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Short Communication

Tuberculous otomastoiditis: analysis of otological tuberculosis with intact tympanic membrane

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ABSTRACT

In recent years extra pulmonary tuberculosis has more frequently been associated with mastoiditis in patients with immunodeficiency state. Although tuberculosis of the mastoid or otomastoiditis is a very rare complication of tuberculosis today, when occurs it may cause significant morbidity. Complications such as facial paralysis and permanent hearing loss may develop. Our purpose was to evaluate the differential findings of tuberculous otomastoiditis and evaluation of outcomes in patients undergoing surgery along with anti-tubercular therapy rather than patients receiving only anti-tubercular therapy. We reviewed 12 cases of TOM, all of which had been confirmed on sputum and pathological examination following middle ear mucosal biopsy. Neuroradiologists analyzed the typical findings of HRCT temporal bone. Tympanomastoid ear surgery was planned according to the extent of the disease involved. The soft tissue attenuation in the entire middle ear cavity and extension to the external auditory canal (EAC) or mucosal thickening of the bony EAC, erosion of the ossicles and scutum was clinically significant. Patients who underwent tympanomastoid surgery showed better prognosis than the patients receiving anti tubercular drugs alone. Patients with extra-pulmonary tuberculosis, especially otomastoiditis should get operated to remove the disease along with anti-tubercular treatment to prevent complications.

Keywords: Tubercular otomastoiditis, Anti-tubercular therapy, Pale granulations

INTRODUCTION

Tuberculous mastoiditis was first described by Jean Louis Petit in the 18th century; Wilde in 1853 presented the classical picture of tuberculosis otitis media as a disease characterized by painless, insidious onset of ear discharge, multiple perforations in the tympanic membrane, and pale granulations in middle ear cleft. Politzer discussed the destructive nature of this disease in 1882. In 1892, Koch demonstrated the tubercle bacilli.[1] The incidence of tuberculosis otitis media has been reported to be 0.04% to 0.9% of all chronic suppurative otitis media (CSOM) in the developed countries.[2,3] Tuberculosis affects the middle ear through three routes; aspiration of mucus through the Eustachian tube, blood borne dissemination from other tuberculous foci or direct implantation through the EAC and tympanic membrane perforation.[1-3] The incidence is thought to be more and is on the rise in the developing countries.[4] In recent years extra pulmonary tuberculosis has more frequently been associated with mastoiditis in patients with immunodeficiency state. Although tuberculosis of the mastoid or otomastoiditis is a very rare complication of tuberculosis today, when occurs it may cause significant morbidity. Complications such as facial paralysis and permanent hearing loss may develop.[5] High resolution CT scan of the temporal bone is the best imaging modality available for identifying features suggestive of tuberculosis, the disease extent, presence of complications and demonstration of anatomy prior to surgery. The diagnosis of tuberculous mastoiditis is difficult and may be delayed for months to years,

especially if the patient shows no other manifestations of the disease. The symptoms of tuberculosis of the middle ear typically are otorrhea which is persistent despite of multiple courses of antibiotics, otalgia, hearing loss, and in extreme cases facial palsy. There may also be discharging pre auricular abscess and multiple perforations in the tympanic membrane. Physical examination findings may include abundant polypoid or avascular pale granulation tissue. The patients with exuberant pale middle ear and mastoid granulations should undergo histopathology examination and mycobacterial culture and susceptibility testing to look for coexisting pulmonary disease. TB should always be kept as a differential diagnosis in case of chronic middle ear infection, especially if there is a poor response to antibacterial treatment. HPE of the tissue and specific microbiological testing are the gold standard for diagnosis.

METHODOLOGY USED

We reviewed 12 cases of TOM over a period of 1 year as a prospective analysis. The period of study was from September 2020 to August 2021.

Our purpose was to evaluate the differential findings of tuberculous otomastoiditis and evaluation of outcomes in patients undergoing surgery along with anti-tubercular therapy rather than patients receiving only anti-tubercular therapy.

Patients with sputum examination showing AFB positive or patients having strong clinical suspicion of tuberculosis having symptoms like evening rise of fever, night time sweating with gradual weight loss with chest X ray suggestive of TB.

Patients with only perforation of tympanic membrane and no middle ear/cleft disease were excluded. Patients who refused for ear surgery were also excluded. Patients with other comorbidities, relapses/defaulters, unwilling to take AKT, lost to follow up were excluded from this study.

Comprehensive history taking was done according to predefined proforma from the patient, his /her guardian, parents or spouse. After collecting data, details of the background of their current and past illness, history of contact, family history and personal habits were included. Patients underwent complete ENT evaluation which included otoscopic examination of the ear, inspection of nose using thudicum nasal speculum, oral cavity and oropharynx using lack's tongue depressor, indirect laryngoscopy to assess and visualize larynx and clinical examination of the neck for nodes and to rule out other ENT manifestations caused by TB.

The investigations done were pus and swab taken from discharge if present for microbiological study (AFB and culture and sensitivity), chest X ray to look for pulmonary tuberculosis apart from routine blood and urine investigations. Concurrent pulmonary tuberculosis was ruled out by sending 2 consecutive sputum samples for mycobacterial smear and culture like CBNAAT and GeneXpert.

The chief investigation done in this study to support our diagnosis was high resolution CT (HRCT) scan of temporal bone. In some patients CECT temporal bone and MRI brain was also done depending on extension of disease and involvement of nerve complexes. Two neuroradiologists analyzed the findings of temporal bone CT.

TB findings were confirmed TOM by pathological examination of middle ear mucosal biopsy taken after microscopic examination of ear and suction clearance or after surgery. Tympanomastoid ear surgery was planned according to the extent of the disease involved. Pure tone audiometry was also done to compare audiological outcomes after surgery in patients with history of hearing loss.

Since number of TOM cases is less than 30 in our study, we have not calculated p value and not used any statistical methods or tools. We have taken ethical committee approval before proceeding our study.

OBSERVATIONS

The soft tissue attenuation in the entire middle ear cavity and extension to the EAC or mucosal thickening of the bony EAC, erosion of the ossicles and scutum was clinically significant in radiological findings. Also, if a patient presents with polyp or granulation tissue in middle ear or EAC then histopathology is mandatory to rule out tuberculosis. All the patients in our series underwent surgical exploration. One of them had graft failure who was severely immunocompromised having already been diagnosed as SLE and lupus nephritis. In our case series, 6 of the patients underwent modified radical mastoidectomy, 4 underwent canal wall down and rest 2 underwent canal wall up mastoidectomy. Since number of TOM cases is less than 30, we have not calculated p value.

Table 1: Symptoms.

Symptoms	N
Hearing loss	11
Facial weakness	3
Otorrhea	7
Cerebellar/temporal abscess	4

Table 2: Otology finding.

Otology findings	N
Granulation tissue	5
Polyp	3
Intact TM	2
Intact TM with retraction	2

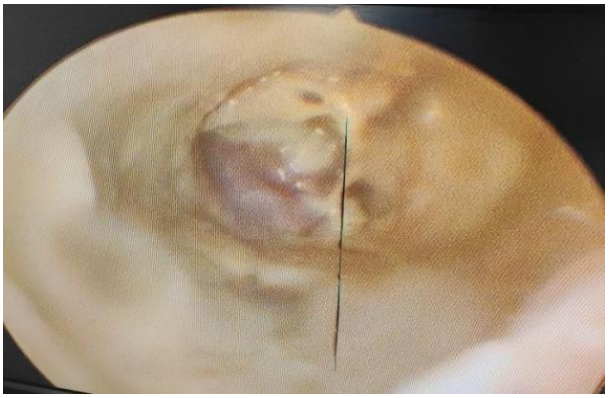

Figure 1: Intact TM with otomastoiditis but grade 4 retraction in pars tensa.

Figure 2: Extensive granulation tissue in the external ear canal.

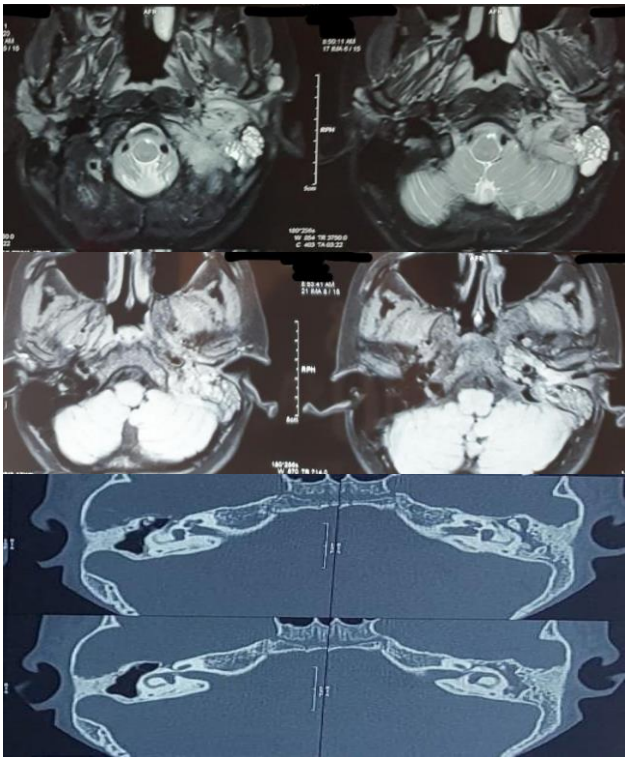

Figure 3: Radiological findings in otomastoiditis with complete soft tissue visualized in middle ear and mastoid region.

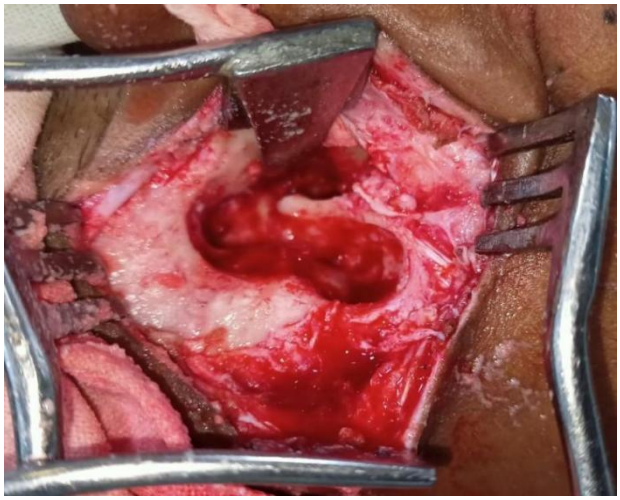

Figure 4: Intraoperative clearance of disease and soft tissue from middle ear and mastoid cavity.

DISCUSSION

The classical clinical features described of tubercular otomastoiditis were painless otorrhea, multiple tympanic membrane perforations, granulations in middle ear and mastoid, progressive CHL, and facial nerve palsy. Such textbook presentations are no longer seen consistently. Most of the time, the presentation is similar to that of any other case of CSOM. As it was seen in our series, the condition may mimic necrotizing otitis media, cholesteatoma, otitis externa, or even coalescent mastoiditis. Due to the nonspecific clinical findings, a delay in diagnosis is commonly seen. Otorrhea and hearing loss were consistent findings in all of our cases. However, it is the failure of otorrhea to respond to conventional antimicrobial treatment which should raise the possibility of the pathology being tubercular. In contrast to what has been described in the literature, only one of the patients had facial nerve involvement. Three patients were immunocompromised, and none had any other systemic focus of TB.

A CT scan of temporal bone is the standard radiological investigation for evaluation of any case of chronic otitis media. It also helps in localizing the facial canal in cases with facial paralysis. Radiographic findings may include destruction of the ossicles, sclerosis of the mastoid cortex, or opacification of the middle ear and mastoid air cells, which are seen on COM. Sclerosis of the mastoid is denser and more widespread in the case of TOM than in COM of other cause. Hoshino et al reported that a cochlear fistula seemed to be characteristic of advanced TOM. We were unable to observe cochlear fistula in our patients because of the earlier stage of TOM in our patients. The gold standard for establishing the diagnosis of TOM includes culture and HPE of material obtained from middle ear and mastoid. An ear swab should be sent for TB culture and polymerase chain reaction analysis. The standard treatment for TOM is anti-tubercular therapy. The duration of ATT should be at least 6

months. This can be extended depending on the clinical response. In our series, the patients received ATT for 6-9 months. All the patients recovered uneventfully. As far as the role of surgery in TOM is concerned, the literature is not uniform. There is no good evidence to demonstrate effectiveness surgery for TOM. On the other hand, anti-tubercular drugs do not have a good middle ear penetration. Surgery in the absence of any complications has been condemned by some authors. Some studies have demonstrated higher rates of dry ears when surgery precedes ATT.

Clinicians should suspect tuberculous otitis media and mastoiditis if clinical findings include refractory otorrhea, soft tissue, and erosion of the bone or sequestra as shown by CT in tympanic cavity and mastoid air cells. History of tuberculosis should be asked carefully in order to differentiate tuberculous otitis media and mastoiditis. The patients who received surgery and anti-tuberculosis anti-tubercular therapy achieved more rapid healing of the ear which is similar result as in a study done by Hao et al.[6]

CONCLUSION

This series demonstrates the diagnostic and therapeutic challenges posed by a rare entity called tubercular otomastoiditis owing to the fact that the clinical features are nonspecific, and standard microbiological and radiological tests fail to differentiate it from other chronic temporal bone pathologies. A high index of suspicion is mandatory to establish the diagnosis, especially if otorrhea is not treated by antibiotics. It is important for the treating physician to be aware of this condition as an early diagnosis and prompt initiation of treatment including a tympanomastoid surgery is a must for a favorable outcome and to prevent serious, life-threatening complications.

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