Vestibular disorder

Vestibular schwannoma is a serious but nonmalignant tumor that develops on the sheath of inner ear's vestibulo-cochlear nerve, which transmits both balance and sound information to brain. (This nerve is also referred to as the acoustic nerve, hence the name.) As an acoustic neuroma grows, it compresses the vestibulo-cochlear nerve, usually causing hearing loss, tinnitus, and dizziness or loss of balance.

AGE-RELATED DIZZINESS AND IMBALANCE

Dizziness in the elderly can be a result of problems with the vestibular, central (brain-related), and vision systems, as well as from neuropathy, psychological causes, and unknown (idiopathic) causes. Vestibular disorders, however, are thought to be the most common cause of dizziness in older people, responsible for approximately 50% of the reported dizziness in the elderly.

AUTOIMMUNE INNER EAR DISEASE

When a virus attacks, the immune system defends the body. When the immune system malfunctions, its defense capabilities sometimes mistake the body's own cells for invading viruses or germs and attack them, which is referred to as autoimmunity. The immune system can attack the whole body or just certain systems, including the ear. When the ear is itself attacked, this is known as autoimmune inner ear disease. The progression of damage and functional loss caused by AIED can be rapid.

BENIGN PAROXYSMAL POSITIONAL VERTIGO (BPPV)

BPPV is a common vestibular disorder that causes vertigo, dizziness, and other symptoms due to debris that has collected within a part of the inner ear. This debris, called otoconia, is made up of small crystals of calcium carbonate (sometimes referred to informally as “ear rocks”). With head movement, the displaced otoconia shift, sending false signals to the brain.

BILATERAL VESTIBULAR HYPOFUNCTION

Reduction or loss of vestibular function bilaterally results in difficulty maintaining balance, especially when walking in the dark or on uneven surfaces, and in a decrease in the patient’s ability to see clearly during head movements. Bilateral vestibular hypofunction and loss can occur as secondary to a number of different problems.

CANVAS SYNDROME

CANVAS is an easy to remember acronym for cerebellar ataxia, neuropathy, and vestibular areflexia. There are only a very few patients reported who have the requisite combination of two rare clinical findings (cerebellar ataxia and vestibular areflexia), and the very common peripheral neuropathy. Patients with CANVAS combine cerebellar ataxia (i.e. coordination problems – the CA), peripheral nerve damage (neuropathy - N), and loss of vestibular function (vestibular areflexia – the VA). This combination causes major disturbances to balance as each of these systems alone contributes to balance. Of course, when all are out at the same time, balance is much worse than when only one or two happens to be malfunctioning.

CERVICOGENIC DIZZINESS

Neck pain often accompanies dizziness, but it may be difficult to tell whether the dizziness and the neck pain are related or just coincidental. Because true spinning vertigo is rarely associated with this

syndrome, cervicogenic dizziness is a more accurate name for this syndrome. However, cervicogenic dizziness tends to be a controversial diagnosis, because there are no tests to confirm that it is the cause of the dizziness.

CHOLESTEATOMA

A cholesteatoma is a skin growth that occurs abnormally in the middle ear behind the eardrum. It is usually caused by repeated infection, and often takes the form of a cyst or pouch that sheds layers of old skin that builds up inside the ear. Over time, the cholesteatoma can increase in size and destroy the surrounding delicate bones of the middle ear. Hearing loss, dizziness, and facial muscle paralysis can result.

CONCUSSION

Trauma to the brain can result in abnormal vestibular system functioning. This article examines the vestibular/concussion connection, including symptoms, coping strategies, and prevention. An infographic and links to other resources is also included.

ENLARGED VESTIBULAR AQUEDUCT SYNDROME (EVAS)

An enlarged vestibular aqueduct is usually accompanied by an enlargement of the endolymphatic duct and sac, which help maintain the volume and ionic composition of endolymph necessary for transmitting hearing and nerve signals to the brain. When EVA causes hearing loss or balance symptoms, it is referred to as enlarged vestibular aqueduct syndrome (EVAS).

LABYRINTHITIS AND VESTIBULAR NEURITIS

Labyrinthitis and vestibular neuritis are disorders resulting from an infection that inflames the inner ear or the vestibulo-cochlear nerve (the eighth cranial nerve), which connects the inner ear to the brain. Neuritis (inflammation of the nerve) affects the vestibular branch of the vestibulo-cochlear nerve, resulting in dizziness or vertigo but no change in hearing. Labyrinthitis (inflammation of the labyrinth) occurs when an infection affects both branches of the nerve, resulting in hearing changes as well as dizziness or vertigo.

MAL DE DÉBARQUEMENT

Mal de débarquement literally means “sickness of disembarkment.” This term originally referred to the illusion of movement felt as an aftereffect of travel by ship or boat. Some experts now include other types of travel, such as by train and airplane, and situations with new and different movement patterns, such as reclining on a waterbed.

MIGRAINE-ASSOCIATED VERTIGO (MAV)

Migraine, a disorder usually associated with headache, is extremely common and can cause several vestibular syndromes. Studies suggest that about 25 percent of migraineurs experience dizziness or migraine during attacks. Migraine-associated vertigo (MAV) can occur with or without pain.

MÉNIÈRE’S DISEASE

Ménière’s disease is a vestibular disorder that produces a recurring set of symptoms as a result of abnormally large amounts of a fluid called endolymph collecting in the inner ear. The exact cause of Ménière’s disease is not known. The four classic symptoms are vertigo, tinnitus, a feeling of fullness or pressure in the ear, and fluctuating hearing.

NEUROTOXICITY

Neurotoxic vestibulopathy is a poisoning of neurons in the brain that help control balance as a result of exposure to a neurotoxin (naturally occuring substance), such as lead, or a neurotoxicant (synthetic substance), such as the anti-malarial drug, mefloquine (a.k.a. Lariam).

OTOSCLEROSIS

Otosclerosis is the abnormal growth of bone of the inner ear. This bone prevents structures within the ear from working properly and causes different types of hearing loss, depending on which structure within the ear is affected. In addition to hearing loss, some people with otosclerosis experience dizziness and balance problems.

OTOTOXICITY

Ototoxicity (“ear poisoning”) is due to exposure to drugs or chemicals that damage the inner ear or the vestibulo-cochlear nerve, which sends balance and hearing information from the inner ear to the brain. Ototoxicity can result in temporary or permanent disturbances of hearing, balance, or both. Many chemicals have ototoxic potential.

PEDIATRIC VESTIBULAR DISORDERS

Until recently, most medical professionals assumed that problems with vestibular function primarily affect adults, with only a small number of children being affected. However, there is growing evidence of vestibular system dysfunction in children, with consequent problems with gaze stability (seeing clearly with head movement), balance ability and/or the development of balance abilities, and dizziness.

PERILYMPH FISTULA

A perilymph fistula is a tear or defect in one of the small, thin membranes that separate the middle ear from the fluid-filled inner ear. When a fistula is present, changes in middle ear pressure will directly affect the inner ear, stimulating the balance and/or hearing structures and causing symptoms.

PERSISTENT POSTURAL PERCEPTUAL DIZZINESS (PPPD)

PPPD - formerly known as Chronic Subjective Dizziness (CSD) - symptoms include non-vertiginous dizziness and unsteadiness that is increased by a person’s own motion, exposure to environments with a complex or moving stimuli (e.g., stores, crowds), and performance of tasks that required precise visual focus (e.g., reading, using a computer). PPPV is NOT a psychiatric disorder, but rather a neuro-otologic condition with behavioral elements.

SECONDARY ENDOLYMPHATIC HYDROPS (SEH)

Secondary endolymphatic hydrops involves abnormalities in the quantity, composition, and pressure of an inner-ear fluid called endolymph, apparently in response to an event or underlying condition such as head trauma or ear surgery. It can occur with other inner ear disorders, allergies, or systemic disorders.

SUPERIOR SEMICIRCULAR CANAL DEHISCENCE

TINNITUS

Tinnitus is a symptom that can be experienced with some types of vestibular disorders and is not vestibular disorder by itself. Tinnitus is abnormal noise perceived in one or both ears or in the head. Tinnitus (pronounced either “TIN-uh-tus” or tin-Ny-tus“ may be intermittent, or it might appear as a constant or continuous sound. It can be experienced as a ringing, hissing, whistling, buzzing, or clicking sound and can vary in pitch from a low roar to a high squeal. Click here to download a copy of our publication “Tinnitus: Ringing in the Ears”

VESTIBULAR HYPERACUSIS

Hyperacusis is the perception of an unusual auditory sensitivity to some noises or tones. It is an abnormal condition in which the complex electrical signals generated by sound vibrations are misinterpreted, confused, or exaggerated. With cochlear hyperacusis, subjects feel ear pain, discomfort, annoyance, or some other emotional reaction when certain sounds are heard. In vestibular hyperacusis, exposure to sound can result in falling or a loss of balance or postural control.

VERTEBROBASILAR INSUFFICIENCY

The vertebral and basilar arteries carry blood to the inner ear labyrinth, the vestibulo-cochlear nerve, and the brainstem. When blood flow through these vessels is restricted for any reason, it is called vertebrobasilar insufficiency. This is a common cause of vertigo in the elderly. The vertigo occurs suddenly without warning, usually lasts for several minutes, and can also be accompanied by nausea, vomiting, headache, and impaired vision.

Case reports

Willms et al., discuss a case with combined vestibulocochlear and facial neuropathy mimicking a less urgent peripheral vestibular pattern of acute vestibular syndrome (AVS). With initial magnetic resonance imaging read as normal, the patient was treated for vestibular neuropathy until headaches worsened and a diagnosis of subarachnoid hemorrhage was made. On conventional angiography, a ruptured distal right-sided anterior inferior cerebellar artery aneurysm was diagnosed and coiled. Whereas acute vestibular loss usually points to a benign peripheral cause of AVS, combined neuropathy of the vestibulocochlear and the facial nerve requires immediate neuroimaging focusing on the cerebellopontine angle. Imaging should be assessed jointly by neuroradiologists and the clinicians in charge to take the clinical context into account [1)].

1)
Willms JF, Baltsavias G, Burkhardt JK, Ernst S, Tarnutzer AA. Missed Anterior Inferior Cerebellar Artery Aneurysm Mimicking Vestibular Neuritis-Clues to Prevent Misdiagnosis. J Stroke Cerebrovasc Dis. 2016 Oct 13. pii: S1052-3057(16)30356-1. doi: 10.1016/j.jstrokecerebrovasdis.2016.09.027. PubMed PMID: 27746081.