Comparative Study Between Vestibular Maneuver Vs Vestibular Maneuver With Drug Therapy In Management Of Patients With Benign Paroxysmal Positional Vertigo

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Abstract

Background:
Benign Paroxysmal Positional Vertigo (BPPV) is the most common peripheral vestibular disorder, characterized by brief vertigo episodes triggered by head position changes. It results from dislodged otoconia entering semicircular canals, primarily the posterior canal, disrupting normal vestibular function. The Epley maneuver, a repositioning technique, is a well-established treatment. However, pharmacological agents like betahistine are sometimes co-administered despite limited evidence for their added efficacy.

Objective:
To compare the clinical effectiveness of Epley maneuver alone versus Epley maneuver combined with oral betahistine in managing BPPV symptoms, particularly evaluating their impact on symptom resolution and functional disability.

Methods:
A hospital-based randomized trial was conducted over 19 months involving 122 patients aged 18–60 years, diagnosed with BPPV confirmed via Dix-Hallpike test. Patients were randomized into two groups:

- Group A (n=61): Treated with Epley maneuver only
- Group B (n=61): Treated with Epley maneuver + oral betahistine (48 mg/day for 1 week)

Outcomes were assessed at baseline, 1 week, 3 weeks, and 6 weeks using the Dizziness Handicap Inventory (DHI), Visual Vertigo Analogue Scale (VVAS), and Mean Vertigo Score (MVS). The primary endpoint was reduction in DHI scores over time.

Results:
Demographic and clinical parameters (age, sex distribution, symptom duration, and precipitating factors) were comparable across groups ($p > 0.05$). Both groups showed improvement in DHI scores post-treatment; however:

- At 3 weeks and 6 weeks, Group A (maneuver-only) showed significantly greater improvement in DHI scores compared to Group B (combined therapy) ($p < 0.001$).
- Generalized Estimating Equation (GEE) analysis confirmed that symptom improvement over time was statistically significant ($p < 0.001$), with the maneuver-only group showing better results ($p = 0.031$).

- At baseline and week 1, no statistically significant difference was found between groups.

Conclusion:
Epley maneuver alone is not only effective but superior to combined therapy with betahistine in managing BPPV, offering faster and more sustained symptom relief. This supports its role as the first-line and standalone treatment in BPPV management. The study discourages routine use of pharmacological agents like betahistine due to lack of added benefit, aligning with principles of evidence-based and cost-effective care.

Limitations:
The study had a limited sample size and short follow-up duration (6 weeks). Absence of a placebo-controlled group for the drug therapy arm limits conclusive interpretation regarding betahistine's independent efficacy.

INTRODUCTION

Benign paroxysmal positional vertigo (BPPV) is the most prevalent peripheral vestibular disorder, characterized by brief episodes of vertigo triggered by changes in head position relative to gravity. [1] Vertigo, defined as a false sensation of movement, results from dysfunction within the vestibular proprioceptive system. BPPV occurs when calcium carbonate crystals, or otoconia normally embedded in the utricle and saccule become dislodged and migrate into the semicircular canals, most commonly the posterior canal. [2] This abnormal migration leads to inappropriate stimulation of the hair cells during head movement, causing transient vertiginous episodes typically lasting less than one minute. [3]

BPPV accounts for approximately 20–30% of diagnoses in specialized dizziness clinics, with over one million new cases reported annually in India. [4] The condition is idiopathic in 50–70% of cases; however, head trauma remains the leading cause in individuals under 50 years of age, even when indirect (e.g., whiplash injuries). In the elderly, age-related degeneration of the vestibular system is the most common etiological factor. Moreover, Idiopathic BPPV has a higher incidence in females, occurring nearly twice as often compared to males. [5]

Timely and accurate diagnosis is essential for effective management of BPPV. This is primarily achieved through clinical evaluation, with the Dix-Hallpike maneuver serving as the gold standard for diagnosing posterior canal involvement. Among therapeutic options, the Epley maneuver a canalith repositioning technique has demonstrated excellent efficacy, resolving symptoms in up to 90% of cases. Despite high success rates with repositioning maneuvers, a subset of patients, particularly those who are elderly or have systemic comorbidities, may continue to experience residual dizziness and imbalance. [6]

Pharmacologic management of BPPV has traditionally included vestibular suppressants such as antihistamines, benzodiazepines, anticholinergics, and calcium channel blockers (e.g., cinnarizine, flunarizine). Among these, betahistine, a histamine H1 receptor agonist and H3 receptor antagonist has been widely used in managing peripheral vertigo. Betahistine is thought to exert its effects by enhancing microcirculation within the inner ear and modulating vestibular function, potentially reducing the frequency and severity of vertigo episodes. [7] While it has been shown to improve the quality of life in patients with peripheral vestibular disorders, clinical evidence regarding its specific role in treating BPPV remains limited.

Thus, this study aims to compare the clinical outcomes of patients treated with vestibular maneuvers alone versus those managed with a combination of repositioning maneuvers and pharmacological therapy.

MATERIALS AND METHOD

The present hospital based randomized trial was conducted in the Department of Otorhinolaryngology over a period of 19 months. A total of 122 patients were included in the study fulfilling the inclusion and exclusion criteria. Before the initiation of the study, the written informed consent form was obtained from the patients. Approval from the ethical committee was also obtained.

Inclusion Criteria:

The inclusion criteria for the study comprised patients aged between 18 and 60 years who presented with a clinical history suggestive of benign paroxysmal positional vertigo (BPPV). Patients with positive Dix-Hallpike test were included. Additionally, only those individuals who provided informed consent were enrolled in the study.

Exclusion Criteria:

The exclusion criteria for the study encompassed patients with central or systemic causes of vertigo, as well as those currently undergoing treatment with vestibular sedatives. Individuals who demonstrated a negative result on the Dix-Hallpike test were excluded. Patients with uncontrolled diabetes mellitus, as well as those with orthopedic or connective tissue disorders that restricted neck mobility, were also not considered eligible. Furthermore, individuals with a history of cerebrovascular accident (CVA) or myocardial infarction (MI) were excluded. Lastly, patients who did not provide informed consent were not included in the study.

Methodology:

Before initiating treatment, all participants were evaluated using the Dizziness Handicap Inventory (DHI) questionnaire. The severity of symptoms was assessed using the following scales:

- VVAS (Visual Vertigo Analogue Scale)
- MVS (Mean Vertigo Score)

Patients diagnosed with BPPV were divided into two groups: Group A and Group B. Group A (n=61) received only the Epley's maneuver as treatment. In contrast, Group B (n=61) received a combination of the Epley's maneuver and oral betahistine therapy. Betahistine was administered in tablet form at a total daily dose of 48 mg, divided into two equal doses for a duration of one week.

The effectiveness of the intervention was assessed using the Dix-Hallpike test after one week of treatment. Follow-up evaluations were conducted at 1 week, 2 weeks, 4 weeks, and 6 weeks post-initiation of therapy to monitor symptom progression and response to treatment.

Statistical Analysis

The collected data were entered into a Microsoft Excel sheet and subsequently analyzed using appropriate statistical software, specifically SPSS. Quantitative data that followed a normal distribution were expressed as mean and standard deviation, whereas non-normally distributed quantitative data were presented as median and range. Qualitative or categorical data were expressed as ratios. The normality of data distribution was assessed using the Kolmogorov–Smirnov test and the Shapiro–Wilk test. For normally distributed data, comparisons were made using the Student's t-test. In contrast, non-normally distributed data were analyzed using the Mann–Whitney test or the Kruskal–Wallis test, as appropriate. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Table 1. Distribution of demographic and clinical variables across interventions

Variables	Total (n = 122)	Vestibular maneuvers (n = 61)	Vestibular maneuvers + Drug therapy (n = 61)	p-value
Sex, n (%)				
Female	74 (60.7%)	38 (62.3%)	36 (59.00%)	0.93
Male	48 (39.3%)	23 (37.7%)	25 (41.00%)	
Age in years, (Mean ± SD)	47.23 ± 11.34	45.8 ± 10.4	49.3 ± 9.6	0.05
Duration of symptoms in days, median (IQR)	-	5 (2, 10)	6 (3, 10)	0.432
No. of episodes per day, median (IQR)	-	3 (2, 4)	3 (2, 5)	0.082
Precipitating factors, n (%)				
Standing up	44 (36.1%)	24 (39.3%)	20 (32.8%)	0.92
Bending down	21 (17.2%)	8 (13.1%)	13 (21.3%)	
Looking up	3 (2.5%)	1 (1.6%)	2 (3.3%)	
Turning head	46 (37.7%)	24 (39.3%)	22 (36.1%)	

The study compared vestibular manoeuvres alone and in combination with drug therapy in BPPV patients (n = 122) and found no significant differences in demographic or clinical variables. Both groups had 61 participants, with a female predominance. The mean age was slightly higher in the combination group, with a borderline p-value (0.05). Duration of symptoms, frequency of episodes, and precipitating factors like standing up, bending down, looking up, and turning the head were similar between groups, showing no statistically significant variation.

Table 2: Comparison of Dix-Hallpike Test Results and DHI Scores at follow-up Between Groups

Variables	Overall (n = 122)	Vestibular maneuvers (n = 61)	Vestibular maneuvers + Drug therapy (n = 61)	p-value
Dix-Hallpike test, n (%)				
Positive to Right	74 (60.66%)	37 (60.66%)	37 (60.66%)	1.000
Positive to Left	48 (39.34%)	24 (39.34%)	24 (39.34%)	
DHI Score – Mean ± SD				
At Baseline	38.12 ± 12.35	36.00 ± 10.20	39.00 ± 13.29	0.164
At Week 1	17.00 ± 9.10	17.25 ± 8.46	18.08 ± 9.80	0.617
At Week 3	15.87 ± 7.09	11.66 ± 5.37	20.53 ± 6.92	<0.001
At Week 6	12.00 ± 6.25	9.60 ± 5.10	16.32 ± 5.45	<0.001

The comparison of Dix-Hallpike test results showed identical distributions across both groups, with 60.66% testing positive on the right and 39.34% on the left (p = 1.000). Dizziness Handicap Inventory (DHI) scores at baseline and Week 1 were comparable between groups with no significant differences. However, by Week 3 and Week 6, the vestibular maneuvers-only group showed significantly lower DHI scores than the group receiving combined therapy ($p < 0.001$), indicating greater improvement in symptoms with maneuvers alone.

Table 3: Generalized Estimating Equation for DHI Score

		Robust				
DHI	**Coef.**	**Std. Err.**	**z**	**P > |z|**	**95% Confidence Interval**	
Intervention	2.230745	2.407805	0.96	0.402	-2.519245	6.900798
Week	-3.693467	0.2428641	-14.15	0.0001	-4.186171	-3.254154
Intervention						
1	0.912349	0.3987654	2.37	0.031	0.1086456	1.686244
cons	30.34053	1.4023654	20.01	0.0001	22.6023	29.0726

The GEE analysis showed a significant reduction in DHI scores over time ($p < 0.001$). While the overall intervention effect was not significant ($p = 0.402$), the vestibular maneuvers-only group showed greater improvement ($p = 0.031$), suggesting it was more effective than the combination therapy.

Table 4: DHI Score Difference at Baseline 1 week, 3-week, 6 weeks

DHI	**Coef.**	**Std. Err.**	**z**	**P > |z|**	**95% Confidence Interval**	
At baseline	2.19782	2.417812	0.97	0.349	-2.489240	6.910796
At 1 week	3.098231	2.127435	1.49	0.130	-.8846920	7.091143
AT 3 week	4.923124	1.502921	3.29	0.001	1.99630	7.749860
AT 6 week	7.545455	1.305524	5.88	0.001	5.045361	10.03553

The analysis of DHI score differences between groups over time showed no significant difference at baseline ($p = 0.349$) and at 1 week ($p = 0.130$). However, significant differences emerged at 3 weeks ($p = 0.001$) and 6 weeks ($p = 0.001$), with the vestibular maneuvers-only group showing greater improvement in symptoms compared to the combination therapy group.

DISCUSSION

In the present study involving 122 BPPV patients, the comparison between vestibular maneuvers alone and in combination with drug therapy revealed no significant differences in baseline demographic or clinical characteristics. Each group included 61 participants, with a female predominance overall. Although the mean age was slightly higher in the combination therapy group, the difference approached but did not reach statistical significance ($p = 0.05$).

These findings align with previous studies. **Faralli et al.,** [8] noted an increased incidence and worse prognosis of BPPV with advancing age, attributed largely to the higher prevalence of vascular risk factors in older populations. Additionally, Sertac Yetiser et al., [9] in a larger cohort of 263 patients, reported that BPPV was most commonly seen in the 30–50-year age group. The gender distribution in the present study aligns with previous research, such as that by Kavathia et al., [10] who reported a female predominance of 62%. Similarly, Sertac Yetiser et al., [9] found a female-to-male ratio of approximately 1.5:1.

In the present study, although no significant differences in Dizziness Handicap Inventory (DHI) scores were observed between the groups at baseline ($p = 0.349$) and at 1 week ($p = 0.130$), the vestibular maneuvers-only group showed significantly greater improvement at both 3 weeks and 6 weeks ($p = 0.001$ for both). This suggests that vestibular maneuvers alone provide more sustained and effective symptom relief compared to combination therapy with medication.

Similarly, Josna et al., [11] found that while both treatment groups experienced a reduction in DHI scores following intervention, the group treated with maneuvers alone showed a statistically significant greater improvement. Their study reported significant differences in mean DHI scores between the two groups at 24 hours, 1 week, and 1 month post-treatment, with a p-value of 0.000 at all-time points. These findings further support the superior and consistent efficacy of vestibular maneuvers in managing BPPV symptoms.

Supporting these findings, Panuganti et al., [12] reported that 22 out of 25 patients with moderate to high baseline DHI scores showed marked improvement post-treatment, and achieving low DHI scores. In contrast, only 56.52% of patients in the drug therapy group showed improvement after 1 week, and just 30.43% improved by the second week, indicating slower recovery. Similarly, Prokopakis et al., [13] found that 85% of patients experienced symptom relief within the first week following the Epley maneuver, with only 2% requiring repeat procedures.

These findings collectively reinforce the clinical effectiveness of vestibular maneuvers as a primary treatment strategy for BPPV, demonstrating faster and more sustained symptom relief compared to combined therapy with medication.

LIMITATION OF THE STUDY

The study had several limitations, including a relatively small sample size and a short follow-up period of only six weeks, which restricted the evaluation of long-term outcomes. Additionally, the absence of a placebo-controlled group limits the ability to fully assess the independent efficacy of medical therapy. Future research with larger patient populations and extended follow-up durations is recommended to better determine the long-term effectiveness of treatment modalities in BPPV.

CONCLUSION

These findings strongly support the use of vestibular maneuvers as the first-line treatment for BPPV, emphasizing their effectiveness in reducing symptoms without the need for additional pharmacologic intervention. By avoiding unnecessary drug therapy, patients are spared potential side effects and medication costs. This is especially important in resource-constrained settings, where simple, non-pharmacological, and evidence-based treatments are essential. Thus, vestibular maneuvers alone emerge as a more effective, safer, and economically viable strategy for BPPV management.

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