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CASE REPORT

REFRACTORY VESTIBULO-AUDITORY SYMPTOMS IN EARLY-ONSET MENIERE'S DISEASE WITH COEXISTING SINONASAL INFLAMMATION: A CASE REPORT

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Abstract

Meniere's disease is a chronic disorder of the inner ear characterized by episodic vertigo, fluctuating sensorineural hearing loss, tinnitus, and aural fullness. The condition predominantly affects middle-aged adults; early-onset presentations are rare and often misdiagnosed, particularly when sinonasal pathology coexists.We report the case of an 18-year-old male presenting with persistent bilateral tinnitus, progressive hearing loss, recurrent vertigo attacks, nausea, imbalance, headache, facial pain, and ear discomfort for more than one year. Despite prolonged medical therapy including betahistine, cinnarizine, prochlorperazine, clonazepam, analgesics, and multivitamin supplementation, symptoms persisted and significantly impaired quality of life.Computed tomography of the paranasal sinuses revealed mucosal thickening and partial opacification of the maxillary and ethmoid sinuses, suggestive of chronic sinusitis with possible Eustachian tube dysfunction. Clinical findings were consistent with early-onset Meniere's disease.Given poor response to pharmacological therapy, the patient was advised bilateral myringotomy with ventilation tube placement, followed by intratympanic steroid administration to reduce inner ear inflammation and stabilize vestibular symptoms.This case highlights the diagnostic complexity of early-onset Meniere's disease when associated with chronic sinonasal inflammation. Early multidisciplinary evaluation and targeted intratympanic therapy may improve symptom control and prevent long-term auditory-vestibular disability.

Keywords: *Meniere's disease; Vertigo; Tinnitus; Hearing loss; Intratympanic steroid therapy*

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Introduction

Meniere's disease (MD) is a chronic and debilitating disorder of the inner ear characterized by episodic vertigo, fluctuating sensorineural hearing loss, tinnitus, and aural fullness.[1] The underlying pathology is believed to involve endolymphatic hydrops, resulting in abnormal fluid dynamics within the cochlea and vestibular system.[2] Although the disease predominantly affects individuals between 30 and 60 years of age, early-onset MD is rare and frequently underdiagnosed due to overlapping symptoms with sinusitis, vestibular migraine, and chronic otitis media.[3]Sinonasal inflammation and Eustachian tube dysfunction are known contributors to middle ear pressure dysregulation, which can exacerbate vestibular symptoms.[4] Chronic sinusitis may therefore play a contributory role in the pathogenesis or clinical severity of MD, especially in young patients.[5] This report describes an unusual presentation of MD in an 18-year-old male with concurrent sinonasal pathology and persistent symptoms refractory to standard medical therapy.

Case Report

An 18-year-old male presented with a one-year history of progressive auditory and vestibular complaints. His initial symptoms included intermittent headache and facial pain, followed by bilateral tinnitus described as constant ringing in both ears. Over subsequent months, the patient developed fluctuating hearing loss, episodic vertigo lasting 2–5 minutes, nausea without vomiting, and progressive loss of balance.Vertigo attacks occurred predominantly in the evening or late at night and were associated with severe discomfort and anxiety. The patient reported that tinnitus intensity often triggered headaches and ear pain. He denied a history of head trauma, ototoxic drug use, or family history of vestibular disorders (Figure 1).

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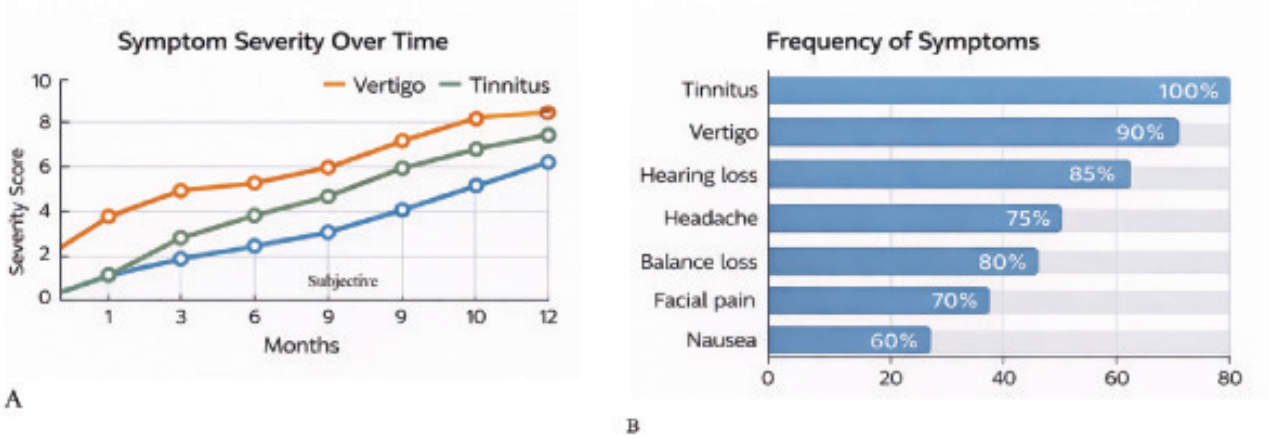

Figure 1: *(A). Progressive increase in vertigo, tinnitus, and hearing loss severity over 12 months before surgical intervention. Symptom severity was graded on a 10-point scale, demonstrating a gradual worsening of vestibulo-auditory dysfunction despite prolonged pharmacological therapy. (B). Distribution of reported clinical symptoms in the patient with early-onset Meniere's disease, highlighting tinnitus as the most prevalent symptom, followed by vertigo, hearing loss, headache, balance impairment, facial pain, and nausea.*

Otoscopy revealed intact tympanic membranes with mild bilateral retraction. Audiological assessment demonstrated mild-to-moderate bilateral sensorineural hearing loss. Vestibular testing revealed postural instability and a positive Romberg sign.Computed tomography of the paranasal sinuses showed mucosal thickening and partial opacification of the maxillary and ethmoid sinuses with narrowing of the nasal cavity, suggestive of chronic sinusitis. Subtle thickening around the Eustachian tube region was noted, raising suspicion of impaired middle ear ventilation.

Computed tomography (CT) of the paranasal sinuses was performed to evaluate the underlying cause of the patient's persistent facial pain, nasal obstruction, and auditory symptoms. Axial and coronal sections demonstrated mucosal thickening and partial opacification of the bilateral maxillary and ethmoid sinuses, consistent with chronic rhinosinusitis. Narrowing of the nasal cavity was also observed, suggesting impaired sinonasal ventilation.Additionally, subtle soft tissue changes were noted around the Eustachian tube region, raising suspicion of Eustachian tube dysfunction and compromised middle ear pressure regulation. Although the inner ear structures are not optimally visualized on CT, these findings collectively support a potential association between chronic sinonasal inflammation and the patient's auditory and vestibular manifestations, including tinnitus, vertigo, and hearing loss (Figure 2).

The patient underwent extended pharmacological management, which included betahistine (Serc),

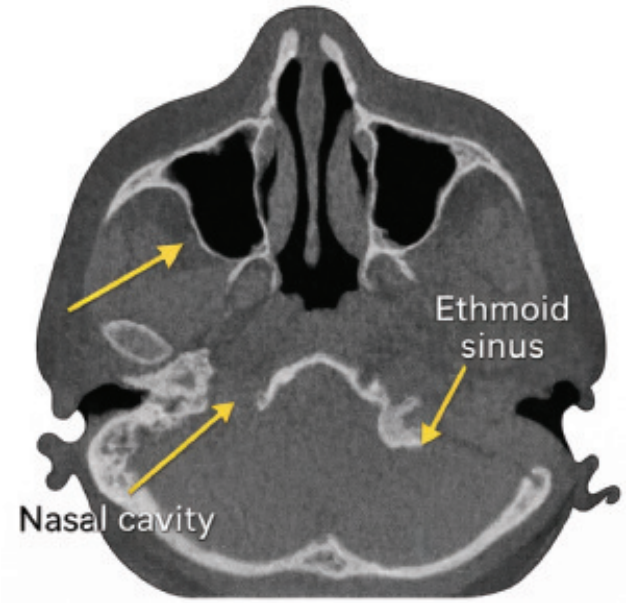

Figure 2: *Axial computed tomography scan of the paranasal sinuses demonstrating mucosal thickening and partial opacification of the bilateral maxillary and ethmoid sinuses with narrowing of the nasal cavity. These findings are consistent with chronic rhinosinusitis and possible Eustachian tube dysfunction, which may contribute to auditory and vestibular symptoms.*

gradually titrated from low to high doses; prochlorperazine (Stemetil); clonazepam drops (Revotril); cinnarizine (Stugeron); paracetamol combined with caffeine (Panadol Extra); and multivitamin supplementation. Although the patient adhered to the prescribed regimen, therapeutic response was limited and largely transient. Persistent vertigo, tinnitus, and hearing impairment continued

to affect daily functioning, and prolonged use of sedative agents raised clinical concerns regarding potential dependence and diminished long-term efficacy (Figure 3).

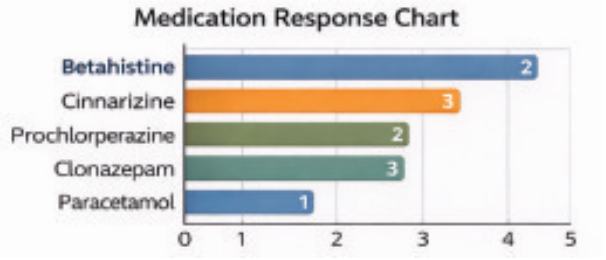

Figure 3: *Subjective effectiveness scores (0–5) of previously prescribed medications in controlling vestibular and auditory symptoms. Betahistine, cinnarizine, and clonazepam provided only partial and temporary relief, while paracetamol and multivitamin supplementation showed minimal clinical benefit.*

Given the refractory nature of the patient's symptoms and the inadequate response to prolonged pharmacological therapy, the otolaryngology consultant recommended bilateral myringotomy with ventilation tube insertion, followed by intratympanic corticosteroid administration. This minimally invasive procedure enables the direct delivery of anti-inflammatory medication to the inner ear, while also improving middle-ear aeration and pressure regulation. The primary objective of this intervention is to suppress labyrinthine inflammation, restore endolymphatic homeostasis, and thereby reduce the frequency and severity of vertigo attacks, tinnitus, and hearing fluctuations. Intratympanic steroid therapy has demonstrated favourable outcomes in patients with treatment-resistant Meniere's disease, making it an appropriate next-line therapeutic option in this complex early-onset case (Figure 4 and Table 1).

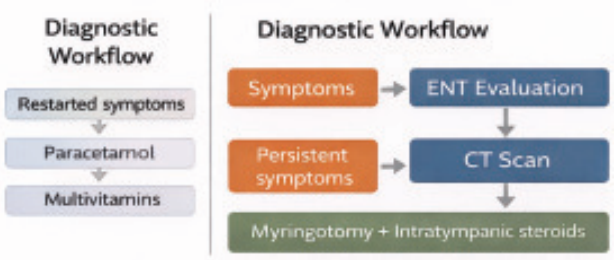

Figure 4: *Diagnostic and management pathway for early-onset refractory Meniere's disease, illustrating progression from initial symptom presentation through ENT evaluation, CT imaging, persistence of symptoms despite medical therapy, and eventual escalation to bilateral myringotomy with intratympanic steroid administration.*

Table I

Clinical Profile, Diagnostic Findings, and Management Summary

Category	Findings
Patient demographics	18-year-old male
Chief complaints	Persistent bilateral tinnitus, fluctuating hearing loss, vertigo (2–5 min episodes at night), nausea, headache, facial pain, ear pain, imbalance
Symptom duration	>12 months
ENT findings	Mild tympanic membrane retraction, nasal congestion, facial tenderness
Audiology	Bilateral sensorineural hearing loss (mild–moderate)
Vestibular assessment	Postural instability, positive Romberg
CT scan findings	Maxillary and ethmoid sinus opacification, narrowed nasal cavity, suspected Eustachian tube dysfunction
Initial medications	Betahistine, Prochlorperazine, Clonazepam drops, Cinnarizine, Paracetamol, Multivitamins
Response to therapy	Partial and temporary relief only
Provisional diagnosis	Early-onset Meniere's disease with chronic sinonasal inflammation
Definitive management	Bilateral myringotomy with ventilation tube insertion and intratympanic steroid therapy

Discussion

This case highlights the considerable diagnostic difficulty of early-onset Meniere's disease when accompanied by chronic sinonasal pathology.[6] The presence of persistent sinus inflammation likely contributed to Eustachian tube dysfunction, resulting in impaired middle ear ventilation and abnormal pressure dynamics.[7] These changes may aggravate endolymphatic hydrops and intensify vestibular symptoms, thereby masking the classical presentation of Meniere's disease and delaying accurate diagnosis.[8] The patient's poor and temporary response to conventional pharmacological agents, including vestibular suppressants and antiemetics, emphasizes the limitations of long-term medical therapy in refractory cases.[9] Recurrent vertigo, persistent tinnitus, and progressive hearing impairment despite adherence to treatment support the necessity for early escalation to procedural interventions.[10] This clinical course reinforces the importance of recognizing treatment resistance as an indication for alternative therapeutic strategies.

Intratympanic steroid injection represents a targeted therapeutic modality that delivers anti-inflammatory medication directly to the inner ear while minimizing systemic side effects.[11] Although its short-term efficacy has been documented, the contribution of concomitant sinus pathology to disease progression and therapeutic response remains insufficiently explored.[12] Further research is required to elucidate the mechanistic link between chronic sinonasal inflammation and inner ear disorders, particularly in young patients presenting with atypical or early-onset Meniere's disease.

Conclusion

Early-onset Meniere's disease accompanied by chronic sinonasal inflammation is difficult to diagnose because the symptoms of sinus disease—such as facial pain, nasal blockage, and headache can hide or imitate inner ear disorders. The failure of prolonged pharmacological therapy indicates that conservative treatment alone may be insufficient in refractory early-onset Meniere's disease. Early intervention may therefore improve long-term outcomes and quality of life in young patients with complex presentations.

Declarations

Ethical Approval and Consent to Participate

Ethical approval was obtained from the institutional review board of the Ala-Too International University, IRB / Ethics Committee approval numberERC/AIU/ENT/2025/014. Written informed consent was obtained from the patient and his legal guardian for participation in this case report and for the use of anonymized clinical data and imaging.

Consent for Publication

Written informed consent was obtained from the patient and his legal guardian for the publication of this case report and the accompanying images. All identifying information has been removed to ensure patient confidentiality.

Availability of Data and Materials

All data generated or analysed during this study are included in this published article.

Competing Interests

The author declares that they have no competing interests.

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Authors' Contributions

The author was responsible for study conception, data interpretation, manuscript preparation, and final approval of the version to be published.

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Use of Artificial Intelligence

Artificial intelligence tools (Grammarly and Open AI) were used for language editing and structuring of the manuscript under the author's supervision. All scientific content, interpretations, and conclusions are the responsibility of the author.

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