Canalith Repositioning for Benign Paroxysmal Positional Vertigo

Timothy C. Hain, MD
Departments of Otolaryngology and Physical Therapy
Northwestern University, Chicago, IL

Benign Paroxysmal Positional Vertigo (a.k.a.)

BPPV
BPV (Benign Positional Vertigo)
Positional Vertigo
(Not BPV of childhood)

Case SH
- 61 yr o wm slipped and fell, hitting back of head
- LOC for 20 min
- In ER, unable to sit up
- Hallpike maneuver -- positive

Diagnosis: Dix-Hallpike Maneuver

BPPV nystagmus
- Latency (0-20sec)
- Burst (< 60 sec)
- Upbeating/ Torsion vector
- Reversal on sitting
- Fatigue with repetition

Video Frenzel Goggles make it easier

C. Nystagmus of BPPV

C. Nystagmus Technology, Chatham
Prevalence of BPPV is high

- 20% of all vertigo
- 50% of vertigo in older persons.
- Linear increase with age!
- 85% of all positional vertigo


BPPV Mechanism canalithiasis (loose rocks)


BPPV timing: Latency, burst, reversal, fatigue

Hydrodynamic advantage is less in ampulla
Margination -- fatigue


BPPV Variants

Ewald’s first law: eye movements occur in the plane of the canal being stimulated. Three canals → three vectors.

- Posterior canal
- Lateral canal
- Anterior canal


Vector of nystagmus tells you the variant of BPPV (and the treatment)

- PC - Upbeating and Torsion
- AC - Downbeating and Torsion
- LC - Horizontal
PC - BPPV Treatment

- Controlled studies of PC BPPV treatment, show that it works well - 80% response.
- Goal of therapy is to remove debris from semicircular canal.

Brandt-Daroff – avoid this maneuver

- Brandt-Daroff exercises
  - 3 cycles of exercise 3 times per day.
  - Stop exercises symptom-free with routine and exercises for 2 consecutive days
  - Outcome: 23% success rate within 1 week
    - (Radtke, Neuhauser, et al., 1999; Soto Varela, Bartual Magro et al., 2001).
  - MUCH WORSE than more current treatments


Canalith Repositioning Procedure

Illustrated for treatment of right PC.

- Single Treatment
- Force of gravity redistributes otoconia
- Outcome: In RCT, 79 ± 16% average short term success rate of single treatment session.

Debris Right PC


PC – BPPV Treatment -- Epley (CRP)

- Canalith Repositioning Procedure – CRP

Semont Maneuver

- Semont Maneuver also referred to as Liberatory Maneuver. Illustrated for treatment of right PC.
- Single treatment approach
- Similar geometry to Epley
- Outcome: In RCT, 82 ± 6% average short term success rate of single treatment session (slightly better than CRP)


**CRP vs Semont Maneuver**
- Practically, efficacy is the same for CRP and Semont Maneuver.
- A comparison of the position of the head during the CRP and Semont Maneuver illustrates that the maneuvers are nearly the same.
- In US, tend to use Epley – takes less space, safer, less vigorous.

**Complications of Procedures**
### PC BPPV
- Canal Conversion
- Canal Jam
- Nausea and Vomiting
- Recurrence

**Canal conversion.** The “Oh My God” reaction to second cycle of CRP.
- During treatment of PC – BPPV, debris moves from posterior canal to lateral canal (mainly), or anterior canal (rarely).
- Second CRP results in a dramatically different nystagmus
- Treat with maneuvers we will demonstrate later in talk

**Complications of Procedures -- Emesis**
- Nausea and vomiting.
  - Always identify a good sized wastebasket
  - High risk patients may be administered antiemetic
    - Ondansetron HCL (Zofran) – if they have to drive home
      - We prefer 8 mg of liquid
    - Meclizine (Antivert, Bonine) – if they don’t have to drive home
    - Promethazine (Phenergan) – also can’t drive home

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PC – BPPV Self Treatment
- Self-Canalith Repositioning Procedure illustrated for treatment of right PC.
  - Self treatment
    - Head is extended over edge of pillow.
    - 3 cycles of exercise 3 times per day.
    - Stop exercises symptom-free with routine and exercises for 2 consecutive days
  - Outcome: In RCT, 93 ± 4% cured within 1 week.

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Complications of Procedures
- Emesis

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- High risk patients may be administered antiemetic
  - Ondansetron HCL (Zofran) – if they have to drive home
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  - Promethazine (Phenergan) – also can’t drive home
BPPV often Recurs

- Of patients treated successfully
  - 25% redevelop BPPV within 1 year
  - 44% redevelop BPPV within 2 years


Where do the rocks go?
- They just dissolve? (Parker et al, 1968)
- The dark cells?
  - Lim suggested that otoconia are reabsorbed by the “dark cells” of the labyrinth (Lim, 1973, 1984), which are found adjacent to the utricle and the crista


Case: LATERAL CANAL BPPV
- Patient seen in office, has mild PC BPPV
- Sent home with home-Epley instructions
- Calls to say that he is now “much worse”
- Before, just got dizzy lying down on left.
- Now he is dizzy to both sides, and doesn’t feel too good standing up either.

Direction Changing Positional Nystagmus (DCPN) is seen in lateral canal BPPV

Lateral Canal (5%)
- Horizontal DCPN

Mechanism of lateral canal BPPV:
- Debris deposited in lateral canal
- Can be on either side of loop or stuck to cupula

Supine roll test
Lateral canal BPPV: Canalithiasis

- Can be on either side of loop
- Sign: direction changing positional nystagmus (DCPN)


Lateral canal BPPV: Cupulolithiasis


HC – BPPV Treatment

- Determine side involved
- Treat with Log-roll rolling from bad to good side
- Switch to other side if no better

Log Roll - 270° rotation around longitudinal axis at 90° increments in the recumbent position. Illustrated for canalithiasis right HC

- Performed by clinician or self treatment.
  - 3 cycles of exercise. If self treatment, 3 times per day.
  - If self treatment, stop exercises when symptom free with routine and exercises for 2 consecutive days

- Outcome: 71% cured within 1 treatment (Nuti, et. al., 1998).

Complications of Log Roll

- Nausea and vomiting – lateral canal BPPV seems to cause more nausea – stronger, longer nystagmus
- Doesn’t work –
  - You may be treating the wrong side. Switch to other side.
  - You may be treating the wrong disease

Gufoni Maneuver - geotrophic

- Logroll is inefficient. No need to go to “bad side”, if debris is already halfway there.
- Called “Gufoni” maneuver, 80% response rate.
- Side-lying intense “good” side
- Turn head down after 30 seconds.

Gufoni Maneuver -- ageotropic

- Side-lie to less intense “bad” ear
- Turn head 45 deg up after 30 seconds

Kim et al (2012) reported 62% response, compared to 34% for Sham maneuver.

Case: ANTERIOR CANAL BPPV

- Patient seen in office, gets dizzy lying on back (any position)
- Dix-Hallpike shows downbeating nystagmus --- possibly with torsion

Anterior Canal BPPV

Diagnosis of Anterior Canal BPPV

- Downbeating or mixed down/torsional nystagmus
- Provoked by head-hanging
- If no previous BPPV, DD includes DBN in general.

AC – BPPV Treatment

There are no controlled studies

- We use Deep Dix Hallpike, Kim, or Yacovino maneuvers
- Logic – wait long enough for debris to sediment past the top of AC. Don’t put head too far forward at end.

Deep Dix Hallpike

AC – BPPV Treatment

Kim maneuver

- Treatment for AC BPPV as proposed by Kim and associates (2005). Prospective unblinded study – 96.7% success

In position ‘b’, the head is turned 45 degrees towards the symptomatic side for 2 minutes.

In position ‘c’ debris goes around the bend of AC.

Problems – 1. position ‘d’ might encourage debris to fall back. 2. What if wrong ear?
AC – BPPV Treatment
Yacovino maneuver

- Treatment for AC BPPV as proposed by Yacovino, Hain, Gualtieri (2009). Improved variant of Deep Dix Hallpike

In position ‘2’, debris falls to apex of AC. Variant that we use is to turn head 45 deg to L and R (i.e. treat both AC)

In position ‘3’ debris goes around the bend of AC.

WHAT IF EXERCISES FAIL?

- Get an MRI
- If normal you can do any or all of following
  - Nothing (6 months – 80% response to time)
  - Avoidance of provoking positions
  - Medication
  - Daily Exercise ………

Daily Exercises

- Daily home-Epley, Log Roll, Semont, AC maneuver
- Rationale: More treatment may resolve

WHAT CAN HAPPEN IF YOU DON’T GET AN MRI

- Dizzy 75 year old man
- Frenzel exam showed downbeating nystagmus
- Treated with PT for many sessions for AC BPPV, then discharged
- 2 years later, returned

Fourth ventricular ependymoma

AC – BPPV Treatment
Head down maneuver

In step ‘2’, debris falls to apex of AC. Turn head 45 deg to L and R (to treat both AC)

In step ‘4’ debris goes around the bend of AC. Could end up in PC. If it does, proves AC was cause

Step 5 – into vestibule.
SURGERY

Surgery: Canal Plug Procedure – works 90% of the time (this was the pre CRP-treatment)

Select an experienced otologic surgeon. Roughly a 4% chance of hearing loss.

BPPV - Summary

- BPPV is easily diagnosed. Debris within specific anatomical locations have specific nystagmus patterns.
- PC BPPV treatment with mechanical maneuvers is highly successful.
- HC and AC BPPV have specific and logical maneuvers, but controlled studies are presently lacking.

For much more, including more movies, see: