Post-Concussive Dizziness: Concussion Recovery Program

Majid Fotuhi, MD PhD
Post-Concussion Dizziness and Vertigo

- Affects 30-65% of patients with TBI
- Results in significant impairment in daily function due to:
  - Reduced balance
  - Fear of falls
  - Difficulty with eye-hand-head coordination
  - Difficulty to return to work
  - Risk for further head trauma
  - Inability to participate in sports or complete daily tasks
  - Avoidance of social engagements
  - Frustration, anxiety, depression
Equilibrium system

- Eyes (vision, focal & peripheral)
- Inner ear (vestibular system)
- Neck (proprioception)
- Joints (proprioception)
- Soles (touch)
Trauma to Inner Ear, Diffuse Axonal Injury, Cervical Injury
Common Causes of Post-Concussive Dizziness

- Labyrinthine & VN injury
- Vestibular Migraine
- Meniere’s Disease
- BPPV
- Medication side-effects
BPPV

- Vertigo in a specific head position (most often with looking up or turning in bed - less symptomatic with walking)
- “World spinning”—patient feels very nauseated and uncomfortable
- Symptoms stop when a specific head position is avoided
- Is easy to diagnose and treat
Examination in BPPV

The Dix–Hallpike Test of a patient with BPPV affecting the right ear
Maneuvers to Diagnose and Treat BPPV
Epley Maneuver

BPPV

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Common Causes of Post-Concussive Dizziness

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Trauma to the Inner Ear or Vestibular Nerve

- Trauma to the semicircular canals or the vestibular nerve can cause disruption in the flow of information from the inner ears to the brain

- Acute symptoms of gait imbalance, veering to the right or left, vertigo with rapid head movements to the right or left

- Responds well to treatment with vestibular rehab

http://my.clevelandclinic.org/services/head-neck/diseases-conditions/vestibular-neuritis
Examination and Treatment

- Gait imbalance (veer to one side)
- Difficulty with standing on either foot alone (falls to the same side on repeated testing)
- Positive head-impulse test
- Positive Fukuda test
- Normal hearing
- Negative Dix–Hallpike
- Vestibular rehab can result in complete resolution of symptoms within weeks to months

Labyrinthine & VN injury
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Post-Traumatic Meniere’s

- “Glaucoma of the inner ear”
- Increased pressure inside inner ear
- Associated with fluctuating
  - Hearing loss
  - Fullness in ears
  - Tinnitus
  - Attacks of unprovoked vertigo, not positional
- Couple of hours at a time

Meniere’s Disease

http://picnicwithants.com/menieres-disease/
Examination and Treatment

- Unilateral LF hearing loss
- May have unilateral vestibular hypofunction (positive head impulse test)
- Normal gait (unless experiencing vertigo attack at the time of examination, in which case cannot walk at all)
- Treated with
  - Low salt diet
  - Acetazolamide
  - Clonazepam (for acute vertigo attacks)

Meniere’s Disease

http://upload.wikimedia.org/wikipedia/commons/0/00/Menieres-hearing-loss.png
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Vestibular Migraine (VM)

- Most often underdiagnosed, attributed to anxiety
- Episodes of dizziness last hours to days
- Symptoms can range from frank vertigo (spinning) to a rocking sensation or disequilibrium
- Often associated with motion sensitivity
- Can happen with or without headaches, photophobia, phonophobia, and nausea
Examination in VM

- Normal
- Difficulty with focusing eyes, may have convergence insufficiency (trouble reading)
- Sometimes patients have evidence of unilateral vestibular hypofunction or spontaneous nystagmus (especially during the vertigo attack)
- Signs of anxiety and depression (in up to 40% of patients)
Treatment for Vestibular Migraine

- **Identify and address the triggers for migraine:**
  - Poor sleep
  - Poor diet, certain food item
  - Excessive noise, light, odors, people, or visual stimuli in the work/home environment
  - Stress and anxiety
  - Lack of rest and relaxation

- **Treatment with medications:**
  - Topamax or other prophylactic medications for migraine
  - Anti-anxiety medications such as SSRIs for 3-6 months
  - Counseling, meditation training, or neurofeedback
Neurofeedback

- Performed by a certified EEG neurofeedback specialist
- Live EEG feedback is provided through auditory and visual responses to help the patient move brain activity towards an optimal state
- Very effective for treatment of migraine symptoms
- Benefits are long-lasting
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Why Some Patients Do Not Recover Promptly?

- Severity and frequency of damage to the brain
- Inadequate initial treatment of symptoms
- **Fragmented interventions, without a coherent and systematic approach**
- **Depression, loss of hope due to persistent dizziness, with or without co-existing sleep, anxiety, and disability issues**
- **Loss of self-esteem, deterioration in lifestyle**
- Secondary gain, legal matters
Concussion Recovery Program:
Treatment of Three Main Categories of Symptoms

- Migraine Issues
- Mood, Sleep, and Cognitive Issues
- Balance & Equilibrium Issues
## Concussion Recovery Program

<table>
<thead>
<tr>
<th>Migraine</th>
<th>Balance &amp; Equilibrium</th>
<th>Mood, Sleep, and Cognitive Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reduce exposure to triggering stimuli</td>
<td>• Careful examination by expert neurologists</td>
<td>• Meditation</td>
</tr>
<tr>
<td>• Improve sleep</td>
<td>• Equilibrium testing</td>
<td>• Counseling</td>
</tr>
<tr>
<td>• Prophylactic medications</td>
<td>• Balance and vestibular rehab</td>
<td>• Improve sleep</td>
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<tr>
<td>• Improve Diet &amp; Exercise</td>
<td>• Address co-existing issues (such as tinnitus)</td>
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Concussion Recovery Program

Results:

- Better balance & Equilibrium
- Awareness and understanding of disease processes and solutions
- Expect full resolution of symptoms
- Regain confidence
- Better sleep
- More hopeful
- Brighter mood

https://alum.mit.edu/news/QuickTake/Archive/200804/
THANK YOU!

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