CENTRAL CAUSES OF DIZZINESS
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WHAT DOES THE WORD DIZZY MEAN?

DIZZY
Vertigo – dysfunctional vestibular system
Presyncope – poor cerebral perfusion
Imbalance – poor cerebellar function or positional sense
Other – indescribable sense of unease, imbalance, etc.
MS. JONES IS DIZZY

- 62 y/o woman with HTN, HLD, smoking presents to the ED complaining of sudden severe dizziness.
- She describes a sudden onset yesterday of nausea/vomiting, a feeling of the room spinning when she sits up or rolls over, lies down or even when she turns her head.
- Inner ear pathology is the most likely.
- But what else could it be?

CENTRAL VERTIGO

- Vestibular nuclei in medulla and pons
  - By far the most common
  - Damage can lead to true sensation of movement

Four vestibular nuclei

<table>
<thead>
<tr>
<th>Caudal Pons</th>
<th>Rostral Medulla</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superior vestibular nucleus</td>
<td>Medial vestibular nucleus</td>
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<tr>
<td>Lateral vestibular nucleus</td>
<td>Inferior vestibular nucleus</td>
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</tbody>
</table>
TRUE VERTIGO WHICH IS PERSISTENT – CENTRAL CAUSES

- Stroke/TIA –
  - Small percentage of people presenting with dizziness in ED
  - <1% of those with ISOLATED dizziness
  - Usually have other symptoms from the brainstem such as hemiataxia, hemisensory loss, dysphagia, dysarthria, diplopia, etc.

BRAINSTEM STROKE WITH VERTIGO

- Most common – Lateral Medullary syndrome (Wallenberg)
  - Often due to vertebral artery dissection
  - Rare, but more common in young people
  - Some or all of: dysphagia, Horner’s syndrome, ataxia, sensory loss, nystagmus, vertigo
TRUE VERTIGO WHICH IS PERSISTENT - CENTRAL CAUSES

- Demyelination/MS
- Brainstem plaque can lead to vertigo
  - Rare cause of vertigo – only 4% of true vertigo in an ED study was due to demyelination
  - Not common as the presenting symptom of MS
  - Very rarely in isolation (same reason as the brainstem strokes)
  - More typical to have cerebellar symptoms reported as dizziness (more common site of MS plaques)

INTERMITTENT TRUE VERTIGO - CENTRAL CAUSES

- If a patient has intermittent symptoms which are positional
  - With standing or other orthostatic maneuvers – can get focal hypoperfusion of the brainstem
  - Should resolve with position change
  - Consider vertebrobasilar insufficiency
    - Stenosed or occluded vertebral arteries BILATERALLY or stenosed or occluded basilar artery

I GET DIZZY WHEN I STAND UP

- True vertigo (not lightheadedness) with standing up for a period of time
  - Ischemia of vestibular nuclei in the pons and medulla can present with vertigo
  - Often with other associated symptoms such as diplopia, dysarthria
VERTEBROBASILAR INSUFFICIENCY

I GET DIZZY WHEN I TURN MY HEAD

- Bowhunter's syndrome – intermittent brainstem ischemia from vertebral artery compression

INTERMITTENT TRUE VERTIGO -CENTRAL CAUSES

- Schwannoma or other CP Angle tumor (meningioma)
- Often starts with intermittent vertigo with only vague other symptoms
  • Tinnitus
  • Hearing loss
  • Symptoms tend to increase over time
  • Don’t tend to be positional
PRESYNCOPE – INTERMITTENT

- May be driven centrally (Parkinson’s, PSP, Multiple System Atrophy)
- Still plays out with a peripheral drop in blood pressure
- The next speaker is talking about autonomic.
- And Persistent presyncope is called being unconscious, so...
- Missing...

MR. SMITH IS DIZZY

- 32 year old man with no past medical history. He presents with complaints of dizziness to the ED.
- He describes the sensation of falling to the left which particularly occurs when he is walking. He often bumps into things when he walks. He feels like he is walking on a boat sometimes and sometimes feels himself swaying when he stands still. He has been dropping things in his left hand as well. He denies hearing changes and is not aware of any other neurologic symptoms.

IMBALANCE

- Patients with balance dysfunction often complain of being dizzy
  - When pressed – unbalanced, falling, being pulled, walking on uneven ground
  - Can be bilateral, just unilateral
  - More specific when it is unilateral, pulling or falling in one direction
IMBALANCE

- Cerebellum – dysfunction causes many of the symptoms of being drunk
  - Unsteady gait
  - Incoordination/ataxia
  - Slurred speech
  - Scanning speech (loud and soft, fast and slow, poor cadence)
  - May have jerky and uncoordinated eye movements as well.

MR. SMITH

INTERMITTENT CEREBELLAR DYSFUNCTION

- Cerebellar tumor
  - Common primary brain tumor in children
  - Can present with intermittent symptoms at first
  - Often have accompanying headache
- Cerebellar degeneration
  - Can present with “moral” imbalance – difficulty walking
  - Inherited disorder with a progressive pattern; eventually becomes persistent

...
TUMORS IN THE CEREBELLUM AND BRAINSTEM

- More common in children
- Medulloblastoma
- PNET
- Ependymoma
- Astrocytomas of BS and cerebellum (20% of kids tumor)
- Gliomas – almost exclusively children/young adults
- Metastases are more common in adults
- Extra-axial cerebellar compression from meningioma, acoustic neuroma
INTERMITTENT CEREBELLAR DYSFUNCTION

- Drug toxicity— in these few, can lead to persistent cerebellar damage, outlasting the use of the drug/exposure
  - Trifluoperazine
  - Anticonvulsants (phenytoin and others)
  - Cocaine, phencyclidine
  - Lithium
  - Mercuric chloride
  - Mercury, lead, manganese, toluene

PERSISTENT CEREBELLAR DYSFUNCTION

- Cerebellar stroke
  - Most often present with sudden development of trouble walking or standing.
  - Complaint of pulling or falling to one side in hemispheric stroke
  - Usually have hemistasia, but fine other neurologic deficits
  - If large mass effect, can be life-threatening

- Parainfectious Cerebellitis
  - Most often in children weeks after a viral infection
  - Presents weeks after infection
  - Usually self-limited until good if imperfect recovery, but cerebellar swelling may be life-threatening

- Paraneoplastic Cerebellar Dystrophy—
  - Associated with cancer, usually breast or ovary, usually occult
  - Abrupt onset, rapidly progressive in weeks, purkinje cell destruction
  - Tumor identification and removal is the only treatment
MS. WHITE IS DIZZY

- 67 y/o woman who hasn’t seen a doctor in many years presents to her primary doctor stating she can’t walk well because she is dizzy.
- When asked to elaborate, she describes a feeling of being on a boat, or uneven ground when she tries to walk, even indoors. She has great fear of falling and holds onto the walls when she walks. She has no sensation of spinning or problems when she isn’t trying to walk.
- When you examine her, she has a normal CN, motor, and light touch sensation. She has absent reflexes in her ankles. When asked to walk, she has a wide based gait, holds the wall, and looks at the ground as she walks.

IMBALANCE FROM THE PERIPHERAL NERVES

- Sometimes people with position sense loss from neuropathy will complain of dizziness
  - Will NOT necessarily have subjective sensory loss or pain
  - Diabetes
  - Hypothyroid
  - B12 deficiency/pernicious anemia
  - Chemotherapy drugs
  - B6 overdose

OTHER “DIZZINESS”

- Migraine, anxiety, cardiac arrhythmia
- Temporal lobe epilepsy can sometimes present with a sensation of disorientation as an aura
  - Patients can describe falling, pitching, spinning, etc
  - May or may not be followed by altered consciousness
  - One patient insisted she was “zooming”
  - If all else fails nothing and the exam is normal in between, consider evaluation for TLE
  - Not your first, second, or third diagnostic consideration!
THANK YOU