Objectives

- Use the four classic dizziness sub-categories to differentiate between causes of dizziness.
- Perform classical office tests for dizziness diagnosis, such as the Dix-Hallpike, visual fixation and head thrust tests.
- Differentiate between central (serious) and peripheral (benign) causes of vertigo.

Objectives

- Diagnose and manage common causes of vertigo
- Describe how the approach to dizziness may differ in an elderly patient, and identify several ways to prevent falls and maintain function in the elderly patient with dizziness.
- Perform the modified Epley maneuver for treatment of benign positional vertigo.

Dizziness

- Common medical complaint in primary care – Most causes benign, but can be serious
- Often frustrating
- Clinical Diagnosis
**Case 1: 67 YOF who can’t go to the salon**

- “I feel like the room is spinning”
- “Comes and goes”
- Lasts only seconds
- Brought on by rolling over to get out of bed in the morning, looking up to a shelf
- No hearing loss or tinnitus
- Feels fine between these “spells”

**67 YOF with bad hair**

- Medications: HCTZ
- PMH: HTN
- FH: mom had a stroke in her late 80’s
- SH: quit smoking 20 years ago, no ETOH

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**Describe “Dizziness”**

- Wait for it... let the patient describe

- What are the four types of dizziness?

- What kind of dizziness does this patient have?

- What are the four types?
  - Presyncope
  - Vertigo
  - Dysequilibrium
  - Non-specific dizziness
Vertigo

- A false sense of motion
  - Self or environment
- Spinning
- Amusement park ride
- Swaying or tilting

List some common causes of vertigo

Causes of Vertigo

**Peripheral "Benign"**
- BPPV
- Vestibular neuritis
- Meniere’s disease
- Perilymphatic fistula
- Herpes zoster oticus
- Acoustic neuroma
- Ototoxicity
- Otitis media
- Vestibular hypofunction
- Semicircular canal dehiscence syndrome

**Central "Serious"**
- Migrainous vertigo
- Intracranial mass
- Stroke
  - Cerebellar/brainstem
- Vertebrobasilar insufficiency
- Chiari malformation
- Multiple sclerosis

Historical Clues

- Timing – Episodic vs Constant
- Duration – Seconds vs hours vs days
- Recurrence
Narrowing your diagnosis

<table>
<thead>
<tr>
<th>Duration</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Episodic</td>
<td>Constant</td>
</tr>
<tr>
<td>Seconds</td>
<td>BPPV</td>
</tr>
<tr>
<td>Minutes-Hours</td>
<td>Meniere's</td>
</tr>
<tr>
<td></td>
<td>Migraine</td>
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<tr>
<td></td>
<td>TIA</td>
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<tr>
<td>Days</td>
<td>Migraine</td>
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<tr>
<td></td>
<td>Vestibular neuritis</td>
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<td></td>
<td>CVA</td>
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</tbody>
</table>

Historical Clues

- Triggers – position changes, head movement, pressure changes
- Associated symptoms – neurologic, hearing loss, tinnitus, headache
- PMH – diabetes, CVD, HTN, head trauma
- FH – stroke, migraine, Meniere’s, BPPV
- Medications – antihypertensives, anticonvulsants

Physical Exam

- Ear: cerumen, vesicles on TM, middle ear effusion, hearing
- Eye: nystagmus, ocular movements, vision
- CV: carotid bruits, murmur, arrhythmia, signs of PAD
- Neurologic: Rhomberg, cerebellar signs

What do you look for on physical exam?
67 YOF with bad hair

- Vitals: AF, HR 62, BP 145/92
- HEENT: some cerumen in canals bilaterally
- Neck: No carotid bruits
- CV: RRR, no murmurs
- Ext: DP +2 b/l, no edema
- Neuro: wnl, no nystagmus

What should you do next?

Benign Paroxysmal Positional Vertigo

- Most common cause of vertigo
  - Increasing incidence with age
- Brief episodes lasting < 1 minute
- Triggered by head position changes
  - No vertigo between attacks

DIX-HALLPIKE
BPPV - Treatment

- Most spontaneously improve in 4-6 weeks
- Best: Epley maneuver
- Physical Therapy (vestibular rehabilitation)
- Avoid symptomatic medications
  - Meclizine, antiemetics, benzodiazepines
- Counsel about recurrence, evaluate fall risk

Case 2: 45 YOM truck driver who can’t drive

- Severe “dizziness” for 2 days
- Nauseas and vomiting
- Whenever he opens his eyes, feels like everything is moving
- Prefers to lie still with eyes closed
- Recent URI
- No hearing loss or tinnitus

Epley maneuver

- What do you think is going on?
- What do you look for on physical exam?
45 YOM who can’t open his eyes

- HEENT: TM’s normal
- CV: RRR, no murmurs
- Neuro:
  - spontaneous unilateral nystagmus to right
  - Romberg normal
  - gait – veers towards the left but can walk

What tests might help differentiate vestibular neuritis from a CVA?

**HEAD THRUST TEST**

**VISUAL FIXATION**

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**Head thrust test**

Positive test

Normal test

Adapted from *Pract Neurol* 2008; 8: 211–221.

**Visual fixation**

- Have a patient focus on a visual target
  - Nystagmus stops if lesion is peripheral
- Place a blank sheet of paper in front of the patient’s face
  - Nystagmus returns
- Central lesions will not be suppressed by visual fixation
**Peripheral Central**

<table>
<thead>
<tr>
<th>Peripheral</th>
<th>Central</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPPV</td>
<td>Vestibular Neuritis</td>
</tr>
<tr>
<td>History</td>
<td></td>
</tr>
<tr>
<td>- Brief, recurrent</td>
<td>- Sudden onset</td>
</tr>
<tr>
<td>- Triggered by positional changes</td>
<td>- Risk factors for stroke</td>
</tr>
<tr>
<td>- No vertigo between attacks</td>
<td>- Severe headache</td>
</tr>
<tr>
<td>Nystagmus</td>
<td></td>
</tr>
<tr>
<td>- Up-beating and torsional</td>
<td>- Direction changing</td>
</tr>
<tr>
<td>- Horizontal and unidirectional</td>
<td>- Purely vertical</td>
</tr>
<tr>
<td>- Unidirectional</td>
<td>- Purely torsional</td>
</tr>
<tr>
<td>Gait</td>
<td></td>
</tr>
<tr>
<td>- Unaffected between episodes</td>
<td>- Unable to walk</td>
</tr>
<tr>
<td>Specialized physical exam tests</td>
<td></td>
</tr>
<tr>
<td>- Positive Dix-Hallpike maneuver</td>
<td>- Negative head thrust test</td>
</tr>
<tr>
<td>- Positive supine roll test</td>
<td>- Visual fixation does not stop nystagmus</td>
</tr>
<tr>
<td>Additional Neurologic Signs</td>
<td></td>
</tr>
<tr>
<td>- Rare</td>
<td>- Rare</td>
</tr>
<tr>
<td>- Rare</td>
<td>- Rare</td>
</tr>
<tr>
<td>- Common (such as dysarthria, aphasia, incoordination, weakness, or numbness)</td>
<td></td>
</tr>
</tbody>
</table>

**Vestibular neuritis**

- Second most common cause of vertigo
  - 50% have had recent URI
  - Hypothesized to be a viral infection (HSV) of CN8
- Sudden, constant severe vertigo
- Oscillopsia with spontaneous nystagmus
- May veer towards affected side

**What treatment could you offer this patient?**

- Would you advise symptomatic medication (anti-emetics, anti-cholinergic, etc) and if so, for how long?
Vestibular neuritis - Treatment

• Rest, gradually improves in a few weeks
• Vestibular suppressants for first few days ONLY
  – antiemetics, antihistamines, benzodiazepines

Corticosteroids controversial
  – 2011 Cochrane review found insufficient evidence for routine use
  – Studies show earlier return of vestibular function testing but mixed evidence for earlier recovery of symptoms
  – Prednisone burst for 10 days
• BEST – vestibular rehabilitation

Vestibular rehabilitation

• Facilitates “vestibular adaptation” – brain compensates for vestibular dysfunction
• Quicker recovery and decreased long-term sequel

Case 3: 13 year old who is missing school from “dizzy spells”

• Describes as spinning sensation, often triggered by movement
• Lasts hours, sometimes days.
• Associated with nausea and vomiting and photophobia
• Often seems to occur around time of menstruation
13 year old with dizziness, photophobia, and phonophobia

- PMH: chronic headaches
- Meds: NSAIDs, APAP as needed
- FH: Migraines in mother, CVA in grandmother
- PE: no abnormal findings including neurologic exam and gait

What is the likely diagnosis?

What tests would you consider?

- What if this patient was 65 years old with a history of HTN, DM2 and 30 pack-year smoking history?

Vestibular migraine

- Common, unrecognized cause of vertigo
- Migraine variant
- Often a history of migraine
- Vertigo may occur with headache
- Duration and triggers similar to migraine

Exam usually normal

Clinical diagnosis of exclusion

- Obtain audiometry and vestibular function testing to exclude other etiologies
- Consider MRI brain, esp. if red flags/stroke risk factors
Diagnostic Criteria for Vestibular Migraine

A. At least five episodes fulfilling criteria C and D
B. A current or past history of migraine without aura or migraine with aura
C. Vestibular symptoms of moderate or severe intensity, lasting between 5 minutes and 72 hours
D. At least 50 percent of episodes are associated with at least one of the following three migrainous features:
   1. Headache with at least two of the following four characteristics:
      a) Unilateral location
      b) Pulsating quality
      c) Moderate or severe intensity
      d) Aggravation by routine physical activity
   2. Photophobia and phonophobia
   3. Visual aura
E. Not better accounted for by another ICHD-3 diagnosis or by another vestibular disorder

Vestibular Migraine: Treatment

- Same as for migraine
  - Improvement of vertigo with triptans can be both therapeutic and diagnostic
  - Trigger avoidance
  - Prophylaxis if frequent or debilitating
- Vestibular suppressants

Case 4: A dizzy 37 YOF with an earful of ocean

- Last week, had vertigo, nausea, and vomiting
  - Lasted 3-4 hours
  - Spontaneously resolved
- Recurred this morning
- Difficulty walking
- “Sounds like the ocean is in my left ear”

37 YOF with dizziness and roaring in her left ear

- PMH: Hypertension
- Meds: HCTZ, OCP
- FH: Grandfather with a “dizziness problem”
- SH: Occasional ETOH, former smoker
37 YOF with dizziness and roaring in her left ear

- Vitals: AF, BP 132/85, HR 77, RR 18
- General: Lying supine, uncomfortable-appearing
- HEENT: Horizontal nystagmus with left gaze; decreased hearing in left ear
- CV: RRR, no murmurs, no bruits
- Neuro: + Rhomberg, mild gait ataxia

What do you think is going on?
What further testing is needed?
How would you treat her acute symptoms? Prevent future episodes?

Meniere’s Disease

- Classic triad of vertigo, hearing loss, and tinnitus/aural fullness
  - HL is fluctuating, occurs with vertigo, initially low frequency

Meniere’s disease

- Overtime, can lead to permanent disability
  - Permanent hearing loss
  - Vestibular function loss leads to chronic imbalance and positional vertigo
Meniere’s Disease: Diagnosis

- Clinical diagnosis
- Audiometry
- MRI/MRA - rule out other causes
- +/- Vestibular function testing

Diagnostic criteria for Meniere’s disease

**Definite Meniere’s Disease**

A. ≥ 2 definitive spontaneous episodes of vertigo 20 min or longer
B. Audiometrically documented hearing loss on at least 1 occasion
C. Tinnitus or aural fullness in the treated ear
D. Other causes excluded

Treatment

- Goals: decrease frequency/severity of vertigo, improve balance, preserve hearing and QOL
- Acute: Symptomatic meds, steroid
- Prophylaxis:
  - Diet: Decrease salt, caffeine, alcohol, MSG, nicotine
  - Diurectics: e.g. triamterene-hydrochlorothiazide (Dyazide) 37.5-25 mg
- Educate: No “cure” but most can get good improvement of vertigo

Other treatment modalities (from most to least conservative)

- Vestibular rehabilitation
- Meniett device
- Intratympanic gentamicin
- Endolymphatic sac procedures
- Vestibular neurectomy
- Labyrinthectomy
Case 5: 72 YOF who gets dizzy when putting the dishes away

- Feels like things are spinning
- Noticed that it occurs whenever she looks up to put dishes away on high shelves
- Lasts about a minute, resolves if she “holds still”
- Normal between episodes

72 YOF who gets dizzy when putting the dishes away

- Medications: Lisinopril-HCTZ, ibuprofen
- PMH: HTN
- SH: ½ ppd x 45 years, no ETOH
- FH: Father died of MI age 62

72 YOF who gets dizzy when putting the dishes away

- Vitals: BP 157/82, HR 89
- HEENT: TMs clear, swollen turbinates
- Neck: bilateral carotid bruits
- CV: RRR, no murmur
- Ext: DP 1+ B/L
- Neuro: WNL, no nystagmus

What do you think is going on?

What is your first step in further evaluating this patient?
72 YOF who gets dizzy when putting the dishes away

- Orthostatics: BP → 145/76, ↑ 113/68
  - Stopped diuretic – symptoms unchanged
- Dix-Hallpike: +vertigo on right, ? nystagmus
- Carotid doppler
  - Right ICA 50-69% stenosis
  - Reversal of flow in left vertebral artery: Subclavian Steal Syndrome
- Symptoms resolve with stenting of left subclavian artery (90% stenosis)

Vertebrobasilar insufficiency (TIAs)

- Brainstem ischemia
  - Embolic, atherosclerotic occlusions of vertebrobasilar arterial system
  - Subclavian steal syndrome
  - Rotational vertebral artery syndrome

Vertebrobasilar insufficiency

- Recurrent, abrupt episodes lasting min - hours
- +/- diplopia, ataxia, weakness, drop attacks, dysarthria
  - Isolated vertigo if ischemia is in the distribution of the vertebral artery
- Crescendo pattern
- KEY: Risk factors for cardiovascular disease

Indications for further testing

- Diagnosis uncertain or refractory BPPV
  - Vestibular function testing
  - BPPV can occur along with other vestibular disorders
- Red flags → rule out central cause
  - Included are risk factors for CVD
- MRI/MRA, Carotid doppler
84 YO dizzy male who was told he was just “getting old”

- Chronic dizziness
- Unsteady on feet, which he notes “go numb”
- Curtailing activities
- PMH: Advanced macular degeneration, hearing loss, DM2, HTN
- Meds: metformin, lisinopril, ASA 81mg, Tylenol PM

VS: Temp 36.8, HR 62, BP 110/70
HEENT: VA 20/200 OU, PEERLA, Cerumen obscuring both TMs, cannot decipher words spoken softly in either ear
CV: RRR, systolic murmur at RUSB
Neuro: Gait –hesitant, improves if he can touch his hand to a counter/your arm. Decreased sensation to light touch, temperature and vibratory sense in LE bilaterally.

Dizziness in the elderly

- Over 1/3 of elderly experience dizziness
- Increases fall risk, disability, institutionalization, and death
- Usually multiple contributors, therefore evaluate all possible contributing factors

What other physical exam tests would you do?
What do you think is contributing to his dizziness?
What can you offer him?
Take home points

- Dizziness is not a disease, it is a symptom
- Most dizziness can be diagnosed with history and physical exam alone
- Do further testing if dx unclear or red flags
  - neurologic sx's/signs, risk factors for vascular disease

Use the Dix-Hallpike and Epley maneuvers to diagnose and treat BPPV

Vestibular rehabilitation reduces fall risk, improves outcomes

Avoid using vestibular suppressants for BPPV, and no more than 2-3 days for VN

Dizziness in the elderly often multifactorial

References