

## Original Research Article

# Effectiveness of Semont maneuver in the treatment of benign paroxysmal positional vertigo: an institutional study

Swapna U. P., Smitha B.\*, Salil Kumar K.

Department of ENT, SUT Academy of Medical Sciences, Trivandrum, Kerala, India

**Received:** 05 November 2020

**Revised:** 01 December 2020

**Accepted:** 08 December 2020

### \*Correspondence:

Dr. Smitha B.,

E-mail: [smitha.arun30@gmail.com](mailto:smitha.arun30@gmail.com)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

**Background:** Benign paroxysmal positional vertigo (BPPV) is a common cause of vertigo. In this condition, the vertigo is precipitated by certain head movements. BPPV is diagnosed by Dix-Hallpike positional test. Various repositioning maneuvers and treatment modalities exist for the management of this condition. Semont maneuver is a simple procedure for the treatment of posterior semicircular canal BPPV.

**Methods:** This non randomized controlled study was conducted in the ENT Department of a tertiary care hospital at Thiruvananthapuram over a period of one year. Hundred patients with posterior semicircular canal BPPV were included in the study. Fifty patients treated with Semont maneuver were compared with 50 patients who were treated with betahistine 16 mg three times daily. Outcomes were measured by relief of vertigo and negative Dix- Hallpike positional test during follow up examination.

**Results:** The most common age group affected by BPPV was 50-60 years. Right side was more affected than the left. There was a female preponderance. 84% patients treated with Semont maneuver were cured at the end of the first week and 90% at the end of the second week. The percentage of patients cured with betahistine were 48% at the end of first week and 56% at the end of second week.

**Conclusions:** The Semont maneuver was very effective in the treatment of BPPV. It helps to reduce the long-term use of medicines in our population.

**Keywords:** Benign paroxysmal positional vertigo, Semont maneuver, Dix- Hallpike positional test

### INTRODUCTION

Benign paroxysmal positional vertigo (BPPV) is a common cause of vertigo in patients attending the otolaryngology department. BPPV was first described by Barany in 1921.<sup>1</sup> It accounts for fifty percent of cases with peripheral vestibular dysfunction. Most common age group of on-set of BPPV is between 50-70 years. The incidence of BPPV increases with age. In 50-70% of patients with BPPV, the cause is not known.<sup>1</sup> Head trauma is a common cause of BPPV in young individuals.<sup>2</sup> Traumatic BPPV is often bilateral as compared to idiopathic type.<sup>3</sup> BPPV is due to movement

of otoconia from the utricle to the posterior semicircular canal during head movements. The diagnosis of BPPV is by the typical history of vertigo associated with head movement and the positional test described by Dix and Hallpike which produces the characteristic nystagmus. It is more common in females than males and affects all age groups.<sup>4</sup> Right ear is more commonly affected by BPPV. Some authors believe that it is due to the tendency of the general population to sleep on the right side.<sup>5</sup> In BPPV there is mild to severe vertigo associated with nausea or vomiting, which is triggered by certain positions of the head. Posterior semicircular canal is the most frequently involved in BPPV.<sup>6</sup> The Dix- Hallpike positional test is

useful for the diagnosis of anterior and posterior canal BPPV. BPPV can be effectively treated by repositioning the otolith from the semicircular canal to the utricle. This can be done by various canalith repositioning procedures (CRP) like Epley maneuver and the liberatory maneuver or Semont maneuver. Drugs like betahistine and cinnarizine are also used for symptomatic improvements in patients with BPPV.

There are only very few studies conducted in India to find the effectiveness of Semont maneuver. The objectives of the study were to find the effectiveness of Semont maneuver in the treatment of posterior semicircular canal BPPV in our population. The results of the maneuver were compared with a group who were offered only medicines (betahistine hydrochloride 16 mg three times daily).

## **METHODS**

The study was conducted in the otolaryngology department of a tertiary care hospital at Thiruvananthapuram. The study was approved by the institutional ethical committee. The study was conducted to know the effectiveness of Semont liberatory maneuver in the treatment of BPPV of posterior semicircular canal origin. The study duration was 1 year from June 2012 to May 2013. Of the patients with vertigo who came to the outpatient department of ENT, 100 patients with symptoms suggestive of posterior canal BPPV were selected for the study. This was a non-randomized controlled study in which fifty patients were treated with Semont maneuver and fifty were given medicines (betahistine 16 mg three times a day). This was done because patients who did not undergo Semont maneuver could not be left without any form of treatment

### ***Inclusion criteria***

All patients above 18 years of age with posterior semicircular canal BPPV, confirmed by Dix- Hallpike positional test, were included in the study.

### ***Exclusion criteria***

Exclusive criteria excluded the patients with lateral semicircular canal BPPV, superior semicircular canal BPPV, Meniere's disease, vestibular neuronitis, vertigo of central origin, pregnant patients, chronic suppurative otitis media and labyrinthitis.

The date of first reporting was recorded on the prepared proforma. A detailed history was taken including mode of onset of vertigo, duration, positional change, associated symptoms like hearing loss, tinnitus, ear discharge, aural fullness, preceding upper respiratory illness. They were asked about any neurological symptoms, intake of any medicines, any history of head injury or ear surgery. A detailed examination including general examination and ENT examination were done. Otoscopy was done to

visualize the tympanic membrane. Pure tone audiometry was done in all patients. Fistula test was done to exclude peri lymphatic fistula.

BPPV was diagnosed based on the history and examination findings. They had brief episodes of vertigo lasting for a few minutes. The vertigo was provoked by certain head positions. They did not have any auditory symptoms. Vestibular function tests and audiogram were normal. Dix-Hallpike test was done to confirm the diagnosis. In Dix- Hallpike positional test, the patient was made to sit on the examination table with head turned 45 degrees towards the side to be tested. The patient was then quickly made to lie down with the head hanging over the edge of the table. Patients were watched for nystagmus and any subjective symptoms of vertigo. In posterior canal BPPV there was up beating torsional nystagmus towards the affected side. The nystagmus had a latency of 5 to 20 seconds and lasted for less than one minute. Direction of nystagmus was fixed. Nystagmus was fatigable with repeated testing. The patients who were diagnosed as having posterior semicircular canal BPPV were offered either Semont maneuver or were put on medications (betahistine 16 mg three times daily).

The causes of vertigo other than BPPV were diagnosed by history, clinical examination and relevant investigations. Patients with Meniere's disease had associated hearing loss, tinnitus, and aural fullness that was exacerbated during an episode of vertigo. They had recurrent episodes of vertigo lasting for minutes to hours not associated with positional change. Audiogram showed sensorineural hearing loss usually unilateral in lower frequencies. In patients with labyrinthitis there was history of an episode of upper respiratory infection. They had a single episode of vertigo lasting for many days. Associated hearing loss was present. There was little or no nystagmus during Dix-Hallpike test and pure tone audiogram demonstrated sensorineural hearing loss. Cranial nerve examination was done for all patients. In central disorders the vertigo was gradual in onset and were less severe. The nystagmus during Dix- Hallpike test did not show a latent period and was not fatigable. The nystagmus lacked a torsional component and was usually vertical. Those patients having neurological features were sent to a neurologist for assessment and CT/MRI was taken for further assessment. All these patients were excluded from the study.

### ***Semont maneuver steps***

The patient was made to sit at the edge of the table with the legs hanging down and their head rotated 45 degrees towards the normal side, the patient was then quickly moved to a lying down position on the side affected, this face up position was maintained for 1 to 2 minutes, the patient was then rapidly moved to the opposite side maintaining the same position, this face down position was maintained for 1 to 2 minutes and the patient was then brought back to a sitting position.

The other group was offered betahistine 16 mg three times daily. Both groups were reviewed after one week. They were assessed for symptoms of BPPV. The positional test was repeated and the results were entered in the proforma. Patients whose symptoms persisted and had positive positional test were offered the treatment of the group to which they belonged and assessed at the end of second week.

**Statistical analysis**

Data was recorded on a pretested proforma and entered using statistical software Microsoft excel and analyzed using the software SPSS version 10. The comparability of the groups with respect to baseline variables like age, sex and the involved side were assessed using "t" test and chi-square test. For statistical significance p value was fixed at 5%. Comparisons between the 2 groups were done with chi square test, p value effect size and 95% confidence interval of effect size.

**RESULTS**

In our study all the patients were in the age group of 19 to 79 years. The mean age was 52.18 years. We had 3%

patients below 19 years. 5% of patients were in the age group 20 to 29 years, 10% in the age group 30 to 39 years, 19% in the age group 40 to 49 years, 36% in the age group 50 to 59 years, 16% in the age group 60 to 69 and 11% in the age group 70 to 79 years. Maximum number of patients were in the age group of 50 to 59 years (Figure 1). The distribution of patients according to age and treatment offered is shown in Table 1.

The percentage distribution of patients according to gender was 67% females and 33% males (Figure 2). In 66% patients the right side was involved and in 34% patients the left side was involved (Figure 3). The comparability of groups of patients with respect to the baseline variables like age, sex, involved side were assessed using " t " test and chi-square tests. All these results were not significant indicating that the group of patients were well comparable. 42 out of 50 patients who were treated with Semont maneuver were asymptomatic after 1 week, whereas only 24 out of 50 patients who were treated with betahistine showed symptomatic relief after the same time period. The percentage of patients who were cured with Semont maneuver was 84% and the percentage of patients who were cured with betahistine was 48%. There was a difference of 36% in the cure rates which was in favor of the Semont maneuver.

**Table 1: Distribution of patients according to age and treatment offered.**

Variables		Treatment		Total	
		Semont	Medicine		
Age group (in years)	≤19	Count	1	2	3
		% within treatment	2.0	4.0	3.0
	20-29	Count	1	4	5
		% within treatment	2.0	8.0	5.0
	30-39	Count	5	5	10
		% within treatment	10.0	10.0	10.0
	40-49	Count	10	9	19
		% within treatment	20.0	18.0	19.0
	50-59	Count	22	14	36
		% within treatment	44.0	28.0	36.0
	60-69	Count	7	9	16
		% within treatment	14.0	18.0	16.0
	70-79	Count	4	7	11
		% within treatment	8.0	14.0	11.0
Total	Count	50	50	50	
	% within treatment	100.0	100.0	100.0	

**Table 2: Distribution of patients according to response to treatment.**

Variables		Treatment		
		Semont	Medicine	
Cure status	Cured after 1 week	Count	42	24
		Percentage (%)	84.0	48.0
	Cured after 2 weeks	Count	45	28
		Percentage (%)	90.0	56.0
	No cure	Count	5	22
		Percentage (%)	10.0	44.0

The cure rate of Semont maneuver at the end of second week was 90% and the cure rate with betahistine was 56%. The distribution of patients according to response to treatment is shown in Table 2. Comparisons between the two groups were done by using Chi square test, p value, effect size and 95% confidence interval of effect size. Effect size in the first week (84-48)=36%. 95% confidence interval  $36 \pm (1.96 \times 8.76) = 18.82 \rightarrow 53.18$ . Chi square test value is 14.44. The p value was found as 0.00014 which was highly significant. Effect size in the second week was (90-56)=34%. 95% confidence interval was  $34 \pm (1.96 \times 8.20) = 17.93 \rightarrow 50.07$ . Chi square test value was 14.66 and p value was 0.00013 which was highly significant. All these results showed that the Semont maneuver was very effective in the treatment of posterior semicircular canal BPPV.

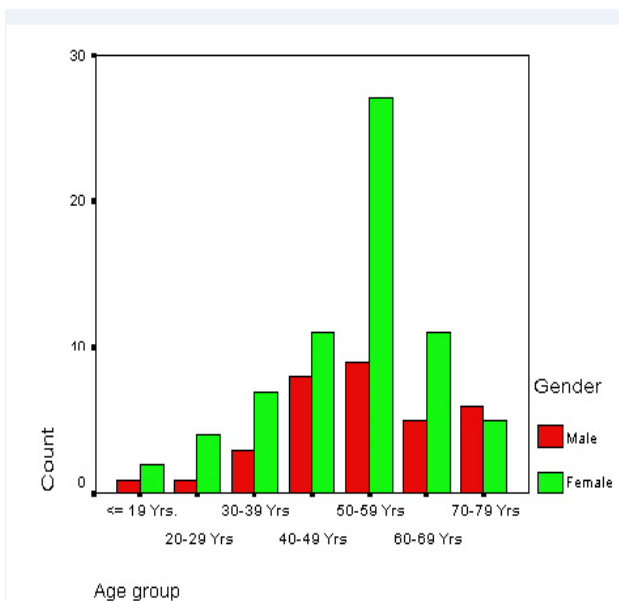


Figure 1: Distribution of patients according to age.

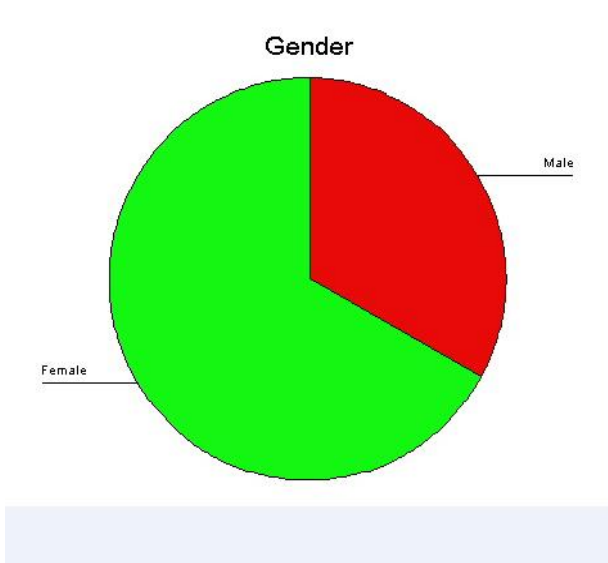


Figure 2: Distribution of patients according to gender.

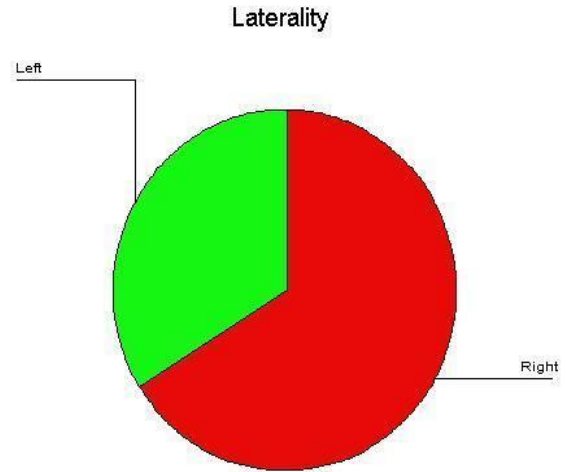


Figure 3: Distribution of patients according to side involved.

### DISCUSSION

BPPV is one of the most common causes of vertigo, especially in elderly individuals. This leads to frequent falls, and impairment of daily activities. This may lead to depression. Early diagnosis and treatment of BPPV is very important. Various maneuvers and medicines are used for the treatment of BPPV. This was a study to assess the effectiveness of Semont maneuver in the treatment of posterior canal BPPV. The effectiveness was assessed by comparing it with a group of patients who were offered only medicines (betahistine 16 mg three times daily). Several studies were conducted worldwide on the treatment modalities of BPPV. In a retrospective study conducted by Levart et al on the efficacy of Semont maneuver for BPPV demonstrated a cure rate of 83.5% after 2 maneuvers and 90.3% after 4 maneuvers. In their study 278 patients presenting with unilateral BPPV of the posterior semicircular canal were included.<sup>7</sup> In another retrospective study by Chen et al, 128 patients diagnosed as posterior semicircular canal BPPV were evaluated. 90% cure rate was noted when they were re-evaluated at day four.<sup>8</sup> A study conducted by Coppo et al in 1996 showed that 80% of patients were successfully treated after 1 to 3 sessions of Semont maneuver.<sup>9</sup> In another study conducted to compare the efficacy of Semont maneuver and Epley maneuver, 100 patients were treated with Semont maneuver and 100 patients were treated with Epley maneuver. 94 patients treated with Semont maneuver showed complete recovery after 3 months.<sup>10</sup> Another study showed that restrictions following Semont liberatory maneuver were not needed in BPPV patients.<sup>11</sup> In a study by Vaz Garcia, of 175 patients who were treated by Semont maneuver, 79% were cured after 1 week.<sup>12</sup> The results obtained in these studies are comparable to our study. This shows that the Semont maneuver is effective in our population for the treatment of BPPV.

The limitations of our study were that the duration of study was limited. Hence a larger sample size could not be considered. There was no long term follow up. The post treatment assessment was done only in the first and second week in both the study group and control group.

## CONCLUSION

BPPV is a common cause of vertigo in patients attending the otolaryngology department. Most common age group affected in BPPV was 50 to 60 years with female preponderance. Right ear was more commonly involved than the left ear. Semont maneuver was very effective in the treatment of posterior canal BPPV. In our study the percentage of patients cured with Semont maneuver was 84% at the end of first week and 90% at the end of second week. The percentage of patients cured with betahistine was 48% at the end of the first week and 56% at the end of the second week. The results obtained in our study were comparable with many other international studies. The study showed that Semont maneuver is very effective in our population for treating BPPV.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. Parnes LS, Agrawal SK, Atlas J. Diagnosis and management of benign paroxysmal positional vertigo (BPPV). *CMAJ*. 2003;169(7):681-93.
2. Fife TD, Giza C. Posttraumatic vertigo and dizziness. *Seminars Neurol*. 2013;33(3):238-43.
3. Liu H. Presentation and outcome of post-traumatic benign paroxysmal positional vertigo. *Acta Otolaryngol*. 2012;132(8):803-6.
4. Mizukoshi K, Watanabe Y, Shojaku, Okubo J, Watanabe I. Epidemiologic studies on BPPV in Japan. *Acta Otolaryngol Suppl*. 1988;447:67-72.
5. Von Brevern M, Seelig T, Neuhauser H, Lempert T. Benign paroxysmal positional vertigo predominantly affects the right labyrinth. *J Neurol Neurosurg Psychiatry*. 2004;75:1487-8.
6. Viree E, Purcell I, Baloh RW. The Dix Hallpike test and the canalith repositioning maneuver. *Laryngoscope*. 2001;111:94-945.
7. Levrat E, Van Melle G, Monnier P, Maire R. Efficacy of the Semont maneuver in benign paroxysmal positional vertigo. *Arch Otolaryngol Head Neck Surg*. 2003;129(6):629-33.
8. Chen Y, Zhuang J, Zhang L, Zhou H. Short term efficacy of Semont maneuver for BPPV - a double blind Randomized trial. *Otology and Neurotol*. 2006;33:1127-30.
9. Coppo GF, Singarelli S, Francchia P. Benign paroxysmal positional vertigo follows up of 165 cases treated by Semonts liberatory maneuver. *Acta Otorhinolaryngol Ital*. 1996;16:508-12.
10. Ajayan PV, Aleena PF, Jacob AM. Epley's maneuver versus Semont's maneuver in treatment of posterior canal benign positional paroxysmal vertigo. *Int J Res Med Sci*. 2017;5(7).
11. Nuti JD, Nati C, Passali D. Treatment of benign paroxysmal positional vertigo: no need for post maneuver restrictions. *Otolaryngol Head Neck Surg*. 2000;122(3):440-4.
12. Vaz Garcia F. Treatment failures in benign paroxysmal positional vertigo. Role of vestibular rehabilitation. *Rev Laryngol Otol Rhinol*. 2005;129:271-4.

**Cite this article as:** Swapna UP, Smitha B, Kumar SK. Effectiveness of Semont maneuver in the treatment of benign paroxysmal positional vertigo: an institutional study. *Int J Otorhinolaryngol Head Neck Surg* 2021;7:27-31.