

# Effect of Particle Repositioning Maneuver Epleys versus Semonts in the Treatment of Idiopathic Benign Paroxysmal Positional Vertigo of the Posterior Semicircular Canal

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## Abstract

**Background:** Benign paroxysmal positional vertigo (BPPV) is a common problem encountered in medical and otorhinolaryngological practice. It is quite a distressing symptom and affects the patients day-to-day activities. A multifactorial etiology has been attributed to the symptom of vertigo. Causes may be otological, neurological, medical or psychogenic. BPPV is probably the most common cause of vestibular vertigo. Correct identification of the cause of vertigo helps to alleviate the patients of their distressing symptoms. Pharmacotherapy has failed to achieve complete resolution of symptoms. Particle repositioning maneuvers, like Epley's or Semont's manoeuvre, have reported complete symptom resolution. It is now accepted as a quick, effective and easily rectifiable treatment for BPPV.

**Materials and Methods:** A total of 112 patients who attended the ear, nose, and throat outpatient department with a history suggestive of vertigo were interviewed, and informed consent was taken for collecting information related to socio-demographic details and concurrent diseases including hypertension, diabetes mellitus, heart disease. Benign positional paroxysmal vertigo was diagnosed on the basis of the history of positional vertigo and the results of the Dix-Hall pike and supine head turning tests. The treatment outcomes of BPPV were collected using a structured interview with the patients using a structured per foma.

**Results:** BPPV was noted to be mostly idiopathic with a female preponderance. Most patients presented with a right sided BPPV. Epley's manoeuvre for posterior canal (PC) BPPV was found to be quite effective way of treating this condition. Very few needed a repeat of the same manoeuvre while more number of patients treated by Semont's manoeuvre needed a repeat procedure at the first follow-up thus implying that the Epley's manoeuvre was a more effective procedure for treating idiopathic BPPV of the PC.

**Conclusion:** In our study, Epley's manoeuvre was found to be definitely more effective in the treating patients with posterior semicircular canal BPPV.

**Key words:** Benign paroxysmal positional vertigo, Epleys, Semonts

## INTRODUCTION

Benign paroxysmal positioning vertigo is a disorder characterized by brief attacks of vertigo, with associated

nystagmus, precipitated by certain changes in head position with respect to gravity. It is a common problem encountered in medical and otorhinolaryngological practice. In the medical literature, the first descriptions of positionally induced vertigo are attributed to Adler and later Barany, who believed it was a disorder of the otolith organs.

Barany first described benign paroxysmal positional vertigo (BPPV) in 1921.<sup>1</sup> It is defined as an abnormal sensation of motion elicited by certain provocative movements and positions. These can be turning in bed, sitting up in bed, looking upward, extending the neck, etc. The condition

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is diagnosed by taking detailed patient history and by performing the Dix-Hall pike manoeuvre or roll test. Since the disease has a favorable course, the term “benign” has been used but there are certain disabling variants of BPPV described due to their high recurrence rate and low response to therapy.

BPPV classification:<sup>2</sup>

For clinical practice, BPPV has been classified based on the involved canal as follows:

1. Posterior semicircular canal (PSC)
2. Lateral semicircular canal
3. Anterior semicircular canal
4. Multicanalar BPPV.

BPPV is also referred to as top shelf vertigo since people with BPPV feel dizzy and unsteady when they tip their heads back to look up. A multifactorial etiology has been attributed to the symptom of vertigo. Causes may be otological, neurological, medical, or psychogenic. BPPV is probably the most common cause of vestibular vertigo.<sup>3</sup> Other causes of vertigo, in decreasing order of frequency, include recurrent vestibulopathy, Meniere’s disease and central causes.

Nothing replaces a good clinical history in arriving at a diagnosis of BPPV though there have been many developments in the field of balance and vestibular testing. In 1992, Epley described a revolutionary technique for the management of BPPV involving repositioning the patient’s head in a series of manoeuvres.<sup>4</sup> These manoeuvres moved the displaced particles in the PSC back into the utricle, resulting in resolution of symptoms. Symptom resolution of the BPPV patients with nystagmus was 76-100%, whereas for those without nystagmus was 50-97.1%.<sup>5</sup> The present study aims to look at the study of the effect of particle repositioning manoeuvre epleys versus Semonts in the treatment of PSC BPPV.

## MATERIALS AND METHODS

A total of 112 patients diagnosed with BPPV in the ear, nose, and throat (ENT) Department of Sree Gokulam Medical College were included in the study. The study duration was 1 year, November 2013 to November 2014.

The patients were seen at first presentation, along with the consultant ENT doctor, and detailed history taken. This included history of vertigo, sleep position lateralization, and comorbidities. The diagnosis was based on a history of positional vertigo and the results of the Dix-Hall pike tests.

The Dix-Hall pike test, for posterior canal (PC-BPPV) was done by making the patient initially sit on the bed so that when he is made to lie down, his head is beyond the edge of the table and turned to 45°. The test is considered positive if this caused vertigo and nystagmus were recorded with appropriate positioning, latency, duration, and fatigue, and reversed when the patient resumed a sitting position.

We collected information on demographic characteristics, the clinical features of the BPPV, the history of BPPV, and concurrent diseases including hypertension, diabetes mellitus, heart disease, thyroid disease, and treatment outcomes of BPPV. The etiology was considered traumatic if the symptoms appeared within 1 week after head trauma. The information was collected in a structured interview with the patients.

The patients were treated with either of the repositioning manoeuvres Epleys or Semonts.

The Epley’s manoeuvre begins with the patient sitting. The head is rotated 45° to the affected ear side. The patient is then rapidly moved from a seated position to a supine position with the affected ear down (first part of the Dix-Hall pike test). The patient’s neck is extended approximately 20° and supported by the examiner. This will cause vertigo and nystagmus. The patient stays in this position till these features subside.

After this, the head is slowly is turned by 90° to the opposite side such that the affected ear is up and the patient stays in this position for 30 s.

The physician then turns the patient’s head an additional 90° to the same side and the patient rolls his or her body by 90° in the same direction such that he is in a face down position and stays in this position for another 30 s.

Finally, the patient is brought up slowly to the sitting position with the head still turned 45° to the unaffected side. The procedure finishes with the patient in the sitting position and the head turned forward by 20°.

The results of Epley’s manoeuvre can be predicted even during the manoeuvre. When the head is turned 90° toward, the unaffected side after the Dix-Hall pike maneuver, the positioning nystagmus develops in the same direction as the manoeuvre (orthotropic nystagmus) if a clump of particulate matter moves in the correct direction into the common crus, resulting in a successful repositioning.

The Semont’s liberatory manoeuvre begins with the patient in the sitting position and the head turned away from the affected side. The patient is then quickly put into a position

lying on his or her side, toward the affected side, with his or her head turned upward. After about 5 min, the patient is quickly moved back through the sitting position to the opposite position lying on his or her side with his or her head now facing downward. The patient remains in this second position for 5-10 min before slowly being brought back to the sitting position.

Patients were given specific post-manoeuvre instructions such as to keep their head erect and avoid sudden head movements for 48 h, to sleep in a head end elevation position at 30° and to avoid lying on their affected side for 5 days. All anti-vertiginous drugs were stopped.

Assessment of the success of treatment included both the patient's report of relief from vertigo and a negative Dix-Hall pike test result. This was done at the first follow-up in outpatient department at 1 week after the treatment. We collected information on the presence of any residual dizziness and its characteristics at that time in case of persistent symptoms; the manoeuvre was repeated. The reappearance of symptoms and clinical signs after the first week of the follow-up was considered as BPPV recurrence.

Detailed records of all the above parameters were maintained using Microsoft Excel sheet, and findings tabulated.

**RESULTS**

About 49 patients were affected by BPPV in the age group of 40-59. 33 patients were affected in the age group of 60-79. 20 patients were affected in the age group of 20-39. 6 patients were affected in a group of <20 years and 4 affected in the category of >80 years (Table 1).

There were total 112 number of patients out of which 38 were males and 74 were females (Figure 1).

Equal number of patients were treated with either of the manoeuvres (Table 2).

There was a right side preponderance of 59.8% for the patients presenting with BPPV (Table 3).

The cause for BPPV was mostly idiopathic, but there was a correlation of 33.9% of patients with hypertension to have BPPV (Figure 2).

**Audiology**

There was not any significant correlation between BPPV and audiological findings as 46.4% of the patients evaluated had a hearing within normal limits and the rest 50% who

comprised the elderly age group had age-related hearing loss (Figure 3).

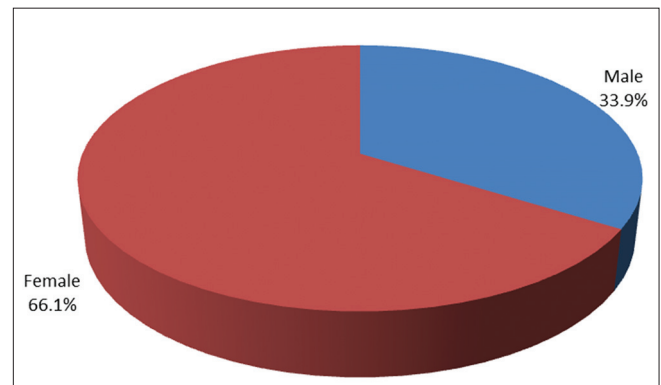
Around 92.9% of patients treated for BPPV with Epley's correction had complete resolution of symptoms on first follow-up, whereas only 73.2% of patients who were subjected to Semont's manoeuvre showed improvement (Table 4).

**Table 1: Age distribution**

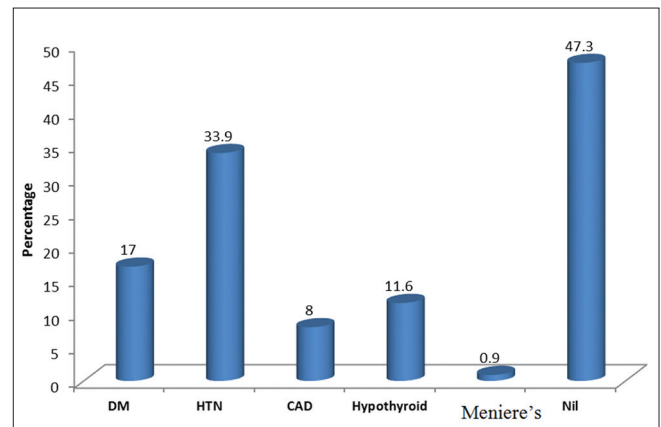
Age	Frequency (%)
<20	6 (5.4)
20-39	20 (17.9)
40-59	49 (43.8)
60-79	33 (29.5)
80-99	4 (3.6)
Total	112 (100.0)

**Table 2: Manoeuvres used for correction**

Manoeuvres used for correction	Frequency (%)
Epley's	56 (50.0)
Semont's	56 (50.0)
Total	112 (100.0)



**Figure 1: Gender**



**Figure 2: Comorbidities**

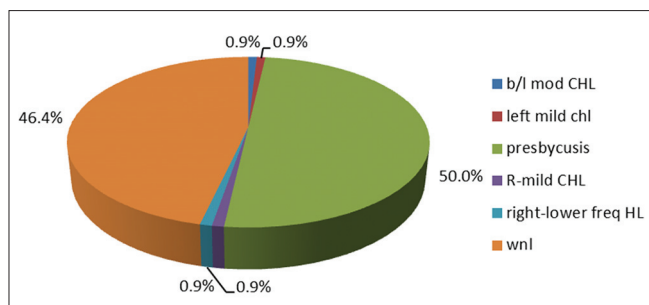


Figure 3: Audiology

## DISCUSSION

PSC BPPV accounts for 75-80% of cases of BPPV encountered by otolaryngologist. It is thought to range from 10.7/100,000 to 17.3/100,000 population in Japan and has been reported as 64/100,000 in a population study from Minnesota.<sup>5</sup>

The social and demographic data in 112 files of BPPV patients revealed that most cases were in the age group of 41-60 years. Mean age at onset is in 4<sup>th</sup> and 5<sup>th</sup> decade, but BPPV may also occur in childhood. Chung –Lan Kaobc suggested the involvement of deranged calcium metabolism in idiopathic BPPV and a significant association between osteopenia/osteoporosis and idiopathic BPPV and thus concluded that BPPV is prone to occur and recur in people of senior age. We found a strong association with hypertension in our BPPV patients. Cohen *et al.*, 2004 suggested that comorbid conditions, particularly diabetes, sinus disease, and mild head trauma are unusually prevalent in BPPV patients.<sup>6</sup> Giovanni Paolo Santoro, 2010 also suggested that many factors have been associated with BPPV like: Mature age, female sex, some systemic diseases (hypertension, diabetes, osteoporosis), neurological diseases (migraine, head trauma) and otological diseases (Meniere's disease, vestibular neuritis, otosclerosis, chronic otitis media), head surgery and intubation.<sup>7</sup> This was further supported by De Stefano *et al.*, 2014 who conducted a multicenter observational study on the role of comorbidities in the recurrent episodes of BPPV and concluded that there was a statistically significant difference between the number of comorbidities and the number of recurrences, otherwise said as comorbidity disorders increased the number of relapses increased too.<sup>8</sup> In my study, BPPV was associated with hypertension in 33.9%, diabetes mellitus in 17%, heart diseases in 8%, hypothyroidism in 11.6% and Meniere's in 0.9%.

Our study showed that laterality of head toward right side had a major role on BPPV. This was similar to a PubMed literature search of BPPV case series which specified the affected side of BPPV with BPPV of the PC showing

### Table 3: Laterality

Laterality	Frequency (%)
Left	45 (40.2)
Right	67 (59.8)
Total	112 (100.0)

### Table 4: Recurrence

Recurrence on 1 <sup>st</sup> follow up visit	Manoeuvres used for correction		Total N (%)
	N (%)		
	Epley's	Semont's	
Absent	52 (92.9)	41 (73.2)	93 (83.0)
Present	4 (7.1)	15 (26.8)	19 (17.0)
Total	56 (100.0)	56 (100.0)	112 (100.0)

right labyrinth to be affected more predominantly.<sup>9</sup> Çakir *et al.*, 2006 also suggested that habitual lateral head-positioning during bed rest can be a major factor leading to the development of BPPV in the ipsilateral ear.<sup>10</sup> Right labyrinth involvement was more frequent in our BPPV patients, which was similar to Von Brevern *et al.* findings. According to these authors, the right labyrinth is involved 1.41 times more often than the left labyrinth due to the habit of sleeping in right lateral decubitus.<sup>11</sup> In my study, the right was involved in 59.8 % and left in 40.2%.

The most popular methods for treating PC-BPPV are Semont's liberatory and Epley's manoeuvres. Rashad, 2009 suggested that Epley's manoeuvre remains an effective modality for treatment of BPPV.<sup>12</sup>

The particle repositioning manoeuvre Epleys was successful in total 92.9 (%) which was consistent with Epley, 1992 who stated Canalith repositioning manoeuvre as the most effective form of treatment.<sup>13</sup> 73.2% patients after Semont's successfully recovered which was consistent with the findings of Coppo *et al.*, 1996 who stated that over 80% patients were successfully treated after 1-3 sessions with Semont's liberatory manoeuvre.<sup>14</sup> We followed strict post manoeuvre restrictions after the repositioning. On the contrary Nuti *et al.*, 2000 suggested that restrictions following Semont's liberatory manoeuvre are not necessary when treating BPPV.<sup>15</sup>

Alcione Botelho Pereira conducted a study in which the study sample comprised 21 patients, of which 18 were female (86%).<sup>16</sup> In my study, female (78) subjects showed a predominance than males (38), similar to other published reports. Mariana Azevedo Caldas conducted a study in which BPPV predominated in females and in the 41-60 year age group.<sup>17</sup> In my study, there were more cases seen in the age group of 40-59.

Four patients treated by Epley's manoeuvre and 15 patients treated by Semonts had recurrence after 1 week follow-up. The effectiveness of these manoeuvres in the treatment of BPPV patients has previously ranged from 78.0% to 95.0% of cases.

## CONCLUSION

BPPV was noted to be most prevalent between 41 and 60 years and in female subjects. In most cases, it was idiopathic with a laterality toward the right side and we found a strong association with hypertension in our BPPV patients. Canalith repositioning manoeuvres were highly effective in treating this condition. With Epleys for PC a significant majority of patients responded in one sitting. Very few needed a repeat of the same manoeuvre while more number of patients treated by Semont's manoeuvre needed a repeat procedure at the first follow-up implying that the Epley's manoeuvre was a more effective procedure for treating idiopathic BPPV of the PC.

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