

Tuberculous Otitis Media: A Mysterious Ailment – A Case Series

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ABSTRACT

Introduction

Tuberculous otitis media (TOM) is an infrequent ailment. As an uncommon form of extra-pulmonary Tuberculosis, it is often underestimated, leading to a delay in diagnosis and start of appropriate treatment.

Case Series

We describe 3 cases of TOM diagnosed and treated in our institute. The typical presentation was prolonged ear discharge not responding to culture sensitive antibiotics, hard of hearing, perforation of tympanic membrane, pale whitish granulation tissue. Pure Tone Audiogram (PTA) done to evaluate the hearing loss. The granulation tissue from all the patients sent for Histopathology examination (HPE) and Cartridge Based Nucleic Acid Amplification Test (CBNAAT) examination. CBNAAT results were positive in all three patients. HPE reported as chronic inflammatory pathology. PTA revealed sensorineural hearing loss in 2 patients and conductive hearing loss in 1 patient. Treatment with regular ATT 4FDC (Anti Tubercular Treatment- Four Drug Combination) regimen was started as per weight band for 6 months. Each of them was on follow up and symptomatically improving.

Conclusion

TOM requires recognition in refractory chronic otitis media. Early diagnosis and intervention are essential to prevent complications and optimise outcomes. The delay in initiating therapy may lead to complications such as facial nerve palsy. This case series aims to highlight the clinical presentation, effective diagnostic modalities and treatment of tuberculous otitis media and stresses the importance of awareness among otorhinolaryngologists regarding TOM and its timely management.

Keywords

Extra-pulmonary Tuberculosis; Granulation Tissue; Antibiotics; Drug Combination; Chronic Otitis Media

Tuberculous otitis media (TOM) is an infrequent ailment.¹ The clinical signs and symptoms of TOM were first documented in 1853 and the bacilli was first isolated from otic discharge in 1883. During the early 20th century, tuberculosis (TB) was attributed to 3 to 5% of chronic suppurative otitis media cases.² Presently, reports indicate a prevalence of 0.04 to 0.9% of chronic middle ear infections in developed nations.^{1,3,4} As a less common form of extrapulmonary TB, it tends to be potentially underestimated.^{1,5,6} Its low incidence doesn't raise suspicion among ear, nose, and throat specialists. Symptoms vary and lack specificity, often differing from classic portrayals. Due to the uncommon suspicion of TB, routine TB tests are not typically requested.⁷ Mycobacterium tuberculosis, can yield false-negative cultures, contributing to diagnostic challenges too. The consideration of TOM comes into play after antibiotic

regimens fail or persistent effusion even after post-tympanoplasty or mastoidectomy.⁸ Consequently, diagnosis often occurs during or after surgical procedures.⁷ Such late diagnosis postponed treatment initiation, heightening the risk of complications such as facial paralysis, irreversible hearing impairment, labyrinthitis and intracranial dissemination of infection.¹

Case 1:

A 29-year-old female presented with complaint of persistent ear discharge for 2 years, which was

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intermittent, mucopurulent, non-blood-stained, non-foul-smelling, initially responded to treatment but frequently recurred. Pre operative pus culture and sensitivity of discharge showed no active growth. She also reported progressive hearing loss and tinnitus for 3 months. Clinical examination revealed a central tympanic membrane (TM) perforation with pale granulation tissue in the middle ear (Figure 1) Pure Tone Audiometry (PTA) indicated conductive hearing loss of 40 dB. The patient underwent tympanoplasty. Intra-operatively malleus, incus and stapes supra-structure were absent. Pale granulation tissue found

and sent for Cartridge Based Nucleic Acid Amplification Test (CBNAAT) and Histopathological Examination (HPE). Postoperatively CBNAAT was positive for tuberculosis and HPE showed chronic inflammatory pathology. She was initiated on Anti-Tuberculosis Treatment (ATT). After 2 months of follow-up, her hearing had shown improvement (Figure 2) This case underscores the importance of considering tuberculosis in cases of chronic ear discharge and conductive hearing loss, highlighting the positive impact of early diagnosis and treatment with ATT on hearing improvement.



Fig. 1. Case 1 preoperative image of ear

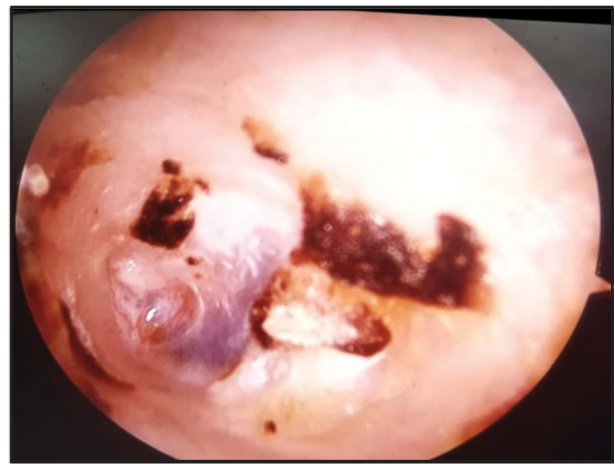


Fig. 2. Case 1 postoperative image of ear

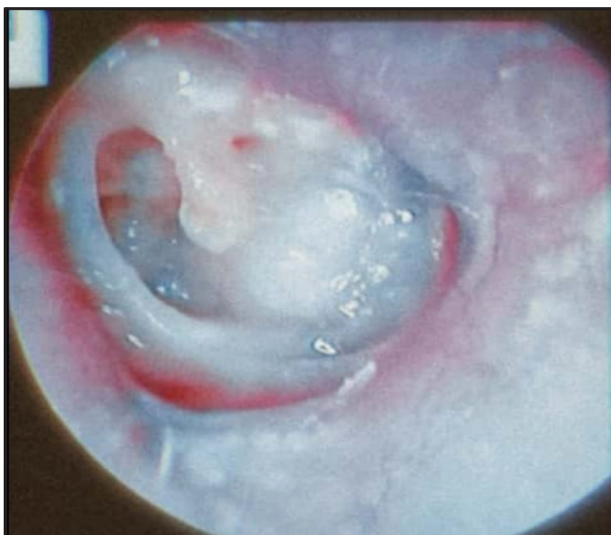


Fig. 3. Case 2 preoperative image of ear

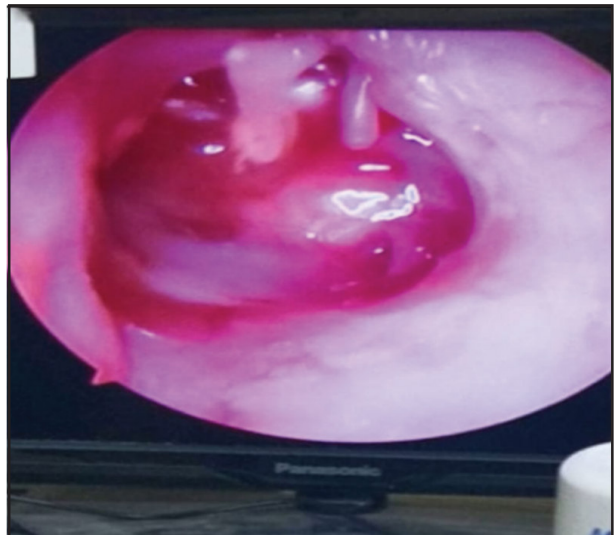


Fig. 4. Case 2 post ATT image of ear

Case 2:

A 34-year-old female presented with a six-month history of recurrent non-foul-smelling mucopurulent ear discharge occasionally mixed with blood, unresponsive to conventional treatment based on microbiological examination of discharge, with progressive sensorineural hearing loss for one month. Evaluation revealed a large central TM perforation and pale granulation tissue in the middle ear (Figure 3). Tissue analysis confirmed tuberculous infection via positive CBNAAT and chronic inflammatory changes on histopathology. The patient was initiated on ATT, resulting in reduced discharge and regression of granulation tissue during follow-up (Figure 4), with a pending plan for necessary surgical intervention. There was no improvement in hearing in the patient. This case underscores the importance of considering tuberculosis in chronic otitis media cases, necessitating multidisciplinary management for improved outcomes.

Case 3:

A 58-year-old male presented with a three-month history of non-foul-smelling mucopurulent ear discharge that was unresponsive to conventional treatment. Pre-operative pus culture and sensitivity showed no growth. He had history of hearing loss, tinnitus and facial weakness. Clinical examination revealed a central TM perforation with discharge in the middle ear (Figure 5) and Grade 4 lower motor neuron facial nerve palsy. HRCT of the temporal bone, showed soft tissue opacification in mastoid air cells and the middle ear, involving the Prussak space (Figure 6). The patient underwent a Modified Radical Mastoidectomy, a medium-sized central TM perforation with oedematous mucosa and unhealthy malleus and incus was observed. Pale granulation tissue was noted in the mastoid and along the horizontal part of the facial nerve, which was found to be dehiscent (Figure 7). The removed granulation tissue was sent for HPE which showed chronic inflammatory pathology and tissue CBNAAT confirmed tuberculosis. ATT was initiated, leading to improved hearing during follow-up (Figure 8), facial nerve paralysis reduced to Grade 2 on House Blackman scale. This case highlights the complexity of ear pathology, showcasing the interplay between chronic ear infections, facial nerve

involvement, and the significance of comprehensive surgical and medical management.

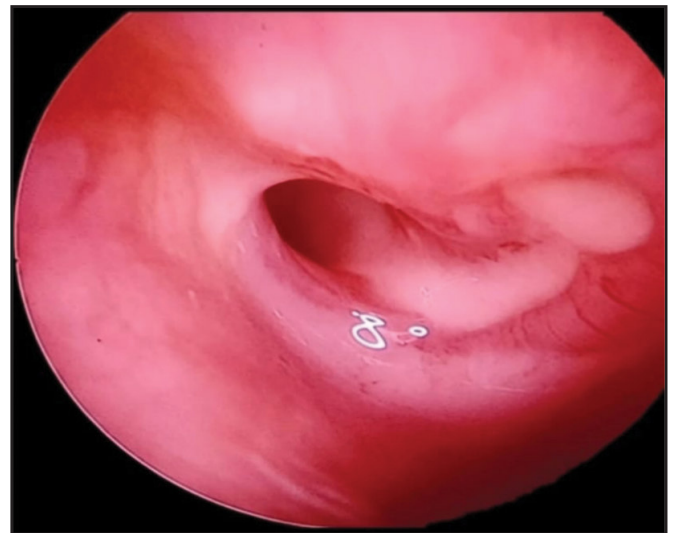


Fig. 5 Case 3 preoperative image of ear



Fig. 6. Case 3 HRCT temporal bone

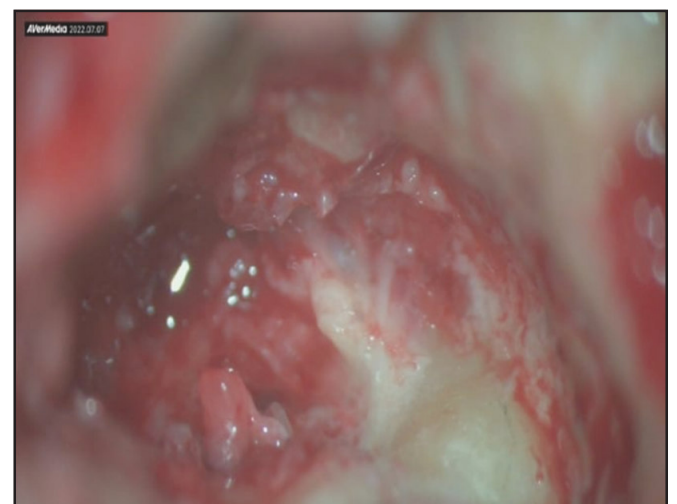


Fig. 7. Case 3 intraoperative image of ear

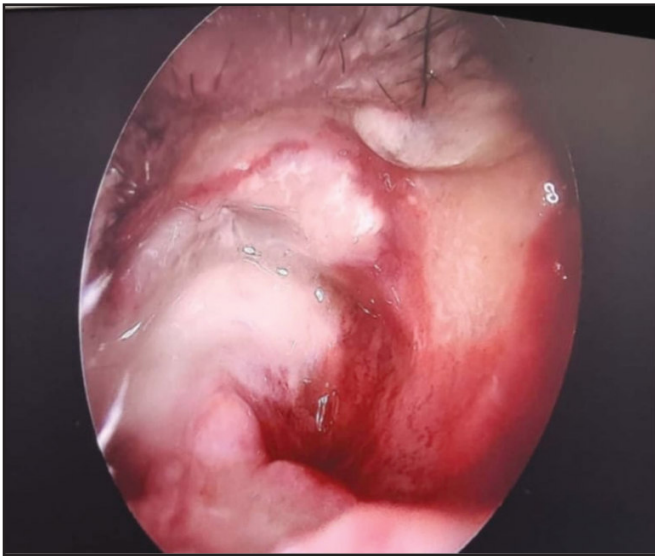


Fig. 8. Case 3 post operative image of ear

Discussion

Extra pulmonary tuberculosis is common in developing nations with incidence of 6.1% (Stani et al). Tuberculous otitis media is still rampant in India and other developing nations, with an incidence of 1.5 Per 1000 population.⁹ But TOM is a rare cause of a chronic suppurative infection of the middle ear, accounting for only 0.05 to 0.9% of all cases of chronic otitis media.¹⁰ The pathogenesis of TOM include¹ aspiration of mucous with TB bacilli through eustachian tube,² Dissemination through blood from other tuberculous foci³ direct spread through external auditory canal with a perforated tympanic membrane.¹¹ In our study all 3 patients were cases of primary TOM. All patients were screened for Pulmonary TB.

The clinical features of TOM differ greatly, but the commonest symptom is an ear discharge. Acute onset of hearing loss disproportionate to the extent of disease is also common. PTA shows either conductive hearing loss (90%) or sensorineural hearing loss (~8%), or mixed (~2%).¹² Ear pain is uncommon.

Clinical examination of the ear reveals pale granulation tissue with thickened TM. Perforations occur in granulomatous area. The consistency of the discharge varies from thick and mucoid to thin and watery. Ossicular destruction is common due to granulomas. Progression of disease leads to atticointral blockage, mastoiditis or

tuberculous osteomyelitis of temporal bone. Associated facial nerve palsy seen in ~35% of pediatric population and ~16% of adult patients.¹³ Another deadly complication we can expect is tuberculous meningitis. Labyrinthitis and petrositis have also been reported.

To diagnose this disease early, CBNAAT is important diagnostic tool in TOM, and histopathology is also used to confirm the diagnosis. Positive CBNAAT with histopathological features suggestive of TOM were seen in all patients. Tissue sent for Ziegler Nielsen staining for detection of Acid Fast Bacilli (AFB), was negative in all three patients. This depicts the difficulty in demonstrating AFB in discharge from the middle ear cavity and further highlights the importance of CBNAAT as a tool for diagnosing TOM. ATT was given to our patients and all the patients showed relief from symptoms and improved hearing. The primary goal of treatment is to get the patient started on an antitubercular regimen and to initiate early surgical intervention to avoid further complications.

In the management of all cases (Table I), the common thread emerged as the confirmation of TB through positive CBNAAT results. Subsequently, a tailored treatment approach of Regular ATT 4FDC (Four-Drug Combination) regimen according to the individual patients' weight bands was initiated. All patients in our study received ATT 4FDC for a period of 9 months. Patients were followed up 1st after completing intensive phase of ATT treatment and after 9 months completion of ATT. This strategy is aligned with established protocols and guidelines for tuberculosis management. By consistently monitoring their progress through follow-up visits, the healthcare team can gauge the efficacy of the treatment, thereby refining the management strategy as needed.

In summation, the positive response observed in all three cases, characterised by reduction of ear discharge, improvement in conductive hearing loss, and improvement in facial nerve function underscores the value of timely diagnosis and targeted treatment of tuberculosis-related ear manifestations. The utilisation of the Regular ATT 4FDC regimen, combined with attentive follow-up, showcases the holistic and professional approach employed to optimise patient outcomes in these complex clinical scenarios.

Table I : Case details

CASE	CASE 1	CASE 2	CASE 3
Age	29 year/female	34 year/female	58 year/male
Chief complaints	Ear discharge for 2 years, intermittent, last episode for past 3 months	Ear discharge for past 6 months, last episode for past 1 month	Ear discharge 3 months
History	H/O hard of hearing-progressive for 3 months, H/O tinnitus+	H/O hard of hearing for progressive for 1 month	H/O hard of hearing, H/O mild tinnitus
Pre ATT	With conductive hearing loss	With sensorineural hearing loss	With facial nerve palsy (Grade 4)
Post ATT	Dry ear, improvement in hearing	Dry ear, no improvement in hearing	Dry ear, facial nerve palsy (Grade 2)

Conclusion

In conclusion, this case series sheds light on the often-mysterious ailment of TOM. These three cases emphasise the importance of considering TOM in patients with refractory chronic otitis media, especially in regions with a high tuberculosis burden. The diagnostic challenges associated with TOM, such as its diverse clinical presentations have been highlighted. Early diagnosis through methods like CBNAAT and prompt initiation of ATT is essential to prevent complications and optimise outcomes, as demonstrated by the positive response observed in these cases. This series underscores the crucial role of awareness in recognising and managing TOM for the benefit of their patients.

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