

Vertigo and Dizziness

Understanding and Managing Fall Risk

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KEYWORDS

• Vertigo • Dizziness • Fall risk • Geriatric vestibulopathy

KEY POINTS

- Dizziness is associated with functional disability and risk of falls.
- Falls are the leading cause of fatal and nonfatal injuries among older Americans.
- “Dizziness” can describe several sensations, including spinning or nonspinning vertigo, disequilibrium, imbalance, presyncope, lightheadedness, and floating or a combination thereof.
- Chronic dizziness is often multifactorial and can reflect dysfunction in the vestibular, somatosensory, or visual systems or in their central integration. Systemic processes, such as postural hypotension, arrhythmias, heart failure, medication use, and lower extremity weakness or frailty, also contribute.
- Careful history and physical examination are critical in evaluating dizzy patients and in many cases may preclude the need for more expensive imaging or vestibular testing.

INTRODUCTION

Vertigo and dizziness are common among older adults, defined as those over age 65 years. These symptoms are closely associated with fall risk and portend major implications for geriatric injury and disability. Management can be particularly challenging, because symptoms are often nonspecific and may reflect multiple etiologies. This article reviews relevant definitions, epidemiology, pathophysiology of balance, diagnosis, and clinical management.

DEFINITIONS

Dizziness is a general term that can describe several sensations, including spinning or nonspinning vertigo, disequilibrium, presyncope, lightheadedness, floating, or a combination thereof.

- Vertigo refers to the illusory sensation of movement of the body or the environment.

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- Disequilibrium describes a sense of imbalance, unsteadiness, or postural instability.
- Presyncope connotes lightheadedness and the sense of an impending fainting episode. It is often associated with temporary diffuse cerebral hypoperfusion.

Despite current consensus among medical practitioners as to the use of these terms, patients use these words to describe any or all of the sensations described previously and may also include other sensations, such as weakness, fatigue, floating, fear of falling, or unstable gaze. This discrepancy underlies the importance of asking patients to describe their symptoms in their own words.

EPIDEMIOLOGY

Prevalence studies of dizziness among older adults vary depending on the definition of dizziness, study population (eg, age range or community-dwelling adults vs nursing home), and study setting (eg, emergency department vs primary care). Estimates range from 10% to 35%,¹⁻⁴ with rates increasing with age such that up to 50% of community-dwelling adults older than 80 are affected.⁵

Falls are highly associated with vertigo and dizziness.⁶ Every 11 seconds, an older adult presents to an emergency room for a fall, and every 19 minutes, an older adult dies from a fall.⁷ Even in the absence of falls, dizziness is detrimental to quality of life.⁸ Adverse effects include anxiety, decline in mobility, fear of falling, limitations of activities of everyday life, and an increase in indirect health care costs.⁸

PATHOPHYSIOLOGY OF DIZZINESS

Balance involves the central integration of multiple sensory systems: vestibular, vision, and somatosensory proprioception and exteroception. It also involves neuromuscular reflex pathways and core and lower body strength to maintain postural stability in response to perceived stimuli. Dizziness can reflect specific medical conditions affecting single systems or may represent multisensory dysfunction from multiple etiologies ([Table 1](#)).

The peripheral vestibular system provides information about linear and angular acceleration. Three sets of paired semicircular canals sense angular acceleration. The utricle and saccule (otolithic organs) sense horizontal and vertical linear acceleration, respectively. The canals and otolithic organs are innervated by the vestibular nerve, which projects to the brainstem vestibular nuclei and cerebellum. Efferent tracts from the cerebellum then project to motor nuclei of the extraocular muscles and vestibulospinal tracts, which contribute to gaze stabilization and postural control.

Age-related vestibular loss manifests in decreased vestibular hair cells, fewer vestibular nerve fibers, and loss of cerebellar Purkinje cells. Although older adults consistently show decreased vestibular function on quantitative testing, the presence of dizziness is highly variable: those with objective dysfunction may have no subjective symptoms.⁹

The somatosensory system provides information about proprioception (internal sense of body/limb position) and exteroception (sensation of the environment) from mechanoreceptors in the joints and skin. Information must be relayed through peripheral nerves and the posterior spinal column to reach the central nervous system. In an elevator, the vestibular system's saccule detects vertical acceleration, but mechanoreceptors in the feet simultaneously sense a drop in pressure when going down, and an increase when going up. Common disorders affecting the somatosensory system include arthritis, joint replacements, and peripheral neuropathy from diabetes or vitamin deficiency.

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