Evaluation of the Dizzy Patient

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The speaker has no disclosures
Who Sees Dizzy Patients?

- ED physicians
- Internists
- Neurologists
- ENT

30%
Two Key Questions

1. What do you mean by Dizzy?
2. Localization?
Q1: What do you mean by “Dizzy”? 

Dizziness

- Syncope
- Dysequilibrium
- Misc.
- Vertigo
Syncope/Presyncope

• Nearly one-fifth of patients report as “dizziness”

• Presyncopal symptoms key: Color change, lightheadedness, tunnel vision

• Witnesses may have difficult time distinguishing from seizure
Vertigo: Definition

- Room spinning not usually present and will lead to many vertiginous patients misidentified
- An illusion of movement, falling, or rocking
- Dissociation between the patient and the environment
Q2: Classify Vertigo

Vertigo

Central

Peripheral

Imaging
Which of the following most reliably distinguishes central from peripheral vertigo?

A. Severe vomiting
B. Inability to walk
C. Inability to sit upright without falling to one side
D. Presence of nystagmus
E. Slurred speech
Central vs. Peripheral: History

- Presence of many symptoms not helpful in distinguishing
  - Nausea and Vomiting
  - Inability to Walk
  - Inability to Sit
- All of these tend to be worse in peripheral vertigo, but can’t use severity to distinguish
Central vs. Peripheral: History

- Peripheral
  - Associated ear findings
    - Hearing loss
    - Tinnitus
    - Pressure or Fullness in the Ear
    - Otalgia
  - Head turning brings on symptoms
Central vs. Peripheral: History

- Central
  - Associated Brainstem symptoms
    - Dysarthria
    - Dysphagia
    - Diplopia
  - Headache
  - Depressed LOC (not related to meds)
  - Age and vascular risk factors
Central vs. Peripheral: Nystagmus Exam
Central vs. Peripheral: Nystagmus Exam

- Will fatigue with time
- Goes away with fixation
- Changes direction with gaze
- Latency of 5-10 seconds
- Direction
  - Torsional/Horizontal
  - Vertical
Central vs. Peripheral: Nystagmus Exam

Torsional/Horizontal
Central vs. Peripheral: Nystagmus Exam

Alexander’s Law: Amplitude increases when eye moves in the direction of the fast phase
Central vs. Peripheral: Other Examination Findings

- Always central, always needs imaging
  - 1. Any Cranial Nerve Lesion
  - 2. Any Asymmetric Cerebellar Finding
  - 3. Complete Absence of Peripheral Signs
### Peripheral Vertigo: Anatomy

<table>
<thead>
<tr>
<th>Episode Duration</th>
<th>Auditory Symptoms Present</th>
<th>Auditory Symptoms Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seconds</td>
<td>Perilymphatic Fistula</td>
<td>Positional vertigo (cupulolithiasis)</td>
</tr>
<tr>
<td>Hours</td>
<td>Meniere’s syndrome</td>
<td>Recurrent vestibulopathy</td>
</tr>
<tr>
<td></td>
<td>Syphilis</td>
<td>Vestibular migraine</td>
</tr>
<tr>
<td>Days</td>
<td>Labyrinthitis</td>
<td>Vestibular neuronitis</td>
</tr>
<tr>
<td></td>
<td>Labyrinthine concussion</td>
<td></td>
</tr>
<tr>
<td>Months</td>
<td>Acoustic neuroma</td>
<td>Head trauma</td>
</tr>
<tr>
<td></td>
<td>Ototoxicity</td>
<td></td>
</tr>
</tbody>
</table>

*Jackler & Kaplan, 1994*
Case 1

- 63M comes to the ED with 12 hours of severe vertigo, nausea and vomiting without hearing loss or tinnitus

- Examination shows right beating nystagmus in all directions of gaze (worse when looking right) and severe imbalance with inability to even sit up

- He recently recovered from a URI
Vestibular Neuronitis

• Other names
  – Vestibular neuritis
  – With hearing loss: labrynthitis

• 2nd most common cause of peripheral vertigo in most series

• Worsens for 24-72 hours and then slow improvement

• Presumed viral or post-viral etiology
  – History present in only about half of patients
Which of the following treatments works best for this condition?

A. Acyclovir  
B. Epley Maneuvers  
C. Corticosteroids  
D. Meclizine  
E. Benzodiazepines
Vestibular Neuronitis: Treatment

• No role for anti-virals
• Steroids? (Strupp NEJM 2004)
  – Significantly improved outcomes at 1 year
  – High dose used for three weeks
    • 100mg daily oral methylprednisolone for three days and then slow taper
  – Not clear if lower dosages or other regimens effective
Case 2

- 75M reports the sudden onset of severe vertigo when rolling over in bed to turn off his alarm clock. He is now reluctant to move as the symptoms quickly return.
- No auditory symptoms
- Examination normal except Dix-Hallpike maneuver
  - 5 second latency, rotatory nystagmus with return of symptoms when placed with right ear down
Benign Paroxysmal Positional Vertigo (BPPV)

- Most common cause of peripheral vertigo, often recurs
- Calcium carbonate crystals in posterior canal have plunger effect
- Latency due to the movement of the crystals
BPPV: Treatment

Epley Maneuver
BPPV: Treatment

Semont Maneuver
Case 3

• 55M experienced a pressure sensation behind the left ear followed by vomiting, vertigo, and deafness

• 3 hours later: vertigo improving but the deafness persists

• Exam: Conjugate horizontal nystagmus beating to the right, veers to the right when walking
What is the most likely diagnosis?

A. Cerebellar Stroke
B. Migraine
C. Meniere’s Disease
D. BPPV
E. Acoustic Neuroma
Meniere’s syndrome

- Etiology unknown, recurrent
- Increase in volume of endolymphatic system
- RARE

- Treatment
  - Low salt diet
  - Diuretics
  - Surgery occasionally
Peripheral Vertigo: Other Etiologies

• Post-concussive labrynthopathy
• Migraine
• Autoimmune inner ear disease
• Ototoxic drugs
• Infections (e.g. Syphilis)
• Mastoiditis
• Acoustic Neuroma
Peripheral Vertigo: Treatment

- Specific Therapies
- Symptomatic therapies
  - Meclizine, Valium, etc.
    - Work by sedation
    - Interfere with normal compensation process
  - Antiemetics
- Vestibular rehabilitation
  - Lying in bed detrimental
Central Vertigo: Anatomy

• “Cerebellar Signs”
  – 1. Cerebellum itself
  – 2. Brainstem
Case 4

• A 30 year-old man with no PMH presents with 6 hours of vertigo. He is on no medications.

• Exam: The right pupil is 4mm and minimally reactive while the left reacts briskly 3 to 2mm. He has vertical bobbing movements of both eyes and there is no corneal response on the left.

• Motor examination is difficult, but all four extremities are moving antigravity
CT Brain in the ED: Negative

Patient deteriorated over two hours to coma
What is the most likely diagnosis?

A. Cerebellar Stroke
B. Basilar Artery Thrombosis
C. GHB Ingestion
D. Benzo overdose
E. Migraine
UCSF “Stroke Protocol” CT

- Obtained at UCSF in all suspected acute stroke and TIA patients
  1. Non-contrast CT of the head
  2. CT Angiography from aortic arch/heart through Circle of Willis
  3. CT Perfusion study
  4. Post-contrast CT of the head
- Very powerful tool in vertigo investigations
Repeat CT and CT Angiogram
MRI Brain

Patient expired 3 days later after withdrawal of support by family
Basilar Artery Thrombosis

• Carries a high mortality
• Common from cardioembolic disease or vertebral artery dissection (in young)
• Embolectomy successful out to 12-16 hours
• CTA can identify this and other posterior circulation occlusions/stenoses (VBI)
• Clues on exam
  – Vertigo or coma with any cranial nerve abnormalities
Case 5

• A 65 year-old man with a history of DM, HTN presents with 1 day of imbalance and vertigo

• Examination shows right-sided homonymous hemianopia and R>L severe ataxia of the limbs with inability to walk due to imbalance. Power is normal throughout.
Case 5 (con’t)

• Patient discharged from the ED
• BIBA 24 hours later after respiratory arrest at home, now in coma
Cerebellar Ischemic Stroke

• Maximal swelling: 3-5 days
• Decompression indicated if patient decompensates
• Will only see on MRI
• “Malignant Meniere’s”
• Exam findings not to miss
  – Asymmetric cerebellar examination
  – Lack of peripheral signs in a vertiginous patient
    • Midline SCA stroke
Cerebellar Hemorrhage

- Life-threatening emergency
- When the neurosurgeons will intervene
  - 3cm rule?
  - Patient deteriorating?
- Ventriculostomy (EVD)?
  - Concern for upward herniation
Central vs. Peripheral: Which Imaging Modality?

- Always central, always needs imaging
  - 1. Any Cranial Nerve Lesion
     - Think Brainstem: CT/CTA or MRI needed
  - 2. Any Asymmetric Cerebellar Finding
     - Think Cerebellum
       - Non contrast CT can exclude hemorrhage
       - MRI needed if CT negative
  - 3. Complete Absence of Peripheral Signs
     - Think midline cerebellum: MRI needed
Take Home Points

• Two major questions
  – What do you mean by Dizzy?: History Key
  – Central or Peripheral?: Exam key

• Demystify nystagmus exam

• Vestibular Neuronitis and BPPV are common

• Imaging indications for central vertigo
  – Brainstem Abnormal: Basilar Artery Thrombosis
  – Cerebellar Exam Asymmetric: Cerebellar Stroke/ICH