Evaluation of the Dizzy Patient

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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
- Vertigo
- Syncope
- Dysequilibrium
- Misc.
- Misc.

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

THE CLINICAL FEATURES OF SYNCOPE
PHÄNOMENOLOGIE DER SYNKOPEN
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 Flowchart]

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

1. Severe vomiting
2. Inability to walk
3. Inability to sit upright without falling to one side
4. Presence of nystagmus
5. Slurred speech

Central vs. Peripheral: History

**Peripheral**
- Associated ear findings
  - Hearing loss
  - Tinnitus
  - Pressure or Fullness in the Ear
  - Otolgia
- Head turning brings on symptoms

**Central**
- Associated Brainstem symptoms
  - Dysarthria
  - Dysphagia
  - Diplopia
- Headache
- Depressed LOC (not related to meds)
- Age and vascular risk factors
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

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, Syphilis</td>
<td>Recurrent vestibulopathy, Vestibular migraine</td>
</tr>
<tr>
<td>Days</td>
<td>Labyrinthitis, Labyrinthine concussion</td>
<td>Vestibular neuretiis</td>
</tr>
<tr>
<td>Months</td>
<td>Acoustic neuroma, Ototoxicity</td>
<td>Head trauma</td>
</tr>
</tbody>
</table>

Alexander’s Law: Amplitude increases when eye moves in the direction of the fast phase

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?

1. Acyclovir
2. Epley Maneuvers
3. Corticosteroids
4. Meclizine
5. 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
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?

1. Cerebellar Stroke
2. Migraine
3. Meniere’s Disease
4. BPPV
5. 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?

1. Cerebellar Stroke
2. Basilar Artery Thrombosis
3. GHB Ingestion
4. Benzo overdose
5. 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
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.

Repeat CT and CT Angiogram

MRI Brain

Patient expired 3 days later after withdrawal of support by family

CT Brain in the ED: (not) Negative

CT Brain
Case 5 (con’t)

- Patient discharged from the ED
- BIBA 24 hours later after respiratory arrest at home, now in coma

CT Brain 24 hours later

- Needs immediate surgical decompression
- Mannitol 1 gm/kg now

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