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Is the Patient Having a Stroke or Just Dizzy?

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Is the Patient Having a Stroke or Just Dizzy?

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Disclosures

▪ NIH /NINDS Research Support

▪ NETT/SIREN
Goals

▪ To discuss a reasonable approach to the dizzy ED patient
▪ To do it in 15 minutes
The Problem

- Dizziness can be a sign of a posterior circulation stroke which carries a 1 month mortality of 3-11%.
- The peripheral and central systems share nerves and blood vessels (labyrinth artery form the AICA).
- There are 400,000 to 800,000 patients that present with a chief complaint of DIZZINESS.
- Only about 3% have a posterior circulation stroke.
TOOLS

- History
- Physical Exam
- Tests
- Imaging
History

What do you mean by dizziness?
- Very inconsistent description by patients
  - 50% change their description within 5-10 min
  - Patient descriptions are not well connected to a diagnosis

Vestibular symptoms = dizziness, vertigo, imbalance, light headed

Change the focus to:
- Timing and Duration
- Triggers
- Associated symptoms
<table>
<thead>
<tr>
<th>Timing and Duration of Dizziness</th>
<th>Triggers</th>
<th>Associated Symptoms</th>
<th>Syndrome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Onset, Continuous Sx Lasting days</td>
<td>Head movement</td>
<td>Nausea, vomiting, unsteady gait nystagmus</td>
<td>Acute Vestibular Syndrome AVS</td>
</tr>
<tr>
<td>Episodic, spontaneous Lasting minutes to hours</td>
<td>none</td>
<td></td>
<td>Spontaneous Episodic Vestibular Syndrome s-EVS</td>
</tr>
<tr>
<td>Episodic, Short duration &lt; 1 minute</td>
<td>Head movement Body position (rolling over)</td>
<td></td>
<td>Triggered Episodic Vestibular Syndrome t-EVS</td>
</tr>
</tbody>
</table>
The History connects to the DDx

<table>
<thead>
<tr>
<th>Syndrome</th>
<th>Common Benign Causes</th>
<th>Serious Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AVS</strong></td>
<td>Vestibular Neuritis, Labyrinthitis</td>
<td>Posterior Circulation Stroke</td>
</tr>
<tr>
<td>Acute Vestibular Syndrome (Symptomatic in the ED)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>s-EVS</strong></td>
<td>Vestibular migraine, Meniere's disease</td>
<td>Posterior Circulation TIA</td>
</tr>
<tr>
<td>Spontaneous Episodic Vestibular Syndrome</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>t-EVS</strong></td>
<td>BPPV, (benign paroxysmal positional vertigo)</td>
<td>CPPV (rare) (central paroxysmal positional vertigo)</td>
</tr>
<tr>
<td>Triggered Episodic Vestibular Syndrome</td>
<td>Orthostatic hypotension</td>
<td>Orthostatic hypotension with serious underlying disease</td>
</tr>
</tbody>
</table>
Physical Exam

- LOC
- Vital Signs, orthostatic BP,P
- Cranial Nerves
  - Dysarthria, dysphagia, dysarthria, visual fields
  - Hearing loss, ptosis
- Nystagmus
- Motor, Sensory – crossed findings from CN
- Cerebellar
  - Coordination,
  - Ataxia: sit and walk without assistance
Physical Exam in AVS

▪ **HINTS**
  – **Head Impulse, Nystagmus, Test of Skew**
  – Used on patients with vertigo and nystagmus

  – Check Nystagmus first
  – Check Skew second
  – Lastly do the head impulse test
HINTS

**Nystagmus**

- **Peripheral Nystagmus**
  - the fast component of nystagmus that is always in the same direction when the patient looks left or right

- **Central Nystagmus (brainstem and cerebellar lesions)**
  - nystagmus that changes direction with different positions of gaze
  - pure vertical nystagmus or torsional.
  - no fatigue, no latency, no inhibition with visual fixation
Test for Skew

– cover one eye and observe for vertical shift in the eye when uncovered or track eyes as they move up and down
– Brainstem and cerebellar lesions cause a skew deviation
- **Head Impulse Test** (head thrust test)
  - Normal response (bad)
    - eyes remain on the target
    - preserved in central lesions.
  - Abnormal response: “corrective saccade”
    - eyes are dragged off of the target by the head turn, followed by a saccade back to the target;
    - c/w peripheral vestibular lesion, impaired vestibulo-ocular reflex on the side of the head turn
HINTS

Brainstem or cerebellar lesion:
- any of the following, whether present or untestable
  - Normal head impulse test on both sides
  - Direction-changing nystagmus
  - Skew deviation

Peripheral lesion:
- presence of ALL of the following
  - An abnormal head impulse test on one side
  - Unidirectional, horizontal, torsional nystagmus that increases in intensity with gaze toward the fast phase
  - Absent skew
Diagnostic Evaluation of Patients With an AVS

Diagnosis of patients with the acute-onset persistent dizziness
Ask and answer 5 questions in the following sequence:

Is there a central pattern of nystagmus?

Is skew deviation present?

Is the head impulse test negative?
(only applies to patients with nystagmus*)

Are there any CNS signs on focused neurological exam?

Is the patient unable to sit or walk unassisted?

“Yes” answer to any question:
Treat as stroke

- Consult a neurologist
- Perform brain and cerebrovascular imaging; specifically rule out vertebral dissection
- Admit for rest of stroke etiology work-up
- Begin secondary stroke prevention (if no thrombolysis)

“No” answer to all questions:
Treat as vestibular neuritis

- Give steroids
- Prescribe symptomatic medication such as antihistamines for no more than 3 days
- Arrange early follow-up with neurology or PCP

* In patients without nystagmus, the head impulse test may give misleading results; the focused neurological exam and gait assessment become more important in this group (see text)

s-EVS
spontaneous episodic vestibular syndrome

- Usually dizziness not present at time of exam
- Can’t us the HINTS test
- DDx:
  - vestibular migraine
    - Associated with headache (classic sx, photophobia, phonophobia, aura, etc.)
    - Similar episodes before
    - Hx of migraines
  - TIA,VBI
    - ABCD2 score, risk factors, treat with ASA
  - Meniere's disease
    - Tinnitus, hearing loss
t-EVS
triggered episodic vestibular syndrome

DDX

- Orthostatic hypotension
- BPPV, benign paroxysmal positional vertigo
- CPPV, central paroxysmal positional vertigo
  - Very rare, cerebellar source
  - Associated with medulloblastoma in cerebellar nodulus.

- Dix-Hallpike test
  - Elicits endolymph movement in the posterior semi-circular canal
  - Produces nystagmus that could be vertical or torsional
    - Which is not seen in AVS
  - Reproduces symptoms

- Supine Head Roll
  - Like rolling over in bed
Further Risk Stratification for AVS

- **HINTS plus**
  - HINTS test (c/w central cause) and new unilateral hearing loss
  - 99.9% sens, 97% specific for Posterior Circulation Infarct
    - Benign HINTS Plus more sens for PCI than MRI (w/in 48 hrs)

- **Benign HINTS and ABCD2 score < 4**
  - PCI rate 0-1%
    - Kerber, Neurology 2015;85:1869–1878
Imaging

- Non Contrast CT-Head
  - Useful if HEADACHE is prominent
  - Cannot exclude PCI
  - Relevant in 0-1.6% of cases
  - Sensitivity -16% (Kattah, STROKE 2009;40:3504)

- MRI
  - DWI: False Negative rate -7-15%
  - Worst in first 48 hours
TIPS

- Base the history on timing, duration, assoc sx, triggers
- Spend the time to do a careful neurologic exam
  - CN, nystagmus
  - HINTS
  - Walk the patient
- We aren’t doing that badly
  - 0.14 - 0.5% of dizzy patients DC’d with peripheral cause are later found to have a posterior circulation infarct
  - Morgenstern 2006