

New repositioning techniques for benign paroxysmal positional vertigo: the Li repositioning manoeuvres

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Abstract

Benign paroxysmal positional vertigo can be treated by repositioning manoeuvres. Current manoeuvres can be cumbersome to perform and require determination of the canal affected, usually by assessing nystagmus direction on provocation. We developed a new series of manoeuvres to manage benign paroxysmal positional vertigo of each semicircular canal. The canal affected, and thus the manoeuvre used in each case, was determined by the patient's subjective report of vertigo on provocative head positioning. The reported manoeuvres were utilised in 216 patients, with an excellent rate of symptom resolution (96.7 per cent). The Li particle repositioning manoeuvres are effective, reliable and simply performed alternatives for the management of benign paroxysmal positional vertigo.

Key words: Positional Vertigo; Physical Therapy; Semicircular Canals

Introduction

Benign paroxysmal positional vertigo (BPPV) is a transient vertigo which is commonly elicited by head movements or changes of body position. It is the most common form of positional vertigo.

Many aetiologies have been hypothesised. The two most common are canalithiasis, in which loose otoconia within the semicircular canal create endolymph flow that alters hair cell firing, and cupulolithiasis, in which otoconia embedded in the cupula of the canal cause a change in mass and result in movement of the cupula, creating endolymph flow and changes in hair cell firing.

In 1988, Semont's group published their seminal paper¹ introducing a treatment for posterior canal BPPV, which they termed Semont's liberatory manoeuvre. The premise of the manoeuvre was based on the cupulolithiasis theory and was designed to 'liberate' misplaced static otoconia from the cupula of the canals and move them into the utricle, restoring normal vestibular signalling. A modified version of Semont's manoeuvre, named the quick liberatory rotation manoeuvre, has become widely utilised across Europe.²

An alternative to these liberatory manoeuvres is the Epley particle repositioning manoeuvre, aimed at curing canalithiasis. Also widely practiced, it is a somewhat slower process, relying on dependent head positioning and step-wise movements to produce gravitational repositioning of loose otoconia from the sensitive canals into the utricular cavity.

We had employed the quick liberatory rotation manoeuvre in our otolaryngology clinic and found it to be simple and effective. However, we noted that junior staff sometimes found it difficult to assess nystagmus and to ascertain the site of origin of the vertigo, and therefore to decide which manoeuvre to employ.

Therefore, we designed a series of new manoeuvres for treating vertigo, based solely on the head position in which the patient complained of subjective vertigo, regardless of direction of nystagmus. In contrast to the traditional Dix–Hallpike test, in which direction of nystagmus is assessed to ascertain semicircular canal involvement, our testing procedure does not assess nystagmus. We use provocative positioning of the patient, and apply treatment based on the patient's verbal report of vertigo. The test head positions are easy to assess and the liberatory manoeuvres simply performed. We have employed these techniques in 216 patients.

Here, we present these techniques and their results.

Materials and methods

Diagnosis criteria

Benign paroxysmal positional vertigo was diagnosed in all patients attending the otolaryngology clinic with symptoms of repeated vertigo episodes due to changes in head position, lying on one or both sides, rising, or looking up (with or without nausea or vomiting). The diagnosis was confirmed by: the onset of typical vertigo following the positioning test (with a latency period between completion of the test and onset of vertigo); resolution of vertigo within 60 seconds; and reduction in vertigo severity (i.e. fatigability) when the positioning test was repeated.

Determination of affected semicircular canal

To assess the posterior semicircular canal, the patient was laid supine on a bed with their head extended and face turned up to the ceiling. If subjective vertigo was elicited with the face turned right and upwards, right posterior semicircular canal BPPV was diagnosed. If subjective

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vertigo was elicited with the face turned left and upwards, left posterior semicircular canal BPPV was diagnosed.

If a patient complained of vertigo when laid supine with head extended, anterior semicircular canal BPPV was diagnosed.

If a patient complained of vertigo when laid supine with head elevated 30° and placed in a right-sided decubitus position, right horizontal semicircular canal BPPV was diagnosed; vertigo in a similar but left-sided position indicated left horizontal semicircular canal BPPV.

Li repositioning manoeuvres

Prior to any particle repositioning manoeuvres, the patient was given a clear explanation of the pathogenesis of the vertigo, together with the principles and key stages of the manoeuvre, to facilitate maximum cooperation. All repositioning manoeuvres were based on the principle of rotation in the plane of the affected semicircular canal (based on Ewald's First Law).

Posterior semicircular canal manoeuvre. Benign paroxysmal positional vertigo of the posterior semicircular canal was treated by rotation of the patient in the coronal plane. This removed the otoconia from the ampullated end of the canal to the non-responsive utricular cavity. In cases of right posterior semicircular canal BPPV, the patient was placed in the right decubitus position, with legs and knees bent as shown in Figure 1. If vertigo occurred, the clinician waited for it to resolve before proceeding. The clinician stood behind the patient's thighs, facing the patient, as shown in Figure 2. The clinician then reached down to hold the patient's head with both hands, while the patient held the operator's left arm by claspng both hands together around the forearm (Figure 3). The patient was then rotated from the right to the left decubitus position as quickly as possible and held in the final position for 4 minutes (Figure 4). This rotation sometimes required an assistant to help the patient from behind, but the patient's active cooperation was vital for this step. In patients with left posterior semicircular canal BPPV, the manoeuvre rotated the patient from the left to the right decubitus position.

Anterior (superior) semicircular canal manoeuvre. Treatment for BPPV of the anterior semicircular canal did not



FIG. 2

The clinician stands behind the patient's thighs, facing the patient.

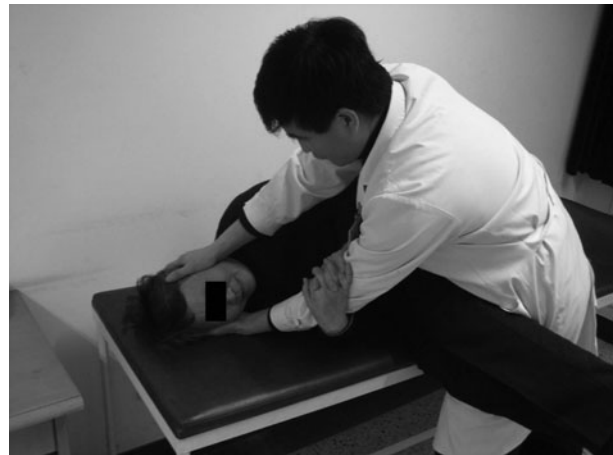


FIG. 3

The clinician holds the patient's head, with hands placed over each mastoid region, and the patient clasps the operator's left arm.



FIG. 1

The patient is placed in the right decubitus position, with legs and knees bent.



FIG. 4

The patient is quickly rotated to the left decubitus position, and this position held for 4 minutes.



FIG. 5

The patient is placed supine with neck extended and legs hanging off either side of the bed.

depend on side. The manoeuvre rotated the patient along the sagittal plane. The patient was placed in a supine position on a narrow hospital bed, with their legs hanging, bent at the knees, over each side (Figure 5). The clinician stood on the patient's right, with their right hand placed under the patient's occiput and left hand placed on the forehead. The patient was then rotated from a supine to a sitting position and through to a prone position as quickly as possible (Figure 6). This position is held for 4 minutes.

Horizontal (lateral) semicircular canal manoeuvre. Horizontal canal BPPV was treated by rotation of the patient in the axial plane. In cases of right-sided vertigo, the patient was placed in the right decubitus position on a wide bed, near one edge (Figure 7). After waiting for any vertigo to subside, the clinician stood behind the patient and used their right hand to grasp the patient's right hand. Using this hand grasp, the patient was rolled to the left decubitus position as quickly as possible (Figure 8), and this position was held for 4 minutes. Patients with left horizontal semicircular canal BPPV were rolled from the left to the right decubitus position.

These manoeuvres were quick and simple to perform. Patients often experienced mild residual disequilibrium the



FIG. 6

The patient is rotated rapidly forward from supine to prone, and this position is held for 4 minutes.



FIG. 7

The patient is placed in the right decubitus position. The clinician stands behind the patient, holding their right hand.

day after the manoeuvre, which resolved within 48 hours. No postural restrictions were needed after the treatment.

Patients

From January 2000 to December 2008, a total of 216 patients with BPPV were treated in our clinic using the above manoeuvres. Their ages ranged from 21 to 73 years, with a mean age of 51 years. There were 117 men and 99 women. On presentation, patients reported repeated episodes of vertigo lasting from 2 days to 32 years. Based on the above diagnostic tests, 151 patients had posterior semicircular canal BPPV, 35 had horizontal semicircular canal BPPV, 29 had anterior semicircular canal BPPV, and one had simultaneous posterior and horizontal semicircular canal BPPV. This last patient was managed by first using the posterior semicircular canal manoeuvre and then, three days later, the horizontal semicircular canal manoeuvre.

Results

Follow up was arranged on the third, seventh and 10th day after treatment. Patients were asked to assess their own



FIG. 8

The clinician quickly rolls the patient to the left decubitus position, and this position is held for 4 minutes.

improvement using the phrases 'no improvement or worsening', 'great improvement' or 'complete cure'. If patients were not completely cured on the third or seventh day after the initial treatment, repeated manoeuvres were performed. If patients continued to complain of repeated, unimproved episodes of vertigo on the 10th day after the initial manoeuvre, they were regarded as treatment failures.

Complete cure was obtained in 157 patients after the first treatment, and in 33 patients after repeated treatment. Great improvement was obtained in 19 patients after repeated treatment. Seven patients experienced no improvement. The overall success rate was 96.7 per cent (209/216). We considered that patients experiencing no improvement may have BPPV due to cupulolithiasis; these patients were instructed in vestibular rehabilitation exercises.

Conclusion

The described repositioning manoeuvres for BPPV enable the clinician to avoid having to identify the various directions of diagnostic nystagmus required for other BPPV manoeuvres. Instead, one has only to establish the position replicating the patient's sensation of vertigo. The described manoeuvres are effective, reliable and easy alternatives for the management of BPPV. However, these manoeuvres have some limitations: they are not suitable for elderly patients or those in poor general condition, and are difficult in very large patients.

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