Approach to dizziness in older adults

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Objectives ...

- How to define and describe dizziness.
- Discuss different categories of dizziness.
- Demonstrate how to approach a patient with dizziness.
- Review most common causes of each category and its treatment.
Introduction …

- Dizziness in general is a **false sense of motion**
- One of the **most common symptoms** of older adults
- Its prevalence reaches **30% beyond 60 years of age**, while rising to **50% beyond 85 years**.
- Dizziness is more common in **women than in men**.
- Dizziness in the elderly is a **strong predictor of falls**.
- One of the strongest contributors to **disability burden after age 65**.
Manifest differently as more of non-specific dizziness and instability than younger patients, making diagnosis more complex.

Associated with increased fear of falling, functional disability and depressive symptoms.

The most common causes of acute dizziness are acute vestibular neuritis, cerebrovascular ischemia and cardiovascular disorders resulting in hypotension.
1-The brain **receives** sensory information from three sources:

A- Vestibular part of the inner ear 
B- Vision. 
C- Proprioceptors of the muscles, joints, and tendons.

2-The brain **integrates** these sensory information and **sends motor orders** to two groups of muscles:

The extra-ocular muscles to keep the eyes stable and The spinal muscles to keep the limbs and trunk stable.

**Age-related degeneration** of different neural structures affects balance.
Patients sometimes have difficulty describing it. Physicians should focus more on timing and triggers!

**Mixed dizziness**: results from combination of two or more of the above and is the most common type of dizziness reported by older adults. (Combination of vestibular, CNS, visual or proprioceptive system, anemia, H.F, DM and hypothyroidism) therefore it requires multifactorial assessment and intervention.

### Main Categories of Dizziness

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>DESCRIPTION</th>
<th>PERCENTAGE OF PATIENTS WITH DIZZINESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertigo</td>
<td>False sense of motion, possibly spinning sensation</td>
<td>45 to 54</td>
</tr>
<tr>
<td>Disequilibrium</td>
<td>Off-balance or wobbly</td>
<td>Up to 16</td>
</tr>
<tr>
<td>Presyncope</td>
<td>Feeling of losing consciousness or blacking out</td>
<td>Up to 14</td>
</tr>
<tr>
<td>Lightheadedness</td>
<td>Vague symptoms, possibly feeling disconnected with the environment</td>
<td>Approximately 10</td>
</tr>
</tbody>
</table>

![Pie chart showing percentages of different types of dizziness: Vertigo 46%, Presyncope, Lightheadedness, Disequilibrium 54%]
An 81 year-old woman comes to the office, because she has episodes of dizziness in which the room spins intensely when she tries to get out of bed. The episodes last up to 1 minute. The first few times they were associated with intense nausea. She feels better when she doesn’t move her head.

O/E: External auditory canals and T.M appear normal. Results of Weber and Rinne tests are normal.

What other questions you shall ask and physical exam you can do?
History alone can reveal diagnosis in $\frac{3}{4}$ of cases

- How patients describe it
- Onset (sudden or slow)
- Course (episodic or continuous)
- Duration (seconds, minutes or hours)
- Severity
- Recurrence (Meniere, BPPV)
- Provoking, aggravating factors
- Triggering factors
- Associated symptoms (CNS symptoms, hearing symptoms)
- Associated nausea/vomiting
- Hearing loss or tinnitus
- Risk factors for cardiovascular disease
- Drug history
- Past history medical problems
- Recent viral illness, fever, systemic symptoms
History taking ... Duration

- **Seconds**
  - BPPV

- **Minutes**
  - BPPV
  - Perilymphatic fistula

- **>Hour**
  - TIA, Meniere's
  - Perilymphatic fistula

- **Hours**
  - Meniere's Disease, Migraine
  - Acoustic Neuroma

- **Days**
  - Migraine, early Vestibular Neuritis
  - MS, Stroke

- **Weeks**
  - Psychogenic
The approach to management in older adults has similarities to that in younger patients.
PHYSICAL EXAMINATION:

- **Vital Signs:** Blood pressure (sitting & lying) - pulse
- **CNS exam:** Cranial nerves - gait - Romberg sign - proprioception & vibration.
- **Head & Neck:** Auscultate for carotid bruits, Nystagmus
- **Heart:** Auscultation for A.S.
- **Ear exam:** Rinne test - Weber’s test - TM - Valsalva
Timed Up and Go test for gait and balance problems.
Dix-Hallpike maneuver.

**HINTS exam**: (head impulse, nystagmus, test of skew) examination can help distinguish a possible stroke (central cause) from acute vestibular syndrome (peripheral cause).

https://www.youtube.com/watch?v=1q-VTPweuk
Acute vestibular syndrome

- **Acute, continuous vertigo** lasting days to weeks with nausea or vomiting with nystagmus even if the patient gets worse with changes in position.

- 2 forms: **Post-Exposure**: anti-epileptic drugs, etc., **Spontaneous**: vestibular neuritis, stroke, MS.

- **HINTS** required! Ruling out stroke is critical, particularly in the elderly.

- The **HINTS** assessment protocol can be performed at the **bedside**, with **high sensitivity and specificity** to diagnose **stroke** in an acute vestibular syndrome with better sensitivity than early (MRI).
### Acute, Continuous Dizziness (days)
### Acute Vestibular Syndrome

<table>
<thead>
<tr>
<th>Impulse Test</th>
<th>Nystagmus</th>
<th>Skew</th>
<th>DIAGNOSIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abnormal</td>
<td>Unidirectional</td>
<td>Absent</td>
<td>Neuritis</td>
</tr>
<tr>
<td>Abnormal</td>
<td>Unidirectional</td>
<td>Present</td>
<td>Stroke</td>
</tr>
<tr>
<td>Abnormal</td>
<td>Bidirectional</td>
<td>Absent</td>
<td>Stroke</td>
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<td>Stroke</td>
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</table>
Missed Stroke and Dizziness...

**Look Back Approach:**
Stroke patients more likely to have been discharged from ED with “benign” dizziness prior ~14 days (N = ~180,000 strokes)

**Look Forward Approach:**
‘Benign’ dizziness sent home from ED more likely to return with a stroke within ~30 days, but not heart attack (N = ~30,000 ED dizzy discharges)
Peripheral causes of dizziness arise from abnormalities in the peripheral vestibular system: semicircular canals, the saccule, the utricle, and the vestibular nerve.

Common peripheral causes of dizziness/vertigo include:
- BPPV
- Vestibular neuritis (i.e., vestibular neuronitis)
- Meniere’s disease
Benign Paroxysmal Positional Vertigo (Most common !)
- Common between 50 and 70 years.
- **Etiology:** Head trauma - Intoxication - alcohol, Canelithiasis
- **No obvious cause** is found in 50% to 70% of older patients
- Precipitated by **movement or position change** in the head or body
- **Dx:** Dix-Hallpike maneuver
- **Contraindication:** Severe carotid stenosis, unstable heart disease, severe neck disease
Treatment of BPPV consists of a *canalith repositioning* procedure such as the **Epley maneuver, Li maneuvers** which repositions the *canalith* from the semicircular canal into the vestibule.

The *success rate* is approximately **70%** on the first attempt, and nearly **100%** on successive maneuvers.

Home treatment with **Brandt-Daroff exercises**

(http://www.youtube.com/watch?v=voZXtTUdQ00)
If there is **no improvement** with repeated repositioning maneuvers, or if a typical or ongoing nystagmus with nausea is present, **another cause** should be considered.

- **Pharmacologic** treatment: *(Meclizine (Antivert), 25 to 50 mg orally every four to six hours)* has **no role** in the treatment of BPPV.

- **Vestibular suppressant medications** should be **avoided**

- Surgical treatment: Post. Canal occlusion in refractory BPPV.
Vestibular neuritis:

- Cause unknown, viral

Clinical features:
- Sudden prolonged attack of vertigo – Nausea, vomiting, disequilibrium and apprehension – Positional
- Tinnitus and a sensation of fullness in the ear

- Audiology tests are normal
- No neurological signs
- Usually resolves spontaneously but may recur
- Vestibular neuritis is treated with medications and vestibular rehabilitation.
- Vertigo and associated nausea or vomiting can be treated with a combination of antihistamine and antiemetic.
- Systemic corticosteroids have been recommended as a treatment for vestibular neuritis. Methylprednisolone (Depo-Medrol), initially 100 mg orally daily then tapered to 10 mg orally daily over three weeks.
- Antiviral medications are ineffective.
Meniere's disease:

- **Pathophysiology:** The underlying pathology is excess endo-lymphatic fluid pressure leading to inner ear dysfunction; however, the exact cause is unknown.

Any age, it is more common between 20 and 60 years

Bouts of intense vertigo – minutes to hours

- **Fullness** or pressure in the ear
- **Tinnitus**
- **Fluctuating** unilateral hearing loss (**SNHL low more than high frequency**)
Treatment of Meniere's disease ...

1st line Treatment of Meniere's disease:
- limiting dietary salt intake to less than 2,000 mg per day
- reducing caffeine intake - limiting alcohol to one drink per day

2nd line treatment:
- Daily thiazide diuretic hydrochlorothiazide/triamterene [Dyazide].
- Intratympanic injections of Dexamethasone and gentamicin can improve vertigo.
Effective in vertigo but generally don’t provide benefit in chronic dizziness or disequilibrium. Vestibular suppressants should be tapered quickly => inhibitory effect on vestibular and central compensation.
Acoustic neuroma:
- Slow growing tumor
- Patients often experience mild vertigo or no vertiginous symptoms at all
- Unilateral tinnitus
- Unilateral SNHL (high frequencies)
- MRI brain (Diagnostic)
- Treatment: Surgery
Peripheral neuropathy:
- DM, Vit B12 def., Idiopathic, Cervical spine DJD
- Decreased vibration and position sense, gait abnormality
- Signs of radiculopathy or myelopathy
- Cervical or vestibular rehabilitation, cervical collar, surgery if needed
D.D of central causes of Dizziness ... 25%

- Pathology at the following sites:
  - The vestibular nuclei
  - Cerebellum - Brainstem - Spinal cord
  - Potentially **deadly central** causes of acute vestibular syndrome may **mimic** a more **benign peripheral** disorder, and a **stroke** may present with no focal neurologic signs.
**Diagnosis** usually relies on a history of brainstem symptoms, such as diplopia, dysarthria, weakness, gait or truncal ataxia, hypertonia and hyperreflexia, clumsiness of the limbs.

**MRI/MRA** may be helpful.

- **Treatment** includes antiplatelet therapy and reduction of risk factors for cerebrovascular disease.

- **Warfarin** (Coumadin) has been used in cases of significant vertebral or basilar artery stenosis.
Sudden intense persistent vertigo with nausea and vomiting.

Pronounced gait abnormalities

Pt falls toward the side of the lesion

Typically older pts (>60 y/o) with CV risk factors
Chronic dizziness...

- Dizziness for **more than 1-2 months**
- More **common** in **older adults**, has a larger variety of contributing causes.
- **Risk factors:** Angina, MI, stroke, arthritis, diabetes, syncope, anxiety, depressive symptoms, impaired hearing, use of medications in several classes, >5 medications.
- Given the **multifactorial etiology** >> Geriatric syndrome.
- Therefore, **multifaceted approach to interventions**
### Table 2. Medications Associated with Dizziness

<table>
<thead>
<tr>
<th>Medication</th>
<th>Causal mechanism</th>
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<tbody>
<tr>
<td>Alcohol</td>
<td>Cardiac effects: hypotension, postural hypotension, torsades de pointes, other arrhythmias</td>
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<tr>
<td>Antiarrythmics, class 1a</td>
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<tr>
<td>Antidementia agents</td>
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<tr>
<td>Antiepileptics</td>
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<tr>
<td>Antihistamines (sedating)</td>
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<tr>
<td>Antihypertensives</td>
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<tr>
<td>Anti-infectives: anti-influenza agents, antifungals, quinolones</td>
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<tr>
<td>Antiparkinsonian agents</td>
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<tr>
<td>Attention-deficit/hyperactivity disorder agents</td>
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<tr>
<td>Digitalis glycosides</td>
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<tr>
<td>Dipyridamole</td>
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<td>Narcotics</td>
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<tr>
<td>Nitrates</td>
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<tr>
<td>Phosphodiesterase type 5 inhibitors</td>
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<tr>
<td>Skeletal muscle relaxants</td>
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<tr>
<td>Sodium–glucose cotransporter-2 inhibitors</td>
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<tr>
<td>Urinary anticholinergics</td>
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<tr>
<td>Skeletal muscle relaxants</td>
<td>Central anticholinergic effects</td>
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<tr>
<td>Urinary and gastrointestinal antispasmodics</td>
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<tr>
<td>Antiepileptics</td>
<td>Cerebellar toxicity</td>
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<tr>
<td>Benzodiazepines</td>
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<tr>
<td>Lithium</td>
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<tr>
<td>Antidiabetic agents</td>
<td>Hypoglycemia</td>
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<tr>
<td>Beta adrenergic blockers</td>
<td></td>
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<tr>
<td>Aminoglycosides</td>
<td>Ototoxicity</td>
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<tr>
<td>Antirheumatic agents</td>
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<tr>
<td>Anticoagulants</td>
<td>Bleeding complications (anticoagulants), bone marrow suppression (antithyroid agents)</td>
</tr>
<tr>
<td>Antithyroid agents</td>
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</tbody>
</table>
Most patients presenting with dizziness **DON’T** require laboratory testing.

Laboratory tests includes **hematocrit, glucose, electrolytes, BUN, Vitamin B12, folic acid** and **TSH** should be performed on all patient with **chronic dizziness**.
When to order imaging studies ...

- Neurological sign and symptoms.
- Risk factors for cerebrovascular disease.
- Progressive unilateral hearing loss.
- MRI more appropriate than CT.
Expensive tests like electronystagmography, rotational chair testing, postugraphy and not often needed in the evaluation of dizziness.

**ECG:** If cardiac cause is suspected, Holter and event monitor only if suspicious of arrhythmia is strong.

**Audiometry:** in Tinnitus and hearing loss to differentiate between Meniere disease and Acoustic neuroma.
A 67-Year-old woman c/o dizziness and generalized weakness. She recently had a prosthetic heart valve placed. She describes her dizziness as gradually over the past few days, at a bearable, constant level of intensity. She reports no nausea, vomiting, or ringing in her ears.

O/E: There is a vertical nystagmus. Dix-Hallpike test is inconclusive.

Which one of the following is the most likely diagnosis:
- Vestibular neuritis
- Central vertigo probably due to stroke
- Meniere’s disease
- BPPV
- Perilymph fistula
An 85-year-old woman comes to the office because she has had a recent episode of dizziness in which she senses the room spinning around her, feels her right ear is blocked, and hears a roaring sensation. The symptoms improve gradually until she returns to baseline over few hours. She has no associated headaches. History includes diabetes and hypertension.

Which one of the following is the most likely diagnosis:

- BPPV
- Acute labrynthitis
- Arrhythmia
- Meniere's disease
Take home message ...

- TITrATE approach + History (important)
- Dizziness .. Vertigo/Presyncope / disequilibrium / Lightheadedness
- Seconds = Dix  Days = HINTS
- The longer symptoms >> Central cause >> urgent treatment
- Laboratory testing and imaging are not required and are usually not helpful.
- VRT includes different exercises such as vestibule-ocular reflex adaptation exercises and habituation exercises
Take home message ...
References …

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4481149/