# NANOS Patient Brochure

## Meniere's Disease

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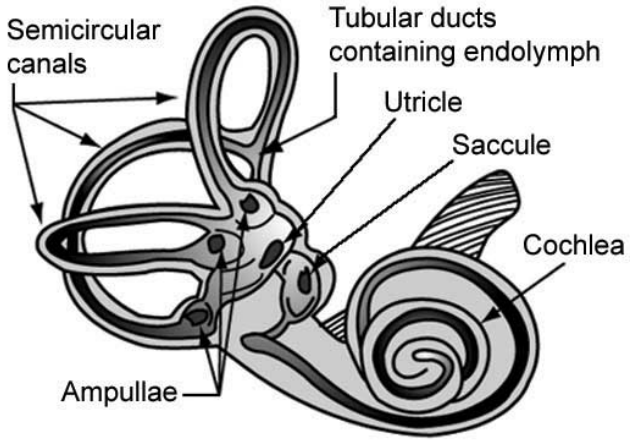
# Menière's Disease

Menière's Disease is named after Prosper Menière, a French physician who first described the condition in 1861. It is an inner ear disorder that can cause vertigo (false sensation of motion) In addition to hearing symptoms such as variable hearing loss and tinnitus (noise emanating from the affected ear). About 1-2 of every 1,000 people suffer from Menière's Disease which begins most commonly between ages 40 and 60.

## Anatomy and Physiology

The ear has three parts; the external ear, consisting of the visible ear and canal leading to the tympanic membrane (ear drum), the middle ear containing three small bones which transmit vibrations from the drum to the inner ear, and the inner ear. The inner ear has two functions: The cochlea is involved in hearing while the vestibular apparatus is involved in balance. Both can be affected by Menière's Disease.

The cochlea is a hollowed, bony chamber shaped like a spiral shell. It is filled with two types of fluid, perilymph and endolymph, which are separated from each other by membranes which run throughout the bony cochlea. These fluids move when sound vibrations are conducted from the ear drum and bones in the middle ear. The movement of the fluid is transmitted to tiny hair cells in the cochlea. These hair cells convert this mechanical energy into electrical impulses to be sent via the auditory nerve to the brain for interpretation. Hair cells nearest to the middle ear respond to high frequency sounds whereas hair cells nearest to the end of the cochlea convey low frequency sounds.




The vestibular system consists of three semicircular canals that sense head rotation in various planes, and two otolith organs that sense linear acceleration. Like the cochlea, the semicircular canals are bony tubes that house membranes that contain endolymph and separate it from the perilymph which resides between the membrane and the bone. The fluids move with each head motion, stimulating tiny hair cells which transmit electrical discharges to the brain. In response to each head movement, the eyes will move in the opposite direction to keep the eyes fixed on a target. This is called the vestibulo-ocular reflex or VOR. The VOR is responsible for stabilizing us during motion. For instance, for every head movement to the left, there is a compensatory eye movement to the right, which under normal circumstances, matches the head movement exactly, preventing blurred vision during motion.

## Causes

The exact cause of Menière's Disease is unknown. There may be an increase in the volume of the endolymph within the tubular ducts that form the semicircular canals and the cochlea (hence the alternate name, endolymphatic hydrops), either by impaired absorption or increased production of

endolymph. Other hypotheses have suggested that there may be a change in the constitution of the endolymph due to a rupture of the membranes which separate it from the perilymphatic fluid. Other theories feature autoimmune mechanisms, viral infection, trauma or genetic components.

**Symptoms of Menière's Disease**

Patients with Menière's Disease may experience fluctuations of some or all of a constellation of symptoms consisting of vertigo, variable low frequency hearing loss, tinnitus and fullness around the affected ear. Typically, Menière's Disease only affects one ear, but can rarely affect both ears. Attacks of vertigo can be separated in time from the hearing loss and tinnitus; that is, the vestibular symptoms can precede or follow the cochlear symptoms, even by some years. The vertigo typically lasts for some hours and is worsened by movement. Associated systemic symptoms consisting of nausea, vomiting, sweating and diarrhea. The vertigo can be preceded by the auditory symptoms of muffled hearing and tinnitus, or these symptoms can be simultaneous. With repeated attacks, recovery of hearing may become incomplete producing permanent hearing loss.

Secondary paroxysmal positional vertigo (BPPV) may be superimposed on Meniere disease, and produces short-lived attacks of vertigo, typically occurring when looking up or down or rolling over in bed. Less common symptoms include Tumarkin's phenomenon, which is a fall preceded by the sense of being pushed, Tullio's phenomenon (sound induced vertigo), or vertigo caused by pressure within the external ear canal (Hennebert's sign).

**Signs**

During an attack, physicians may observe nystagmus, which is a to-and-fro "wiggling" motion of the eye in response to the abnormal inner ear function. The direction of the eye movement can indicate which ear is affected. Around the time of an attack, there may be loss of low frequency hearing in the affected ear, which can be measured with an audiogram. The vestibular ocular reflex (VOR) may be abnormal, and this is assessed by rapidly moving the patient's head while the patient fixes on a visual target.

**Investigations**

The diagnosis of Menière's Disease is made primarily by history and physical examination. Audiometry (hearing test) is important to document fluctuations of hearing loss. MRI may be done to rule out centrally mediated causes of vertigo, while CT of the temporal bones may help rule out other causes such as semicircular canal dehiscence, which can mimic Menière's Disease. Other tests may include electronystagmography and caloric testing to measure the VOR, posturography, electrocochleography (abbreviated ECochG or ECOG) and vestibular myogenic evoked potentials (VEMP).

**Treatment**

Treatment begins with dietary modification. Limiting sodium intake, including salt, monosodium glutamate and sodium nitrite is important. Restricting sugar and caffeine, alcohol and nicotine will also help to reduce symptoms of dizziness and tinnitus.

Prophylactic medications may help reduce the number of attacks of vertigo, most commonly diuretics such as hydrochlorthiazide. Symptom treatment during episodes of vertigo may employ several medications such as meclizine, betahistine, scopolamine (often worn as a patch for seasickness), ondansetron, or glycopyrrolate. Exercises to resolve superimposed benign paroxysmal positional vertigo (BPPV) may help in suitable patients. Hearing aids may assist with hearing impairment.

In some patients, treatments that partially destroy the affected vestibular system are used. These include intratympanic injections of low dose gentamicin (an antibiotic) via a small needle through the ear drum. Afterwards, the brain compensates for the loss of the vestibular apparatus on the injected side, rebalancing the system. Potential side effects include hearing loss. If gentamicin injections fail, vestibular neurectomy (sectioning of the vestibular nerve, thereby sparing hearing), or labyrinthectomy (typically in patients who have lost hearing) may be considered but are associated with greater risk.

## FAQ's

### *Will the Menière's Disease ever "burn out"?*

Some patients may experience temporary remissions that can last years, but "burnout" often means that the Menière's Disease has progressed to the point where the vestibular and cochlear function in the affected ear have been destroyed. At this point, the patient may become free of recurring spells of vertigo, but tinnitus and fullness in the ear may persist, even when the ear is completely deaf.

### *Are there any herbal preparations that can help in Menière's Disease?*

There are no proven herbal therapies for Menière's Disease.