Evaluating the acutely dizzy patient

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Dizziness: the problem

• Common complaint: 7.5 million patients yearly in ambulatory settings

• Etiology usually benign but could be life-threatening

• Large, multi-hospital study in TX:
  – Stroke/TIA diagnosed in 3.2% of patients presenting to the ED with chief complaint of dizziness
  – Of the 46 validated strokes, 16 misdiagnosed in ED (35%) Kerber et al, Stroke 2006
The dizzy patient: history

**Question 1: Characterize the dizziness**
- Light-headed (like I could pass out)
- Disequilibrium (unsteady on my feet)
- Vertigo: feeling of movement (spinning, tilting)

Not helpful:
- like I need to grab onto something
- like I need to sit down
- gets worse with movement

Helpful:
- comes on when I stand up
- comes on when I move my head
Peripheral vs Central

- Peripheral
  - Vestibular neuritis
  - Labyrinthitis
  - Meniere’s
  - BPPV

- Central
  - Posterior circulation infarct
    - Inferior cerebellum
    - Brainstem (other neurologic findings)
    - Superior cerebellum (ataxia, dysarthria more prominent than vertigo)
  - Other (MS, migraine, infection . . .)

- As many as 25 % of patients with risk factors for stroke who present to an ED with isolated, severe vertigo, nystagmus, and postural instability have an infarction of the inferior cerebellum. NEJM 1998; Acta Neurol Scand 1995
Acute Vestibular Syndrome
John R. Hotson, M.D., and Robert W. Baloh, M.D.

Elicited by Right, Left, or Upward Gaze, and Severe Gait Instability.
SCA: Limb and/or trunk ataxia, dysarthria

AICA: acute vestibular syndrome, hearing loss

PICA: acute vestibular syndrome

Each can also have N/V and associated brainstem signs
Why diagnose stroke?
1-acute treatment
2-prevent further events

3% of strokes = 20,000 yearly in the US Edlow NEJM 2008
History: patient with vertigo

- Question 2: onset of vertigo
- Question 3: duration of vertigo
- Question 4: accompanying symptoms
History: patient with vertigo

- Question 2: onset of vertigo
- Question 3: duration of vertigo
- Question 4: accompanying symptoms
  - Nausea, vomiting (not very helpful)
  - Tinnitus, hearing loss
  - Headache
  - Weakness, numbness
  - Swallowing difficulty, hiccups, hoarseness
History: patient with vertigo

• Question 5: stroke risk factors
  – Prior stroke/TIA, Hypertension, Diabetes, hyperlipidemia, atrial-fibrillation, smoking, age
  – Hemorrhagic CVA risk factors (meds)
  – Other: Cocaine use, trauma, stroke-prone disease (Lupus, Hyper-coaguoble state)
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<thead>
<tr>
<th>Etiology of peripheral vertigo</th>
<th>Onset</th>
<th>Duration</th>
<th>Hearing impaired?</th>
<th>Other symptoms</th>
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<tr>
<td>Vestibular neuritis</td>
<td>Acute vs evolves over hours</td>
<td>Days to weeks</td>
<td>No</td>
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<tr>
<td>BPPV</td>
<td>Acute</td>
<td>Intermittent, brief, seconds</td>
<td>No</td>
<td>N unsteadiness</td>
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<td>Meniere’s disease</td>
<td>Acute</td>
<td>Hours</td>
<td>Maybe</td>
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Vertigo exam: characterize the nystagmus

- Horizontal vs vertical
- Direction – characterize it by the fast component
- Does the direction change depending on direction of gaze?
Vertigo exam: nystagmus

Characteristics of peripheral nystagmus

• Horizontal
• Unidirectional
  – Fast phase always in same direction
• Improves with fixation
• Worsens with removing fixation
  – Ophthalmoscope: cover fixating eye

Characteristics of central nystagmus

• Horizontal or vertical or purely torsional
• Uni or multi-directional
  – Fast phase may change with direction of gaze
• Does not improve with fixation
• No change with removing fixation
What if the patient doesn’t have nystagmus in clinic?

• Perform Hallpike Dix maneuver to try to trigger nystagmus

• Consider head thrust test: correctional saccade is a sign of peripheral lesion
Vertigo exam: gait

• Peripheral vertigo: patient leans/veers toward side of lesion; may fall this way on Romberg testing
  – Instruct patient to fall/lean in the direction they feel like falling/leaning (rather than compensating)
  – “unidirectional postural instability with preserved walking” Hotson et al NEJM 1998

• Central vertigo
  – often can’t walk without falling
  – May lean/fall in more than one direction
Vertigo Exam: other findings**

- **Cranial nerves:**
  - 2 funduscopic exam: disc edema?
    pupils: Horner’s?
  - 3 **Skew deviation**? (vertical misalignment); extraocular movements, cover-uncover
    *Vertical smooth pursuit*: saccadic interruptions?
  - 5 impaired pain and temperature (ipsilateral)
  - 7 face weakness?
  - 3, 6, 8 **Head thrust test, nystagmus**?
  - 9, 10 hoarseness, unilateral decreased palate elevation, unilateral loss of gag

- **Motor**: unilateral weakness?
- **Sensory**: impaired pain and temperature: classically contralateral to face
- **Coordination**: impaired finger-nose-finger, HKS, inability to walk
**Exam finding** | **Central lesion** | **Vestibular neuritis** | **Group difference**  
--- | --- | --- | ---  
Vertical saccadic pursuit | 88% | 20% | p < .01  
Gaze evoked nystagmus | 56% | 17% | p < .01  
Skew deviation | 40% | 0 | p < .01  
Positive head thrust sign | 39% | 82% | p < .01  

Bedside differentiation of vestibular neuritis from central "vestibular pseudoneuritis".  
Cnyrim CD, Newman-Toker D, Karch C, Brandt T, Strupp M.
Neuro-imaging

• Head CT will rule out hemorrhage
  – Negative head CT does not rule out acute ischemic stroke
• Brain MRI is the best study
So who needs an acute work-up?

• No bright line rule
• Factors in favor of acute work-up
  – stroke risk factors (including age >50) and acute onset vertigo
  – Headache
  – Additional neurologic complaints (besides n/v, hearing loss, tinnitus)
  – focal finding on neuro exam
• Factors in favor of foregoing MRI
  – Unidirectional horizontal nystagmus that improves with fixation
  – Unilateral hearing loss*, tinnitus without other neurologic signs
  – ABSENCE OF STROKE RISK FACTORS
  – Absence of focal findings on neuro exam
Approach 1: Forego MRI if . . .

A patient has isolated acute vertigo, peripheral vestibular nystagmus that is suppressed by visual fixation, and is unstable but can still walk, ok to defer MRI for 48 hours. Substantial improvement in 48 hours is consistent with vestibular neuritis and brain imaging is not necessary. Hotson et al NEJM 1998
Approach 2: Obtain MRI if . . .

1-acute or subacute onset of prolonged vertigo and postural imbalance; and
2-horizontal spontaneous nystagmus,
3-AND one or more of the following
   – Skew deviation
   – Gaze evoked nystagmus (opposite to the direction of spontaneous nystagmus)
   – Vertical saccadic pursuit
   – Normal head thrust test OR
   – Severe or multiple vascular risk factors

Cnyrim et al, J Neurol Neurosurg Psych 2008
Additional work-up to discern stroke etiology

- Cardio-embolic
- Large vessel atherosclerosis
- Vertebral artery dissection (especially in young patients)
- Small vessel disease
- Artery-artery embolism
- Hypercoaguable states, vasculitis, venous sinus thrombosis, acute cocaine use
Summary: Evaluating a dizzy patient

- **History**
  1. Characterize the dizziness
  2. Onset of vertigo
  3. Duration of vertigo
  4. Accompanying symptoms
  5. Stroke risk factors

- **Exam**
  - Characterize nystagmus
  - Gait
  - Other neurologic findings
  - Add to your repertoire
    - Head thrust test
    - Vertical pursuit
    - Skew deviation