

DIZZINESS/VERTIGO

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Overview

“Dizziness” is a commonly feared symptom in family practice, as it is non-specific. Dizziness can refer to pre-syncope, disequilibrium, or true vertigo.¹ Pre-syncope is the prodromal symptom of fainting.² The symptoms can be described non-specifically and may vary between patients, but lightheadedness is common. The underlying etiologies and evaluation of pre-syncope are the same as for syncope. Typical causes include orthostatic hypotension, cardiac arrhythmias, and vasovagal attacks.

Disequilibrium is the sense of imbalance perceived when walking. Underlying causes can include peripheral neuropathy, visual impairment, cerebellar disorders, cervical spondylosis, Parkinsonism, musculoskeletal disorders.²

Vertigo accounts for 54% of dizziness seen in primary care.³ It is the illusion of motion or a false sense of motion, either of self or of the environment; it is most commonly described as a spinning sensation.⁴ Vertigo is caused by damage to or dysfunction of the labyrinth apparatus of the inner ear, vestibular nerve, or central vestibular structures in the brainstem.⁴ Vertigo can be separated into peripheral centre causes.⁵

Peripheral Cause of Vertigo	Central Cause of Vertigo
Viral Labrynthitis Benign Paroxysmal Positional Vertigo (BPPV) Herpes Zoster Oticus (Ramsay-Hunt Syndrome) Meniere's disease Acoustic Neuroma Otitis media (serous) Aminoglycoside toxicity	Migrainous vertigo Brainstem ischemia Cerebellar infarction/hemorrhage Chiari malformation Multiple Sclerosis

The most common causes of vertigo in the family MD's office include: Viral labyrinthitis, BPPV, Eustachian tube dysfunction (often with serous OM), Meniere's disease, Vertebrobasilar Insufficiency.⁶

Diagnostic Considerations^{3,4,7}

History

- Distinguish true vertigo from other types of dizziness (lightheadedness, disequilibrium, presyncope)
- Timing & Duration
 - o The longer the symptoms last continually, more likely to be a central cause
- Provoking factors:
 - o Positional/Postural → ?BPPV vs presyncope
 - o Worsening with cough/sneeze/valsalva
- Associated symptoms:
 - o Hearing loss/Tinnitus/Aural fullness → ?meniere's
 - o Fever → ?labryntitis/menginitis
 - o Feeling of warmth/Diarphoresis/Visual blurring → ?presyncope
 - o Diplopia/Ataxia/Vomiting/Headache/Slurred speech/Numbness or weakness → ?central cause of vertigo

Risk Factor Assessment:

- o Medications associated with vestibular (cisplatin, aminoglycosides) or cerebellar toxicity (phenytoin)
- o Age
- o Risk factors for cerebrovascular disease (HTN, smoking, DM, etc)
- o History of migraine
- o Family history of vertigo

Physical

Neurologic	Head and Neck	Cardiovascular	Dix-Hallpike Maneuver ^{7,8,9}
<ul style="list-style-type: none"> • The presence of any neurologic signs strongly suggests a central cause • Examine cranial nerves for signs of palsies, sensorineural hearing loss, and nystagmus • Nystagmus from peripheral disease occasionally appears purely horizontal, but is never purely torsional or vertical, and is suppressed by visual fixation³ • Nystagmus from central lesions may have any trajectory and cannot be suppressed by visual fixation³ • Assess balance, gait, cerebellar function 	<ul style="list-style-type: none"> • Otoscope exam to look at tympanic membranes • Should r/o otitis media, otitis media with effusion and foreign body • Bedside hearing test 	<ul style="list-style-type: none"> • Vitals • Orthostatic changes in systolic blood pressure • Carotid bruits 	<ul style="list-style-type: none"> • May be the most useful test to perform on someone presenting with vertigo • Tests for canalithiasis of the posterior semicircular canal • Should provoke nystagmus as well as symptoms of vertigo • Nystagmus and vertigo usually appear after a latency of a few seconds and last less than 30 seconds • Purely vertical (usually downbeat) or torsional nystagmus without a latent period, that does not wane with repeated maneuvers suggests a central cause for vertigo

Investigations

Cardiovascular investigations as dictated by history: Holter monitor, carotid dopplers (see Syncope One Pager)

Imaging Studies:

- o Should consider neuroimaging in patients with vertigo who have neurologic signs and symptoms, risk factors for cerebrovascular disease, progressive unilateral hearing loss³
- o MRI is better than CT for diagnosing vertigo because of its superiority in visualizing the posterior fossa, where most central nervous system diseases that cause vertigo are found⁴

Audiometry

- o Useful to confirm Meniere's disease and to evaluate hearing loss in other peripheral causes
- o Complete audiometric testing can help distinguish vestibular pathology from retrocochlear pathology⁴

Electronystagmography and video nystagmography¹⁰

- o Can be used to differentiate between central and peripheral causes of vertigo

Brainstem auditory evoked potentials¹¹

- o Can identify acoustic neuromas

Referral

- o Should consider referral to the appropriate subspecialist (e.g., otolaryngologist, head and neck surgeon, neurologist, neurosurgeon) if the diagnosis of vertigo is unclear³

Management

1. DISEASE SPECIFIC:

Condition	Management Approach
BPPV	Canalith Repositioning Maneuvers (Epley) <ul style="list-style-type: none"> o success rates of 50-90% o recurrence rates after Epley range between 15-40 %^{8, 12, 13, 14}
Vestibular neuronitis/Labyrinthitis	Treatment focuses on symptom relief using vestibular suppressant medications, followed by vestibular exercises ^{15, 16}
Meniere's	Treatment lowers endolymphatic pressure: <ul style="list-style-type: none"> o low-salt diet (less than 1 to 2 g of salt per day) o diuretics (most commonly the combination of hydrochlorothiazide and triamterene) o Serc (betahistine) o surgery (decompression with an endolymphatic shunt or cochleosacculotomy)→ usually reserved for patients with severe, refractory Ménière's disease^{4, 15}
Vascular ischemia/Vertebrobasilar insufficiency	<ul style="list-style-type: none"> o Prevention of future events (TIA/Stroke) o Vestibular suppressant meds on day-1 o Vestibular rehabilitation exercises o Placement of vertebrobasilar stents may be considered in a patient with symptomatic critical vertebral artery stenosis that is refractory to medical management^{4, 15}
Migraines	<ul style="list-style-type: none"> o Eliminate triggers o Lifestyle changes (i.e., exercise, stress reduction, improvements in sleep patterns) o Vestibular rehabilitation exercises o Medications (e.g., benzodiazepines, tricyclic antidepressants, beta blockers, selective serotonin reuptake inhibitors [SSRIs], calcium channel blockers, antiemetics)^{4, 15}
Eustachian tube dysfunction/Serous otitis media/Otitis Media with Effusion (OME)	<ul style="list-style-type: none"> o Unless there are also signs of an infection, do not treat OME at first: <ul style="list-style-type: none"> o Recheck in 2 - 3 months o Autoinsufflation may be helpful o Decongestants might cause some symptom relief by alleviating nasal congestion o A majority of effusions will resolve over the course of 12 weeks, and most patients can be observed over this time period o Myringotomy with tube placement can be considered if no resolution^{4, 15}

2. PHARMACOLOGICAL:

To treat acute vertigo lasting hours to days and concurrent nausea and emesis:

VESTIBULAR SUPPRESSANT MEDICATIONS ^{8, 15}	DOSAGES
Antihistamines a) Dimenhydrinate (Gravol) b) Diphenhydramine (Benadryl)	50-100 PO/IV/IM q4-6 25-50 mg PO/IM/IV q4-6
Betahistine a) SERC	8-16 mg PO tid or 24 mg PO bid (8,16,24 mg tablets)
Antiemetics a) Metoclopramide (Maxeran) b) Ondansetron (Zofran)	10 mg IM/IV 8 mg PO q12h or 8 mg IV q12h infused over 15 min
Benzodiazepines a) Lorazepam (Ativan)	0.5-2 mg q4-6h prn

**Older patients are at particular risk for side effects of vestibular suppressant medications (e.g., sedation, increased risk of falls, urinary retention). Be sure to understand and read-over contraindications for each medication before prescribing, especially in the elderly.¹⁵*

3. NON-PHARMACOLOGICAL

- Vestibular exercises in patients with peripheral vestibular disorders^{8, 12, 13, 14}
<http://otolaryngology.umc.edu/documents/handouts/VestibularExercise.pdf>
http://sunnybrook.ca/content/?page=Focus_MSK_Prog_Rehab_Home
 - o May be accomplished by a series of sessions with a physical therapist, or the patient may be trained by a nurse or physical therapist to do these independently, at home
 - o Exercises train the brain to use alternative visual and proprioceptive cues to maintain balance and gait⁸
- Vestibular rehabilitation incorporates vestibular exercises with coordination training, education, coping skills and mobilization
- Referral can be arranged through most physiotherapy departments or 'dizzy clinics'

References can be found online at http://www.dfcu.utoronto.ca/programs/postgraduateprograme/One_Pager_Project_References.htm