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Audiology Vestibular Assessment and Management for Acute Dizziness in Hospital Settings, in Partnership with the University of Pittsburgh

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Disclosures

- **Presenter Disclosure:** Leslie Cody: Financial: Leslie Cody is a Clinical Audiologist at the VA Pittsburgh Healthcare System. Student CEU memberships were provided in lieu of honoraria. Non-financial: Leslie Cody has no relevant non-financial relationships to disclose.
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- The course may not cover all possible risk factors, diagnostic methods, or treatment options, and complex cases may require additional considerations.
- Healthcare providers should apply cultural competence and sensitivity to ensure effective and respectful care based on their patients' diverse needs.
- Providers should always evaluate the limitations of diagnostic and screening tools, considering their potential for false results as well as any ethical implications.
- It is the responsibility of course participants to critically evaluate the evidence from multiple sources to guide professional practice.

Learning Outcomes

After this course, participants will be able to:

- Identify key clinical indicators that warrant immediate bedside vestibular assessment for patients presenting with acute dizziness.
- List the steps of a bedside vestibular protocol to classify dizziness.
- Explain how to navigate logistical considerations, including interdisciplinary communication, to optimize vestibular care across hospital units.

U.S. Department of Veterans Affairs VA Pittsburgh Healthcare System

- Largest and most complex VA health care system in Pennsylvania
 - Level 1A
- 146 inpatient beds – medicine, surgery, critical care, neurology
- 56 inpatient psychiatric beds
- Teaching facility
- Hospital-based emergency department (ED)
 - Level 3 Geriatric ED accreditation

- Dizziness is a diagnostic challenge for ED physicians and hospitalists.
- Dizziness is a symptom of many health issues.
 - vestibular, cardiovascular, neurologic, metabolic, anxiety & panic disorders
- Missing a stroke is one of the biggest concerns when someone presents with acute dizziness.

Facts and Figures

- Dizziness is a common complaint in EDs
 - 3-4% of all visits ¹
 - High proportion are admitted
- 24-43% have a vestibular disorder ²
 - BPPV
 - Vestibular neuritis/labyrinthitis
 - Vestibular migraine
- 5.5% of patients presenting with dizziness with additional symptoms have stroke ³
- 13.9% have stroke with isolated dizziness ³
- Patients with dizziness have an increased incidence of fall related injuries

Vestibular Misdiagnosis and Mismanagement

- A cross-sectional study of ED visits found and overgeneralized symptomatic approach for patients with “vertigo”.²
 - 7.4% were given a vestibular disorder diagnosis – typically BPPV or Acute Peripheral Vertigo (APV).
 - 22% were given a symptomatic diagnosis of “dizziness”.
 - Most were prescribed Meclizine and completed imaging.
- 35% of posterior circulation strokes presenting with dizziness are initially misdiagnosed, increasing to 44% when dizziness is the only symptom.⁴
- Neuroimaging is frequently overused to investigate dizziness.
 - In 2011, neuroimaging was performed in 39.9% of dizziness presentations to US EDs, accounting for \$3.9 billion in costs, or about 4% of total ED costs.⁵

Neuroimaging for Central Causes of Acute Dizziness ⁶

- Non-contrast CT:
 - Sensitivity 28.5%
 - Specificity 98.9%
- MRI:
 - Sensitivity 79.8%
 - Specificity 98.8%
- CTA:
 - Sensitivity: 14.3%
 - Specificity: 97.7%
- MRA:
 - Sensitivity 60%
 - Specificity: 92.9%



Definitions

- **Acute Vestibular Syndrome (AVS)**
 - Sudden-onset, continuous vertigo lasting longer than 24 hours with nausea and vomiting
 - Worsened with head movement
 - Caused by:
 - Vestibular neuritis/labyrinthitis
 - Posterior circulation stroke
- **Vestibular Labyrinthitis**
 - Inflammation of membranous labyrinth
 - Acute SNHL in 1 ear
 - Acute vertigo
- **Vestibular Neuritis**
 - Inflammation of vestibular portion of VIII nerve
 - No change in hearing
 - Acute vertigo
- **Posterior circulation stroke**
 - Blockage or reduced blood flow in arteries at the back of the brain
 - “5 Ds” – dizziness, diplopia, dysarthria, dysphagia, dystaxia
 - Unilateral SNHL possible

Posterior Circulation Stroke (PCS)

- Blockage or reduced blood flow to the brainstem, cerebellum, occipital lobes, parts of the temporal lobe via the vertebrobasilar system
- PCS make up 20-25% of ischemic strokes
- Misdiagnosed more than 3x more often than anterior circulation strokes
- May have dizziness and/or unilateral SSNHL
- MRI is gold standard for detecting PCS, but false positives may occur in first 24 hours

AVS Symptoms

Posterior Circulation Stroke (Central)	Vestibular Neuritis/Labyrinthitis (peripheral)
Rapid onset vertigo lasting > 24 hours	Rapid onset vertigo lasting >24 hours
Spontaneous nystagmus present	Spontaneous nystagmus present
Unilateral SNHL	Unilateral SNHL (labyrinthitis)
Unable to walk unassisted	Able to walk with assistance
May have diplopia, dysarthria, dysphagia, dystaxia	No focal neurologic symptoms



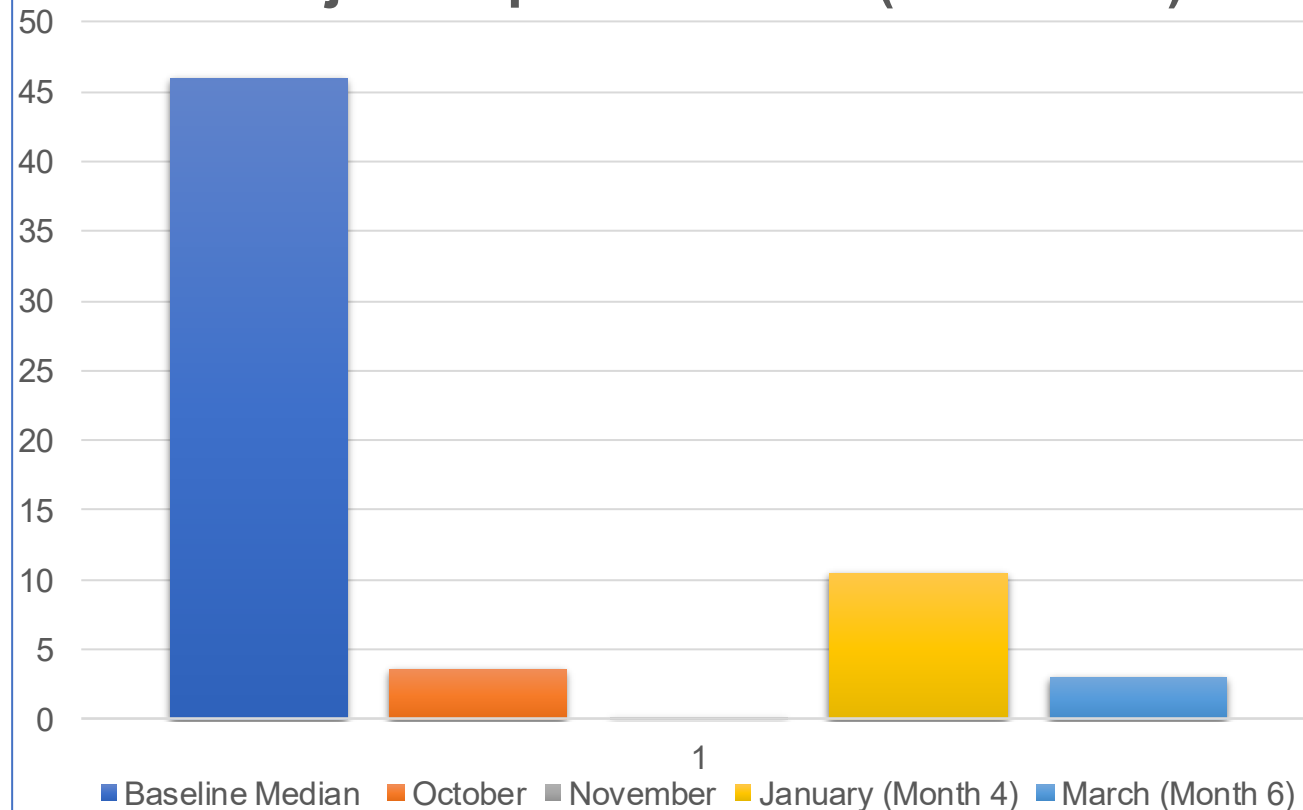
Summary

- Dizziness is common reason for ED visits.
- Dizziness is often misdiagnosed and mismanaged.
- Vestibular disorders are more common than stroke.
- Primary concern for ED physicians is whether patient can go home or whether there's a life-threatening cause that requires hospital admission.
- Imaging is overused, has limitations, and is costly.



Origin of the Bedside Assessment at VAPHS

Median number of days from when a Veteran presents to the ED until they are seen in Audiology: Before and After Project Implementation (2023-2024)





Origin of the Bedside Assessment at VAPHS

- Retrospective review of inpatients admitted to VAPHS in 2025 with a primary ICD-10 diagnosis of “dizziness and giddiness”
 - 49% had a vestibular etiology included in their differential diagnosis
 - 5% were seen by Audiology as inpatients
 - 0% were referred for outpatient eval



Appropriate Referrals

- Do not recommend seeing every patient admitted with dizziness.
- Review from 2025 at VA Pittsburgh showed that 52% of admissions were not appropriate for vestib referral.
- Provide consulting providers with referral questions:
 - Duration?
 - Triggers?
 - Constant or episodic?
 - Associated symptoms?
 - Prior history?
- Maintain open and ongoing conversation with referring teams.

Vestibular Screening Tool ⁷

- Designed for patients presenting to EDs and acute hospital settings with dizziness when emergent conditions have been ruled out
- 4 Questions
- 83% sensitivity and 84% specificity for identifying vestibular disorders

✓ Appropriate Referrals

☐ SELECT THIS CHECKBOX TO BEGIN

Vestibular Screening Tool

Does Veteran endorse:

Feeling that things are spinning or moving around:

*



Bending over or looking up makes them feel dizzy:

*



Lying down and/or turning over in bed makes them feel dizzy:

*



Moving head quickly from side to side makes them feel dizzy:

*



Total points: * ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8

(*Submit this consult ONLY if Veteran scores 4 or greater*)

Is the total score 4 or greater:

✓ Appropriate Referrals

- Don't underestimate the value of differential diagnosis.
 - Once a vestibular disorder is accurately ruled out, the probability of a central disorder substantially increases.
 - Ruling out a vestibular disorder helps the medical team focus on the right referrals and tests, rather than defaulting to the ear as the source.
 - Use the opportunity to educate.



Bedside Protocol

- Case History
- BPPV/Positional Assessment
 - All canals
 - Provide immediate treatment
 - Make follow-up plan with patient and communicate with team
 - Document recommendations for medical team (e.g. Meclizine is contraindicated)



Bedside Protocol

- Video HINTS Exam
 - (Video) Head Impulse Test
 - Presence of catch-up saccades?
 - Nystagmus assessment with goggles, with and without fixation
 - Alexander's Law?
 - Direction-changing?
 - Effect of fixation?
- Test of Skew
 - Vertical or diagonal deviations on cover-uncover test?

Bedside Protocol

- High Frequency Headshake/Headshake Test (HST)
 - Perform with Frenzel or video goggles to eliminate fixation
 - Patient shakes head from 15-20 seconds in the horizontal plane @ 2 Hz with head down 20-30 degrees.
 - Observe for nystagmus after shaking
 - Nystagmus enhanced or provoked post-headshake may be suggestive of an uncompensated vestibulopathy
 - Patients with normal vestibular function or a bilateral loss will not have nystagmus

STANDING ⁸

- Alternative to HINTS
- **SponTAneous Nystagmus** – present or absent?
 - If absent in supine, check for positional nystagmus
- **Direction** – nystagmus unidirectional, multi-directional, vertical?
- Head **Impulse** – presence of corrective saccades?
- Standi**NG** – can the patient stand unassisted?

Value of Bedside Testing ⁹

- STANDING
 - Sensitivity: 93.4-100%
 - Specificity: 71.8%-94.3%
- HINTS
 - Sensitivity: 95.3%
 - Specificity: 92.6%
- MRI
 - Sensitivity 79.8%
 - Specificity 98.8%

Provider Skill and Technique Matter

- HINTS is only valuable when performed by trained specialists.
- Dmitriew et al. (2021), completed retrospective review of patients presenting with dizziness to an ED in Ontario from 2014-2018 and found:
 - Majority of patients with AVS did not receive a HINTS exam
 - Most patients who had HINTS exam were not appropriate candidates
 - 3.1% were appropriate candidates
- Korda et al. 2022, compared vHINTS to cHINTS on all patients with AVS 2015-2020:
 - vHINTS:
 - Sensitivity: 100%
 - Specificity: 88.9%
 - cHINTS
 - Sensitivity: 90.9%
 - Specificity: 85.7%

Using Bedside Results to Inform Medical Team

- BPPV, peripheral - no further testing needed
- (video) HINTS – central
 - vHIT – no corrective saccades *or* normal
 - Nystagmus – direction-changing nystagmus *or* normal
 - Test of skew – vertical deviation present *or* normal
- (video) HINTS – peripheral
 - HIT – corrective saccades present
 - Nystagmus – unidirectional, follows Alexander's law
 - Test of skew – vertical skew absent

Reporting Results

- “Bedside exam suggests central pathology due to...”
 - “Consult with neurology is recommended due to concern for central pathology, specifically posterior circulation stroke.”
- “Bedside exam suggests peripheral pathology due to...”
 - “Recommend vestibular PT and to d/c use of vestibulo-suppressants to allow for central compensation.”
- “Bedside exam could not rule out central pathology.”
 - “Continue to work with medical team to determine etiology of dizziness. No further vestibular work-up is needed.”
 - “If no source of dizziness is determined at discharge, submit referral for outpatient vestibular evaluation to further assess for vestibular pathology.”

Case 1

- 61-year-old male presented to ED with infected diabetic foot wound
- Also reported new-onset dizziness with vomiting, worse with standing or moving head
 - Distorted vision when turning head to left
 - Very difficult to walk
 - Dizziness is his primary complaint
- In ED, went into transient run of ventricular tachycardia and was perisyncopal
 - Recent cocaine use
- Admitted for cardiac monitoring and possible surgery for foot wound
- Critical care NP re vertigo – “low suspicion for CVA, hx of CI, consider ENT consult, PT/OT”
- Consult to Audiology 2 days later due to cochlear implant

Case 1 Cont.

Used STANDING approach

- Gaze right:
 - Without fixation: 5 dps left beating
 - With fixation: 5 dps left beating
- Gaze left:
 - Without fixation: 6 dps right beating
 - With fixation: 6 dps right beating
- Gaze up:
 - Without fixation: 3 dps left beating
 - With fixation: 5 dps up beating
- Could not stand unassisted

Case 1 Cont.

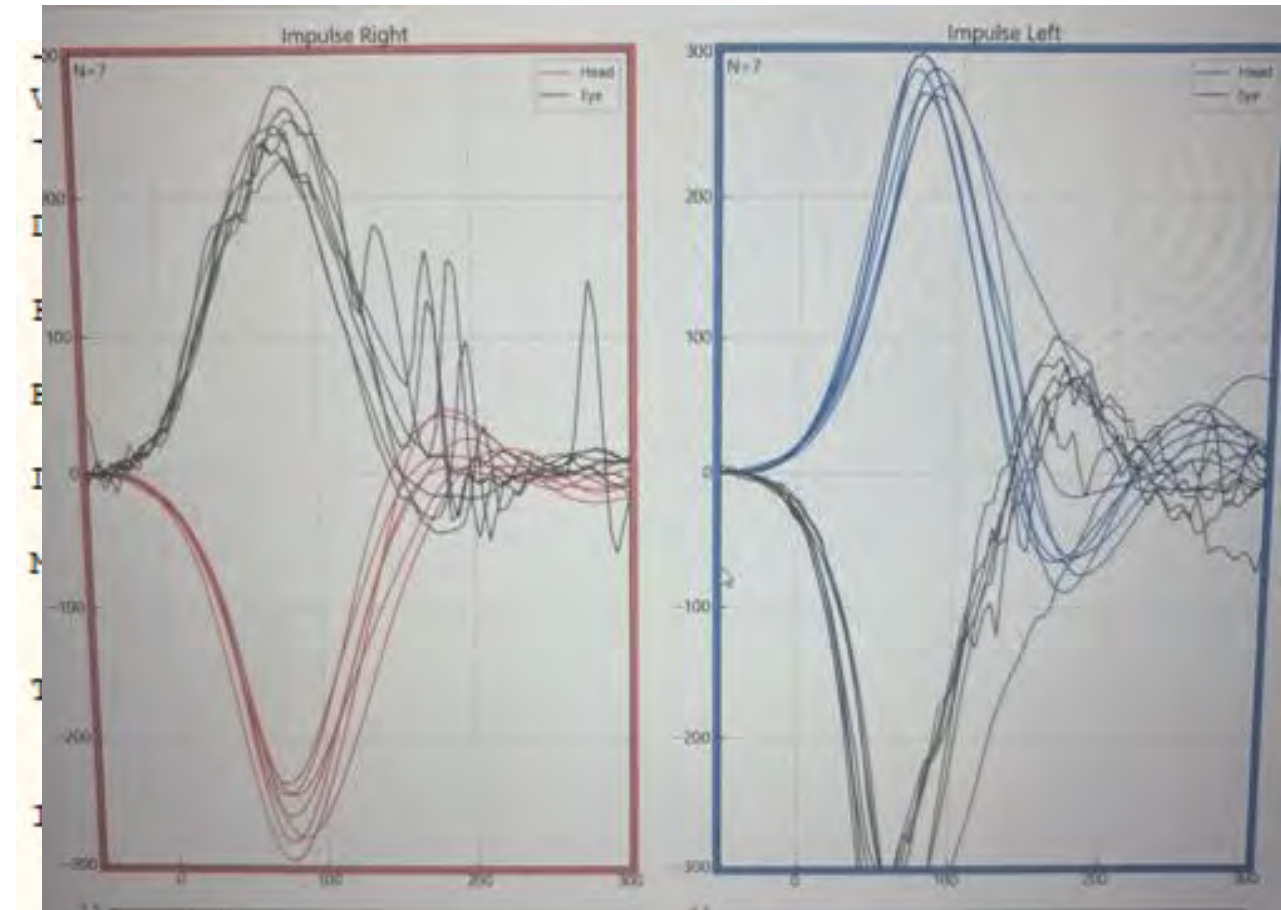
- Neurology-
 - Reported presence of nystagmus
 - Pt denied vision changes, sensory changes, weakness, change in speech, new facial droop, or difficulty with swallowing
 - Pt reported new difficulty controlling his right arm –
 - Dysmetria on finger to nose test
 - Treated for presumed cerebellar stroke
 - MRI non-diagnostic due to artifact from CI

Case 2

- 67-year-old male presents to ED with acute onset vertigo upon getting up in the night to use the bathroom
 - Constant
 - Worsens with position changes and standing
- Past hx of pulmonary hypertension, pacemaker, right craniotomy w/removal of bone cyst, bilateral knee replacements, PD
- Hospital admission for monitoring, neuro consult and MRI
- Neurology
 - Denied blurry vision, diplopia, vision loss, dysphagia, changes in voice, focal weakness or numbness
 - Wife reports patient had recent URI
 - Dix Hallpike: negative
 - HINTS: negative
 - MRI: no acute intracranial abnormalities - no acute infarction, hemorrhage nor intracranial mass lesion

Case 2 Cont.

- Audiology saw at bedside 4 days later
 - Patient reports symptoms are still present but improving
 - BPPV Assessment: Normal
 - Spontaneous nystagmus: 4 dps left beating, followed Alexander's law
 - Head shake: positive, enhanced nystagmus and symptomatic
 - vHIT: overt catch-up saccades present during right head impulses
 - Test of skew: normal
- D/C with vestib PT consult and Prednisone taper; avoid vestibular suppressants
- One month follow-up with PCP
 - Completed vestib PT and symptoms resolved



Case 3

- 56-year-old female presented to ED for acute nausea, vomiting and dizziness
 - Occurred upon awakening, severe vertigo with persistent vomiting – EMS called
 - By arrival to ED vertigo improved but lightheadedness persisted
 - Denied headache, syncope, focal weakness, numbness, vision changes, neck pain, chest pain, or shortness of breath
- Recent Whipple procedure for pancreatic head IPMN
 - Had additional surgery to remove a pancreatic duct stent day prior to onset of dizziness

Case 3 Cont.

- Admission to medical unit for observation, IV hydration, antiemetic therapy, electrolyte replacement
- Reports vertigo with standing up and “position changes” followed by nausea and vomiting
 - Avoiding movement
- DDx includes CVA, vestibular etiology, GI

Case 3 Cont.

- Audiology sees 3 days later
 - Pt reports vertigo when looking up and to the left
 - Symptoms improving since admission
- BPPV Assessment: positive for HC-BPPV; geotropic horizontal nystagmus stronger on the left side
 - 2 BBQ rolls performed over the course of the day
 - Repeat evaluation 2 hours later revealed no nystagmus or dizziness
 - D/C same-day with outpatient follow-up

Vestibular Screening Tool

Does Veteran endorse:

Feeling that things are spinning or moving around:

YES (2 pts)

Bending over or looking up makes them feel dizzy:

YES (2 pts)

Lying down and/or turning over in bed makes them feel dizzy:

YES (2 pts)

Moving head quickly from side to side makes them feel dizzy:

YES (2 pts)

Total points: 8

Is the total score 4 or greater:

YES

Case 4

- Direct admission from another hospital for acute shortness of breath, dizziness and lightheadedness
 - Dizziness gets worse with standing and “position changes”
- PMHx of ischemic cardiomyopathy, AFib, DM, hypertension
 - Recent hospitalization for uncontrolled Afib
 - Afib now controlled but still dizzy so med team considering alternate etiologies
 - DDx dehydration, medication induced, vestibular dysfunction

Case 4 Cont.

Vestibular Screening Tool

Does Veteran endorse:

Feeling that things are spinning or moving around:

SOMETIMES (1 pt)

Bending over or looking up makes them feel dizzy:

SOMETIMES (1 pt)

Lying down and/or turning over in bed makes them feel dizzy:

YES (2 pts)

Moving head quickly from side to side makes them feel dizzy:

YES (2 pts)

Total points: 6

Is the total score 4 or greater:

YES

- Audiology Consult
 - BPPV Assessment: negative
 - Veteran reports dizziness with head turned to right
 - vHIT: normal
 - Nystagmus: normal
 - Test of Skew: normal
 - “No further vestibular workup recommended”
- Diagnosed with heart failure, transferred to LTC facility

Current State and Future Plans

- Q3 FY26, 100% of patients with primary diagnosis of “dizziness and giddiness” with vestibular etiology on DDX, were referred to Audiology
- Since March 2026:
 - Received an average of 4 consults/month
 - 42% have had peripheral vestibular findings
 - 14% have had central findings
- Future considerations:
 - Develop bedside protocol for patients with longstanding dizziness
 - Include bedside audiogram

Equipment considerations

- Have patients come to clinic if portable equipment is not available
- Perform testing without equipment if goggles can't be used
- vHIT – get creative
 - Place fixation sticker any blank surface, window shade, room divider, blank wall
 - Have patient sit on side of bed, wheelchair, guest chair or ask nurse if there's another room available
- Dix Hallpike – use pillow or blankets for supported Dix Hallpike

Practical Tips

- Know infection control policies and understand signage
- Know how the med team wants to be notified of results – chart notes, Teams messages, phone call, face-to-face report
- Provide training on the value of audiology services available and how to request an evaluation
- Discuss Meclizine use
- Are there times that are best for nursing staff?
- Bring clinic cards and literature/handouts to give to patients

Summary

- Acute dizziness is common and often misdiagnosed in acute hospital settings, particularly when it presents as the only symptom.
- Expertise and assessment tools offered by vestibular audiologists can significantly improve diagnostic accuracy.
- Vestibular audiologists should actively engage in interdisciplinary care teams to support differential diagnosis and patient outcomes.

Thank You!

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