Dizziness, Vertigo and Hearing Loss

Neurology Didactic Session 4
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Definitions

- **Tinnitus** – A sensation of noise in the ear
  - **Objective** = Examiner can auscultate it (Think AVM)
  - **Subjective** = Only experienced by patient

- **Vertigo**
  - Illusion of motion
  - Does NOT mean “spinning”

- **Hearing loss**
  - **Unilateral** = Focal pathology distal to brainstem
  - **Bilateral** = Toxic-metabolic
    - STROKES HARDLY EVER CAUSE HEARING LOSS!
Ear anatomy and definitions

- **External ear**
  - Tympanic membrane and everything distal
  - Includes the external ear
- **Middle ear – Ossicles plus Eustachian tube**
  - Malleus, Incus and Stapes – pierces oval window
  - Eustachian tube - pressure equalization
- **Inner ear – Fluid filled labyrinth**
  - Cochlea - Hearing
  - Vestibule for balance (saccule and utricle)
  - Semicircular canals for detecting rotation
Posture

- Three main structures
  - Visual input most important
  - Posterior columns
    - Detect the floor
    - Allow for orientation with the environment
  - Inner ear (least important)
- Vertigo occurs when there is a mismatch
Connections

- Medial longitudinal fasciculus
  - Yokes eyes together
  - Coordinates with vestibular system
- Cerebellum (Smothes out movements)
  - Flocculonodular lobe – Eye movements/vestibular system
  - Vermis and other midline structures – trunk coordination
- Hemispheres- Controls the limbs
# Central vs. peripheral vertigo

<table>
<thead>
<tr>
<th></th>
<th>Peripheral</th>
<th>Central</th>
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<tbody>
<tr>
<td><strong>Nystagmus</strong></td>
<td>Combined horizontal and torsional; inhibited by fixation of eyes onto object—does not change direction with gaze to either side</td>
<td>Purely vertical, horizontal, or torsional; not inhibited by fixation of eyes onto object;</td>
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<tr>
<td><strong>Imbalance</strong></td>
<td>Mild to moderate—able to walk</td>
<td>SEVERE—unable to walk</td>
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<tr>
<td><strong>Hearing loss/tinnitus</strong></td>
<td>Common</td>
<td>Rare</td>
</tr>
<tr>
<td><strong>Non-auditory neurological deficits</strong></td>
<td>Rare</td>
<td>Common</td>
</tr>
<tr>
<td><strong>Latency after provocative maneuver</strong></td>
<td>Longer (up to 20 sec)</td>
<td>Shorter (up to 5 sec)</td>
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Approach to the dizzy patient

- Have the patient define “dizziness”
  - Illusion of motion?
  - Lightheadedness?
  - Affected by postural changes?
- Examine for “neighborhood signs”
  - Nystagmus
  - Extraocular abnormalities
  - Facial weakness
- Examine for orthostatic hypotension
- Examine for “long tract signs”
Common peripheral disorders

- Benign positional vertigo
  - Provoked by moving into ONE specific position
  - More common in older persons
- Acute labyrinthitis
  - Vertigo and eye movement findings
  - Position independent
- Acoustic Neuroma
  - Slowly progressive unilateral hearing loss
- Meniere’s Disease
  - Dizziness, Vertigo and Unilateral hearing loss
Imaging studies

- Indications:
  - ANY evidence of central nervous system involvement
  - Unilateral hearing loss
  - Cannot definitive determine lesion is peripheral

- Study of choice
  - Head CT to exclude hemorrhage
  - MRI if hemorrhage is excluded by CT
Treatments summarized

- Benign positional vertigo
  - Epley Maneuver
  - http://www.youtube.com/watch?v=ZqokxZRbJfw
- Acute labrynthitis
  - Sedative agents (e.g. clonazepam)
  - Rehabilitation
- Acoustic Neuroma
  - Surgical excision should be considered
- Meniere’s Disease
  - Low salt diet
  - Diuretics