

Unsteady Influence

Meniere's disease can result in an erratic and unreliable vestibular system.

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As the command center for our sense of movement and balance, the vestibular system is responsible for countless human actions. It's also the unifying system that integrates and coordinates information about head movement that's received from other systems. When the vestibular mechanism malfunctions, the impact can be widespread.

Such is the case with Meniere's disease, a disorder of the inner ear that causes episodes of vertigo, ringing in the ears (tinnitus), a feeling of fullness or pressure in the ears, and fluctuating hearing loss. Although Meniere's affects only about 0.2 percent of the population, its symptoms can wreak havoc.

UNDERSTANDING THE FACTS

A typical attack of Meniere's disease is preceded by fullness in one ear; hearing fluctuation or tinnitus may also precede an episode. The episode

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generally includes severe vertigo, imbalance, nausea and vomiting, and lasts 2 to 4 hours. Following a severe attack, most people feel exhausted and sleep for several hours.

The duration of symptoms is highly variable. Some people experience brief "shocks," while others feel constant unsteadiness. High sensitivity to visual stimuli is common¹, as is nystagmus—an involuntary jumping of the eyes.

Sudden falls are a disabling symptom of Meniere's, which can result in severe injury. A fall can occur without warning, called otolithic crisis of Tumarkin.² They're attributed to a sudden mechanical deformation of the otolith organs (utricle and saccule), which activates vestibular reflexes. Patients suddenly feel as if they're tilted or falling and rapidly try to reposition themselves.

Meniere's episodes may occur in clusters within a short period of time, or years can pass between episodes. Most people are free of symptoms or note mild imbalance and tinnitus between acute attacks. However, Meniere's disease may persist for 20 years or more, and severely impact people's lives. In acute episodes, the condition is one of the most debilitating diseases experienced by people who survive any illness.³

Although the underlying cause of Meniere's disease is generally unknown, it's often attributed to viral inner ear infections, a hereditary



predisposition and allergies. In addition, the condition is associated with hydrops—increased pressure in the affected ears. Hydrops occurs when the membranous labyrinth—a system that contains endolymph fluid—becomes dilated when pressure increases. This can happen when the drainage system is blocked, or if too much fluid is secreted within the ear.

Repeated attacks of Meniere's may kill hair cells in the inner ear. This process occurs over years and frequently results in unilateral functional deafness. Meniere's disease also eventually affects the other ear in roughly a third of cases. The hearing hair cells in the cochlea are the most sensitive to Meniere's. Vestibular hair cells seem more resilient, but there's also a slow decline in the caloric response in the diseased ear over time.⁴

Mechanical disruption of the inner ear is also likely. The saccule may dilate and adhere to the underside of the stapes footplate in later stages of the disease. This disruption and distortion of normal inner ear structures may result in the gradual onset of chronic unsteadiness, even when patients aren't having attacks. The periodic dilation and shrinkage of the utricle is a

reasonable explanation for periodic attacks of another inner ear disorder called benign paroxysmal positional vertigo (BPPV).

A rupture of the suspensory system for the membranous labyrinth can also create mechanical instability of the utricle and saccule, and contribute to chronic imbalance.

GAINING GROUND

Meniere's disease is a fluctuating vestibular condition that's difficult to manage. However, interventions can be effective and reduce the severity of symptoms.

- **Pharmacologic options.** Common medications for acute attacks include vestibular suppressants and anti-emetics, such as meclizine, diazepam and promethazine. Patients should take these medications for only brief periods, as they have significant long-term side effects, such as sedation.

To reduce the frequency of attacks between episodes, consider recommending a combination of a low salt diet and diuretics, such as triamterene/HCTZ and acetazolamide. Although preventive treatments are generally ineffective, combining acute and preventive treatments is

used in about 80 percent of Meniere's cases.

- **Invasive treatments.** The main role of invasive treatment is to manage intractable vertigo. A patient acquires fixed vestibular damage, in exchange for dramatic reduction in unpredictable attacks of dizziness and vomiting. Previously, clinicians favored more drastic destructive treatments, such as labyrinthectomy and vestibular nerve section. These treatments are effective and durable, but they cause considerable vestibular impairment. In these cases, physical therapists can help rehabilitate patients with unilateral vestibular reduction.⁵

In recent years, a less destructive treatment called low-dose intratympanic gentamicin has gained favor. This treatment, which injects a medication through the ear drum, is almost as effective and durable as more destructive methods, but it doesn't impair hearing.

- **Physical therapy.** It's been suggested that the definition of vestibular rehab be broadened to include education and prevention of Meniere's disease.⁶ This is appropriate when a vestibular physical therapist is part of an integrated health care team, so that clinicians don't duplicate efforts.

Physical therapy can't change the underlying disease process for Meniere's patients. In fact, adaptations for temporary situations in which the inner ear is malfunctioning may be maladaptive for patients during longer stretches of normal inner ear function. For this reason, it's traditionally taught that physical therapy is inappropriate for Meniere's disease. But there are ways that physical therapy can benefit patients.

Physical therapy goals include improving baseline balance, educating patients on avoiding injuries due to imbalance or vertigo, and rehabilitating patients after destructive treatments that result in static unilateral or bilateral vestibular loss. A physical therapy evaluation can help assess fall risk due to baseline imbalance, and vestibular rehab can train people to improve balance.^{7,8} However, no amount of balance training can prevent the main risk of injury from unpredictable bouts of dizziness.

Therapy should also treat the "spin-offs" of Meniere's disease. Patients may develop visual dependence—an abnormal sensitivity to complex visual surroundings that can make even basic tasks difficult, such as driving or grocery shopping.¹ Symptoms result from an unsophisticated compensation strategy in which a person down-weights vestibular information in favor of visual input. Train patients to recognize their visual dependence and switch to somatosensory or vestibular inputs when visually challenged.

Another troublesome compensatory strategy is a predilection to stiffen the neck to reduce the speed of head motion. This reduces vestibular stimulation and makes head orientation predictable. While this strategy can be effective, unsophisticated use can result in neck pain and discomfort. Make patients aware of this strategy and encourage them to develop a larger repertoire of compensatory techniques.

Studies have documented that patients with Meniere's disease tend to have more psychological disability, such as depression or anxiety, than the normal population.⁹ This is a natural consequence of having a chronic condition that can result in unpredictable spells of dizziness, reduced hearing, tinnitus and imbalance. Through supportive psychotherapy, attempt to validate patients' feelings, provide emotional support and suggest activities that may provide some control over their bodies. ■

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Resource

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