An approach to the dizzy patient

Dr David Szmulewicz
dsz@me.com
Balance Disorders &
Ataxia Service, RVEEH
Neurology Victoria
With thanks to Dr John Waterston for the use of his material in preparing this presentation
Balance Disorders & Ataxia Service (BDAS)

A multi-disciplinary service:

• Neurologists
• Rehabilitation Physician
• Specialist doctors (ENT, emergency, neurology)
• Specialized Audiologists (Australia’s largest vestibular audiology department)
• Vestibular Physiotherapists
• Speech pathologist
• Occupational therapy
• Social work
• BDAS website portal
• Provision of patient centered information
• With much gratitude to Tamar Black
• www.eyeandear.org.au/balance
Omniax positioning system
Omniax positioning system

- One of only 34 in the world
- Purchased with funds generously donated by Gandel Philanthropy
- Developed by John Epley, an ENT surgeon in the USA
- Epley soon realized the limitations of his own technique and almost 20 years later, a commercial solution available
- Principle application is in Omniax positioning system
• Neurological vs non-neurological causes of dizziness/imbalance/dysequilibrium/vertigo
The vast majority of cases of vertigo are due to peripheral causes or benign central conditions (migraine)
• What do you need
  • a good history
  • a bit of examination
    • positional test (Hallpike)
    • maybe a head impulse test
  • occasionally an audiogram
  • not often is ‘brain’ imaging required!
Balance reflexes
- keep us upright
- maintain clear vision whilst moving

Complicating factors
- Musculoskeletal
- Psychological
- Medication
Oscillopsia

LIVING WITHOUT A BALANCING MECHANISM

JOHN C.

BOSTON

ONE morning, now about four years ago, I arranged in my pajama pocket toothpaste, toothbrush, razor and shaving soap, mounted my bike, and biked a mile to the nearest drugstore to buy a new razor blade.
• Vertigo

• = illusion of rotation, also rocking, tilting, dropping

• caused by asymmetric vestibular activity

  • peripheral: vestibular end-organ & nerve

  • central: brain stem/cerebellar/cortical pathways

• **TIP:** classify presentation as acute, chronic or recurrent to reduce the list of DDx’s

• worsened by head movement, so the pt who’s dizzy all the time (& move around) is NOT vertiginous! (RELAX a bit)

• shouldn’t lose consciousness (unless they vomit a lot or bump their head) in aural vertigo
• Red flags for a central (CNS) cause
  
  • focal neurological signs
  
  • ataxia & nystagmus which is out of proportion for the degree of vertigo
  
  • direction-changing (on lateral gaze) or gaze-evoked nystagmus
  
  • pure vertical nystag (UBM/DBN)
  
  • other concurrent eye movement abnormalities (gaze palsy, skew deviation)
7.5.3 Torsional Nystagmus

**Characteristics**
- Upper pole of the eye beats away from the side of the lesion
- Most are conjugate

**Causes**
1. Infarction (37%)
2. Multiple sclerosis (20%)
3. Venous angioma (10%)
4. Arnold-Chiari malformation (7%)
5. Tumor (5%)
6. Encephalitis (5%)
7. Trauma (5%)
8. Seizure (5%)
9. Idiopathic (5%)

**Location of lesion**
1. Pontomedullary junction
2. Cerebellar or midbrain lesions are less common.

**Pathogenesis**
Disruption of anterior and posterior canal projections on the same side (see section 3.7).
“Forget about vertebro-basilar TIA (insufficiency) as a cause of isolated recurrent vertigo” - PLEASE!
- Principle disease causes of vertigo

<table>
<thead>
<tr>
<th>Peripheral</th>
<th>Central</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPPV</td>
<td>Migrainous vertigo</td>
</tr>
<tr>
<td>Vestibular neuronitis</td>
<td>Vascular disease</td>
</tr>
<tr>
<td>Meniere’s disease</td>
<td>MS</td>
</tr>
<tr>
<td>Trauma</td>
<td>Tumours</td>
</tr>
<tr>
<td></td>
<td>Trauma</td>
</tr>
</tbody>
</table>
• Syndromic approach: two questions

1. Acute, chronic or recurrent
2. Spontaneous or motion-induced
4 clinical syndromes

1. Acute vestibulopathy
2. Recurrent vestibulopathy
3. Motion induced vertigo
4. Chronic dysequilibrium

} Spontaneous vertigo
1. Acute vestibulopathy

Vestibular neuritis
Stroke (PICA, AICA)
Perilymph fistula
Trauma
- **Vestibular neuronitis/vestibular neuritis/labyrinthitis**
  
  - = acute severe spontaneous, isolated vertigo ± ataxia, nausea & vomiting (gen. no HL)
  
  - ↑ with head movt, generally > 1/7, recovery in days-weeks
  
  - **TIP:** able to stand (albeit unsteady) with eyes open
  
  - horizontal (-torsional) nystagmus which beats TOWARD the good/unaffected ear
  
  - **TIP:** unidirectional (bi-directional ⇒ central cause)
  
  - **TIP:** may be suppressed by fixation→ophthalmoscopy to bring out the nystagmus
  
  - **TIP:** Head Impulse Test positive in vestibular neuronitis
  
  - 1:5 post-VN BPPV
Head Impulse Test (Head Thrust Test)
Video Head Impulse Test (vHIT)
• Cerebellar infarction
  
  • principle differential of vestibular neuritis

  • **TIP:** generally CANNOT stand without support & eyes open

  • **TIP:** HIT normal

  • **TIP:** nystagmus be bilateral, vertical (up- or down-beating), no fixation suppression

  • MRI brain is generally definitive (possibly normal in 1st 24-48/24)
HINTS to Diagnose Stroke in the Acute Vestibular Syndrome

Three-Step Bedside Oculomotor Examination More Sensitive Than Early MRI Diffusion-Weighted Imaging

Jorge C. Kattah, MD; Arun V. Talkad, MD et al

Stroke 2009;40;3504-3510
HINTS (high stroke risk)

- Head Impulse (normal)
- Nystagmus (direction changing)
- Test of Skew deviation (present)
• Benign HINTS examination result at the bedside “rules out” stroke better than a negative MRI with DWI in the first 24 to 48 hours after symptom onset

• The sensitivity of early MRI with DWI for lateral medullary or pontine infarction was lower than that of the bedside examination (72% versus 100%)
2. Recurrent vestibulopathy

- = recurrent vertigo, \( \leq \) few hours, generally Asx in intervals

  - Migrainous vertigo (or migrainous unsteadiness)
  - Meniere’s disease
  - Vertebro-basilar ischaemia
2. Recurrent vestibulopathy

Migraine
Meniere’s disease
  Vertebro-basilar insufficiency
  Vestibular paroxysmia
  Focal epilepsy
  Episodic ataxia
• Migrainous vertigo/vestibular migraine/basilar migraine is probably incorrectly used in this context (ie. uncommon, more serious entity)

• episodic vertigo ± nausea, vomiting, tinnitus, headache and (even) hearing loss

• **TIP:** chase the headache history (often not volunteered by pt)

• separation of vertigo & headache in time (possibly by years or infinitude (benign recurrent vertigo))

• second most common cause of episodic vertigo

• **TIP:** ? visual sx’s (fortification spectra)

• **TIP:** ? past history of any migrainous symptoms (often need to prompt)

• **TIP:** ? family history (especially maternal side)

• **TIP:** often worth a trial of migraine prophylaxis (Therapeutic Guidelines Neurology)

• Response to acute migraine treatment more variable (but worthwhile)
- Meniere’s disease (or ‘syndrome’)
  - episodic endolymphatic hydrops
  - recurrent spontaneous vertigo (± nausea & vomiting) with fluctuating auditory sx’s (tinnitus, HL (not always perceptable, let alone present) & aural fulness)
  - possibly get isolated vertigo attacks in earlier stages
  - uncommonly ‘drop attacks’ (otolithic crisis of Tumarkin)
  - days, months or even years apart
  - later tends to progress (auditory & vestibular), but can permanently remit
- **TIP**: very uncommon in neurologic practice
• Vertebro-basilar ischaemia

- vertigo triggered by cervical (head) flexion is almost never vertebral artery occlusion secondary to osteophytes (despite past teaching)
  - head extension vertigo is usually a peripheral vestibulopathy (especially BPPV)
- rarely isolated vertigo
- usually other sx’s: diplopia, dysphagia, dysarthria, visual field defect; focal motor/sensory deficits
3. Motion-induced dizziness

- Uncompensated peripheral lesion
- Benign positional vertigo
  - Migraine
  - Cervical vertigo
  - Cerebellar disease

• Usually respond to physical treatment modalities
3. Motion induced vertigo

= frequent, brief episodes of motion-induced vertigo (NOT spontaneous vertigo at rest)

i) Uncompensated peripheral vestibular lesion (e.g. following vestibular neuronitis)

ii) Benign Paroxysmal Positional Vertigo (BPPV)
• Poorly compensated peripheral vestibular lesion (e.g. following vestibular neuronitis)
  • marked motion-induced sx’s when upright
• Benign Paroxysmal Postural Vertigo (BPPV) aka BPV aka crystals in your inner ear
  • most common cause of (acute, episodic) vertigo
  • motion-induced: “roll over in bed, hang out washing on line, shave, put on make-up”, etc
  • episodic (often in bouts), days to weeks, spontaneously remit, returns in weeks, months or years later
  • ie. pt with repeated bouts of vertigo over decades and a normal examination most likely have BPPV (DDx MV)
  • pathology is that of displaced otoconia (generally in the posterior SCC) causing havoc
  • occasionally post-traumatic or post vestibular-neuronitis bppv
  • if you’ve got one you’re more likely to get others
    • associations eg MV, MD
• So what do next?

• Provoke an attack (or at least nystagmus) of course!
• Epley manœuvre

• do as continuation of Hallpike

• works in 8/10 cases

• rarely surgical occlusion of posterior canal undertaken
Diagnosis

- Must see nystagmus with vertigo
- Patients with other vestibular disorders will often feel dizzy during the Hallpike manoeuvre
- Spontaneous or central nystagmus may be more prominent during positional testing
4. Chronic dysequilibrium

- P/W imbalance, falls

**TIP:** Sx’s only when stand/walk

**TIP:** important to recognize multi-sensory dizziness/dysequilibrium in older pts b/c sedative & vestibular suppressants (eg tematil, diazepam) may exacerbate

- eg. visual impairment, peripheral neuropathy, age-related vestibular changes, cervical spondylosis
Duration of vertigo

- Seconds
  - BPPV, uncompensated peripheral lesion
- Minutes
  - migraine, vertebro-basilar ischaemia (rare)
- Hours
  - migraine, Meniere’s disease
- Days
  - vestibular neuronitis, stroke
• So,

• In most patients a provisional diagnosis can be reached so that appropriate treatment can be commenced (i.e. have a go!)

• Vestibular vs. psychological/other aetiology:

1. Vestibular aetiology ↑ likely if dizziness triggered/aggravated by head movement,

2. A C/O constant dizziness for months/years, not related to head movement

• ⇒ generally NOT vestibular, ? psychogenic

• If still unsure, try and reproduce sx’s (rotate on spot with eyes closed, (physiol. vertigo) hyperventilate (light headedness))
- Panic attack
  - hyperventilation
  - sensation is not true vertigo, but dizziness
- PPV/psychogenic dizziness
  - possible accompaniment
  - often situation specific
  - reassurance/explanation
  - treat the organic component
Treatment of acute vertigo

- prochlorperazine (Stemetil)
- promethazine (Avomine, Phenergan)
- diazepam (Valium)

NB. Avoid prolonged use because of:
- possible antagonism of central compensation
- risk of extrapyramidal side effects
- risk of habituation
Treatment of chronic vertigo

- Treatment of underlying causes
  - Meniere's disease, migraine.
- Treatment of exacerbating factors
  - anxiety, tranquilisers

- Physical therapies
  - Cawthorne-Cooksey exercises
  - programmed vestibular rehabilitation
  - specific therapies for benign positional vertigo

- Ablative therapy
  - ototoxic drugs
  - vestibular nerve section
Vestibular rehabilitation

Appropriate

- Motion-induced symptoms
- Continuous symptoms with motion exacerbation
- Functional balance or gait dysfunction

Inappropriate

- Spontaneous vertigo (unstable or progressive lesion)
- No provocative activity or balance dysfunction
- Progressive central lesion
Summary

• In the patient with repeated attacks of isolated vertigo:

  1. Always do a positional test (eg. Hallpike)
  2. Learn to do the particle repositioning manoeuvre (eg. Epley)
  3. Consider an audiogram
  4. Try migraine prophylaxis
  5. Put vertebrobasilar insufficiency at the bottom of the list

• In the patient having the first ever attack of acute spontaneous vertigo:

  1. Learn to do the head impulse test (? vestibular neuronitis)
  2. Think of cerebellar infarction
When to image

- Most patients presenting with vestibular symptoms will not require a routine imaging study
  - particularly if they present with a typical vestibular syndrome (e.g. vestibular neuritis, BPPV, vestibular migraine, Meniere’s)
- Most scans in patients with vestibular symptoms will be negative*

Indications for CT

- suspected superior semicircular canal dehiscence or perilymph fistula
- post-traumatic vertigo

Indications for MRI

- asymmetric SNHL in order to rule out an acoustic nerve lesion
- central eye movement disorder (e.g. central nystagmus)
- acute severe vertigo with negative head impulse test/presence of red flags

- The probability that a patient with dizziness has a cerebello-pontine angle (CPA) mass is 0.0004 (i.e. 2500 imaging studies required to pick-up one CPA mass)
- In patients with isolated dizziness (i.e. normal hearing), this value decreases to 0.000107 (i.e. 9307 scans requested to pick-up one CPA mass)
- In patients with dizziness & asymmetric hearing loss, the probability of finding a CPA mass on imaging is 0.00156 (i.e. 638 scans to pick-up one CPA mass)
Done !