Tuberculous Otitis Media: A Rare Case Report on Middle Ear TB

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Abstract

Tuberculous otitis media (TOM) is a rare form of extrapulmonary tuberculosis that can lead to severe complications if not promptly diagnosed. This case report describes a 25-year-old female with bilateral ear discharge and hearing loss, initially misdiagnosed as bilateral suppurative otitis media. Following ineffective antibiotic treatment, imaging revealed chronic destructive changes, leading to a biopsy that confirmed TOM. Further investigations identified pulmonary tuberculosis, and the patient was started on anti-tuberculosis therapy. At a six-month follow-up, her symptoms had resolved, and hearing improved. This case underscores the need to consider TOM in chronic otitis media cases, particularly in high-prevalence areas. The nonspecific clinical presentation of TOM often mimics more common conditions, making early detection essential to prevent complications. A multidisciplinary approach comining medical and surgical strategies is crucial for effective management. Increased awareness among healthcare providers is necessary to ensure timely intervention and improved outcomes for patients with TOM.

Keywords: Tuberculosis, Middleear, Otitis media.

INTRODUCTION

Tuberculosis (TB) is a serious infectious disease capable of affecting various organs and tissues. It remains one of the leading causes of death worldwide, particularly in individuals over five years of age. Tuberculous otitis media (TOM), a rare form of extrapulmonary TB, is an uncommon but significant condition.[1] Historically, TOM accounted for 3% to 5% of chronic suppurative otitis media cases in the early 20th century. However, more recent studies report an incidence of chronic middle ear infections in developed countries ranging from 0.04% to 0.9%. This rare manifestation of TB is often underdiagnosed, leading to delays in treatment and an increased risk of complications,[2] including destruction of the middle ear's conductive structures, facial nerve paralysis, labyrinthitis with sensorineural hearing loss, and even intracranial infection spread.

Tuberculous otitis media is frequently misdiagnosed due to its nonspecific clinical presentation, which often mimics common middle ear conditions like chronic suppurative otitis media. Typical features include painless ear discharge (otorrhea), multiple perforations of the

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tympanic membrane, and hearing loss, though these symptoms are not exclusive to TOM, making timely diagnosis challenging.[3]

This case report presents a rare occurrence of tuberculous otitis media, shedding light on the diagnostic complexities and management approaches for this condition. It emphasizes the importance of considering TB as a differential diagnosis in cases of chronic otitis media, particularly in regions with a high prevalence of tuberculosis or in patients with known risk factors. Early detection and the initiation of appropriate anti-tubercular therapy are critical to preventing severe complications such as hearing loss and mastoiditis, which can result from delayed diagnosis and treatment.[4]

CASE REPORT

A 25-year-old female, with no prior medical history, presented with a two-month history of bilateral ear discharge and reduced hearing. He denied any ear trauma, ear pain, vertigo, or tinnitus. Additionally, there were no symptoms of prolonged cough or constitutional complaints. Her medical and family history were unremarkable, with no recent travel history or known contact with tuberculosis. Upon examination, pus was observed in both ear canals, and an aural polyp was visible in the left ear canal. Due to narrowing of the ear canals, the tympanic membranes were not clearly visible. A pure tone audiogram revealed profound hearing loss in both ears.

The patient was initially diagnosed with bilateral suppurative otitis media and prescribed a course of oral antibiotics along with antibiotic ear drops. However, during follow-up visits, there was no improvement in her condition. As a result, a High-Resolution Computed Tomography (HRCT) scan of the petrous bone was conducted.The HRCT findings indicated stenosis of the right external auditory canal (EAC) with erosion of the ossicles on the right side, along with dehiscence of the posterior wall of the EAC, tegmen tympani, and sigmoid plate, suggestive of chronic destructive ear disease.Cholesteatoma was considered a possible diagnosis. The left temporal bone structures appeared intact, except for the presence of a left aural polyp and minimal signs of chronic otitis media. The patient was admitted to the hospital and started on intravenous Levofloxacin. She subsequently underwent an ear examination under general anaesthesia, during which a biopsy of the left aural polyp was taken. Histological analysis of the biopsy showed inflamed, fragmented tissue with islands of epithelioid granuloma and scattered multinucleated Langhans-type giant cells, some with central necrosis. Acid fast staining revealed the presence of a few acid-fast bacilli.(*Fig. 1*)

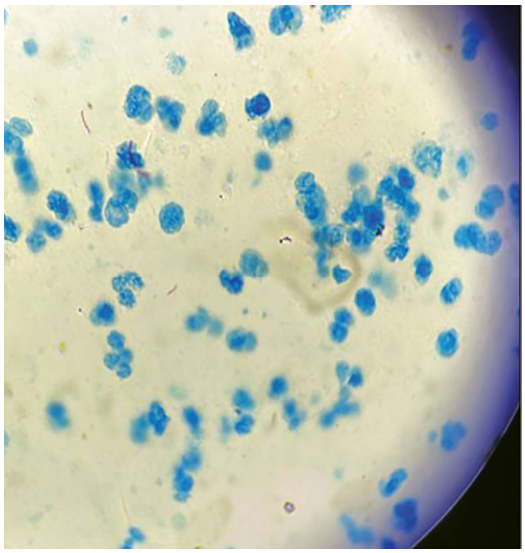

Fig. 1: Showing pink bacilli on Acid fast stain

Following the biopsy results, the patient underwent further investigation for tuberculosis. A chest X-ray revealed changes indicative of pulmonary tuberculosis. Subsequent sputum analysis confirmed a positive diagnosis for tuberculosis. She was started on an anti-tuberculosis treatment regimen. At a six-month follow-up, her ear discharge had resolved. Otoscopic examination showed a healed central perforation in the right ear, while the left ear exhibited a retracted tympanic membrane with perforation in the anterior superior region.

DISCUSSION

Tuberculous Otitis Media (TOM) is a rare cause of chronic otitis media and is often overlooked in differential diagnoses. While the incidence of TB had been decreasing due to advancements in public healthcare and the effectiveness of anti-tuberculosis treatments, the number of cases has recently increased, largely due to factors such as HIV/AIDS, antibiotic-resistant strains, substance abuse, and diabetes.[5,6]

The pathogenesis of TOM remains debated, but three mechanisms have been suggested: aspiration of mucus via the auditory tube, hematogenous spread from other TB sites, and direct implantation through the external auditory canal following tympanic membrane perforation. TOM presents

with a distinct set of clinical features.[7] It should be suspected in patients with chronic middle ear infections that are unresponsive to standard antibiotic treatments, especially in cases involving painless ear discharge, significant hearing loss out of proportion to disease severity, and multiple tympanic membrane perforations, which may be central or total. Hearing loss is predominantly conductive in about 90% of cases, while sensorineural and mixed hearing loss are less common.[8-10] Sensorineural hearing loss in TOM may result from vasculitis in the cochlear veins, immune complex deposits within the cochlea, or granulomatous involvement of the acoustic nerve. Facial nerve palsy, though rare, occurs in approximately 16% of adult cases and 35% of pediatric cases. Otoscopy may reveal findings that resemble cholesteatoma, such as caseous material and granulation tissue that can extend into the mastoid. Advanced disease stages may also present with granulomatous or necrotic tissue, bony sequestrum, and the development of pre-auricular or cervical lymphadenopathy. Retro-auricular fistulas are another common feature of advanced TOM.[11,12]

Recent research indicates that Computed Tomography (CT) is the most effective imaging technique for diagnosing tuberculous mastoiditis. It provides significantly more information than standard plain films and proves to be more accurate and useful than polycycloidal tomography and magnetic resonance imaging (MRI). **Rho *et al.***[13] noted that a CT scan of the temporal bones typically reveals soft tissue attenuation throughout the middle ear cavity, while the mastoid air cells remain preserved without sclerotic changes. There may also be soft tissue extension to the External Auditory Canal (EAC) or mucosal thickening of the bony EAC. Other studies have found that cortical bone destruction is a more prevalent finding, which contrasts with the resorption that characteristically starts in Prussak's space in cases of cholesteatoma.[14]

Diagnosis of tuberculous otitis media relies on direct smear examinations and cultures of ear discharge, as well as histopathological analyses of middle ear tissues. A high degree of suspicion is necessary, even in the absence of pulmonary tuberculosis, as demonstrating Acid-Fast Bacilli (AFB) in ear discharge is challenging.[15] The detection rate for AFB in ear discharge ranges from 5% to 35%, but repeated tests can improve the positivity rate to 50%. Histological examination typically reveals granulation tissue containing epithelioid cells and Langhans giant cells, central necrosis, lymphocytic infiltration, ulceration, and signs of bone resorption. The histopathological findings in the middle ear and mastoid mucosa can exhibit three types of changes: miliary, granulomatous, and caseous. The miliary type is associated with superficial infections, the granulomatous type with superficial bony involvement, and the caseous type with extensive necrosis and sequestration.[16]

Once a diagnosis is confirmed, prompt initiation of medical treatment is essential to prevent serious complications. Early administration of anti-tuberculosis medications typically results in a significant improvement in prognosis. For a complete cure, a minimum duration of six months of drug therapy is necessary. The role of surgery is limited and typically reserved for cases that do not respond to medical treatment or those with extensive disease accompanied by bone sequestra. However, surgical intervention without appropriate drug therapy may lead to complications such as fistula formation, nonhealing suture lines, and surgical failure.[17]

According to **Myerson**[16], radical mastoidectomy is warranted if complications such as facial paralysis, subperiosteal abscess, labyrinthitis, mastoid tenderness, or headache arise. Surgery may also be required to remove sequestra and enhance drainage. When surgery is performed alongside adequate chemotherapy, there is a good likelihood of achieving a dry ear and favorable prognosis. The perspective on surgical intervention has evolved; in the past, it was primarily aimed at drainage, controlling the spread to the central nervous system, and alleviating facial paralysis. The introduction of targeted chemotherapy has changed this approach, and surgery is now generally reserved for decompression of the facial nerve and removal of necrotic material that could harbor the infection and evade anti-tuberculous therapy. Notably, identifying sequestra in the temporal bone during surgery can aid in diagnosis.[18]

Tuberculous mastoiditis can lead to severe complications if the infection spreads from the ear canal to surrounding tissues, potentially resulting in skull base osteomyelitis or tuberculous meningitis. Historically, before the introduction of streptomycin, tuberculous otitis media was associated with high mortality rates. With the advent of comination anti-tuberculosis therapies, outcomes have improved, although significant hearing recovery is often not achieved. Restoration of hearing loss may be possible after resolution of otorrhea through tympanoplasty, and facial paralysis can improve either partially or

completely. The speed and extent of recovery are directly correlated with the time interval between the onset of facial paralysis and the commencement of treatment.[19]

CONCLUSION

This case report highlights the importance of recognizing tuberculous otitis media (TOM) as a potential diagnosis in patients with chronic ear discharge and hearing loss, particularly in areas with a high prevalence of tuberculosis. Despite its rarity, TOM can lead to severe complications if not promptly diagnosed and treated.The resolution of this patient's symptoms after initiating anti-tuberculosis therapy underscores the need for early detection and treatment to improve outcomes. Clinicians must maintain a high index of suspicion for TOM in cases of chronic otitis media, especially when typical presentations are absent. A multidisciplinary approach, incorporating both medical and surgical strategies, is crucial for effectively managing this challenging condition.

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