

Dizziness and Vertigo

Chapter 24 | Part 2 – Cardinal Manifestations & Presentation

KEY CLINICAL POINTS

- 1 Dizziness is an imprecise term encompassing vertigo, light-headedness, faintness, and imbalance.
- 2 Vertigo refers to a sense of spinning or other motion (physiological or pathological).
- 3 Peripheral vestibular lesions cause unidirectional nystagmus with fast phases beating away from the lesion.
- 4 Central vestibular lesions cause nystagmus that changes direction with gaze and is not suppressed by visual fixation.
- 5 The head impulse test is the most useful bedside tool; a normal result makes an acute peripheral vestibular lesion unlikely.
- 6 BPPV is caused by otoconia (calcium carbonate crystals) in semicircular canals, typically treated with repositioning maneuvers like the Epley maneuver.
- 7 Vestibular neuritis usually recovers spontaneously; vestibular suppressants should be avoided after the first several days to allow central compensation.
- 8 Ménière's disease is characterized by episodic vertigo, low-frequency hearing loss, and aural symptoms (pressure/fullness).
- 9 Unilateral sensorineural hearing loss or vestibular hypofunction requires MRI of the internal auditory canals (with gadolinium) to rule out schwannoma.
- 10 Bilateral vestibular hypofunction presents with imbalance in the dark and oscillopsia; treatment involves vestibular rehabilitation.

DEFINITION & OVERVIEW

- **Dizziness:** An imprecise term used to describe various sensations including vertigo, light-headedness, faintness, and imbalance.
- **Vertigo:**
 - **Definition:** Sense of spinning or other motion.
 - **Types:** Can be physiological (e.g., during/after sustained head rotation) or pathological (vestibular dysfunction).
- **Light-headedness:**
 - **Clinical Context:** Classically refers to presyncopal sensations from brain hypoperfusion; however, patients may use it to describe other symptoms like disequilibrium.
 - **Presyncopal Causes:** Include cardiac dysrhythmia, orthostatic hypotension, medication effects, or other causes of hypoperfusion.
- **Imbalance:** Includes disequilibrium and oscillopsia (instability of vision when the head moves).
- **Peripheral Vestibular Disorders:**
 - **Definition:** Disorders affecting the labyrinths or vestibular nerves.
- **Central Vestibular Disorders:**

- **Definition:** Result from disruption of central vestibular pathways.
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EPIDEMIOLOGY

- **Benign Paroxysmal Positional Vertigo (BPPV):** A common cause of recurrent vertigo.
 - **Vestibular Migraine:** Common yet underdiagnosed; can present with episodic unilateral sensorineural hearing loss and vestibular hypofunction.
 - **Bilateral Vestibular Hypofunction:** May be idiopathic, progressive (part of a neurodegenerative disorder), or iatrogenic (e.g., from aminoglycoside antibiotics like gentamicin).
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ETIOLOGY & PATHOPHYSIOLOGY

- **Peripheral Vestibular Disorders:** Affect the labyrinths or vestibular nerves.
 - **Benign Paroxysmal Positional Vertigo (BPPV):**
 - **Pathophysiology:** Caused by free-floating otoconia (calcium carbonate crystals) dislodged from the utricular macula into semicircular canals, usually the posterior canal.
 - **Vestibular Neuritis:**
 - **Pathophysiology:** Acute unilateral vestibular lesion → constant vertigo, nausea, vomiting, oscillopsia, and imbalance due to sudden asymmetry of inputs from the two labyrinths or their central connections, simulating continuous head rotation.
 - **Vestibular Migraine:**
 - **Pathophysiology:** Vertigo may precede a typical migraine or occur without headache; motion sensitivity and sensitivity to visual motion are common.
 - **Ménière's Disease:**
 - **Pathophysiology:** Associated with endolymphatic hydrops (excess endolymph fluid) in the inner ear.
 - **Vestibular Schwannoma:**
 - **Pathophysiology:** Slowly progressive unilateral sensorineural hearing loss and vestibular hypofunction.
 - **Clinical Note:** Patients typically do not have vertigo because the gradual deficit is compensated centrally as it develops.
 - **Bilateral Vestibular Hypofunction:**
 - **Pathophysiology:** No asymmetry of vestibular input → patients do not experience vertigo, but suffer from imbalance and oscillopsia.
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CLINICAL FEATURES

- **Symptoms:** Vertigo, nausea, vomiting, oscillopsia (motion of the visual scene), and imbalance.
 - **Temporal Course:**
 - **Seconds:** BPPV; orthostatic hypotension (provoked by changes in head/body position).
 - **Minutes:** Transient ischemic attacks (TIA) of the posterior circulation, migraine, or other causes.
 - **Hours:** Vestibular migraine, Ménière's disease.
 - **Days:** Vestibular neuritis, prolonged periods of disequilibrium in vestibular migraine.
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DIFFERENTIAL DIAGNOSIS

- **Peripheral vs. Central Distinction:** Based on nystagmus characteristics, head impulse test (HIT) results, hearing loss, and associated neurologic signs.

- **Specific Conditions:**

- **BPPV:** Brief episodes (<1 min), provoked by position changes.
- **Vestibular Neuritis:** Acute prolonged vertigo, spontaneous recovery.
- **Vestibular Migraine:** Episodic unilateral sensorineural hearing loss and vestibular hypofunction.
- **Ménière's Disease:** Vertigo, hearing loss, pain, pressure, fullness in affected ear.
- **Vestibular Schwannoma:** Slowly progressive unilateral sensorineural hearing loss.
- **Bilateral Vestibular Hypofunction:** Loss of balance (especially in the dark), oscillopsia.

- **Table 24-1: Features of Peripheral and Central Vertigo**

- **Nystagmus:**

→ **Peripheral:** Unidirectional, fast phases beat away from the ear with the lesion; may be inhibited by visual fixation.

→ **Central:** Changes direction with gaze; not suppressed by visual fixation.

- **BPPV Specifics:** Transient mixed vertical-torsional nystagmus (pure vertical or pure torsional nystagmus is a central sign).

- **Head Impulse Test:** Absence of a head impulse sign in acute prolonged vertigo → suggests a central cause.

- **Hearing/Neurology:**

→ Unilateral hearing loss → suggests peripheral disorder.

→ Diplopia, dysarthria, and limb ataxia → suggest central disorder.

INVESTIGATIONS & DIAGNOSIS

1. **History:** Assess for danger (arrhythmia, TIA/stroke), duration of episodes (seconds to days), and specific triggers.

2. **Physical Examination:**

- **Ocular Motility:** Evaluate range, pursuit, saccades, cover test for vertical misalignment, and spontaneous nystagmus.

- **Head Impulse Test:** Assess VOR with small-amplitude (~20 degrees) rapid head rotations while patient fixates on a target. A normal result makes an acute peripheral lesion unlikely.

- **Positioning Maneuvers:** Dix-Hallpike (patient sits → head turned 45° toward affected ear → lowered to supine position with head extended back 20° while watching eyes).

3. **Ancillary Testing:**

- **Audiometry:** Required for all suspected vestibular disorders.

→ Unilateral sensorineural hearing loss → supports peripheral (e.g., schwannoma).

→ Predominantly low-frequency hearing loss → characteristic of Ménière's disease.

- **Videonystagmography (VNG):** Records spontaneous and positional nystagmus.

- **Caloric Testing:** Compares responses of the two horizontal semicircular canals.

- **Video Head-Impulse Test:** Measures integrity of each of the six semicircular canals.

4. **Neuroimaging:**

- **MRI of Internal Auditory Canals (with gadolinium):** Required for patients with unexplained unilateral hearing loss or vestibular hypofunction to rule out schwannoma.

MANAGEMENT & TREATMENT

1. **General Principle:** Treatment must be driven by underlying diagnosis; avoid long-term use of vestibular suppressants as they may impede central compensation.
 2. **Vestibular Neuritis:** Most patients recover spontaneously; chronic dizziness, motion sensitivity, and disequilibrium may persist.
 3. **Glucocorticoid Therapy:** Efficacy is uncertain due to inconsistent study results.
 4. **Antiviral Medications:** No proven benefit; only used if evidence of Ramsay Hunt syndrome (herpes zoster oticus).
 5. **Vestibular Suppressants:** Use for acute symptoms only → avoid after first several days to allow central compensation.
 6. **Vestibular Rehabilitation:** Recommended for all patients to accelerate improvement and encourage return to normal activity.
 7. **Benign Paroxysmal Positional Vertigo (BPPV):** Repositioning maneuvers (e.g., Epley maneuver) using gravity to move otoconia out of the semicircular canal.
 8. **Ménière's Disease:** Initial treatment includes diuretics and sodium restriction.
 9. **Vestibular Schwannoma:** MRI of internal auditory canals (with gadolinium); full ablative procedures are seldom required.
 10. **Bilateral Vestibular Hypofunction:** Refer for vestibular rehabilitation.
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PROGNOSIS & COMPLICATIONS

- **Vestibular Neuritis:** Spontaneous recovery common; chronic dizziness, motion sensitivity, and disequilibrium may persist.
 - **Ménière's Disease:** Hearing often improves between attacks, but permanent hearing loss may eventually occur.
 - **Vestibular Schwannoma:** Characterized by slowly progressive unilateral sensorineural hearing loss and vestibular hypofunction.
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KEY PEARLS & CLINICAL TRAPS

- **Board Exam Favorites:**
 - Head impulse test.
 - Nystagmus direction (unidirectional vs. gaze-evoked).
 - Fixation suppression (peripheral vs. central).
- **Clinical Traps:**
 - Long-term use of vestibular suppressants → delays recovery by hindering central compensation.
- **Diagnostic Pitfalls:**
 - A central lesion cannot always be ruled out by exam alone; older patients with vascular risk factors who present with an acute vestibular syndrome must be evaluated for the possibility of stroke even when there are no specific findings that indicate a central lesion.

FLOWCHARTS

Modified Epley Maneuver (Treatment of BPPV)

Step 1: Patient seated → turn head 45 degrees toward the affected ear.

Step 2: Keep head turned → lower to head-hanging position → hold ≥ 30 s until nystagmus disappears.

Step 3: Without lifting head → turn it 90 degrees toward the other side → hold for 30 s.

Step 4: Rotate patient onto their side while turning head another 90 degrees (nose pointed down 45 degrees) → hold for 30 s.

Step 5: Patient sits up on the side of the table → rest briefly → repeat maneuver to confirm success.

REFERENCE TABLES

TABLE 24-1

Features of Peripheral and Central Vertigo • Nystagmus from an acute peripheral lesion is unidirectional, with fast...

- Nystagmus from an acute peripheral lesion is unidirectional, with fast phases beating away from the ear with the lesion. Nystagmus that changes direction with gaze is due to a central lesion.
- Transient mixed vertical-torsional nystagmus occurs in benign paroxysmal positional vertigo (BPPV), but pure vertical or pure torsional nystagmus is a central sign.
- Nystagmus from a peripheral lesion may be inhibited by visual fixation, whereas central nystagmus is not suppressed.
- Absence of a head impulse sign in a patient with acute prolonged vertigo should suggest a central cause.
- Unilateral hearing loss suggests peripheral vertigo. Findings such as diplopia, dysarthria, and limb ataxia suggest a central disorder.