with the highest burden observed in low- and middle-income countries, where the majority of cases occur. According to the World Health Organization (WHO), chronic suppurative otitis media (CSOM), a severe and persistent form of COM, affects approximately 3.8% of the global population—nearly 297 million individuals.

COM significantly impacts patients’ quality of life, frequently leading to conductive hearing loss, communication difficulties, and broader health-related complications. Epidemiological data indicate that socioeconomic status plays a critical role in disease prevalence. Individuals from disadvantaged backgrounds are at increased risk due to factors such as malnutrition, suboptimal hygiene, overcrowded living conditions, and restricted access to healthcare services.

The disease predominantly affects children under five years of age, with particularly high incidence rates in early childhood. Males appear to be more commonly affected than females. Additional risk factors include a prior history of recurrent ear discharge, allergic conditions, and environmental exposures such as air pollution.

Clinically, COM is characterized by persistent otorrhea, varying degrees of hearing impairment, and occasionally vestibular symptoms. Diagnosis is typically established through otoscopic examination demonstrating tympanic membrane perforation and/or discharge, supported by audiometric assessment to determine the extent of hearing loss.

Beyond its immediate clinical manifestations, chronic otitis media may result in long-term developmental consequences, particularly in children, and can substantially diminish health-related quality of life (HRQoL). Instruments such as the Chronic Suppurative Otitis Media Questionnaire-12 (COMQ-12) are used to evaluate patient-reported outcomes and support clinical decision-making.

Although therapeutic approaches—including antimicrobial treatment and surgical interventions—have improved over time, COM remains a major public health issue. Its multifactorial pathogenesis, combined with socioeconomic and environmental determinants, underscores the need for comprehensive prevention, early detection, and management strategies. A thorough understanding of these factors is essential for clinicians and policymakers seeking to reduce disease burden and improve patient outcomes.

Epidemiology

Chronic otitis media (COM) represents a major global health concern, affecting an estimated 65 to 330 million people worldwide. A large proportion of affected individuals live in low- and middle-income countries. The World Health Organization reports that chronic suppurative otitis media (CSOM) has an overall prevalence of approximately 3.8% of the world’s population, corresponding to nearly 297 million people, with the majority of cases occurring in economically disadvantaged regions.

Socioeconomic Factors

Socioeconomic status strongly influences both the occurrence and distribution of COM. Individuals from middle- and high-income groups tend to have lower disease frequency compared with those from poorer backgrounds. This difference is largely explained by improved nutrition, better hygiene practices, and easier access to healthcare services in more advantaged populations. In contrast, people living in deprived conditions are more likely to experience recurrent upper respiratory tract infections, which significantly increase the risk of developing chronic middle ear inflammation.

Demographic Characteristics

COM is most common in children, particularly those younger than five years, where incidence rates are highest. A gender disparity has also been observed, with males generally affected more often than females.

Clinical Associations

Multiple clinical and environmental factors contribute to disease development. Important risk factors include a previous history of ear discharge in childhood, prolonged breastfeeding, allergic disorders within the household, overcrowded living environments, and a family history of chronic ear disease. Environmental exposures—especially air pollution—also play a role, emphasizing the interaction between living conditions and biological susceptibility in the epidemiology of chronic otitis media.

Clinical Characteristics

Chronic otitis media (COM) presents with a variety of symptoms and clinical findings that can markedly impair patients’ daily functioning and well-being. The most typical manifestations include persistent ear discharge (otorrhea), varying degrees of hearing loss, and vestibular complaints such as dizziness. In some cases, patients—especially children—may also develop ear pain, fever, and irritability. Infants often show nonspecific signs, including restlessness, poor feeding, and disturbed sleep, which can make diagnosis more difficult.

Clinical evaluation commonly relies on otoscopic examination, which may demonstrate continuous discharge and perforation of the tympanic membrane. These features are essential for distinguishing COM from other middle-ear conditions, including acute otitis media and otitis media with effusion.

Assessment of hearing impairment requires audiometric testing. Measurement of air- and bone-conduction thresholds across standard pure-tone frequencies allows calculation of the air–bone gap, indicating the severity of conductive hearing loss. However, interpretation of results should consider potential variability between clinics due to differences in audiometer calibration.

From an epidemiological standpoint, COM occurs most frequently in children, particularly those aged 0–15 years, and ear discharge is often the primary reason for seeking medical attention. Many children also experience otitis media with effusion by early childhood, underscoring the importance of recognizing clinical patterns in pediatric populations.

The condition significantly affects health-related quality of life, leading to communication difficulties, reduced academic or occupational performance, and social limitations. The Chronic Suppurative Otitis Media Questionnaire-12 (COMQ-12) is widely used to evaluate patient-reported outcomes and assist clinicians in treatment planning and monitoring.

Pathophysiology

Chronic otitis media (COM) includes a spectrum of long-standing inflammatory disorders of the middle ear, most commonly divided into active chronic infection and otitis media with effusion (OME). The development and persistence of these conditions result from complex interactions between microbial pathogens and the host immune response.

Active Chronic Otitis Media

Active COM is characterized by ongoing inflammation of the middle ear, often accompanied by tympanic membrane perforation and persistent discharge. In some patients, abnormal growth of keratinizing squamous epithelium (cholesteatoma) develops, contributing to progressive tissue destruction.

The infection is frequently polymicrobial. Common pathogens include Staphylococcus aureus, including methicillin-resistant strains, which can provoke a pronounced inflammatory reaction. This inflammatory activity may produce symptoms such as ear pain, fever, irritability, and sleep disturbance.

Accumulation of fluid within the middle ear—referred to as middle ear effusion—is a typical finding and contributes to conductive hearing loss and a sensation of ear fullness.

Otitis Media with Effusion

Otitis media with effusion represents a more chronic and often less symptomatic state in which fluid collects in the middle ear without obvious signs of acute infection. Although usually painless, it commonly causes temporary conductive hearing impairment and may lead to complications if the effusion persists.

Immune regulation plays an important role in its pathogenesis. In particular, imbalance among T-helper lymphocyte subtypes—such as increased Th17 activity—can sustain inflammation and prolong disease duration, preventing normal resolution of middle ear fluid.

Inflammatory Mechanisms

The immune reaction in otitis media involves a complex network of inflammatory mediators, particularly cytokines. CD4+ T-helper type 1 (Th1) lymphocytes release cytokines such as interferon-gamma (IFN-γ) and interleukin-12 (IL-12), which activate macrophages and influence how the infection progresses or resolves. In otitis media with effusion, the consistent presence of IL-12 suggests that it plays an important regulatory role in sustaining inflammation and contributing to chronic disease persistence.

Another important component is the NLRP3 inflammasome, which promotes differentiation of T cells toward a Th1 immune response. Because of its central role in maintaining inflammation, it has been proposed as a potential therapeutic target in chronic middle ear disease.

Pathogen Interaction and Immune Evasion

Certain key microorganisms, particularly Pseudomonas aeruginosa, possess the ability to disturb normal host defense mechanisms and trigger long-lasting inflammation. These bacteria can form biofilms, allowing them to survive within the middle ear and resist both immune responses and antimicrobial therapy.

The interaction between persistent pathogens and host immunity creates a continuous cycle of inflammation and tissue damage, helping explain the chronic and recurrent nature of chronic otitis media. Differences in individual immune susceptibility and microbial virulence further determine disease severity and duration, making management challenging in clinical practice.

A clearer understanding of these mechanisms is essential for developing more effective treatments and improving outcomes for patients with chronic otitis media.

Treatment Options

Acute Otitis Media

Acute otitis media (AOM) is generally treated with symptomatic therapy and selective use of antibiotics. Pain control is the primary initial measure, typically achieved with analgesics such as paracetamol or ibuprofen. In many cases, a watchful waiting approach for 24–48 hours is recommended, as a large proportion of episodes resolve spontaneously within a few days.

Antibiotics are not routinely indicated, since AOM may be caused by either viral or bacterial pathogens. Antibacterial therapy is reserved for patients with severe symptoms, prolonged illness, or higher risk of complications. When required, high-dose amoxicillin is commonly prescribed for individuals without penicillin allergy. Decisions regarding antibiotic use depend on factors such as patient age, clinical severity, and the likelihood of bacterial infection.

If middle ear effusion persists for more than three months, insertion of tympanostomy tubes may be considered to promote ventilation, improve drainage, and prevent recurrent episodes.

Chronic Otitis Media

Management of chronic otitis media (COM) often differs from that of acute disease. Topical antibiotic ear drops are frequently used, particularly in cases with recurrent or persistent discharge. When conservative medical therapy fails, surgical intervention may be necessary.

Procedures such as myringotomy involve creating a small incision in the tympanic membrane to drain accumulated fluid and, when appropriate, placing ventilation tubes to maintain middle ear aeration and reduce recurrence. Advances in surgical techniques, including minimally invasive approaches and improved pressure equalization devices, have

enhanced outcomes in adult patients by decreasing symptom burden and lowering the frequency of reinfection.

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