Benign Paroxysmal Positional Vertigo
Assessment and Treatment

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Objectives

• Be able to identify which canal, side and form of BPPV is present

• Know the forms of BPPV - Canalithiasis and Cupulolithiasis

• Be able to perform treatments for posterior, anterior and horizontal canalithiasis and cupulolithiasis BPPV
Initial presentation of patient

Pt reports a sudden onset of vertigo when lying down, getting up, rolling over in bed, bending over and looking up.

Pt usually states it began when he or she got up in the morning.
Chronic problems that persist after remission of BPPV

• Balance problems
• Lightheadedness or a feeling of floating
• Recurrence is common after have BPPV
Basic Anatomy of the Peripheral Vestibular System
Semicircular Canals

• The Canals are approximately 90 degrees to each other

• They are responsible for angular acceleration

• The Cupula (gelatinous membrane) overlies each set of hair cells in the SCC.

• The Cupula and Endolymph are the same density so therefore not gravity sensitive.
Utrical and Saccule (otoliths)

- Detect linear acceleration and tilt
- Utrical — horizontal plane
- Saccule — vertical plane
- The otoliths are gravity sensitive due to Calcium carbonate crystal (otoconia) located within the gelatinous membrane resting on top of the hair cells
Otoconia calcium carbonate crystals in the Utrical and Saculle
Etiology of BPPV

- The Otoconia is held in place by gelatinous membrane
- The three SCC are attached to the Utricle
- The otoconia/calcium carbonate crystals fall off the macula of the utrical
- They in turn fall into the SCC, changing the canal’s response to gravity
Etiology Continued

• The movement of the otoconia within the SCC due to head movement results in movement of the endolymph fluid and/or the receptors to persist after head movement has stopped.

• Therefore, the CNS is receiving input that the head is still moving.

• The nystagmus is a result of the eye movement occurring just as if the head is still moving.

• Thus Vertigo or spinning is reported by patient.
Etiology continued

**Diagnosis**

- Many cases occur spontaneously
- May occur after head trauma, labyrinthitis or ischemia in the anterior distribution of the vestibular artery.

**Incidence**

- Each year BPPV accounts for 160,000 new cases of dizziness
- Increases with age: 20-29 y/o 3.1% and 80-89 y/o 33.1% of patients with BPPV - increases to 50% in over 90 y/o
Patients Complaints

- Poor Balance 57%
- Vertigo - sense of rotation 53%
- Difficulty walking 48%
- Lightheaded 42%
- Nausea 35%
- Queasy 29%
- Spinning inside the head 29%
Percentage of Canal Involvement

- Posterior: 63%
- Anterior: 12%
- Horizontal: 2%
- Unknown: 23%
Cupulolithiasis

- The otoconia from the utrical is displaced into the cupula of one of the semicircular canals.

- Therefore, the canal becomes gravity sensitive and produces abnormal input to the vestibular nuclei when the head is in the provoking position.
Canalithiasis

- The otoconia from the utrical are free floating in the long arm of the semicircular canal.

- The otoconia free floating in the endolymph makes the canal gravity sensitive
Benign Paroxysmal Positional Vertigo

**Canalithiasis**
- octoconia is floating freely in the endolymph
- Delay of onset 1 to 40 seconds
- Duration less than 60 seconds

**Cupulolithiasis**
- Degenerative debris is adhered to the cupula
- Immediate onset of symptoms
- Duration greater than 60 seconds up to 2-3 minutes but does fatigue
- Relatively uncommon
Semicircular Canal Involvement
The direction of the nystagmus when the patient moves into the provoking position determines the canal or canals:

<table>
<thead>
<tr>
<th>Canal Location</th>
<th>Type of Nystagmus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Posterior</td>
<td>Upbeating and rightward torsional</td>
</tr>
<tr>
<td>Right Anterior</td>
<td>Downbeating and rightward torsional</td>
</tr>
<tr>
<td>Left Anterior</td>
<td>Downbeating and leftward torsional</td>
</tr>
<tr>
<td>Left Posterior</td>
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</tbody>
</table>
Horizontal Canal Involvement

• The direction of the nystagmus is determined by whether it is canalithiasis or cupulolithiasis

• Canalithiasis — nystagmus is geotropic (beats to earth)
  ✦ side of **greater** intensity is the involved side

• Cupulolithiasis — nystagmus is apogeotropic (beats away from the earth)
  ✦ side of **lesser** intensity is the involved side
Assessment/Test

- Dix - Hallpike maneuver is the gold standard
  - It can produce nystagmus and vertigo from any SCC but primarily anterior and posterior
- Sidelying Test for Anterior and Posterior SCC BPPV
- Roll Test for Horizontal Canal
Contraindications to performing the Dix-Hallpike test

- hx of neck surgery
- recent neck trauma
- severe rheumatoid arthritis
- atlantoaxial and occipitoatlantal instability
- cervical myelopathy or radiculopathy
- carotid sinus syndromes
Prior to the testing, explain it to the patient.
1. Keep your eyes open during the test and attempt to not look around

2. The symptoms of vertigo may be felt - however, it should pass

3. Stay in the test position until the vertigo has resolved

4. I will assist you back to sitting slowly if you feel you just can not remain in test position

5. You are safe and I will not let you fall
Dix-Hallpike test
Sidelying Test for BPPV
Roll Test - Horizontal Canal

1. Head is flexed 20 degrees
2. Head is quickly rolled to one side for 1 minute noting pt’s symptoms
3. Head is slowly brought back to midline then the opposite side is tested
Horizontal Canal Nystagmus

https://youtu.be/5eWcwgbgibM
Canalith Repositioning Maneuver For Anterior and Posterior Canal Left Canalithiasis

• First turn head 45 degrees to the left

• Move into Dix - Hallpike position to the left

• Rotate head to the right 45 degrees

• Roll to the right shoulder with head rotated 45 deg down.

• Slowly come to sitting with head rotated to the right then to center

★ hold each position for 30-60 seconds
Liberatory Maneuver for right posterior canal cupulolithiasis

1. Pt sits on edge of mat with head 45 degs to the left (unaffected side) head is hanging 20 degrees

2. Pt is moved quickly to the right side - maintaining position 1-2 minutes

3. Pt is moved quickly up through sitting and down to the left side (face will be 45 degs toward the table)

4. The pt stays in this position for 2 minutes then moves slowly back into sitting position
Liberatory Maneuver for Anterior SCC BPPV - Right

- The treatment has to be modified to move the head in the plane of the anterior SCC

1. Pt sits on edge of mat with head 45 degs to the right *(affected side)*

2. Pt is moved quickly to the right side keeping the head pointing toward the floor - maintaining position for 1 minute

3. Pt is then moved quickly up through sitting and down to the left side maintaining head 45 degrees to the right (face will be 45 degrees toward the ceiling) maintaining position for 1 minute

4. Then slowly the pt is returned to sitting
1. Pt turns head 45 degrees to the unaffected side then moves quickly into side-lying position on affected side

2. Pt maintains position till vertigo stops plus 30 seconds

3. Maintaining 45 degrees rotation - pt sits up then turns head to neutral

4. Pt then turns head 45 degrees and repeats to opposite side

5. The maneuver is repeated 10-20 times, 3 times a day until the patient has 2 consecutive days without vertigo
Brandt-Daroff Treatment

• Mainly used with patients with history that looks like BPPV - However, pt has no nystagmus during assessment

• It may be used if there is continued dizziness after vertigo has been resolved.

• In a study by Amore-Dorado et al 2012 - Brandt Daroff was compared to CRT in a randomized controlled trial with CRT with 80.5% remission and Brandt-Daroff 25%.
Bar-B-Que roll test

1.

2.

3.
Bar-B-Que Roll Treatment for Horizontal Canalithiasis

1. Pt begins in supine with affected ear down

2. The pt’s head is slowly rolled into the face up position - it is held for 15 seconds or until the dizziness stops

3. The pt’s head is then rolled until the affected ear is up — held 15 seconds or until the dizziness stops

4. The pt then rolls the head and body until the face is down - head flexed 30 degrees

5. After 15 seconds, the pt slowly sits up, keeping the head level of flexed 30 degrees

6. If pt is unable to come up from this position you may finish the roll then have pt sit up
Forced prolonged positioning maneuver for Horizontal Canal Canalithiasis

1. The pt lies on the involved side for 20 seconds
2. Then slowly rolls to the unaffected side
3. Patient maintains position all night
Liberatory (Appiani) Maneuver for Left Horizontal Canalithiasis

1. Pt starts in the sitting position with head in neutral

2. Pt quickly lies on the unaffected side

3. Pt maintains position for 2 minutes then quickly turns head 45 degrees down — maintaining position for 2 minutes before sitting up
Modified Semont (Casani) Maneuver for Right Horizontal Canal Cupulolithiasis

1. Pt starts in the sitting position with head in neutral

2. Pt quickly lies on the affected side

3. Pt quickly turns head 45 degrees down - maintaining position for 2-3 minutes before sitting up
BPPV in the Elderly

- BPPV has a tendency to go unrecognized in the elderly

- Undiagnosed patients report an increase in falls and impairments in ADL

- The right questions need to be asked on evaluation - do they experience vertigo or dizziness upon transferring supine to sit or rolling

- It was found that 23% of patients referred to a vestibular clinic had BPPV and an average age of 61 from Whitney and Colleagues
Considerations in the Elderly

- Posture
- Neck range of motion
- Screen for Vertebral basilar compromise
- Cognition
- Speed of the maneuver
- Normal pressure hydrocephalus - contact MD prior to treating
BPPV Treatment consideration in the Elderly

- Paget’s disease
- Low back pain
- RA
- Cervical disorders
- arthritis
- fear
- history of CVA
- Metastatic cancer
Modification to Maneuvers

- Pillow under upper back
- Second or third person
- Tilt table backwards
- Slower movements
- May test is sidelying with soft collar to stabilize neck

The orientation of the head in respect to gravity is of primary importance
References


