

Dizziness and Balance Disorders

Introduction

Dizziness is a non-specific term that can represent a variety of different symptoms. While it generally refers to an abnormal sensation of motion, it can also mean imbalance, lightheadedness, blacking out, staggering, disorientation, weakness, just to name a few. Symptoms can range from mild brief spells to severe spinning episodes lasting hours. Nausea and vomiting may accompany these symptoms.

Common Types of Dizziness

Dizziness

A general term that refers to an abnormal sense of balance and equilibrium.

Imbalance

An inability to keep one's balance especially when on the feet, e.g. standing or walking

Lightheadedness

A near pass-out or faint-like sensation, similar to the feeling if one holds their breath for a prolonged period.

Vertigo

The sensation that you or your surroundings are moving, spinning or whirling.

Maintenance of balance requires that multiple organ systems in the body work in coordination. The brain is the central processing center that manages incoming balance information from the various sense organs and sends outgoing information directed to the muscles and skeleton.

Sensory input comes from three main areas: vision, inner ear, and touch (from the feet and joints). Vision is an important cue to the brain and allows us to determine if we are moving relative to our surroundings.

Anatomy

The human ear serves two main functions: hearing and balance. There are two types of hearing: mechanical and nerve (or electric). The mechanical part of hearing begins when sound waves are picked up by the outer ear. The sound waves travel down the ear canal, hit the ear drum (tympanic membrane) and cause it to vibrate. This vibration sets the three tiny bones of the middle ear into motion.

The inner ear resembles a snail. The coil portion is the cochlea, or sensory organ for hearing. The cochlea converts the mechanical sound energy into an electrical signal which travels through the auditory nerve to be interpreted by the brain.

The other portion of the inner ear is the vestibular or balance system. There are three semicircular or balance canals, each oriented at different angles or planes of movement. Rotational movement of the head causes a fluid shift within the semi-circular canals, which in turn sends a signal to the brain via the vestibular nerve.

In addition to the semi-circular canals there are also two small compartments which contain sensory cells or tiny calcium crystals embedded in a gelatinous mass. These compartments are responsible for sensing linear movement such as swaying, rocking or bouncing. When the crystals of these compartments are dislodged, Benign Paroxysmal Positional Vertigo (BPPV) may result.

The inner ear fluids (perilymph and endolymph) undergo a natural recycling every day. It is made from the brain's spinal fluid and is absorbed by the endolymphatic sac. In Meniere's syndrome, the sac fails to absorb enough

fluid, leading to increased inner ear pressure that may cause dizziness and hearing loss.

The facial nerve is situated in close proximity to the ear. It moves the face and provided some of our taste sensation. Therefore, discussion of ear diseases and surgeries always emphasize preservation of the facial nerve due to its close anatomical relationship.

Common Types of Dizziness

Benign Paroxysmal Positional Vertigo (BPPV)

BPPV is the most common dizzy condition. In BPPV, vertigo is usually triggered by a change in head position, such as in rolling over in bed, tilting the head backward at the hairdresser's, or bending forward. BPPV is caused when the tiny crystals get dislodged from the gelatinous mass they are embedded in. This causes the sensation of spinning. The most common causes of BPPV are head trauma and viral infections of the inner ear. Often, it can start with no apparent cause.

Treatment of BPPV is usually an office repositioning maneuver that replaces the loosened crystals back to their original position within the inner ear. Once they heal back in place the dizziness resolves. Maintaining the head in an upright neutral position promotes healing. Following repositioning, certain head exercises can help reduce symptoms. Sometimes,

repositioning may need to be repeated. Recurrence of BPPV occurs in 10-25% of patients.

Vestibular Neuritis

Neuritis (inflammation of a nerve) is often caused by a virus and may affect the balance (vestibular) nerve. When this occurs, the balance centers of the brain get overstimulated and results in intense dizziness and vertigo.

Vestibular neuritis usually subsides over time and does not typically recur. Certain medications can help decrease the severity of the initial phase of symptoms and later balance therapy (vestibular rehabilitation) can speed recovery. Surgery is occasionally needed if symptoms persist.

Meniere's syndrome (Endolymphatic Hydrops)

Meniere's syndrome is a disorder of the inner ear caused by excess pressure in the endolymphatic fluid compartment. The pressure is usually caused by excess inner ear sodium (salt). In addition to vertigo, which can last for hours, patients often experience fluctuation hearing loss, tinnitus or a roaring sound, and a feeling of fullness in the affected ear. One or both ears may be affected. The cause of this disorder is not known. Excess salt intake, stress, weather changes, or allergies can trigger symptoms.

Treatment usually includes restriction of salt (sodium) intake and the use of a diuretic or water pill. Sometimes anti-dizziness medications like Antivert or Valium can decrease the severity of the spells, but they do not cure the disease. Steroids can occasionally help but due to their side effects are used sparingly.

In severe cases of Meniere's syndrome, surgery or injection of the affected ear may be needed. Your doctor will discuss all options with you.

Migraine

Migraine is a common condition that can affect people of all ages and races. When it presents with headache, the diagnosis may be simple. However, many patients have symptoms related to migraine without the typical throbbing headaches. These symptoms are referred to as the "aura" and may include swaying or spinning sensations, visual distortions, marked fatigue, motion intolerance head pressure or ear fullness. Hearing loss may occur. Symptoms may mimic Meniere's syndrome. While most migraines only last for hours, some patients have symptoms that persist for weeks. In women, symptoms often (but not always) precede menstruation by a week. Migraine aura can be treated with dietary modification. Eliminating red wine, chocolate, strong cheese, fresh bread, or citrus may help resolve symptoms. Medications are often used if symptoms do not resolve.

Vascular Dizziness

Maintenance of balance requires input from the inner ears, other organs, the brain and its neural connections. If areas of the brain that assist with balance do not receive adequate blood supply, even temporarily, dizziness can occur.

Causes of vascular dizziness are varied. Arthritis in the neck can cause compression of arteries to the head. Cholesterol plaques may narrow these arteries too, causing decreased blood flow. Often, blood pressure to the brain can drop temporarily when standing up quickly, especially in the elderly and those who take blood pressure medication. Special imaging techniques such as MRI or Doppler may be needed to accurately diagnose these problems.

Perilymphatic Fistula

The inner ear is a fluid filled boney maze within the skull. If fluid leaks from its bony casing, dizziness and hearing loss may occur. The leak usually arises from the oval or round window membranes, which are inherent areas of anatomical weakness. The leak may occur spontaneously, with heavy straining or after trauma. Some children may be born with an abnormal connection between their brain and their ear, termed "Enlarged Vestibular Aqueduct." This can sometimes be detected on a CT scan and can lead to fluctuating hearing loss as well as dizziness. Inner ear leaks may heal on

their own with rest. In some cases, minor surgery is required to plug the leak.

Superior Semicircular Canal Dehiscence Syndrome

An unusual cause of dizziness is a hole involving the top of the superior balance canal. This hole can develop as a result of weakness in the bone from birth or due to the pressure of the overlying brain that can wear away the bone. The hole allows abnormal movement of the inner ear fluids resulting in dizziness often triggered by pressure to the ear canal, straining or loud sounds. Some patients may develop a conductive or mechanical hearing loss. Surgery may be indicated if symptoms are severe.

Tumors

Rarely, tumors can be a cause of dizziness. The most common types are not cancerous. Acoustic neuromas are benign tumors of the balance nerve. They can cause unsteadiness, hearing loss, and tinnitus. MRI scans are used to identify these tumors.

Medical Treatment of Dizziness

Reduction of the inner ear fluid buildup associated with Meniere's syndrome can often be improved by reducing inner ear pressure. Decreasing the amount of sodium in the inner ear by following a low salt diet combined with a water pill (diuretic) which eliminates the body's sodium are usually very effective. If you take water pills, make sure to speak with your doctor about having a blood test to ensure that the potassium levels in your body do not drop too low. Steroids may also be helpful but have many side-effects. Make sure to discuss them with your doctor.

Vestibular Rehabilitation

To assist the body's ability to compensate for a loss of balance, certain exercises can speed recovery. These exercises can strengthen the balance system and thereby decrease symptoms. These exercises will benefit almost all patients with any type of dizziness.

Inner Ear Injections

For Meniere's syndrome and a few other uncommon ear disorders, "trans-tympanic injections" of steroid medications may provide some benefit and reduce inflammation of the inner ear.

Surgical Treatment of Dizziness

As a last resort, surgery may be needed to treat dizziness if medical or non-invasive treatment fails. Several types of operations are available, depending on the cause of the dizziness. Not all procedures are options for every patient. Some can only be offered in severe situations.

You and your doctor will need to decide on which therapy is best for you. Pros and cons must always be weighed whether treatment is medical or surgical. Factors in consideration include hearing, age, health and the severity of the disease. Surgical risks vary according to the procedure and the individual's age and health status. Most inner ear operations require a general anesthetic and an incision behind the ear after shaving a small amount of hair. Any ear surgery carries potential risks to the important structures in the area, although most risks are minimal. These risks may include hearing loss, tinnitus, dizziness, taste disturbance, facial weakness, infection and bleeding.

Summary

Make sure to ask your doctor how soon you may return to work or driving after surgery. This will vary based on the severity of your dizziness, your job and the type of surgery. It may range from days to many weeks. Stiffness and hearing loss can be expected for some time with any ear operation. This will usually improve slowly as your body absorbs the healing fluids.

Fortunately, most types of dizziness can be cured or at least improved. But in some cases, no medical or surgical treatment may be effective. If so, patients will need to learn how to adapt to a chronic problem. Diet, rehabilitation and exercise can all be important as can developing a positive attitude. Antidepressants are something very effective, not only to help with any anxiety and depression that may accompany chronic dizziness, but also some of these medications can actually help the inner ear and brain's chemicals. These medications should be supervised by your doctor.