

How to do it....

The Dix-Hallpike and Modified Epley Manoeuvres in the diagnosis and management of Benign Paroxysmal Positional Vertigo (BPPV)

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Introduction

Benign Paroxysmal Positional Vertigo (BPPV) is one of the most common balance disorders and one of the easiest to diagnose and treat. It is characterised by short lived episodes of vertigo and geotropic rotatory nystagmus, which occur a few seconds after rapid changes in head position. The vertigo usually lasts no more than a minute and the symptoms reduce in severity with repetitions of the evoking movement.

BPPV was first described in 1921 by Barany¹ and is now recognised as the most common disorder of the peripheral vestibular system. A study from Japan estimated the incidence to be between 10.7 to 17.3 per 100,000 per year² although this is likely to be an underestimate as most cases of BPPV resolve spontaneously before the patient seeks medical attention. The average age of onset is between the fifth and seventh decades of life and several studies have suggested a higher incidence in women.³

Pathophysiology

BPPV results from an altered dynamic response of the posterior semicircular canal to head movement caused by the presence of free floating calcium particles (otoconia) within the endolymph of the posterior canal itself (canalithiasis).

Otoconia are thought to be shed from the utricular macula (which respond to linear motion) and migrate to the posterior semicircular canal (which respond to rotational motion). The free floating debris within the endolymph of the semicircular canal acts like a plunger, causing prolonged stimulation of the auditory canal after the cessation of head movement. The process may be accelerated by falls, high impact exercises and whiplash. Prolonged inactivity may also provoke BPPV when the otoconia may settle.

BPPV is idiopathic in most cases. Secondary causes include head trauma, vestibular neuronitis (viral labyrinthitis), Menieres disease, migraines and inner ear surgery.

Diagnosis

Diagnosis of BPPV may be determined by the clinical history. Patients describe sudden, severe

attacks of vertigo precipitated by certain head positions and movements, the most common of which are rolling over in bed, extending the neck to look up and bending forward. The symptoms are most often experienced when the patient is lying down, which distinguishes BPPV from postural hypotension.. The vertigo and dizziness occurs after a latency of five to ten seconds and lasts for no more than a minute. Both the vertigo and the nystagmus become less severe with repetitions of the evoking movement (fatiguability). Diagnostic criteria are summarised in Figure 1.

Diagnostic Criteria for Benign Paroxysmal Positional Vertigo (BPPV)

- Vertigo associated with a mixed torsional and vertical nystagmus provoked by the Dix Hallpike Test
- A latency (typically a few seconds) between completion of Dix Hallpike test and onset of vertigo and nystagmus
- Paroxysmal nature of symptoms and nystagmus (ie increase and decline over 10 to 20 seconds)
- Fatiguability (decline in vertigo and nystagmus if dix Hallpike test repeated)

Figure 1. Diagnostic Criteria for BPPV

The Dix-Hallpike manoeuvre

The Dix-Hallpike manoeuvre was first described in 1952⁴ and has been used as a diagnostic test for BPPV ever since (see figure)

How to do it.....

- **STEP 1** Seat the patient on the examining table and position them so that their head will extend over the top edge of the table when they are supine. Warn the patient that the procedure may make them feel unwell for a short period.
- **STEP 2** Turn the patients head 45 degrees towards the ear being tested. Instruct the patient to keep their eyes open throughout the procedure.
- **STEP 3** Quickly lower the patient into the

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supine position with their head extending 30 degrees below the horizontal and 45 degrees towards the ear being tested. Observe the patient for rotatory nystagmus after a latent period of 5-10 seconds. When the right ear is being tested the physician should expect to see a fast phase anti-clockwise nystagmus (clockwise for the left ear). The nystagmus should last no more than a minute (due to settling of the otoconia particles).

- **STEP 4** Return the patient to the seated position and observe for nystagmus in the opposite direction.
- **STEP 5** If a positive response is obtained then you should repeat steps 1-4. Usually the severity of vertigo and nystagmus are reduced.

The offending ear is the one that is toward the ground when BPPV occurs during the Hallpike manoeuvre.

Diagnostic Pitfalls

Patients who develop significant symptoms during the procedure but no nystagmus do not have BPPV, although they may respond to repositioning manoeuvres.

Patients with vertigo due to CNS pathology may develop nystagmus with the Hallpike test but there is typically no latent period and no fatiguability.

Menieres Disease- the vertigo is not positional, has a greater duration (one half to two hours) and is associated with tinnitus and hearing loss.

Viral labyrinthitis persists for days, is aggravated by head movement in all directions and the Hallpike manoeuvre is negative.

Management

The Modified Epley Manoeuvre/ Canalith Repositioning Procedure (CRP)

The use of vestibular suppressants and antiemetic medication is largely ineffective in the treatment of BPPV.⁵

The Epley manoeuvre involves a series of head and trunk movements that rotate the posterior semicircular canal in a plane that displaces the otoconia from the canal into the utricle of the inner ear, where it is inactive.⁶

How to do it.....

- **STEP 1** Place the patient in the seated position and perform the Hallpike manoeuvre steps 1-3.
- **STEP 2** Observe the patient for rotatory nystagmus and maintain this position for 2 minutes.
- **STEP 3** Turn the patient's head 90 degrees to the opposite Hallpike position, whilst keeping the neck in full extension.
- **STEP 4** Continue to roll the patient (head and trunk) another 90 degrees until their head is diagonally opposite the first Hallpike position. The movements in steps 3 and 4 should take no more than 5 seconds.
- **STEP 5** Observe the patient for rotatory nystagmus, if the otoconia particles are moving into the utricle the secondary nystagmus should beat in the same direction as the primary nystagmus.
- **STEP 6** Maintain this position for 1 minute then sit the patient up. There should be no vertigo or nystagmus experienced by the patient as the otoconia particles will have already been repositioned within the utricle.

The patient should be advised to remain upright for 24 hours and to avoid sudden head movements. Some physicians advocate the use of a soft collar although there is no hard evidence for this.

Following the first CRP, more than 80% of patients no longer experience vertigo and nystagmus. Patients who do not respond to the first CRP and undergo a second or third procedure have an overall success rate of greater than 90%.⁷

Summary

The Dix-Hallpike Manoeuvre is a simple procedure, which is highly effective in diagnosing BPPV. Treatment with the Modified Epley manoeuvre is simple and safe.

References

1. Barany R. Diagnose von Krankheitserscheinungen in Bereiche des Otolithenapparates. *Acta Otolaryngol (Stockh)* 1921; **2**: 434-7
2. Mizukoshi K, Watanabe Y, Shojaku H, Okubo J, Watanabe I. Epidemiological studies on benign paroxysmal positional vertigo in Japan. *Acta Otolaryngol Suppl* 1988; **447**: 67-77 (medline)
3. Baloh RW, Honrubia V, Jacobsen K. Benign positional vertigo: clinical and oculographic features in 240 cases. *Neurology* 1987; **37**: 371-8.
4. Dix MR, Hallpike CS. Pathology, symptomatology and diagnosis of certain disorders of the vestibular system. *Proc R Soc Med* 1952; **45**: 341.
5. McLure JA, Willet JM. Lorazepam and diazepam in the treatment of benign paroxysmal positional vertigo. *J Otolaryngol*. 1980; **9**: 472-7 (medline).
6. Epley JM. The Canalith repositioning procedure: the treatment of benign paroxysmal positional vertigo. *Otolaryngol Head Neck Surg* 1992; **107**: 399-404 (medline)
7. Wolf JS, Boyev KP, Manokay BJ, Mattox DE. Success of the modified Epley manoeuvre in treating benign paroxysmal positional vertigo. *Laryngoscope* 1999; **109**: 900-3 (medline)