Assessment and Treatment of “Dizziness”

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Anatomy & Physiology
Vestibular System Function

• Orients self to vertical
• Senses and perceives self motion
• Maintains gaze stabilization
• Generates head and body postural changes for stability
Vestibular Apparatus (Inner ear)
Semicircular Canals

Canals are paired
Ampulla
Utricle and Saccule

- Macula
- Hair cells are embedded in the gelatinous layer
- Senses acceleration
Motor Output

Vestibular Ocular Reflex (VOR)
What exactly is “dizziness”

• Dizziness is a vague symptom that generalizes many types of vestibular disorders.
TiTrATE framework for assessing dizziness

– Ti: Timing
  • How long ago did it start?
  • How long does it last?
  • Constant or episodic?

– Tr: Triggers
  • What provokes symptoms?
  • Does it provoke nausea or vomiting?

– ATE: And Targeted Examination
  • We will talk about what this means with each category
Subjective Interview (continued)

– Is there hearing loss, changes or tinnitus?
– Is vision blurred with head movements or double?
– Recent history of virus or infections?
– Sensory changes in facial region?
– History of neck injury or concussion?
– PMH
  • HTN, stroke, migraine, anxiety, previous vestibular disorder
Subjective Interview

• Current medications:
  – Hypertension meds
  – Antibiotics (some are ototoxic)
  – Others with side effects of dizziness
  – Anti-vert medications such as Meclizine
Triggered episodic vestibular syndrome

Spontaneous episodic vestibular syndrome

Acute vestibular syndrome

BPPV
Orthostatic hypotension

Vestibular migraine
Vasovagal
Cardiac arrhythmia
Endocrine crisis
Meniere’s disease
TIA

Vestibular neuritis
Labyrinthitis
Posterior stroke
Acute vestibular syndrome

Vestibular neuritis
Labyrinthitis
Posterior circulation stroke
Vestibular Neuritis

• Acute vestibular loss- inflamed vestibular nerve
• No hearing changes/tinnitus
• Acute onset over hours, lasting days
• Often has had recent cold or virus
• Positive VOR testing
Labyrinthitis

- Acute onset- inflammation of the inner ear/ labyrinth
- Unilateral hearing loss
- Tinnitus
- Onset over minutes to hours, lasting 24-72 hours
- Gradual improvement over time
Posterior Circulation Stroke

- Either ischemic or hemorrhagic
- Often accompanied by nausea/vomiting
- Difficulty walking
- 5 D’s
Examination
1. Oculomotor Screening

2. Hearing screening
   I. Finger rub
   II. Weber's and/or Rinne’s test

3. Caloric Testing/VNG (video nystagmography)
Nystagmus

- Rhythmic oscillation of eyes with slow and fast phase
  - Named for direction of fast phase
  - Physiologic (normal)
  - Pathological
HINTS to Diagnose Stroke in the Acute Vestibular Syndrome: Three-Step Bedside Oculomotor Examination More Sensitive Than Early MRI Diffusion-Weighted Imaging


HINTS 100% sens 96% spec
DWI MRI <48 hours = 12% false negative

Kattah Stroke 2009
Normal leftward head impulse

Positive leftward head impulse
<table>
<thead>
<tr>
<th><strong>HINTS</strong></th>
<th><strong>Peripheral</strong></th>
<th><strong>Central</strong></th>
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</thead>
<tbody>
<tr>
<td>Head Impulse</td>
<td>Abnormal VOR</td>
<td>Normal VOR</td>
</tr>
<tr>
<td>Nystagmus</td>
<td>- Horizontal</td>
<td>- Direction-changing</td>
</tr>
<tr>
<td></td>
<td>- Direction-fixed</td>
<td>- Vertical</td>
</tr>
<tr>
<td></td>
<td>- Away from affected side</td>
<td>- Torsional</td>
</tr>
<tr>
<td>Skew</td>
<td>No deviation</td>
<td>Deviation</td>
</tr>
</tbody>
</table>
Treatments for AVS
Gaze Stabilization exercises
Spontaneous episodic vestibular syndrome

Vestibular migraine
Vasovagal
Cardiac arrhythmia
Endocrine crisis
Meniere’s disease
TIA
Anxiety
Migraine Associated dizziness

• Episodic
• Can be with or without headache, but may have other migraine characteristics (i.e.-photophobia, phonophobia)
• Will often improve with rest
• Usually managed medically/ migraine diet
Meniere’s Disease

- Affects both balance and hearing
  - Unilateral 80%, Bilateral 20%
  - Affects 1% of population
  - Young adults (20-50)
  - “Roaring” tinnitus
  - Aural fullness
  - Sensorineural hearing loss
## Differential of Migraine vs. Meniere’s

<table>
<thead>
<tr>
<th>Migraine</th>
<th>Menieres</th>
</tr>
</thead>
<tbody>
<tr>
<td>High pitched tinnitus</td>
<td>Low pitched tinnitus</td>
</tr>
<tr>
<td>Ear ache, photophobia, phonophobia</td>
<td>Ear fullness</td>
</tr>
<tr>
<td>Spontaneous vertigo is uncommon</td>
<td>Spontaneous vertigo is common</td>
</tr>
<tr>
<td>Naps help</td>
<td>Naps do not help</td>
</tr>
<tr>
<td>Auras common</td>
<td>Auras uncommon</td>
</tr>
<tr>
<td>Motion sickness</td>
<td>No motion sensitivity</td>
</tr>
</tbody>
</table>
Vasovagal/ Cardiac Dizziness

• Often happens when dehydrated or with electrolyte imbalance
  – “Lightheadedness”
  – Syncope
  – May happen with “Valsalva maneuver”
Anxiety

- Counseling/therapy
- Medications
- Physical therapy/biofeedback
Examination for SEVS
Cranial Nerve Exam
EKG
Subjective Interview
Audiogram/ VNG testing
Treatments for SEVS
Meniere’s disease
Medication
Diet modification

Vestibular Migraine
Supplements/Medications
Food/activity logs/ tracking triggers
Patient Logs

- Weekly Symptoms Diary (use to track the severity and duration of symptoms on a daily basis)
- Symptoms Log (use to track when you experience symptoms)
- Food Log (use to record the food and beverages you have ingested, as well as key ingredients that may affect your vestibular symptoms)
- Activity Log (use to record your activities and track how they impact your vestibular symptoms)
- Medications Log (use to track all medications you are taking)
- Ménière’s Monitor (a free app for iPhone, iPad, and Android, designed by Buzz Interactive and the European Centre to study Ménière’s)
- Symptom Trigger Tool (by Mind Over Meniere’s)

Patient Logs - Vestibular Disorders Association

https://vestibular.org/article/diagnosis-treatment/patient-logs/
Triggered episodic vestibular syndrome

BPPV
Orthostatic hypotension
Cervicogenic dizziness
Examination for TEVS
Orthostatic hypotension

Often treatment is conservative and includes:

● Pausing and counting to 10 between position changes

● Drinking more fluids (non-caffeinated)

● Wearing compression stockings and/or abdominal binders

● Occasionally increasing sodium intake

● In extreme cases that do not respond to conservative measures, medications may be helpful
Persistent Postural Perceptual Dizziness

Caused by chronic symptoms of dizziness hypersensitizing the brain to movement, causing an extreme version of motion sensitivity
Benign Paroxysmal Positional Vertigo

- Episodic, short duration of symptoms (lasting seconds to minutes)

- Often reports spinning sensation with position change, such as rolling in bed or tipping head up to ceiling.

- Most common cause of vertigo/dizziness
Dix-Hallpike test for posterior canal BPPV
Contraindications/Precautions

• History of neck surgery
• Recent neck trauma
• Severe RA
• Atlantoaxial or occipitoatlantal instability
• Severe cervical arthritis
• Cervical myelopathy or radiculopathy
• Carotid sinus syncope
• Chiari malformation
• Vascular dissection syndromes
Side-lying Test

Alternative Test for Posterior/Anterior Canal
Roll Test for horizontal canal
Treatment
Canalith Repositioning Maneuvers
Canalith repositioning maneuver for *right posterior canal* BPPV, AKA “Epley Maneuver”
Canalith repositioning maneuver for *right horizontal canal* BPPV, AKA “Gufoni Maneuver”
Cervicogenic Dizziness

Caused by sensory mismatch from the eyes, ears and muscle spindles of the muscles in the neck
Cervicogenic Dizziness

Joint position error testing
Cervicogenic Dizziness

Joint position error exercises
Referral to Neurology

- Appropriate for patients with
  - New onset nystagmus
  - Migraine associated disorders
  - Suspicion of neuroma
Referral to Otolaryngology “ENT”

• Further testing and diagnosis of
  – Suspected Meniere’s
  – Unilateral vestibular loss/hypofunction
  – Bilateral Vestibular loss/hypofunction
  – Abnormal or sudden hearing loss

• Ask for an appointment with a “Vestibular ENT”, often your visit will also have a visit with an audiologist prior to the ENT visit for baseline assessment
Referral to Physical Therapy

- Treatment of BPPV
- Previously diagnosed vestibular loss or hypofunction in need of vestibular rehabilitation therapy
  - (Vestibular Adaptation, Vestibular Substitution, Vestibular Habituation, Balance re-training)
- Further assessment/diagnosis of reports of dizziness
Don’t forget

Patients can have multiple or “layered” diagnoses. BPPV AND subsequent Cervicogenic dizziness. UVH AND Meniere’s …. AKA “Vertigo Lasagna”
Vestibular Physical Therapists in New Hampshire and Vermont:

1. Use the “Find a PT” tool on the APTA website
   https://aptaapps.apta.org/APTAPtDirectory/FindAPTDirectory.aspx

2. Search “vestibular physical therapy New Hampshire”
Vestibular ENT

Dartmouth Health: Lebanon (603)-650-8123

Southern New Hampshire Vertigo and Balance Center: Nashua (603)-889-7434

Northeast Rehabilitation: Salem & Portsmouth (603)-893-2900
References:


- Schubert MC, Tusa RJ, Grine LE, Herdman SJ. Optimizing the sensitivity of the head thrust test for identifying vestibular hypofunction. Phys Ther 2004; 84:151-158

- Herdman S, Clendaniel R, Mattox D, Holliday M. Vestibular adaptation exercises and recovery; acute stage after acoustic neuroma resection. Otolaryngology Head and Neck Surgery, July 1995113(1)77-87
References continued:

Questions?
Thank you!

A special thanks to Kristen Dupuis PT, DPT and Carrie Aberdale OTR/L for their help making the videos in this presentation.