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Case Report

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Spontaneous CSF Otorrhea Masquerading as Middle Ear Effusion: A Case Report

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ABSTRACT

Spontaneous cerebrospinal fluid (CSF) otorrhea is a rare but important differential diagnosis in cases of persistent middle ear effusion. We report a case of a 45-year-old female who presented with persistent aural fullness and hearing loss in the right ear immediately following an airplane flight. She was initially diagnosed with middle ear effusion and underwent myringotomy with grommet ventilation tube insertion. However, the patient continued to experience profuse watery otorrhea for two months postoperatively. Subsequent computed tomography of the temporal bone confirmed a CSF leak from a defect in the tegmen tympani near the anterior epitympanum. The patient underwent successful endoscopic CSF otorrhea repair under general anaesthesia. Three months postoperatively, the patient's hearing improved, and her aural symptoms resolved. This case highlights the importance of considering spontaneous CSF leaks in cases of sudden-onset conductive hearing loss, even in the absence of trauma or prior surgical history.

Introduction

Cerebrospinal fluid (CSF) otorrhea is an uncommon condition that can present as a persistent middle ear effusion, often leading to misdiagnosis [1]. CSF otorrhea can occur due to skull base fracture, tumors, infections, congenital anomalies, or operative trauma. Spontaneous cases are exceedingly rare; in a study by B.J. Ferguson et al., only 29 cases have been reported in the literature [2]. Many patients develop suspicious clear otorrhea only after insertion of a tympanostomy tube [4]. Spontaneous CSF otorrhea typically results from defects in the temporal bone, most commonly at the tegmen tympani or tegmen mastoideum [3]. If undiagnosed or left untreated, it may predispose patients to serious complications such as meningitis [3]. Here, we present a case of spontaneous CSF otorrhea initially diagnosed as middle ear effusion, ultimately requiring surgical repair.

Case Presentation

A 51-year-old female with no history of head trauma or previous otologic surgery presented with a sense of ear fullness and hearing loss in the right ear following a flight journey. She reported a sudden snap-like

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sound in the right ear during landing, after which she experienced persistent ear fullness. Otoscopic examination revealed a partially retracted tympanic membrane with suspected middle ear effusion. Audiological evaluation indicated conductive hearing loss (Figure 1). The subsequent tympanogram showed increased impedance with a B-type curve, indicating middle ear fluid. The patient was prescribed medication for middle ear effusion, which did not resolve the symptoms. After two weeks of treatment, pure tone audiometry of the right ear indicated a conductive hearing loss of 40 dB, with an air-bone gap of 32 dB. The patient weighed 70 kg and had a body mass index of 27.7 kg/m². She had no notable medical or family history of similar conditions.

She subsequently underwent myringotomy with tympanostomy tube insertion in the right ear and was discharged the same day. At the six-week follow-up, she reported persistent watery discharge from the right ear. The discharge was clear and profuse.

To further investigate the otorrhea, high-resolution computed tomography (HRCT) was performed. The HRCT scan revealed a sizable bony defect extending anteromedially from the anterior wall to the roof of the right epitympanum [5]. The patient was diagnosed with spontaneous CSF otorrhea and subsequently underwent endoscopic CSF leak repair under general anesthesia (Figure 2). To identify the leak site, intrathecal fluorescein dye was injected, which helped localize the defect on the tegmen tympani (Figure 3). A multilayer repair technique utilizing lobular fat, temporalis fascia graft, and fibrin glue was employed to seal the defect [5].

The postoperative period was uneventful, with complete resolution of otorrhea. At three-month follow-up, the patient reported significant improvement in hearing, and audiological assessment confirmed resolution of conductive hearing loss (Figure 4). The patient remained asymptomatic, with no recurrence of CSF leakage or other aural symptoms.

Discussion

Spontaneous cerebrospinal fluid (CSF) otorrhea is often underdiagnosed due to its nonspecific

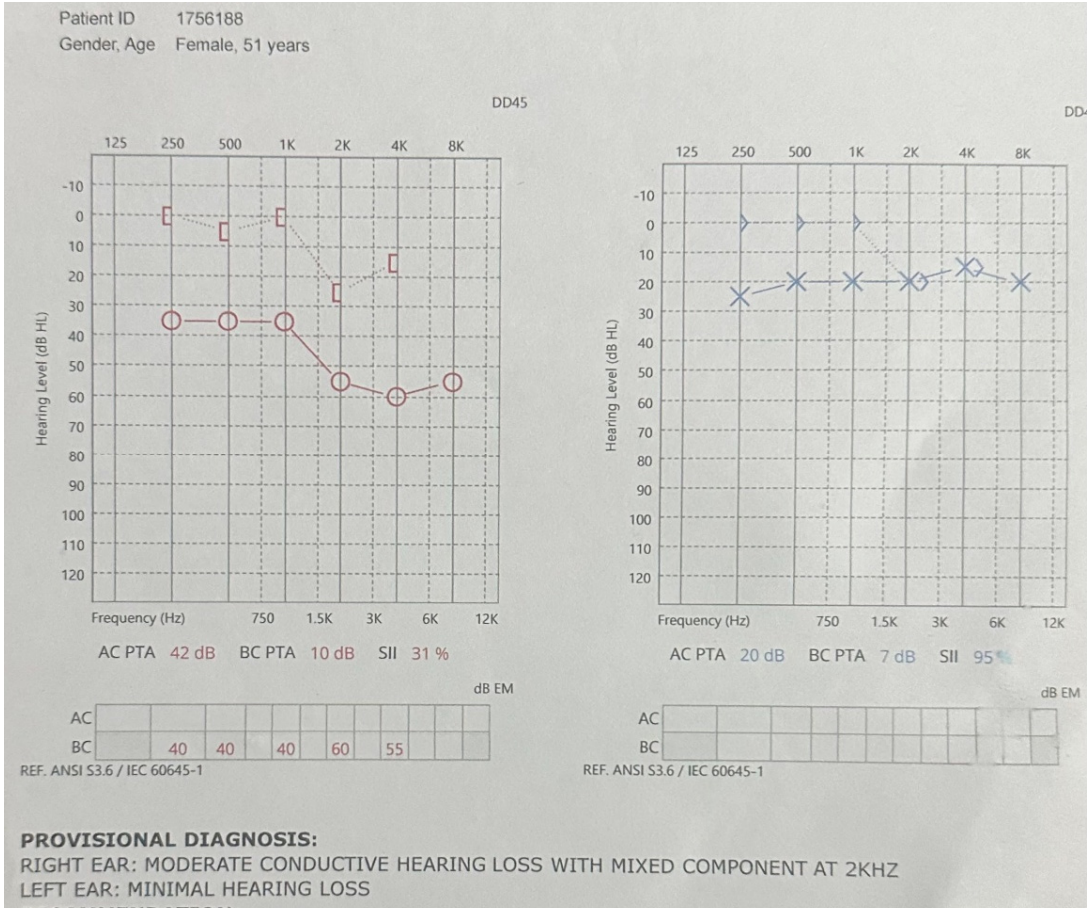

Fig. 1. Preoperative audiogram showing conductive hearing loss in the right ear.

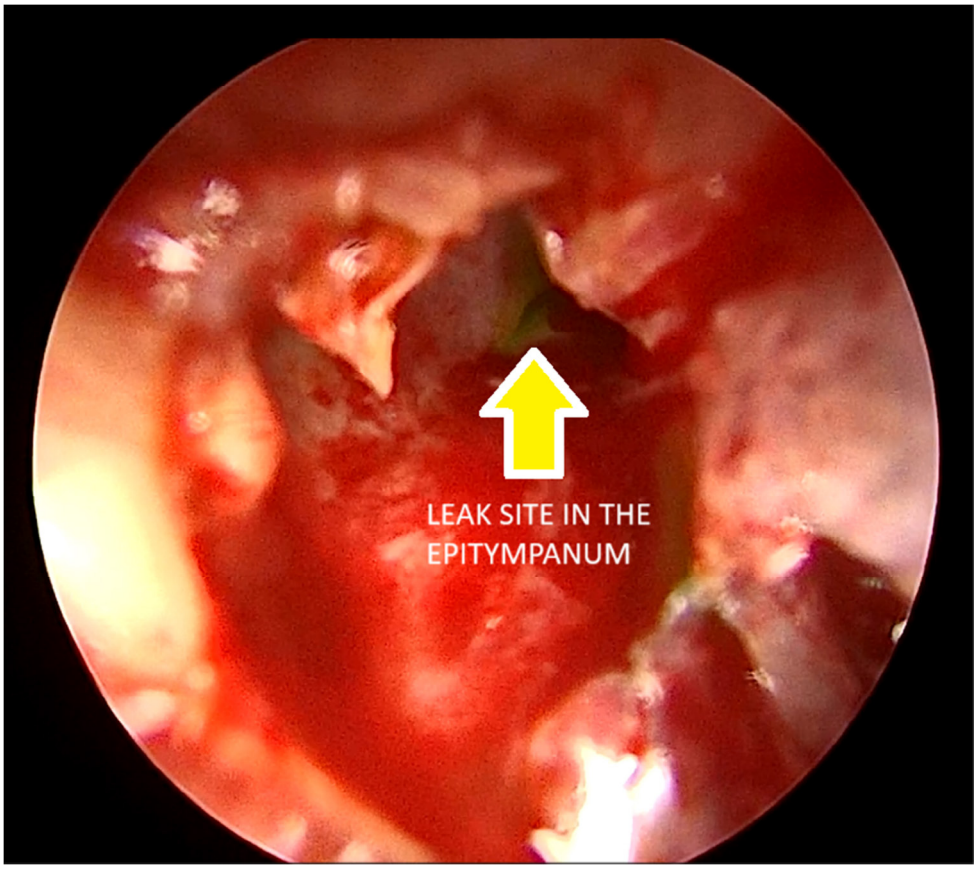

Fig .2. Intraoperative endoscopic view showing the CSF leak site at the tegmen tympani.

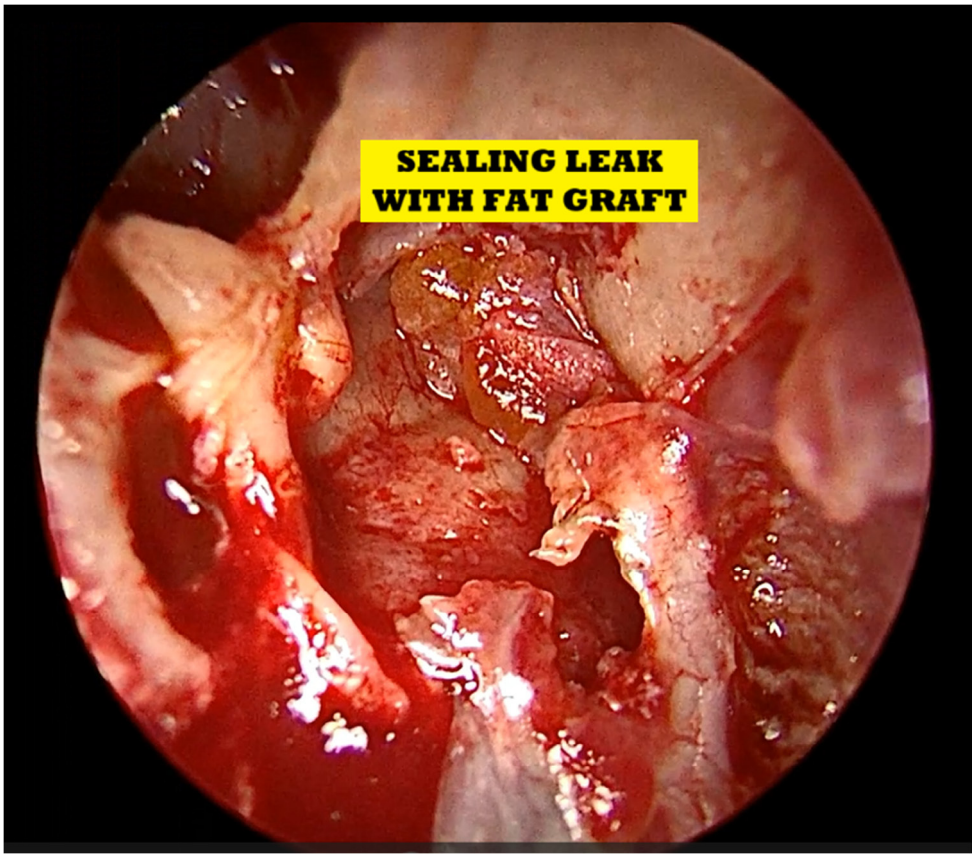

Fig. 3. Endoscopic sealing of the leak site

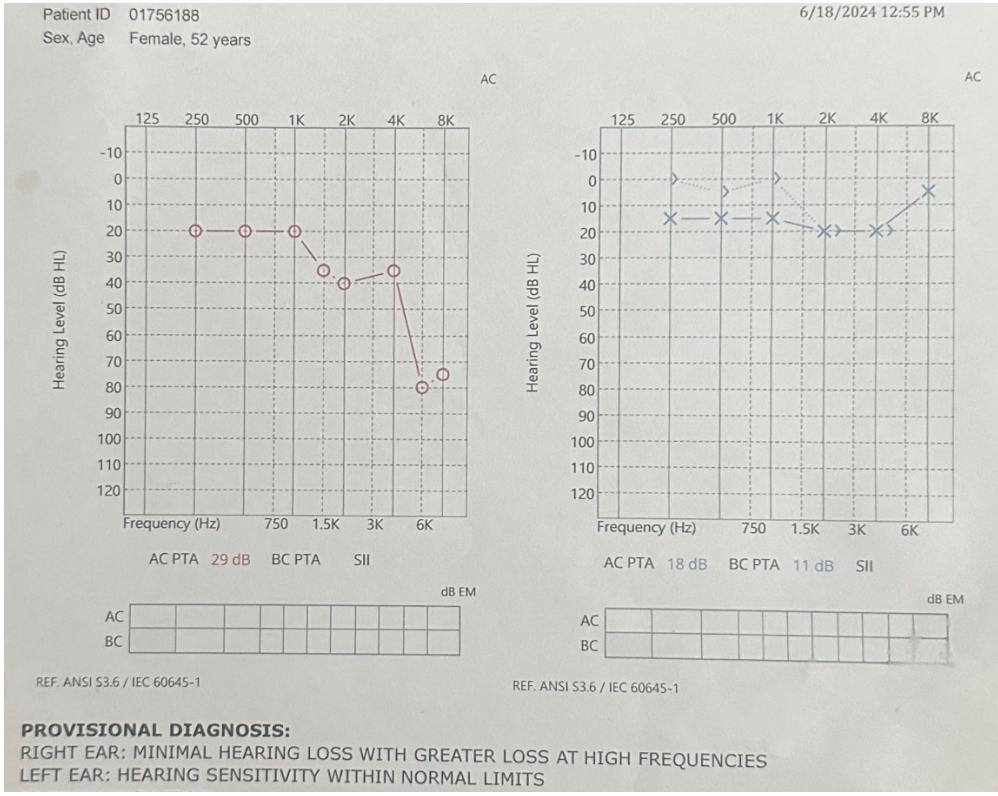

Fig. 4. Postoperative audiogram demonstrating hearing improvement.

presentation. It is uncommon and frequently not identified until a myringotomy or tympanostomy tube is placed. While middle ear effusion is a common otologic finding, persistent clear otorrhea following myringotomy should raise suspicion of a CSF leak [6]. High-resolution imaging, particularly CT cisternography, is invaluable in identifying the site of leakage [7]. The sensitivity of CT cisternography ranges between 85–92% in patients with active leaks and approximately 40% in those with inactive leaks [8].

As per Kutz et al. [9], the most common defect sites are located over the tegmen mastoideum and tegmen tympani, which corroborates with the findings in our case. Surgical intervention remains the mainstay of treatment, with endoscopic techniques offering a minimally invasive approach and successful outcomes [7]. In contrast to our case report, a study by N.E. Brown et al. states that a middle fossa approach alone, or in combination with a transmastoid approach, should be considered in most cases [10].

Conclusion

This case underscores the importance of considering CSF otorrhea in patients with unexplained, persistent middle ear effusion, especially in the absence of infection or trauma. It is more common in women than in men [11]. Early diagnosis and surgical intervention are crucial in preventing complications and ensuring optimal patient outcomes. Surgery is the preferred mode of management, as non-iatrogenic, non-traumatic spontaneous CSF otorrhea can result in life-threatening complications such as meningitis [5, 12]. To ensure proper surgical closure and avoid recurrence, preoperative localization of the defect through imaging is critical [13].

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this article.

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Conflict of Interests

The authors have no conflict of interest to declare.

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