I. Cervicogenic dizziness

   A. Proposed mechanism: cervicogenic dizziness results from a sensory mismatch between somatosensory information from the cervical spine and input from the visual and vestibular systems.

   B. Whiplash injuries
      1. Abnormal caloric and rotary chair tests post-whiplash injury
      2. Abnormal sensory organization test
      3. Tympanometric and perilymph fistulas
      4. Impaired oculomotor function: smooth pursuit neck torsion test (SPNT)
      5. Impaired muscle function
      6. Impaired cervical somatosensation: increased joint position error (JPE)

   C. Conclusions? It seems clear that patients with persistent symptoms after a whiplash injury should be evaluated for:
      1. Vestibular abnormalities, both central and peripheral
      2. Smooth pursuit accuracy
      3. Postural control
      4. Neck muscle function, including strength and endurance, flexors and extensors
      5. Head-neck repositioning

II. Migrainous vertigo

   A. Cervicogenic dizziness implies there is a problem in the cervical spine causing the dizzy symptoms
      1. These impairments can cause other symptoms: HEADACHES! NECK PAIN!
      2. Wrisley (2000) states neck pain is a pre-requisite for the diagnosis.
B. How does one differentiate between Cx dizziness and migrainous vertigo?
   1. Presence of aura, photophobia, phonophobia

III. Recognizing central, peripheral and cervicogenic dizziness
A. Character of dizziness\textsuperscript{23, 24}
   1. Fainting or lightheadedness:
      a) Pre-syncope: think vascular
      b) Test for orthostatic hypotension!
   2. Spinning, think vertigo: peripheral vestibular?
   3. Dizzy or imbalance?
   4. Double vision?
      a) Think new glasses (simplest)
      b) Consider oscillopsia: VOR (vestibular)
   5. Associated aura, photophobia? migraine

B. Differential diagnosis\textsuperscript{23}
   1. Central
      a) Oculo-motor tests
      b) Resting nystagmus; abnormal smooth pursuit, saccades, etc.
      c) Signs of CNS disorder
      d) e.g., UMN signs
      e) Constant vertigo
   2. Peripheral
      a) No resting nystagmus (unless acute)
      b) Position/movement provoked
      c) Good smooth pursuit
      d) No UMN signs
      e) Transient dizziness
      f) Positive passive head shake, head thrust, etc.

C. Summary: key history in cervicogenic dizziness
   1. Concurrent complaint of neck pain
      a) Temporally related onset
      b) Pain and dizziness severity co-vary
   2. Vague description, but NOT true vertigo (i.e., not spinning)
   3. Short duration, or movement provoked
      a) Could be constant low-grade sensation or feeling: “off,” “floating,” etc.
   4. Imbalance or postural dyscontrol

D. Time course of dizziness

<table>
<thead>
<tr>
<th>Duration</th>
<th>Etiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seconds</td>
<td>BPPV, Perilymph fistula, Orthostatic hypotension, CGD</td>
</tr>
<tr>
<td>Minutes</td>
<td>TIA, Migraines</td>
</tr>
<tr>
<td>Hours/ Days</td>
<td>Menière’s, Acute vestibulopathy (UVL)</td>
</tr>
</tbody>
</table>

Interactive Questions: Slide 43 @ 30 minutes
IV. Examination of the patient with dizziness\textsuperscript{25-27}

A. Working assumption: from here forward, we will assume that along with the dizziness:
1. The patient’s symptom onset was associated with a traumatic event, and
2. The therapist is the first contact the patient has with the healthcare system
   a) Thus, for this course the therapist must decide if the patient is appropriate for therapy or needs a referral

B. Examination sequence
1. Appropriate for therapy?\textsuperscript{28}
   a) History of trauma: rule out upper cervical hypermobility (ligamentous laxity tests: sharp-purser, alar ligament tests)\textsuperscript{29}, fractures (open mouth x-ray minimum)
   b) VBI: significant problems associated with extension-rotation test; usefulness in predicting who is at risk is limited. Any questions: refer\textsuperscript{30, 31 32}

2. Central versus peripheral vestibular dysfunction (see above for history)
   a) New unexplained onset of central causes, or changing central signs, are a red flag: refer
   b) Central: Oculomotor exam, upper motor neuron (UMN) signs
      i. Oculomotor exam: spontaneous nystagmus persisting >1 week after onset, saccadic (jerky) smooth pursuit, abnormal saccades (overshoot or >2 eye movements to target)
      ii. Signs of UMN lesion: hyperreflexia, hypertonia, ataxia, etc.
   c) Peripheral:
      i. Hallpike: nystagmus with position change suggests BPPV
         1) Posterior canal: upbeating; anterior canal: downbeating
         2) If true BPPV will have rotary component to the involved side
         3) Canalithiasis: short duration; cupulolithiasis: >1 minute duration
ii. Roll test: horizontal canal BPPV
   1) Supine head rotation to each side; positive is horizontal nystagmus
   2) Nystagmus towards the ground (geotropic): canalithiasis
   3) Nystagmus away from the ground (ageotropic): cupulolithiasis

Interactive Questions: Slide 94 @ 71 minutes

iii. Head thrust: vestibular hypo-function; corrective saccade when head is suddenly moved (thrust) to the involved side

iv. Post-head shake nystagmus: unilateral vestibular hypofunction

v. Dynamic visual acuity (DVA) test: clinical measure of VOR

Interactive Questions: Slide 110 @ 81 minutes

3. Cervical spine: cervicogenic dizziness is a diagnosis of exclusion
   a) Reduction of symptoms with manual cervical traction: cervicogenic

4. Lightheaded upon rising from supine or sitting? Check for orthostatic hypotension

5. With a history of trauma (e.g., whiplash), central (brain injury), peripheral and cervical causes of dizziness can all be present simultaneously

6. Mechanical differential diagnosis: modified neck torsion nystagmus test
   a) Move body under head: reproduction of symptoms suggests cervical involvement
   b) Move head and neck together as one unit (en bloc): reproduction of symptoms suggests central or peripheral vestibular involvement
   c) Must do both to get the full picture
Bibliography


