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Bilateral Ménière's disease and vestibular migraine: diagnostic overlap, otolith electrophysiology findings, and multimodal treatment response

Laryssa Byanca Cruz Santos, Anastácia Soares Vieira, João Lucas Fonseca de Almeida, Ednaldo Bríssio da Silva, Matheus Rodrigues Nóbrega, Jonas Oliveira Santana Neto, Giovanna de Oliveira Sá Costa, Carlos Kasuo Tagushi, Isabelle Caroline Alves Batista de Jesus

Federal University of Sergipe, Aracaju, Sergipe, Brazil

Laryssa Byanca Cruz Santos
larybya404@gmail.com

Introduction
Bilateral Ménière's Disease (BMD) and Vestibular Migraine (VM) are underdiagnosed vestibular disorders with overlapping phenotypes — episodic vertigo, auditory symptoms, and emotional triggers. VEMPs are critical for characterizing otolith dysfunction and supporting dual diagnosis. This case fulfills criteria for both BMD and VM, confirmed by bilateral otolith dysfunction on cVEMP and oVEMP, with therapeutic benefit through multimodal management.

Case presentation
A 55-year-old female caregiver presented with rotatory vertigo for over 10 years, with near-daily crises lasting minutes in recent months. She reported bilateral progressive hearing loss (hearing aid user), persistent bilateral tinnitus, aural fullness, auditory fluctuation, and vertigo worsening under emotional stress. Personal migraine history was noted. She denied comorbidities, smoking, or alcohol use. Prior medications: betahistine 48 mg/day, hydrochlorothiazide 50 mg/day (2×25 mg), duloxetine 30 mg/day. Otoscopy: normal bilaterally. Frenzel: mild left-beating nystagmus. Brandt-Daroff: objectively positive (clockwise torsional and left geotropic nystagmus). Caloric testing: left vestibular hypofunction (PD=15%). Smooth pursuit type I. cVEMP (500 Hz): bilaterally prolonged P13/N23 latencies (P13 up to 17.7 ms), IR ≤40% — bilateral saccular-cervical dysfunction. oVEMP (500 Hz): bilaterally prolonged N10 latencies (up to 13.3 ms), IR=30%, lower left amplitudes — bilateral utricular-ocular involvement. Temporal bone CT and mastoid MRI: normal. Diagnosis: BMD with VM (ICD R42). At initial visit: duloxetine replaced by venlafaxine 75 mg/day; betahistine increased to 48 mg every 8 hours (144 mg/day); hydrochlorothiazide reduced to 25 mg/day; vestibular rehabilitation, psychological support, and a headache-vertigo diary initiated. At 3-month follow-up: vertigo VAS 8 7/10; crises persisting >3×/week; DHI 70 (severe); structured abortive protocol established. At 6 months: significant improvement in migraine frequency and vertigo intensity.

Discussion
Shared pathophysiological mechanisms — endolymphatic hydrops and trigeminovascular sensitization — may underlie BMD-VM co-occurrence. Bilateral VEMP abnormalities provided otolith pathway evidence beyond caloric testing, reinforcing BMD despite normal neuroimaging. Emotional triggers and migraine history fulfilled ICHD-3 VM criteria. Venlafaxine, with established VM prophylactic efficacy, replaced duloxetine. Betahistine escalation to 144 mg/day aligns with evidence favoring higher doses in Ménière's disease; diuretic reduction minimized the hypotension. The modest VAS gain (8 7/10) and DHI of 70 at 3 months reflect dual-diagnosis complexity; the 6-month trajectory confirms cumulative multimodal benefit. Limitations include absence of electrocochleography and gadolinium-enhanced MRI.

Conclusion
BMD and VM may coexist, amplifying vestibular disability. VEMPs are essential for otolith characterization. Combined pharmacological treatment and vestibular rehabilitation yield meaningful improvement.

Keywords:
Ménière's disease
Vestibular migraine
VEMP
Dizziness
Otolith dysfunction

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