Vertigo

Definition

Type of dizziness that involves a false sensation that one's self or the surroundings are spinning, swaying or tilting, usually accompanied by loss of balance & nystagmus (dir=fast phase).

- Peripheral (vestibular) [85%]: e.g. vestibular neuritis, BPPV, Ménière's, ear infections
- Central (CNS) [15%]: e.g. cerebrovascular disease, migraine, MS, acoustic neuroma

Acute vestibular syndrome (AVS)

Acute dizziness with N/V, unsteady gait, nystagmus, intolerance to head motion, and lasts ≥24h, no focal neuro signs (hemiparesis, hemisensory loss, gaze palsy)

- Most common causes: Vestibular neuritis (labyrinthitis) and vertebrobasilar CVA
- Central causes: Vertebrobasilar CVA (83%), multiple sclerosis (11%), other (6%)
- Over 50% of vertebrobasilar CVA's have no focal neuro deficit.
- ***Excludes BPPV and Ménière's*** (as they tend to have <24h of continuous symptoms)

Epidemiology

- Studies show that about a third of cases of dizziness are vertigo.
- Most common are viral, BPPV or Meniere's disease.
- Prevalence estimates for vertigo are ~5%, for BPPV 1.6%. Meniere's disease ~0.5%

Causes of vertigo

Peripheral	Central
Benign paroxysmal positional vertigo	Brainstem (vertebrobasilar) ischemia – infarction/dissection
Vestibular neuritis and viral labyrinthitis	Cerebellar infarction and haemorrhage
Ménière's disease	Multiple sclerosis
Herpes zoster oticus (Ramsay Hunt syndrome)	Migrainous vertigo
Drug toxicity - aminoglycosides, salicylates, quinine	Chiari malformation
Otitis media	Episodic ataxia type 2
Perilymphatic fistula or Semicircular canal dehiscence syndrome	
Labyrinthine concussion	
Acoustic neuroma	

Clinical distinction between central and peripheral vertigo

	Peripheral	Central
Episode frequency		Multiple prodromal episodes of dizziness
Effect of visual fixation	Suppressed	Not suppressed
Horizontal head impulse test	Abnormal vestibular-ocular reflex	Normal
Nystagmus	Unidirectional, fast phase towards the normal ear; increases on gazing to normal ear; never reverses. May be horiz or rotatory-vertical.	Gaze-evoked nystagmus (fast right-beating on gaze to R, fast left-beating on gaze to L). May be purely vertical.
Alternate cover test	Normal or minor horiz re-fixation	Abnormal (vertical refixation = skewed deviation)
Postural instability	Unidirectional instability, (usually towards side of lesion); walking preserved	Severe instability, patient often falls when walking. Truncal ataxia – unable to sit with arms folded
Other neurologic signs	Absent	Often present (e.g. CN palsies, cerebellar signs)
Other features	Hallpike +ve (BPPV), ?Nausea & vomiting more severe	May have headache/neck pain (esp early morning)

Hallpike Test (~50-90% sensitive)

Tests for canalithiasis of posterior semicircular canal (most common cause of BPPV):

- Sit patient on a flat bed. Hold patient's head turned to side with neck extended.
- Lie patient back quickly, eyes open & head 30° below the horiz & turned 30° to examiner.
- Keep in position for 30s and then return to sitting for another 30s. Rpt on other side.
- Positive if latency (few secs) after lying, vertigo and horiz-rotatory nystagmus towards affected (lowest) ear for ≤30s. On sitting nystagmus recurs in opposite direction.
- The vertigo and nystagmus fatigue on repetition (but repetition can reduce the chance of an immediate Epley manoeuvre being successful).

HINTS (Head Impulse test, Nystagmus, Test of Skew) exam for central cause

- Abnormal = **INFARCT**: **I**mpulse **N**ormal, **F**ast-phase **A**lternating, **R**efixation on **C**over **T**est
- If any 1 of 3 abnormal, sensitivity 100% and specificity 96% for central cause

Presentation

- Determine whether patient means vertigo or another form of dizziness.
- Elicit precipitants, course (onset, frequency, and duration of attacks) & features. Meds.
- Exam: T, HR, BP, eyes (nystagmus, fundi, mvmnts), full neuro, ENT, neck (ROM, bruits), Hallpike test, HINTS

Clinical features of common causes of vertigo

Condition	Time Course	Suggestive clinical setting	Characteristics of Nystagmus	Associated Neurologic symptoms	Auditory symptoms	Other Diagnostic features
Benign Paroxysmal Positional Vertigo	Recurrent, brief (seconds)	Predictable head movements or positions precipitate symptoms	Peripheral characteristics	None	None	Dix-Hallpike manoeuvre shows characteristic findings
Vestibular Neuronitis	Single episode, acute onset, lasts days to weeks	Viral syndrome may accompany or precede vertigo	Peripheral characteristics	Falls toward side of lesion, No brainstem symptoms	Usually none	Abnormal head thrust test
Ménière's disease	Recurrent episodes, last several hours to days	Spontaneous onset	Peripheral characteristics	None	Episodes preceded by ear fullness/pain, accompanied by unilateral hearing loss, tinnitus	Audiometry shows unilateral low frequency hearing loss
Migrainous vertigo	Recurrent episodes, last several minutes to hours	History of migraine	Central or peripheral characteristics	Migraine headache accompanying or following vertigo, positive visual phenomena	Usually none	All tests are normal
Verebrobasilar TIA	Single or recurrent episodes lasting several minutes to hours	Older patient, vascular risk factors, and or cervical trauma	Central characteristics	Usually other brainstem symptoms	None	MRI + DWI may demonstrate vascular lesion.
Brainstem infarction	Sudden onset, persistent symptoms over days to weeks	As above	Central characteristics	**Usually** other brainstem symptoms, especially lateral medullary signs	None	MRI will demonstrate lesion
Cerebellar infarction or haemorrhage	Sudden onset, persistent symptoms over days to weeks	Older patient, vascular risk factors, especially hypertension	Central characteristics	Gait impairment is prominent. Headache, limb dysmetria, dysphagia **may** occur	None	Urgent MRI, CT will demonstrate lesion

Differential Diagnosis

- Dizziness from postural hypotension.
- Dysequilibrium - inadequate afferent position info from somatosensory, vestibular & visual sys 2° to peripheral neuropathy, eye disease, or peripheral vestibular disorders.
- Presyncope - ↓cerebral perfusion caused by CVS disorders or anaemia.
- Light-headedness - non-specific, e.g. may result from panic attacks with hyperventilation.
- Hearing loss: Ménière's, Acoustic neuroma, Toxic labyrinthitis, Ototoxic drugs, Barotrauma, Neurosyphillis

Investigations

Bloods: FBC, UEC, Ca^{2+}, BSL, ECG

Imaging: Consider CT (non-contrast only 16% sens for ischaemic CVA) or diffusion weighted MRI (83% sens for ischaemic CVA) if possible neurological cause.

Other: Lumbar puncture (?MS), EEG (?epilepsy)

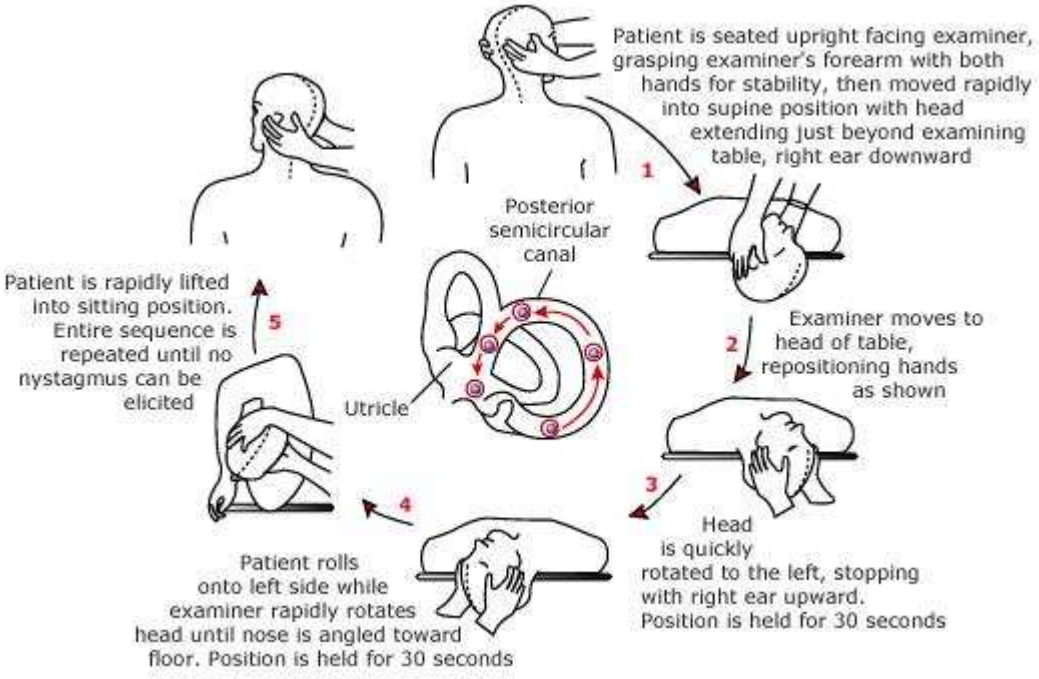
ENT: Audiometry (cochlear function), electronystagmography, calorimetry & brainstem-evoked responses (all for vestibular function)

Management

- Symptomatic relief:
  - **Prochlorperazine** 5mg PO tds or **promethazine** 25mg PO q6h. Can give IV if sev.
  - +/- **Diazepam** 5mg PO prn
  - N.B. prolonged use may prevent central compensation
- Specific:
  - *BPPV:* Epley manoeuvre often effective
  - *Ménière's:* Prophylactic **betahistine** 8-16mg PO tds – little evidence for efficacy. Labyrinthectomy and cochlear implants have been used. Recently, intra-tympanic **gentamicin** application has also been successful.
  - *Vestibular neuritis:* Consider **prednisolone**.
- Refer to ENT specialist if hearing loss, recurrent/persistent vertigo with peripheral vestibular characteristics, or if otoscopy findings are abnormal.
- Cawthorne-Cooksey vestibular rehabilitation exercises promote central compensation & may resolve persistent dysequilibrium. (Ménière's or BPPV may not respond.)
- Balance rehabilitation is important and beneficial in elderly, if dizziness multifactorial.
- Explanation and reassurance. Persistent dysequilibrium should be overcome by central adaptation, but anxiety may prevent this.

Epley's Manoeuvre

- To move calcium carbonate otoliths into the utricle.
- Start with patient having head turned to affected side, then
- Hold for 30s at the end of each step:



- Return head to midline & tilt chin down 45°.

Complications

- Increased risk of falls, especially in the elderly.
- Vertigo may confine people to their home, making them fearful or depressed.

Prognosis

- BPPV recurrence rates of 50% at 5 years
- Persistence of dizziness related to anxiety in ~33% 1 year after vestibular neuritis.