

# Vertigo and Associated Symptoms

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## Definition

*Vertigo* is an abnormal sensation of motion. It can occur in the absence of motion or when a motion is sensed inaccurately. Spinning vertigo is usually of inner ear origin.

Disequilibrium is a sensation of impending fall or of the need to obtain external assistance for proper locomotion. It is sometimes described as a feeling of improper tilt of the floor, or as a sense of floating. This sensation can originate in the inner ear or other motion sensors, or in the central nervous system.

Positional vertigo is a sensation of spinning that occurs after the patient's head has moved to a new position with respect to gravity.

## Technique

Vertigo and disequilibrium are common symptoms in a primary care practice. Since these symptoms can be associated with serious disease, it is important to evaluate them properly. Any disorder that interferes with the sensory function of vision, balance, or proprioception or that affects the oculomotor control system can result in disequilibrium or vertigo (Table 123.1). The history centers on establishing the underlying disease in these sensory systems or in the central mechanisms that mediate responses to these sensory systems.

The objectives of the history are to obtain a clear description of the symptoms and associated symptoms and to gather information that will help locate the lesion. We need to determine whether the lesion is central or peripheral and the side the lesion is on.

Ask the patient to describe the major symptom as to onset, duration, and severity, and for other symptoms that occur at the same time. Tinnitus, ear pressure, or hearing loss not only suggests the inner ear as the location of the disorder but also points out the involved ear. Nausea and vomiting frequently accompany inner ear disorders; loss of vision, slurred speech, or loss of consciousness suggests central nervous system or cerebrovascular disorders. Slowing of the pulse is sometimes noted in vertigo of inner ear origin; very rapid or irregular heartbeat suggests cardiac arrhythmia as the underlying problem.

In intermittent vertigo the frequency, time interval, and duration should be noted. Specifically ask whether change in head position brings on or changes the symptoms. Positional vertigo is extremely common and, in most cases, of inner ear origin.

History of ear pain, drainage, or ear trauma is important to determine disease originating in the ear.

Past history of ear infections, head trauma, and ototoxic medications must be elicited. Patients may not be told that their medication is ototoxic. Therefore, also ask about hospitalizations for infectious illnesses, renal, or heart disease,

common reasons for the administration of ototoxic antibiotics or diuretics.

A family history of vertigo and hearing loss suggests hereditary degenerative processes in the inner ear.

General health problems such as diabetes mellitus, heart disease, atherosclerosis, and neurologic disorders can cause vertigo. Neurologic disorders tend to cause constant vertigo or disequilibrium and usually have other symptoms of neurologic dysfunction associated with the vertigo.

Many medications used to treat seizures, depression, anxiety, and pain affect the vestibular system and the central nervous system. A complete medication history is essential and needs to include over-the-counter and illegal drugs because these can produce vertigo and disequilibrium.

## Basic Science

Head motion is sensed by the vestibular labyrinth and by vision. Turning movements of the head are sensed by the semicircular canals. Linear head movements and the center

**Table 123.1**

Differential Diagnosis of Vertigo, Disequilibrium, and Related Disorders

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| Spinning or turning vertigo                          |
| Viral labyrinthitis                                  |
| Benign paroxysmal positional vertigo                 |
| Labyrinthine injury                                  |
| Postalcohol positional vertigo                       |
| Labyrinth fistula                                    |
| Ménière's disease                                    |
| Labyrinthine syphilis                                |
| Acoustic neuroma (rarely)                            |
| Following head trauma                                |
| Multiple sclerosis                                   |
| Cerebrovascular disease                              |
| Diabetes mellitus                                    |
| Cardiovascular disease (arrhythmias)                 |
| Disequilibrium or gait instability                   |
| Ototoxic loss of vestibular function                 |
| Progressive degenerative loss of vestibular function |
| Cerebrovascular disease                              |
| Multiple sclerosis                                   |
| Acoustic neuroma                                     |
| Following head trauma                                |
| Cerebral neoplasia                                   |
| Centrally depressing drugs                           |
| Spinocerebellar degeneration                         |
| Visual or eye movement disturbance                   |
| Following head trauma                                |
| Cerebrovascular disease                              |
| Multiple sclerosis                                   |
| Central nervous system degenerative disorders        |
| Oculomotor neuropathy                                |

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of gravity are sensed by the utricle and saccule. Muscle and joint receptors in the neck, spine, and limbs sense body position and body and head motion.

Information from the labyrinth is transmitted by the superior and inferior vestibular nerve through the internal auditory canal to the vestibular nuclei at the medullary pontine junction. Secondary neurons connect to neurons in the third, fourth, and sixth cranial nerve nuclei via the medial longitudinal fasciculus and the reticular formation. More rostral connections go to the frontal cortex where we sense rotation.

Descending fibers go to the spinal column via medial longitudinal fasciculus and lateral vestibulospinal tracts.

The visual system sends information from the retina via the optic nerves, optic chiasm, and optic radiations to the occipital cortex. Both frontal and parietal cortex are involved in pursuit and saccade eye movements that are necessary in targeting the visual system both during head movements and during movements of the environment. Cortical eye fields project via the superior colliculus to the paravestibular reticular formation and oculomotor nuclei to initiate eye movements. Visual and vestibular information is integrated at several levels in the central nervous system, particularly at the brainstem and cerebellum.

### Clinical Significance

An acute attack of vertigo is due to sudden change in labyrinthine function. Anatomically, this can be a disorder of

the peripheral labyrinth (viral labyrinthitis, temporal bone fracture, perilymph fistula, Ménière's disease, bacterial labyrinthitis, occlusion of labyrinthine blood supply by thrombus, or, infrequently, cerebellopontine angle tumor). It can also be due to damage to the vestibular nuclei at the brainstem. Ménière's disease usually results in recurrent attacks of vertigo with unilateral hearing loss and tinnitus and a feeling of fullness in one ear.

A feeling of chronic disequilibrium can be caused by bilateral loss of labyrinthine function. This can be due to degenerative disorders, ototoxic drugs, bilateral labyrinthitis, previous meningitis, or head injury. It is also seen in central nervous system degenerative disorders, in multiple sclerosis, and in drug abuse or when exceeding therapeutic levels of prescribed drugs. Almost any medication used in control of epilepsy, anxiety, or depression can do this. In addition, antihistamines, atropine, and scopolamine at higher doses can cause disequilibrium. In central nervous system disease, there is usually historical or physical evidence of involvement of sensory, motor, or connecting systems.

### References

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