

Intra Operative Middle Ear Surprise Presenting with Unilateral Conductive Hearing Loss in an Intact Ear Drum - An Interesting Case Report

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Abstract: *Middle ear masses are relatively uncommon, and endoscopic techniques are increasingly favoured over traditional surgical methods for examining the middle ear. This report details a case involving a 41 - year - old female who experienced a sensation of blockage in her right ear. On examination, the right tympanic membrane appeared intact but was bulging. Audiometric tests confirmed moderate conductive hearing loss in the right ear. Radiological studies revealed a soft tissue mass in the right middle ear and mastoid air cells. During middle ear exploration under general anaesthesia, a smooth, pale, non - pulsatile sessile mass was identified and successfully excised. Histopathological analysis of the mass showed polypoidal severe acute inflammatory granulation tissue with fibrinous exudates. This case underscores the importance of exploratory tympanotomy for direct diagnosis and management, highlighting its crucial role in addressing complex middle ear conditions when conservative methods fall short.*

Keywords: Middle ear, Exploratory tympanotomy, Unilateral conductive hearing loss, Granulation tissue

1. Introduction

Middle ear masses can be diagnosed through a range of differential diagnoses depending on the symptoms presented by the patient. While initial diagnoses may be based on the examination, audiometric tests, or imaging studies, a definitive diagnosis is achieved through histopathological analysis. The use of minimally invasive endoscopic techniques for examining the middle ear cavity has increasingly supplemented traditional surgical methods.

2. Case Report

A 41 - year - old woman with an unremarkable medical history reported persistent sensation of blockage in her right ear for the past 3 weeks, more pronounced in the last 10 days. She had no previous history of trauma, exposure to loud noise, or any family history of hearing loss. Upon physical examination, the right external auditory canal appeared normal, but the tympanic membrane was bulged. Tuning fork test revealed conductive hearing loss on right side. Audiometric testing confirmed moderate conductive hearing loss in the right ear (Fig 1). Tympanometry indicated a Type B tympanogram for the right ear (Fig2).

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Age: 41

Date of birth: 23-05-1983

Report Date: 26-06-2024

Tester: SAJAN S

Report Comments:

Audiometry:

Tuning Fork Tests:

Weber Test: Lateralized to right ear.

Rinne Test: Negative in right ear, Positive in left ear.

Pure Tone Audiometry:

Right ear: Moderate conductive hearing loss. (High frequency BC thresholds were reduced)

Left ear: Minimal hearing loss.

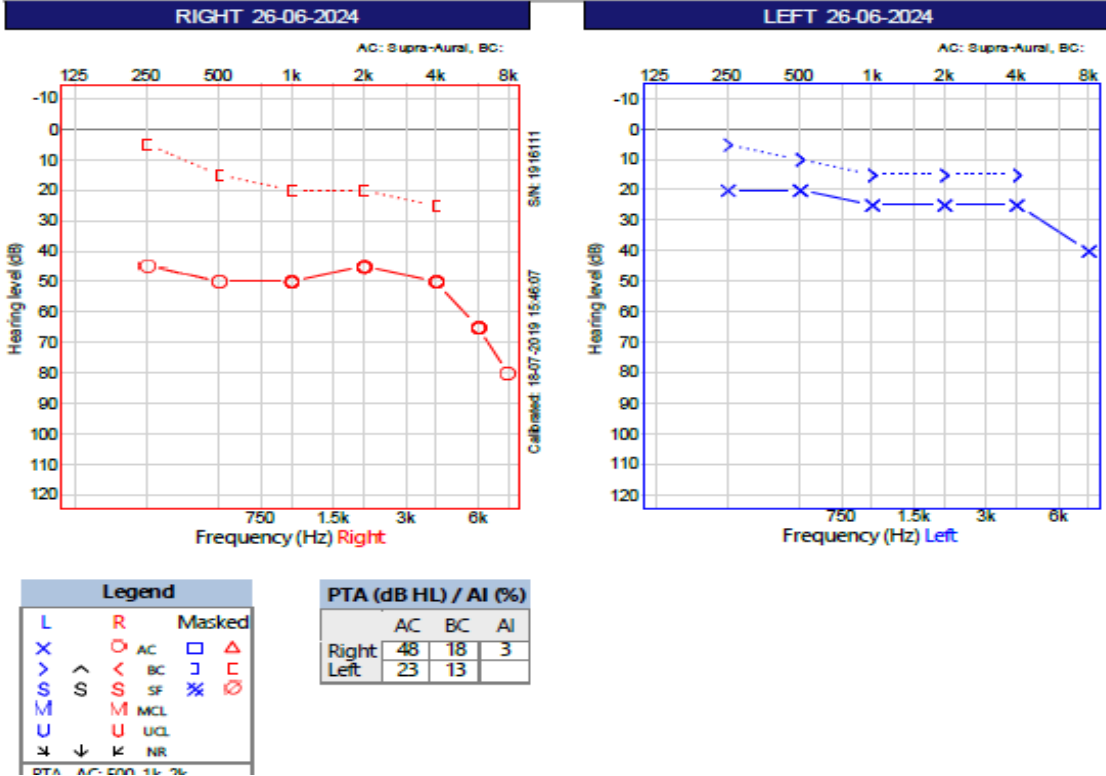


Figure 1: Pre - operative pure tone audiometry

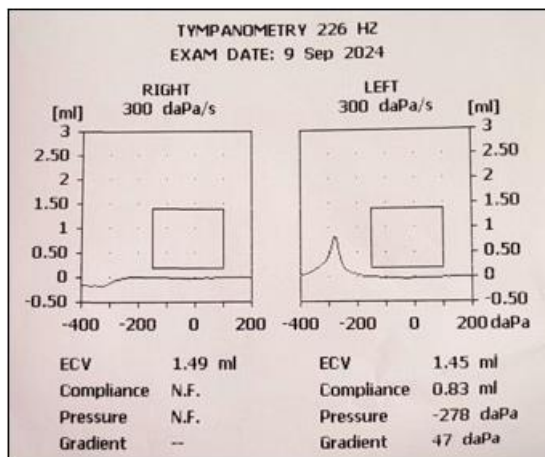


Figure 2: Pre - operative tympanogram

A high resolution computed tomography scan of temporal bones was done which revealed soft tissue completely filling the right epitympanum, mesotympanum, hypotympanum. No ossicular erosions. Soft tissue / fluid completely filling the mastoid air cells - otomastoiditis (Fig 3a, b).

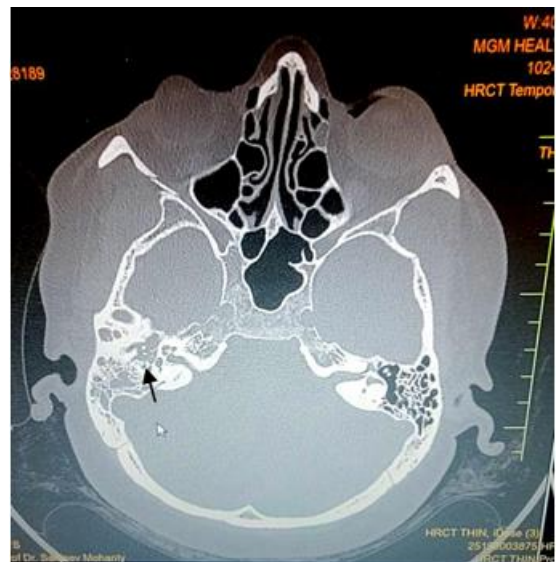


Figure 3: (a) High resolution computed tomography image showing soft tissue density in the right middle ear cavity - axial cut

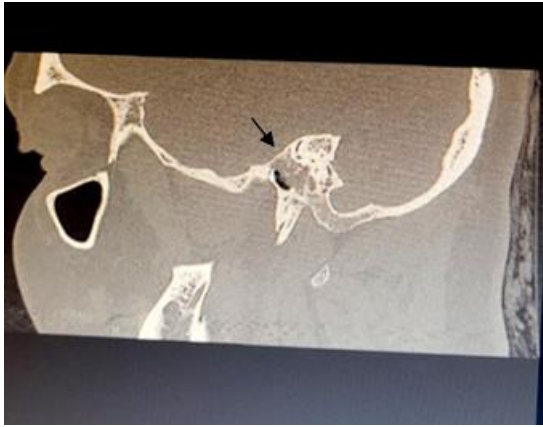


Figure 3: (b) High resolution computed tomography image showing soft tissue density in the right middle ear - sagittal

An endoscopic exploratory tympanotomy was planned as the surgical procedure. During procedure, after elevating tympanomeatal flap, a smooth, pale, non-pulsatile sessile mass was found to occupy the middle ear cavity and enveloping the ossicles. Mass was excised in its entirety with meticulous microdissection and sent for histopathological examination. After removal of mass, ossicular mobility and continuity was assessed and found to be intact. Chorda tympani nerve was identified and preserved, and the round window reflex was tested and found to be normal (see Figures 4 and 5).



Figure 4: Intraoperative finding - smooth pale mass seen filling the middle ear cavity

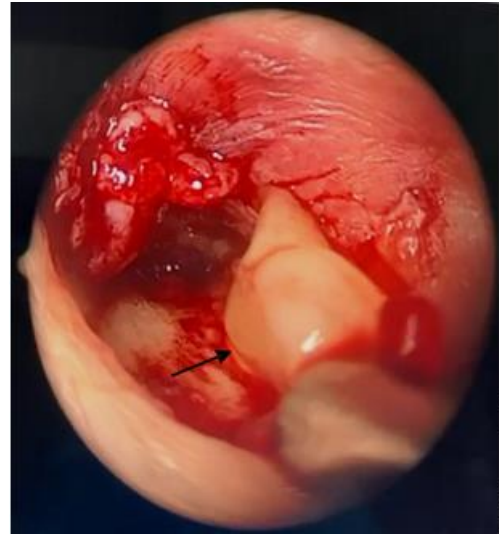


Figure 5: Removal of smooth sessile mass

The histopathological examination of mass occupying the middle ear cavity identified it as polypoidal severe acute inflammatory granulation tissue with fibrinous exudates.

Two months after the procedure, follow-up audiometry demonstrated a reduction in air-bone gap on the right side and enhanced hearing sensitivity and tympanogram (see Fig 7, 8). Additionally, patient reported symptomatic relief compared to preoperative period, leading to an overall improvement in their quality of life.

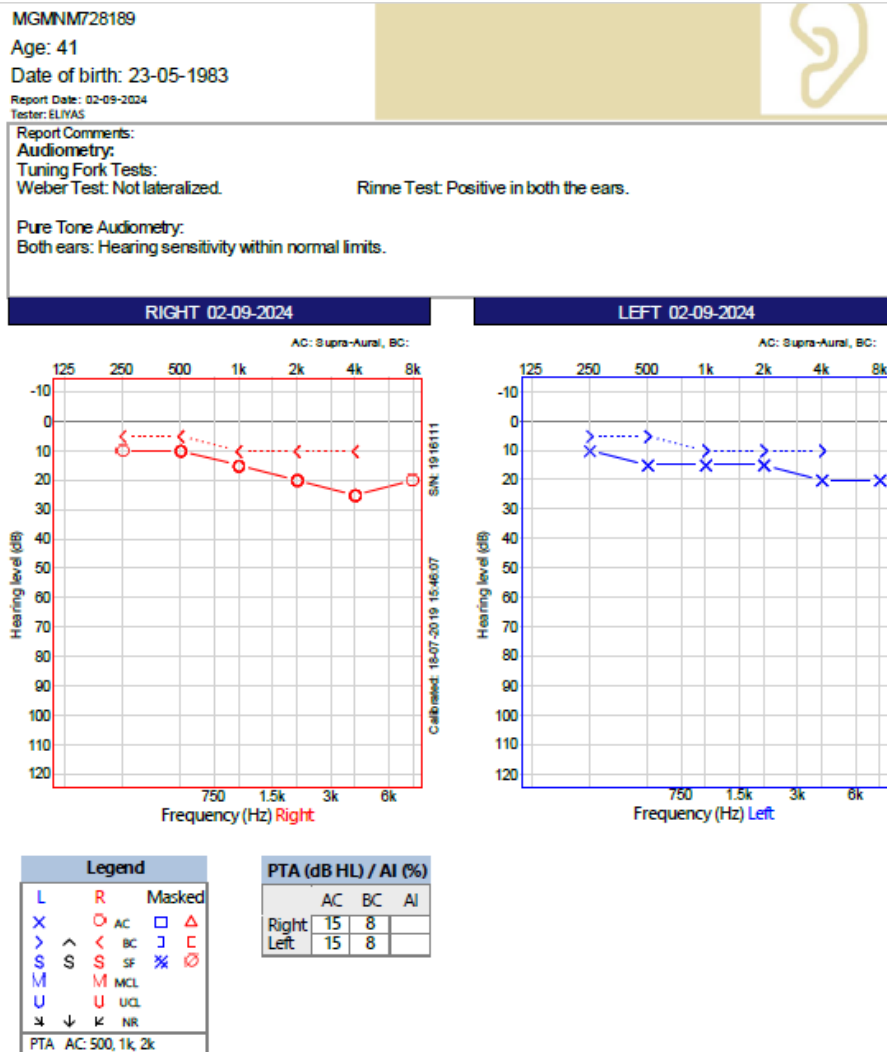


Figure 6: Post- procedure follow- up audiometry after 2 months showing enhanced hearing sensitivity

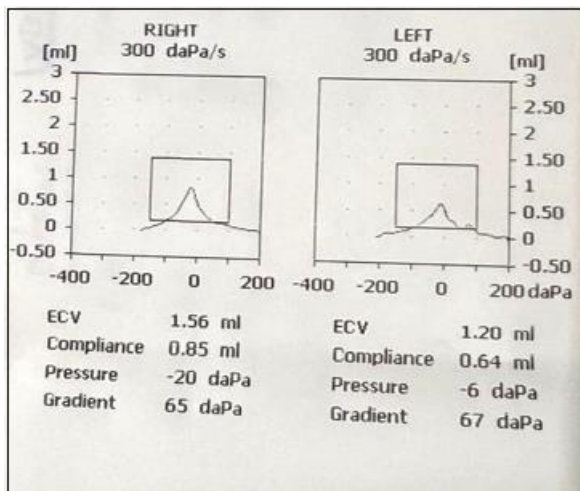


Figure 7: Post procedure tympanogram after 2 months

3. Discussion

This case report details an uncommon intraoperative finding in a patient with unilateral conductive hearing loss, which revealed a rare middle ear lesion not suspected preoperatively. The discovery underscores the importance of comprehensive preoperative evaluation and adaptability during surgery

Unilateral hearing loss with an intact tympanic membrane can result from conditions such as inflammation, trauma, congenital anomalies of the ossicles, otosclerosis, congenital middle ear cholesteatoma, oval window atresia, superior semicircular canal dehiscence, middle ear osteoma, congenital stapedial footplate fixation, middle ear adenoma, or congenital ossification of the middle ear tendons¹. Inflammation is a significant cause of conductive hearing loss². Short duration unilateral conductive hearing loss with a intact tympanic membrane may be linked to any of these conditions. While anatomical location and associated clinical features can offer diagnostic clues, many benign middle ear lesions present with nonspecific imaging findings. Radiological opacification of the middle ear and mastoid can be attributed to a variety of inflammatory, neoplastic, vascular, fibro - osseous, or traumatic changes³. Benign middle ear masses include paragangliomas, vascular malformations, facial nerve tumors, aberrant arteries, variations in the jugular bulb and carotid artery, acquired cholesteatoma, and chronic inflammatory middle ear or mastoid disease. For cases of conductive hearing loss with an intact tympanic membrane, endoscopic ear surgery can be effective for a definitive diagnosis⁴.

In this patient, Exploratory tympanotomy was carried out to directly evaluate and manage the suspected middle ear condition. During surgery, inflammatory granulation tissue

along with pale mass was identified and excised in toto, preserving the ossicular chain. This type of granulation tissue, resulting from the sequelae of acute inflammation, can develop in the middle ear cleft due to various factors such as acute otitis media, recent surgery, or trauma. Granulation tissue was extensive, filling a substantial part of the middle ear cavity. This tissue likely played a significant role in conductive hearing loss by disrupting normal function of ossicular chain and possibly obstructing sound transmission.

Benign middle ear lesions include various local and systemic disorders that impact temporal bone. Despite their benign nature histologically, these lesions can lead to considerable localized damage leading to altered physiology of hearing. Prompt diagnosis and intervention are essential to avoid complications such as auditory, vestibular, and facial nerve dysfunction. Preoperative clinical assessment is essential for selecting the most suitable surgical approach for patients with otologic conditions. However, despite thorough clinical and radiological evaluations, clinicians may still face uncertainty regarding the diagnosis. In such cases, exploratory tympanotomy offers a valuable, safe, and minimally invasive option. This procedure enables direct visualization of the middle ear, allowing for the identification, confirmation, and often treatment of underlying pathological conditions⁵.

4. Conclusion

Addressing severe acute granulation tissue in the middle ear, which causes unilateral conductive hearing loss while tympanic membrane remains intact, presents distinct diagnostic and treatment challenges. This case highlights the vital role of exploratory tympanotomy in both diagnosing and managing such conditions. Surgical procedure allows direct visualization and removal of the granulation tissue, thereby restoring middle ear function and enhancing the patient's hearing. This case emphasizes the necessity for a comprehensive and systematic approach to diagnosing and treating intricate middle ear disorders, demonstrating that direct surgical intervention is essential when non-invasive techniques fall short. It is pertinent to state only after

conservative means fail, surgical treatment is recommended

Informed Consent

Prior to drafting the paper, written informed consent was obtained from the patient, guaranteeing the anonymity of all personal information. This consent facilitated the inclusion of anonymized patient details in the article.

Declaration of Competing Interest

None

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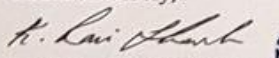
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Thank you for submitting the above article write up for a possible publication in an indexed journal. This proposal was reviewed by IEC, on 02/09/2024. The Institutional Ethics Committee approved the write up for journal submission as there was no evidence of plagiarism and the subject in the study were accessed from MRD.

Yours sincerely,


Dr. Ravi Shankar Kannan
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