Dizziness and Balance Disorders: You're Making Me Dizzy

David Schneider, MD, FAAFP

ACTIVITY DISCLAIMER

The material presented here is being made available by the American Academy of Family Physicians for educational purposes only. Please note that medical information is constantly changing; the information contained in this activity was accurate at the time of publication. This material is not intended to represent the only, nor necessarily best, methods or procedures appropriate for the medical situations discussed. Rather, it is intended to present an approach, view, statement, or opinion of the faculty, which may be helpful to others who face similar situations.

The AAFP disclaims any and all liability for injury or other damages resulting to any individual using this material and for all claims that might arise out of the use of the techniques demonstrated therein by such individuals, whether these claims shall be asserted by a physician or any other person. Physicians may care to check specific details such as drug doses and contraindications, etc., in standard sources prior to clinical application. This material might contain recommendations/guidelines developed by other organizations. Please note that although these guidelines might be included, this does not necessarily imply the endorsement by the AAFP.
DISCLOSURE

It is the policy of the AAFP that all individuals in a position to control content disclose any relationships with commercial interests upon nomination/invitation of participation. Disclosure documents are reviewed for potential conflict of interest (COI), and if identified, conflicts are resolved prior to confirmation of participation. Only those participants who had no conflict of interest or who agreed to an identified resolution process prior to their participation were involved in this CME activity.

All individuals in a position to control content for this session have indicated they have no relevant financial relationships to disclose.

The content of my material/presentation in this CME activity will not include discussion of unapproved or investigational uses of products or devices.

David Schneider, MD, FAAFP

Faculty physician/Didactics Director/Procedures Director, Santa Rosa Family Medicine Residency, California; Professor of Family and Community Medicine, University of California, San Francisco (UCSF) School of Medicine

Dr. Schneider cares for the underserved in Santa Rosa, California, serving Latino, Southeast Asian, and Eritrean populations. He has taught the breadth and depth of family medicine for more than 20 years, and his professional interests include the physician-patient relationship and clinical skills. Cardiovascular system conditions are one of his specialty topics, and he points to "the growing body of evidence suggesting that lifestyle is as effective as, or more effective than, pharmacologic interventions in primary prevention." Dr. Schneider also focuses on conditions of the endocrine system (especially thyroid); skin conditions and dermatology; primary prevention, with a focus on lifestyle; and procedures. Board certified in both family medicine and integrative holistic medicine, he produces Dr. Dave's To Your Health segments for Wine Country Radio and BlogTalkRadio.com.
Learning Objectives

1. Narrow the differential diagnosis of dizziness with physical examination tests and appropriate history taking, including a medication review and anxiety disorder evaluation.

2. Recognize the different clinical presentation of an acoustic neuroma from BPPV.

3. Use evidence-based guidelines to select appropriate treatment of dizziness as appropriate per the etiology.

4. Develop collaborative care plans, including patient education, to help patients minimize reoccurrences of dizziness.

5. Identify Parkinson’s Disease as an etiology of gait disorders and formulate an appropriate treatment plan.

Audience Engagement System
Dizziness is Common

- Prevalence in primary care 1 – 15.5%.
- 2.5-3.5% of ED visits.
- 20-30% of general population.
- 3rd most common sx in general/primary care clinics.

DDx of Dizziness

- Everything you can think of.
- Everything else you thought of later.

DDx of Dizziness

• Peripheral:
  – BPPV
  – Vestibular neuritis
  – Meniere’s
  – Otosclerosis
  – Superior canal dehiscence syndrome
  – Cervicogenic dizziness

• Central (~25%):
  – Vestibular migraine
  – Stroke/TIA
  – Posterior fossa tumor/cerebellopontine angle tumor (rare)
  – Multiple sclerosis
  – Epileptic vertigo & dizziness (rare)

DDx of Dizziness—Other Causes

• Cardiac
  – HF
  – Arrhythmia
  – Aneurysm
  – ASCVD
  – Valvular
• Orthostatic
• Concussion/mild TBI
• Ramsay-Hunt syndrome
• Lyme dz

• Psychiatric:
  – Anxiety
  – Depression
  – Bipolar
  – Hyperventilation syn
• Meds, polypharmacy
• Rare:
  – Wernicke’s encephalopathy
  – Bacterial labyrinthitis
  – Brainstem encephalitis

AFP 2017;95:154-62; CMAJ 2011;183:E571-82; Front Neuro. 2017;8:177;
DDx of Dizziness—Other Causes

- Anemia (hematologic, not metabolic).
- Hypoglycemia.
- Hypercalcemia.
- Thiamine or vitamin B12 deficiency.
- Hyperventilation (metabolic alkalosis).
- Parkinson’s Dz.
- CA.

Meds: CV Mechanism—Hypotension, Postural, Arrhythmia

- Alcohol*
- Antiarrhythmics, class 1a
- Antidementia agents
- Antiepileptics
- Antihistamines (sedating)*
- Antihypertensives*
- Anti-infectives: anti-influenza agents, antifungals, quinolones
- Antiparkinsonian agents*
- ADHD agents*
- Digitalis glycosides
- Dipyridamole
- Narcotics*
- Nitrates
- PDE-5 inhibitors
- Skeletal muscle relaxants*
- Sodium–glucose cotransporter-2 inhibitors
- Urinary anticholinergics*
Meds: Other

- Anticholinergic +/- sedation
  - Skeletal muscle relaxants*
  - Urinary and GI antispasmodics*
- Cerebellar toxicity
  - Antiepileptics
  - Benzodiazepines*
  - Lithium*
- Hypoglycemia
  - Antidiabetic agents
  - Beta-blockers*
- Ototoxicity
  - Aminoglycosides
  - Antirheumatic agents
- Hem—bleeding, marrow suppression
  - Anticoagulants
  - Antithyroid agents

AES Question #1

62 yo Cambodian M p/w constant dizziness X 1 week. +/- sensation of movement, no recent trauma or meds. Which of the following is most likely cause?
A. Meniere’s disease
B. Benign paroxysmal positional vertigo
C. Cerebellar stroke
D. Anxiety/depression/mood disorder
E. Excess alcohol
Types of Dizziness

• Traditionally 4 types:
  – Vertigo (false sensation of motion).
  – Presyncope.
  – Dysequilibrium.
  – Nonspecific dizziness/lightheadedness.
• Type of dizziness not reliable, doesn’t discriminate among causes.


TiTrATE Approach to Dizziness

• **Timing:**
  – Acute, continuous dizziness, duration ≥24 hr.
  – Episodic—seconds, minutes, hrs.
• **Trigger:** present or absent (spontaneous).
  – Movement (head, body).
• **And** Targeted Examination based on syndrome.

4 Vestibular Syndromes

• Episodic Vestibular Syndrome (EVS):
  – Triggered.
  – Spontaneous.

• Acute Vestibular Syndrome (AVS):
  – Post-exposure (trauma, toxin).
  – Spontaneous.

---

Consistent Episodic Spontaneous

s-AVS
--Vestib neuritis (Periph HINTS)
--Posterior circulation stroke

s-EVS
--Vestibular migraine
--Vasovagal syncope
--Panic attacks.
--Meniere’s dz
--Arrhythmia
--TIA

t-AVS
--Trauma (TBI, barotrauma)
--Toxin (Abx, AED)

t-EVS
--BPPV
--Orthostatic
--Tumor

Episodic Vestibular Syndrome (EVS)

- Intermittent, seconds/minutes/hours.
  - Episode duration more important than total illness duration.
  - Usual multiple, discrete episodes over time.
- Triggers:
  - Movement (head, body—orthostatic).
  - Rare: loud sounds, Valsalva.


Diagnostic Error/Misconception

- Head movement tends to exacerbate any dizziness of vestibular cause (benign or dangerous, central or peripheral, acute or chronic).
- Worsening of dizziness w/head motion does not prove peripheral cause.

Acute Vestibular Syndrome (AVS)

- Acute, persistent dizziness, days-weeks, +/- sequelae.
- Temporal evolution at onset & 1st wk more important than total illness duration.
- Early peak, rapid improvement 1st wk, gradual recovery (wks-months). Rarely <48-72 hrs.
  - Postexposure (traumatic/toxic).
  - Spontaneous forms.

4 Vestibular Syndromes

- Episodic Vestibular Syndrome (EVS):
  - Triggered.
  - Spontaneous.
- Acute Vestibular Syndrome (AVS):
  - Post-exposure (trauma, toxin).
  - Spontaneous.
## 4 Vestibular Syndromes

<table>
<thead>
<tr>
<th>Consistent (Acute)</th>
<th>Episodic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spontaneous</strong></td>
<td></td>
</tr>
<tr>
<td>s-AVS</td>
<td>s-EVS</td>
</tr>
<tr>
<td>--Vestib neuritis (Periph HINTS)</td>
<td>--Vestibular migraine</td>
</tr>
<tr>
<td>--Posterior circulation stroke</td>
<td>--Vasovagal syncope</td>
</tr>
<tr>
<td></td>
<td>--Panic attacks.</td>
</tr>
<tr>
<td></td>
<td>--Meniere’s dz</td>
</tr>
<tr>
<td></td>
<td>--Arrhythmia</td>
</tr>
<tr>
<td></td>
<td>--TIA</td>
</tr>
<tr>
<td><strong>Triggered</strong></td>
<td></td>
</tr>
<tr>
<td>t-AVS</td>
<td>t-EVS</td>
</tr>
<tr>
<td>--Trauma (TBI, barotrauma)</td>
<td>--BPPV</td>
</tr>
<tr>
<td>--Toxin (Abx, AED)</td>
<td>--Orthostatic</td>
</tr>
<tr>
<td></td>
<td>--Tumor</td>
</tr>
</tbody>
</table>

### TiTrATE: Acute Vestibular Syn

- **Spontaneous (s-AVS):**
  - HINTS = peripheral & no deafness ➔ vestibular neuritis.
  - HINTS = central or deafness ➔ stroke, TIA, encephalitis, poss bacterial labyrinthitis (clue = mastoiditis, OM).
  - Note: hearing loss + vestib neuritis = labyrinthitis.

TiTrATE: Acute Vestibular Syn

- Spontaneous (s-AVS):
  - No nystagmus, normal EOM’s ➔ medical +/- neuro W/U.
  - Glc, lytes, ? thiamine/B12, other is indicated.
- S-AVS = dizzy @ rest, worse w/head motion ➔ avoid Dix-Hallpike! (Do HINTS.)

Deadly D’s

- Deficit—neuro.
  - Focal.
  - Gait —esp new.
- Dolor—head, neck.
- Dysfunction:
  - Diplopia
  - Dysarthria
  - Dysphonia
  - Dysphagia
  - Dysmetria

Consider posterior circulation stroke!
HINTS Exam

- Targeted Exam for Acute Vestibular Syndrome only (continuous dizziness/vertigo ≥24 hr).
  - **Head Impulse Test**
  - **Nystagmus**
  - **Test of Skew**

Power of HINTS = send home vestibular neuritis pts from office/ED-- Don’t wait 24 hours for sx if + nystagmus!

AES Question #2

In a pt with acute vestibular syndrome, which of the following is concerning on HINTS exam?

A. Corrective saccade on head impulse test
B. No corrective saccade on head impulse test
C. Nystagmus when he looks to L side
D. Lack of vertical skew
Head Impulse

• Pt seated, fixate on nose.
• Rotate head ~20° to 1 side, then briskly turn back to midline.
  – Corrective saccade ➔ impaired vestibulo-ocular reflex ➔ positive/abnormal test ➔ peripheral vertigo (if unilateral saccade).
  – No saccade/eyes do not move ➔ central etiology.

Neurol Clin 2015;33:551-64; AFP 2017;95:154-62

HINTS: Head Impulse

Used with Permission, Dr Peter Johns, University of Ottawa, Dept of Emergency Medicine, at https://www.youtube.com/watch?v=84waYROlI4U
**Nystagmus**

- Spontaneous ➔ looking straight ahead.
- Gaze-evoked ➔ looking to sides.
  - Pt seated, look to 1 side @ a time – not fixate on finger (fixation suppresses nystagmus, esp peripheral cause).
- Nystagmus is “named” for the fast-beating component.

Neurol Clin 2015;33:551-64; AFP 2017;95:154-62

---

**Nystagmus**

- Spontaneous unidirectional nystagmus which worsens when pt looks in direction of nystagmus (Alexander’s law) ➔ peripheral—not specific.
- Bidirectional nystagmus (to R w/R gaze ~ to L w/L gaze) ➔ specific for central.

Neurol Clin 2015;33:551-64; AFP 2017;95:154-62
Nystagmus

Test of Skew (Vertical/Slanted)

- Vertical misalignment of the eyes in absence of EOM palsy.
- Like cover-uncover test in children.
  - Vertical deviation (corrective vertical saccade) of eye immediately after uncovering ➔ central etiology (likely brainstem).

Neuro Clin 2015;33:551-64; AFP 2017;95:154-62
HINTS in Acute Vestibular Syndrome

- Any abnormality ➔ better than diffusion-weighted MRI in detecting stroke.
  - 100% sensitivity, 96% specificity.
  - “INFARCT” = bad:
    - Impulse Normal OR
    - Fast-phase Alternating OR
    - Refixation on Cover Test

HINTS also outperforms ABCD2 for stroke in AVS!

HINTS Plus

• Add hearing test – finger rub.
  – New unilateral hearing loss ➔ central etiology.
  – Sudden hearing loss w/vertigo is more predictive of stroke than either sx alone.
• HINTS plus in ED ➔ ↓ MRI use w/o ↑ 30 day admissions or representation to ED.


Peripheral vs Central

<table>
<thead>
<tr>
<th></th>
<th>Peripheral</th>
<th>Central</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nystagmus Direction</strong></td>
<td>Unidirectional, fast component toward Nl ear; never reverses</td>
<td>May reverse when pt looks in direction of slow component</td>
</tr>
<tr>
<td><strong>Nystagmus Type</strong></td>
<td>Horizontal w/torsional component, never purely torsional or vertical</td>
<td>Can be any direction, usu pure/not mixed</td>
</tr>
<tr>
<td><strong>Dix-Hallpike</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Delay</strong></td>
<td>2-20 sec</td>
<td>None (immed nystag)</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>&lt;1 min</td>
<td>&gt;1 min</td>
</tr>
<tr>
<td><strong>Fatigability/decr w/time</strong></td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

https://eyewiki.aao.org/Nystagmus#Classification
## Peripheral vs Central—2

<table>
<thead>
<tr>
<th></th>
<th>Peripheral</th>
<th>Central</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertigo Severity</td>
<td>Usu more severe</td>
<td>Usu mild</td>
</tr>
<tr>
<td>Tinnitus/Hearing Loss</td>
<td>Common</td>
<td>Uncommon (new unilat or sudden hearing ↓)</td>
</tr>
<tr>
<td>Nystagmus Effect of visual fixation</td>
<td>Suppressed</td>
<td>Not suppressed</td>
</tr>
<tr>
<td>Other neurologic signs</td>
<td>Absent</td>
<td>Often present</td>
</tr>
<tr>
<td>Postural instability</td>
<td>Unidirectional instability, walking preserved</td>
<td>Severe instability, patient often falls when walking</td>
</tr>
<tr>
<td>Deafness or tinnitus</td>
<td>May be present</td>
<td>Uncommon, new unilat or sudden hearing ↓</td>
</tr>
</tbody>
</table>

https://eyewiki.aao.org/Nystagmus#Classification

### S-AVS HINTS Negative

- No deafness ➔ likely vestibular neuritis.
S-AVS: Vestibular Neuritis (Neuronitis)

- 2nd most common cause of vertigo.
- Probably viral.
- Tendency to fall toward affected side.
-Usu resolves over few days, up to ½ may have sx for 2 mo.
-Don’t do Dix-Hallpike!


S-AVS: Vestibular Neuritis (Neuronitis)

- Nystagmus (spontaneous):
  - Horizontal, or horizontal-torsional.
  - Often suppressed w/visual fixation.
  - Does not change direction w/gaze.
  - Fast phase beats away from affected side.
- + Head impulse, corrective saccade (does not R/O central lesion, but helps—do full HINTS).
- No other focal neuro signs.

S-AVS: Vestibular Neuritis Tx

- Prednisone 10 day taper (60→5) may help—mixed data.
- Vestibular sedative (IM/IV preferred):
  - BZD (diazepam, lorazepam, clonazepam).
  - Meclizine or diphenhydramine.
  - Metoclopramide, ondansetron, prochlorperazine.
  - 2-3 days, or may impair brain adaptation/↑ recovery.
- Vestib rehab & home exercises.


4 Vestibular Syndromes

- Episodic Vestibular Syndrome (EVS):
  - Triggered.
  - Spontaneous.
- Acute Vestibular Syndrome (AVS):
  - Post-exposure (trauma, toxin).
  - Spontaneous.

## 4 Vestibular Syndromes

<table>
<thead>
<tr>
<th>Consistent</th>
<th>Episodic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spontaneous</strong></td>
<td><strong>t-AVS</strong></td>
</tr>
<tr>
<td>s-AVS</td>
<td>s-EVS</td>
</tr>
<tr>
<td>--Vestib neuritis (Periph HINTS)</td>
<td>--Vestibular migraine</td>
</tr>
<tr>
<td>--Posterior circulation stroke</td>
<td>--Vasovagal syncope</td>
</tr>
<tr>
<td></td>
<td>--Panic attacks</td>
</tr>
<tr>
<td></td>
<td>--Meniere’s dz</td>
</tr>
<tr>
<td></td>
<td>--Arrhythmia</td>
</tr>
<tr>
<td></td>
<td>--TIA</td>
</tr>
<tr>
<td><strong>Triggered</strong></td>
<td><strong>t-EVS</strong></td>
</tr>
<tr>
<td>t-AVS</td>
<td>t-EVS</td>
</tr>
<tr>
<td>--Trauma (TBI, barotrauma)</td>
<td>--BPPV</td>
</tr>
<tr>
<td>--Toxin (Abx, AED)</td>
<td>--Orthostatic</td>
</tr>
<tr>
<td></td>
<td>--Tumor</td>
</tr>
</tbody>
</table>

**TiTrATE: Acute Vestibular Syn**

- P-exposure = triggered AVS (t-AVS):
  - Head trauma, whiplash ➔ CT/CTA for skull fx, vertebral art dissection.
    - P-concussion syndrome, vestibular nerve injury, labyrinthine concussion.
  - Barotrauma/blast ➔ ? Perilymph fistula (ENT).
  - Med (gent, AED), illicit, CO.

*Neurol Clin 2015;33:577-99; AFP 2017;95:154-62*
4 Vestibular Syndromes

- Episodic Vestibular Syndrome (EVS):
  - Triggered.
  - Spontaneous.

- Acute Vestibular Syndrome (AVS):
  - Post-exposure (trauma, toxin).
  - Spontaneous.

<table>
<thead>
<tr>
<th>Consistent</th>
<th>Episodic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spontaneous</strong></td>
<td><strong>s-AVS</strong></td>
</tr>
<tr>
<td></td>
<td>--Vestib neuritis (Periph HINTS)</td>
</tr>
<tr>
<td></td>
<td>--Posterior circulation stroke</td>
</tr>
<tr>
<td><strong>Triggered</strong></td>
<td><strong>t-AVS</strong></td>
</tr>
<tr>
<td></td>
<td>--Trauma (TBI, barotrauma)</td>
</tr>
<tr>
<td></td>
<td>--Toxin (Abx, AED)</td>
</tr>
<tr>
<td></td>
<td><strong>s-EVS</strong></td>
</tr>
<tr>
<td></td>
<td>--Vestibular migraine</td>
</tr>
<tr>
<td></td>
<td>--Vasovagal syncope</td>
</tr>
<tr>
<td></td>
<td>--Panic attacks.</td>
</tr>
<tr>
<td></td>
<td>--Meniere’s dz</td>
</tr>
<tr>
<td></td>
<td>--Arrhythmia</td>
</tr>
<tr>
<td></td>
<td>--TIA</td>
</tr>
<tr>
<td></td>
<td><strong>t-EVS</strong></td>
</tr>
<tr>
<td></td>
<td>--BPPV</td>
</tr>
<tr>
<td></td>
<td>--Orthostatic</td>
</tr>
<tr>
<td></td>
<td>--Tumor</td>
</tr>
</tbody>
</table>
Triggered Episodic (t-EVS)

• Common triggers = movement:
  – Head.
  – Body (orthostasis).
• Attacks typically last sec-min; frequent provocation or persistent nausea may lead pt to report longer attack ➔ careful hx.


Trigger vs Exacerbating Factor

• Trigger: provokes new sx not present at baseline.
• Exacerbating features: worsen preexisting baseline dizziness.
• Head movement typically exacerbates any dizziness of vestibular cause (benign or dangerous, central or peripheral, or acute or chronic).

AES Question #3

Of the following, the best targeted exam for a pt w/episodic vestibular syndrome triggered by head movement is:
A. HINTS exam
B. Dix-Hallpike maneuver
C. Epley maneuver
D. Complete neuro exam
E. MRI

DDx t-EVS

- Benign:
  - Benign paroxysmal positional vertigo (BPPV) ➔ + Dix-Hallpike.
  - Orthostatic dizziness (not necessarily hypotension).
- Danger:
  - Posterior fossa tumor.
  - Serious cause of orthostatic hypoTN
  - Central paroxysmal positional vertigo (CPPV).

BPPV

• Lifetime prevalence 2.4% (↑ w/age).
• 80-90% posterior canal.
• 10-15% horizontal (lateral) canal
• ≤1-2% anterior canal.

Targeted Exam: Dix-Hallpike Maneuver

• Goal = reproduce episode of vertigo & witness abnormal eye movements c/w BPPV.
• Sensitivity ~80-95%, specificity ~87-98% for posterior canal BPPV.

Orientation of Semicircular Canals

Dix-Hallpike

R & back ➔ R
posterior canal changes orientation

L & back ➔ R post canal near horizontal, otolith stable
Abnormal Dix-Hallpike

BPPV: horizontal + **torsional** (usu upward) nystagmus; + side is downward ear (= side turned toward)

Nystagmus in Posterior BPPV

• Upwards & torsional
  – Torsional component ➔ top pole of eye toward affected ear (fast component).
  – Latency ➔ crescendo-decrescendo nystagmus.
  – Affected ear is pointing down (or pt turned to that side).
  – Other side neg.
BPPV Treatment: Epley Maneuver

1. Start in upright position, head turned 45° toward affected ear (+ ear on Dix-Hallpike).
2. Rapidly laid back to supine w/head hanging back 20°. Maintain ≥30 sec.
3. Turn head 90° toward other (unaffected) side, ≥30 sec.
4. Turn head 90° further, rotating body to lateral decubitus (head 45° toward pillow/bed), ≥30 sec.
5. Sit upright sitting position ≥30 sec.

Epley Maneuver/Exercises: BPPV

70% effective with 1 office procedure

Used w/permission, Dr Christopher Chang, Fauquier ENT, www.FauquierENT.net, Warrenton, VA, via https://www.youtube.com/watch?v=9TLm76Qp3g
Modified Epley Exercises

• Pt does essentially Epley maneuver at home.
  – TID until vertigo gone.
  – Increases success to 90-100% w/repeated home exercises or office maneuver.

AES Question #4

A pt w/ acoustic neuroma is most likely to have which of the following:
A. Vertigo
B. Nonvertiginous dizziness
C. Combined rotatory + horizontal nystagmus on provocative testing
D. Unilateral hearing loss
Acoustic Neuroma = Vestibular Schwannoma

• Unilateral/asymmetric sensorineural hearing loss &/or tinnitus, esp ≥ 50 yo.
  – 90%.Usu progressive.
• Unilat tinnitus (~60%).
• Vertigo ~56%.
• HA, facial paresthesia/neuralgia ~10-15%.

T-EVS Summary

• Dix-Hallpike +/typical ➔ BPPV.
• Dix-Hallpike +/atypical nystagmus ➔ CPPV vs acoustic neuroma ➔ MRI.
  – Consider horiz canal BPPV—supine roll test.
• Dix-Hallpike neg:
  – + orthostatic sx or BP ➔ orthostatic dizziness.
  – Neg orthostatic ➔ refer or MRI.
4 Vestibular Syndromes

- Episodic Vestibular Syndrome (EVS):
  - Triggered.
  - Spontaneous.
- Acute Vestibular Syndrome (AVS):
  - Post-exposure (trauma, toxin).
  - Spontaneous.

Consistent Episodic

- s-AVS
  -- Vestib neuritis (Periph HINTS)
  -- Posterior circulation stroke
- s-EVS
  -- Vestibular migraine
  -- Vasovagal syncope
  -- Panic attacks.
  -- Meniere’s dz
  -- Arrhythmia
  -- TIA
- t-AVS
  -- Trauma (TBI, barotrauma)
  -- Toxin (Abx, AED)
- t-EVS
  -- BPPV
  -- Orthostatic
  -- Tumor

Spontaneous Episodic Vestib Syn

• Episodes rarely provoked @ bedside ➔ hx is critical (incl FH).
  – Vestibular migraine (PMH or current migraine).
  – Vasovagal syncope.
  – Panic attacks.
  – Meniere’s dz.
• Precipitants poss (red wine ➔ migraine), no immediate trigger

S-EVS Danger DDx

• Cerebrovascular: vertebrobasilar TIA, SAH.
• Cardiorespiratory: arrhythmia, unstable angina, PE.
• Endocrine: hypoglycemia.
• Temporary/intermittent CO exposure—rare.
Vestibular Migraine

• F>M, 1% lifetime prevalence.
• Onset age 7-74.
• Mod-severe intensity (interfere w/ activities).
• ~75% have H/O migraine prior to onset of vestibular sx:
  – > 5 years p-migraine onset in ~50%.
  – > 10 years p-migraine onset in ~25% of.

Vestibular Migraine

• PMH &/or FH migraine.
• ≥5 episodes dizziness/vertigo, min-days.
• ≥ ½ episodes of vertigo have ≥1 migraine feature (photo/phono, typical HA, visual aura).
• No hearing loss.
• No other signs of periph vertigo (DHT neg).
• Treatment/prophylaxis of migraine.
Meniere’s

- Classic triad:
  - Spontaneous vertigo (20-180 min).
  - Fluctuating sensorineural hearing loss, usu unilateral.
  - Ipsilateral tinnitus or fullness.
- Between attacks, patients often w/o sx, may have dysequilibrium and lightheadedness.

Meniere’s Treatment

- Diuretics not proven (HCTZ, acetazolamide).
- Low Na⁺ diet.
- Vestibular rehab.
- Vestibular sedatives if severe sx.
- Refractory: systemic/tympanic steroids (ENT).
- Surgery.
AES Question #5

Which of the following is the most likely feature of early Parkinson’s disease?
A. Kinetic tremor
B. Bradykinesia
C. Hallucinations
D. Vertigo

Parkinson’s Disease

• Bradykinesia, rigidity, tremor, postural instability.
• Gradual symptom progression.
• Sustained response to therapy with levodopa.
• Gait disorders common d/t above.

AFP 2013;87:267-73
Parkinson’s Disease

• **T**remor
• **R**igidity
• **A**kinesia/bradykinesia
• **P**ostural instability

Parkinson’s Disease

• **Tremor**: Rest tremor.
  – *Pill-rolling*, ~4-5 Hz, 70-80% @ presentation.
  – 80-100% during course of dz.
  – Starts unilaterally, may be intermittent early.
  – May involve the legs, lips, jaw, tongue; rarely involves head.
  – Anxiety, emotional excitement, or stressful situations can exacerbate the tremor.

AFP 2013;87:267-73; Neurology 2016;86:1400-07; Mov Disord 1990;5:71-7
Parkinson’s Disease

• **Bradykinesia**: hallmark of PD.
  – 80% @ onset, nearly all at some point.
  – Described as “weakness,” loss of dexterity, difficulty w/routine tasks, leg dragging.
• **Rigidity**: cogwheel or not, 75-90%.
  – Cogwheel: tremor + underlying ↑ tone?

AFP 2013;87:267-73; Neurology 2016;86:1400-07; Mov Disord 1990;5:71-7

---

Parkinson’s Disease

• **Autonomic dysfunction** & **visual disturbances** can contribute to dizziness.
• **Depression, anxiety, cognitive difficulties** can also contribute.
  – Dementia usu occurs late.

AFP 2013;87:267-73; Neurology 2016;86:1400-07; Mov Disord 1990;5:71-7
Parkinson’s Disease Treatment

- Levodopa-carbidopa usu 1st line.
  - Start immed release.
  - Motor fluctuations (wearing off).
  - Dyskinesias.
  - Confusion, hallucinations, agitation.
- Dopamine agonists: more SE’s in older.
  - Disinhibition.

AFP 2013;87:267-73; JAMA 2014;311:1670-83; BMJ 2015 Sep 18;351:h4669

Parkinson’s Disease Treatment

- MAO-B inhibitors.
  - Less potent, use early or as add-on.
  - Low SE’s, 1-2 doses daily (simple).
  - Selegiline, rasagiline, safinamide.
  - Amantadine.
- Anticholinergics (trihexyphenidyl, benztropine).
  - Tremor.
  - High SE’s, esp older.

AFP 2013;87:267-73; JAMA 2014;311:1670-83; BMJ 2015 Sep 18;351:h4669
Consult When Needed

- PD & meds can cause dizziness.
- Consult for dx or Tx if needed.

Summary of Dizziness

- Acute/continuous:
  - Triggers? (Trauma, toxins)
  - Spontaneous:
    - HINTS exam:
      - Peripheral $\rightarrow$ vestib neuritis
      - Central $\rightarrow$ stroke/TIA

- Episodic:
  - Triggered:
    - Orthostasis $\rightarrow$ orthostatic
    - Dix-Hallpike + for BPPV $\rightarrow$
      BPPV
    - Other
  - Spontaneous:
    - Vestibular migraine
    - Meniere’s
    - Panic
    - Tumor, TIA
Best Practice Recommendations

- Physical examination in pts w/dizziness should include orthostatic blood pressure measurement (w/sx), nystagmus assessment, and the Dix-Hallpike maneuver (SOR C).
- The HINTS examination can help differentiate a peripheral cause of vertigo from a central cause in acute vestibular syndrome with nystagmus (SOR B).
- BPPV is treated with a canalith repositioning procedure (e.g., Epley maneuver +/- home exercises) (SOR A).

References

Contact Information

David M. Schneider, MD
Santa Rosa Family Medicine Residency
schneid2@sutterhealth.org

Questions
Answer Key

• 1: C
• 2: B
• 3: B
• 4: D
• 5: B

Supplemental Material
**Otolith at Rest—R Posterior Canal**

Head forward & vertical ➔ otolith at inferior part of posterior canal


**Otolith During Hallpike**

- R side ➔ otolith moves with gravity ➔ nystagmus.
- L side, canal more parallel to ground, otolith does not move (much) ➔ no nystagmus

Horizontal Canal BPPV

- **Dx:** Supine Roll test.
  - Tend to have nystagmus & vertigo to both sides – side w/most severe/prominent is affected side.
  - 75% geotropic nystagmus (beats toward ground); can be ageotropic (upward).
- **Dix-Hallpike often +, too—beware.**
- **Tx:** Lempert/log roll/BBQ vs modified roll vs Guffoni vs modified Guffoni/modified Semont

Audiol Neurotol 2011;16:175‐84; Acta Otorhinolaryngol Ital 2013;33:254‐60

Horizontal Canal BPPV

- **Treatment:** BBQ roll (this if for L).

1. 
2. 
3. 
4. 
5—chin gently to chest while propped on elbows & looking down

Audiol Neurotol 2011;16:175‐84; Acta Otorhinolaryngol Ital 2013;33:254‐60
Central Paroxysmal Positional Vertigo

• Downbeat nystagmus.
  – Pure downbeat nystagmus (anterior canal BPPV has torsional downward nystagmus).
  – Persists w/position (vs BPPV $\leq \sim 1$ min).
• Central $\Rightarrow$ no latency, not suppressed w/visual fixation.

Stroke. 2007;38:e26–e27

Central Paroxysmal Positional Vertigo

• Benign causes:
  – Intoxication (ETOH/sedatives)—usu continuous, persistent dizziness exacerbated (rather than triggered) by position change.
• Cerebellar hemorrhage:
  – Persistent nystagmus, usu downbeat or horizontal.

Stroke. 2007;38:e26–e27
Cervicogenic Dizziness

- Controversial
  - Dizziness, rarely vertigo.
  - Assoc’d w/neck pain.
  - Dizziness related to C-spine movement.

Superior Canal Dehiscence Syndrome

- Vertigo (dizziness)—loud noise may trigger.
- Oscillopsia (appearance of movement of stationary objects)—loud noise may trigger.
- Autophony (hearing one's voice or self-generated sounds like breathing and blinking louder than normal).
- Sensitivity to loud sounds.
- Fullness/pressure in the ears.
Chronic Subjective Dizziness

• Persistent nonspecific dizziness, unexplained by active medical conditions.
• Persistent (≥3 mo) nonvertiginous dizziness, lightheadedness, heavy-headedness, subjective imbalance present on most days.
• Neg W/U, incl imaging.

Arch Otolaryngol Head Neck Surg 2007;133:170-6

Chronic Subjective Dizziness

• Anxiety (59.7%):
  – Otogenic—dizzy p-transient medical illness (10%).
  – Psychogenic—no medical cause (33%).
  – Interactive—anx predated illness, dizziness worse p-illness (15%).
• Dysrhythmia = 1.7%.

Arch Otolaryngol Head Neck Surg 2007;133:170-6
Chronic Subjective Dizziness

• CNS D/O (38.6%):
  – Migraine = 16.5%.
  – TBI/p-concussion = 15%.
  – Dysautonomia = 7% (exercise, prolonged standing, orthostatic, heat, straining).

• Does this minimize nonvertiginous dizziness?

Arch Otolaryngol Head Neck Surg 2007;133:170-6