The Brigham Department of Neurology
Martin A. Samuels, M.D., Chairman

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Dizziness

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History in the Dizzy Person

- Take an open-ended history-no suggestions
- Know the synonyms (e.g. giddy, woozy)
- Beware of medicalized history (e.g. vertigo)
- Pace of the illness (acute, subacute, chronic)
- Listen for neighborhood symptoms
  - Hearing loss, tinnitus suggests peripheral
  - Diplopia, dysarthria suggests central
Types of Dizziness

- Vertigo: illusion or hallucination of motion
- Near syncope: cerebral hypoperfusion
- Dysequilibrium: gait disorder
- Ill-defined lightheadedness: anxiety
Epidemiology of Dizziness: More dizziness than dizzy people

- 1.5 dizzy complaints per dizzy person
- Half of all dizziness is vertigo
- Half of all dizziness is divided among:
  - Near syncope
  - Dysequilibrium
  - Ill-defined lightheadedness
Causes of Persistent Dizziness in Elderly Patients in Primary Care
*Ann Fam Med* 2010;8:196-205

Table 4. Subtypes of Dizziness in 417 Dizzy Elderly in Primary Care (Panel Diagnosis)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dizziness subtypea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presyncope</td>
<td>288</td>
<td>69</td>
</tr>
<tr>
<td>Vertigo</td>
<td>171</td>
<td>41</td>
</tr>
<tr>
<td>Disequilibrium</td>
<td>166</td>
<td>40</td>
</tr>
<tr>
<td>Other dizziness</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>No consensus</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>648</td>
<td></td>
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<tr>
<td>Number of dizziness subtypes per patient</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>217</td>
<td>52</td>
</tr>
<tr>
<td>2</td>
<td>137</td>
<td>33</td>
</tr>
<tr>
<td>3</td>
<td>47</td>
<td>11</td>
</tr>
<tr>
<td>No consensus</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>417</td>
<td>100</td>
</tr>
</tbody>
</table>

Note: Data for each patient were independently reviewed by a family physician, a geriatrician, and a nursing home doctor.

*a* Adds up to more than 100%, because more than 1 dizziness subtype per patient is possible.
Examination of the Dizzy Person

- Orthostatic BP and heart rate
- Hyperventilation /squatting
- Carotid sinus massage by expert only
- Hearing testing
  - Pure tone hearing loss
  - Neural hearing loss (air vs bone conduction)
  - Cochlear vs retrocochlear hearing loss (speech discrim)
- Vestibular testing
  - Spontaneous nystagmus (?alternating)
  - Head impulse test
  - Test for skew (alternate cover refixation)
  - Induced nystagmus (Dix-Hallpike maneuver)
- Proprioception testing (Romberg test)
- Cerebellar testing, including gait

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Dix-Hallpike Maneuver
VIII Nerve Anatomy & Physiology

- Three semicircular ducts (angular acceleration)
  - X,Y,Z planes (roll, yaw and pitch)
- Utricle and saccule (linear acceleration)
- Cochlear duct (hearing)
- Perilymph (extracellular [spinal] fluid)
- Endolymph (intracellular fluid)
- End organ is a force transducer obeying $F=MA$
Pathogenesis of Benign Paroxysmal Positional Vertigo

- Canalolithiasis is the most common cause
- Posterior canal is the most likely offender
- Affected canal becomes gravity sensitive
- Characteristics of the nystagmus and vertigo
  - Brief latency
  - Tortional in dependent eye
  - Vertical in other eye
  - Transient (less than 60 seconds)
  - Reverses on return to upright posture
Canalolithiasis
Repositioning Maneuvers for BPPV

All based on the principle of moving the calcium from the semicircular canal back into the utricle from whence it came

Methods:

Epley
Semont
Brandt-Daroff exercises

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C

Posterior canal

Particles

Vantage point

Gravity

Superior canal
Semont Maneuver

Inner ear

Canalith

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Brandt-Daroff Exercises

Position 1

Position 2

Position 3

Position 4

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Later Canal BPPV Maneuver

Position 1. Bad Ear down

Position 2. Supine

Position 3. Bad ear up

Position 4. On hands/Knees

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Perilymphatic Fistula

- Rare cause of positional vertigo
- Perilymph leak at round or oval window
- Conductive hearing loss may be present
- Variable history of trauma, often remote
- Positive fistula test
- Confirmation with radionuclide study
- Surgical repair of rent in window may work
Superior Canal Dehiscence

- Noise induced vertigo (Tullio phenomenon)
- Usually spontaneous, but may be traumatic
- Oscillopsia is common
- Usually resolves spontaneously

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Labrynthitis, Vestibular Neuritis and Cochlear Neuritis

- Acute vertigo and/or hearing loss
- May be viral or post-viral
- Pulsed steroids shorten the course
- Antiviral agents add no additional benefit
- Improves substantially in 6-12 weeks
Meniere Disease

- Episodic vertigo and/or hearing loss, usually with prominent tinnitus
- Over time, hearing deteriorates
- May be immune mediated
- Pulse steroids may help acute attacks
- No good evidence that any treatment works
- Symptomatic therapy during attacks
- Diuretics are of questionable value
Traumatic Vertigo

• Usually major trauma with basilar skull fx
• Vertigo and/or hearing loss with nystagmus
• Overall good prognosis
• Substantial improvement in 3-6 months
• Symptomatic treatment
Postconcussion Syndrome

• Delayed onset symptoms after head trauma
• Often associated with “whiplash” symptoms
• No nystagmus or objective hearing loss
• Beware of drug induced nystagmus
• Related to an ulterior motive
• No medical treatment is effective
• Return to work and end of litigation are best
Vestibulo-cochlear tumors

• Usually Schwannomas or meningiomas
• Vestibular Schwannoma is most common
• Progressive retrocochlear hearing loss
• Variable and often mild vertigo
• Tinnitus is not usually prominent
• Magnetic resonance imaging is very useful
• Usually treatable with surgery or focal RT
Vertebro-Basilar Ischemia

- Pure vertigo is almost never a symptom of main stem basilar disease, but can be basilar branch or vertebral
- Listen carefully for neighborhood symptoms (e.g. diplopia, dysarthria)
- Look carefully for neighborhood signs (e.g. Horner syndrome, facial weakness, ataxia)
- Always test gait (cerebellar lesions affect gait more than peripheral vestibular ones)
- HINTS: horizontal head impulse test; fast phase of nystagmus; skew deviations on alternate cover test
- INFARCT: impulse normal; fast phase alternating; refixation on cover test

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Migrainous Vertigo

• Probably quite common
• About 10% of migrainous attacks include vertigo; more in younger patients
• About 10% of vertiginous attacks are associated with headache
• Motion sickness (physiological vertigo) is strongly associated with migraine
Near Syncope

- Pathogenesis: global cerebral hypoperfusion
- Usually orthostatic
- Inadequate volume or failure to adequately vasoconstrict in the upright posture
- Exercise induced is worrisome for cardiac cause
- Long-term loop recorders of HR and BP helpful
- Common causes:
  - Neurally induced (bradycardic; vasodepressor)
  - Volume depletion
  - Cerebral vasoconstriction (e.g. hyperventilation)
  - Vasodilation (e.g. alcohol, anti-hypertensives, heat)
Dysequilibrium (Gait Disorder)

- Extra-pyramidal (e.g. Parkinsonism)
- Spasticity
- Cerebellar ataxia
- Sensory ataxia (proprioceptive trouble)
- Hydrocephalus (“magnetic gait”)
- Psychogenic (conversion & malingering)
Ill-Defined Lightheadedness

- The core problem is anxiety
- Dizziness is meant metaphorically
- Depression may be a component
- Panic disorders
- Agoraphobia
- Treatment may include psychotherapy, anxiolytics, antidepressants and cognitive behavioral therapy
Drug Treatment of Vertigo

- Most or all drugs work as centrally acting anticholinergic substances
  - Diphenhydramine 25-100mg daily
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  - Meclizine 25-100mg daily
  - Promethazine 25-100 daily
  - Atropine patch

- Benzodiazepines are weak anti-vertigo drugs, and are mainly useful for associated anxiety

- Sympathomimetics improve anticholinergic efficacy and reduce soporific side effects
  - Modafanil 200mg daily
  - Methylphenidate 15-60mg daily
Dizzy?
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