



ENT

COMPARATIVE STUDY BETWEEN VESTIBULAR MANEUVER ALONE VERSUS VESTIBULAR MANEUVER WITH DRUG THERAPY IN THE MANAGEMENT OF PATIENTS WITH BENIGN PAROXYSMAL POSITIONAL VERTIGO

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ABSTRACT **Background:** Benign Paroxysmal Positional Vertigo (BPPV) is the most frequent peripheral vestibular disorder, characterized by transient episodes of vertigo provoked by changes in head position relative to gravity. The definitive gold-standard management is canalith repositioning, predominantly the Epley maneuver. While vestibular suppressants and microcirculatory agents such as betahistine are frequently prescribed alongside physical maneuvers, high-level clinical evidence confirming their adjunctive value remains limited. **Objective:** To evaluate and compare the clinical and functional outcomes of the Epley maneuver alone versus the Epley maneuver combined with oral betahistine in patients diagnosed with posterior semicircular canal BPPV. **Methods:** In this prospective, randomized comparative study conducted over 19 months, 120 patients aged 18 to 60 years with confirmed unilateral posterior canal BPPV (diagnosed via a positive Dix-Hallpike test) were randomized into two parallel arms ($n=60$ each): Group A received the Epley maneuver alone, while Group B received the Epley maneuver combined with oral betahistine (48 mg daily in two divided doses for 7 days). Functional impairment was tracked using the Dizziness Handicap Inventory (DHI) at baseline, Week 1, Week 3, and Week 6 post-intervention. Data were analyzed using independent Student's t -tests and Generalized Estimating Equations (GEE) to model longitudinal trajectories. **Results:** Baseline demographic profiles, symptom duration, frequency of episodes, and provoked triggers were comparable between both cohorts ($p > 0.05$). While both groups demonstrated notable symptom reduction from baseline, Group A exhibited significantly lower DHI scores at Week 3 (11.66 ± 5.37 vs. 20.53 ± 6.92 ; $p < 0.001$) and an intervention-by-time interaction demonstrating superior recovery in the maneuver-alone cohort ($p = 0.031$). **Conclusion:** Standalone canalith repositioning via the Epley maneuver provides superior and more sustained symptomatic relief than combined therapy with betahistine. Routine addition of betahistine provides no adjunctive benefit and may hinder central vestibular compensation.

KEYWORDS :

INTRODUCTION

Benign Paroxysmal Positional Vertigo (BPPV) represents the most common peripheral vestibular disorder encountered in neuro-otology clinics, accounting for 20% to 30% of all balance-related clinical presentations. The condition is biomechanically defined by the detachment of otoconial debris (calcium carbonate crystals) from the utricular macula and its subsequent migration into one or more semicircular canals, most frequently the posterior semicircular canal. When the head moves within the plane of the affected canal, the gravitational displacement of these crystals creates hydrodynamic drag within the endolymph, causing cupular deflection and triggering brief, paroxysmal bouts of rotational vertigo and torsional geotropic nystagmus. The Epley maneuver remains the established first-line intervention, providing mechanical clearance of free-floating otoliths back into the vestibule with reported success rates exceeding 85% to 90%. Despite clear clinical practice guidelines endorsing mechanical repositioning as standalone definitive therapy, pharmacological agents—notably betahistine—remain extensively co-prescribed in routine clinical practice. Betahistine, an agonist at histamine H_1 receptors and a strong antagonist at H_3 receptors, is widely utilized under the premise of enhancing inner ear microcirculation and dampening vestibular nuclei firing. However, whether suppressing vestibular tone confers any clinical benefit in a purely biomechanical condition remains contentious. This randomized comparative trial was conducted to evaluate whether adjunctive betahistine enhances or inadvertently impairs clinical recovery compared to the Epley maneuver alone in posterior canal BPPV.

MATERIALS AND METHODS

Study Design and Setting

This prospective, randomized comparative clinical trial was conducted in the Department of Otorhinolaryngology, Government Medical College, Kota, Rajasthan, over a 19-month study duration. Prior to enrollment, ethical approval was granted by the Institutional Ethics Committee, and written informed consent was acquired from all participants in accordance with the Declaration of Helsinki.

Eligibility Criteria

- Inclusion Criteria:** Adult patients aged 18 to 60 years; clinical presentation consistent with positional vertigo; and objective confirmation of posterior canal BPPV via a characteristic torsional, upbeat nystagmus during the Dix-Hallpike maneuver.
- Exclusion Criteria:** Identifiable central nervous system pathology; multiple-canal or horizontal canal BPPV; concurrent

intake of vestibular sedatives or antihistamines within 48 hours of presentation; severe cervical spine disease limiting neck mobility; prior history of cerebrovascular accident or myocardial infarction; uncontrolled diabetes mellitus; and unwillingness to provide informed consent

Randomization and Intervention

Enrolled participants ($N = 120$) were allocated into two equal cohorts (1:1 ratio):

- Group A (Maneuver Alone, $n = 60$):** Underwent the standard particle repositioning Epley maneuver performed by a trained otolaryngologist. No adjunctive vestibular medication was prescribed.
- Group B (Combination Group, $n = 60$):** Underwent the identical Epley repositioning maneuver along with a 7-day course of oral betahistine hydrochloride (48 mg/day administered as 24 mg twice daily).

Outcome Evaluation

The primary clinical endpoint was subjective vestibular handicap, quantified using the 25-item Dizziness Handicap Inventory (DHI, range 0–100).

Assessments were recorded at baseline (pre-intervention), Week 1, Week 3, and Week 6 post-treatment. Conversion to a negative Dix-Hallpike test was evaluated at follow-up intervals to verify canalith clearance.

Statistical Analysis

Continuous data were assessed for normality utilizing the Kolmogorov-Smirnov and Shapiro-Wilk tests. Normally distributed continuous variables are presented as Mean $\pm$ Standard Deviation (SD) and compared between cohorts using independent Student's t -tests. Non-normally distributed variables are expressed as Median and Interquartile Range (IQR) and analyzed using the Mann-Whitney U test. Categorical variables are reported as counts and percentages (n , %) and evaluated using the Chi-square or Fisher's exact test. To account for repeated within-subject measures across timepoints, a Generalized Estimating Equation (GEE) model with an exchangeable correlation structure was implemented. A two-tailed p -value < 0.05 was considered statistically significant.

RESULTS

Baseline Demographic and Clinical Characteristics

A total of 120 patients completed the study protocol (60 in Group A, 60

in Group B). Demographic and clinical variables exhibited homogenous baseline distribution between both cohorts, confirming comparability (Table 1).

Table 1: Distribution of Demographic and Baseline Clinical Variables

Variables Sex (n%)	Total Cohort (N=120)	Group A: Maneuver Alone (n=60)	Group B: Maneuver + Betahistine (n=60)	p-value
Female	72 (60%)	36 (60.0%)	36 (60.0%)	
Male	48(40%)	24 (40.0%)	24 (40.0%)	
Age in years (Mean $\pm$ SD)	47.23 $\pm$ 11.34	45.80 $\pm$ 10.40	48.66 $\pm$ 12.10	0.168
Duration of symptoms in days, Median (IQR)	5.5 (2.0-10.0)	5.0 (2.0 – 10.0)	6.0 (3.0 – 10.0)	0.432
Episodes per day, Median (IQR)	3.0 (2.0-5.0)	3.0 (2.0 – 4.0)	3.0 (2.0 – 5.0)	0.082
Precipitating Triggers, n (%)				0.841
Turning head	46 (38.3%)	24 (40.0%)	22 (36.7%)	
Standing up	44 (36.7%)	23 (38.3%)	21 (35.0%)	
Bending down	21 (17.5%)	9 (15.0%)	12 (20.0%)	
Looking up	9 (7.5%)	4 (6.7%)	5 (8.3%)	

Positional Test Lateralization and Longitudinal DHI Scores

Canal involvement displayed a right-sided predominance, with 72 patients (60.0%) testing positive on the right and 48 patients (40.0%) on the left, distributed equally across both arms (Table 2). At baseline and Week 1 post-treatment, DHI scores showed no statistically significant differences between Group A and Group B ($p = 0.164$ and $p = 0.617$, respectively). However, at Week 3 and Week 6, Group A demonstrated marked, statistically superior reductions in functional handicap compared to the combination group ($p < 0.001$).

Table 2: Dix-Hallpike Lateralization and Longitudinal DHI Scores Across Follow-up

Variables	Overall (n = 120)	Vestibular maneuvers (n = 60)	Vestibular maneuvers + Drug therapy (n = 60)	p-value
Dix-Hallpike test, n (%)				
Positive to Right	72 (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 $\pm$ SD				
At Baseline	38.12 $\pm$ 12.35	36.00 $\pm$ 10.20	39.00 $\pm$ 13.29	0.164
At Week 1	17.00 $\pm$ 9.10	17.25 $\pm$ 8.46	18.08 $\pm$ 9.80	0.617
At Week 3	15.87 $\pm$ 7.09	11.66 $\pm$ 5.37	20.53 $\pm$ 6.92	<0.001
At Week 6	12.00 $\pm$ 6.25	9.60 $\pm$ 5.10	16.32 $\pm$ 5.45	<0.001

Longitudinal Generalized Estimating Equation (GEE) Modeling

The GEE population-averaged model accounted for within-subject correlation over the study timeline (Table 3). The overall model verified a strong, significant temporal decrease in DHI scores over time ($\beta = -3.69$, $p < 0.001$). While baseline allocation alone did not reach statistical divergence ($\beta = 2.23$, $p = 0.402$), the interaction term (Intervention $\times$ Time) demonstrated a significant therapeutic divergence favoring the maneuver-only approach ($\beta = 0.912$, $p = 0.031$).

Table 3: Generalized Estimating Equation (GEE) Parameter Estimates for DHI

Parameters	Coefficient (β)	Robust Std. Error	z-score	p-value	95% Confidence Interval
Intercept (β_0)	30.34	1.40	20.01	<0.001	27.59 to 33.09
Follow-up Time (Weeks)	-3.69	0.24	-14.15	<0.001	-4.19 to -3.25
Intervention (Group B vs A)	2.23	2.41	0.96	0.402	-2.52 to 6.90

Intervention $\times$ Time Interaction	0.91	0.40	2.37	0.031	0.11 to 1.69
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Table 4: Inter-Group DHI Mean Differences at Individual Follow-up Points

Time-point	Mean Difference (Δ Group B – Group A)	Standard Error	z-score	p-value	95% Confidence Interval
Baseline	2.20	2.42	0.97	0.349	-2.49 to 6.91
Week 1	3.10	2.13	1.49	0.130	-0.88 to 7.09
Week 3	4.92	1.50	3.29	0.001	2.00 to 7.75
Week 6	7.55	1.31	5.88	<0.001	5.05 to 10.04

DISCUSSION

In this prospective randomized trial evaluating 120 patients with posterior canal BPPV, we found that canalith repositioning alone achieved significantly greater long-term symptomatic relief than repositioning combined with short-course oral betahistine. Both cohorts demonstrated substantial initial symptomatic improvement by Week 1. However, patients managed with repositioning alone sustained continuous functional recovery through Weeks 3 and 6, whereas those co-administered betahistine experienced significantly higher lingering handicap scores ($p < 0.001$).

The demographic distribution in our study aligns with established epidemiological data. We observed a female-to-male ratio of 1.5: 1 (60% female) and a mean age in the late fourth decade (47.23 $\pm$ 11.34 years), consistent with observations reported by Yetiser et al. and Kavathia et al.. Mechanical repositioning via the Epley maneuver addresses the underlying mechanical etiology—returning displaced otoconia from the posterior semicircular canal back into the utricle. A critical finding in our study is the paradoxical worsening or stagnation of DHI scores in the betahistine cohort at Weeks 3 and 6, well after the 7-day drug course had ended. Neuro-otologically, dynamic equilibrium following acute peripheral vestibular disruption requires central vestibular compensation—a neuroplastic reorganization within the vestibular nuclei and cerebellum driven by visual and proprioceptive input. Pharmacological agents that suppress vestibular tone or alter histamine-mediated neurotransmission may blunt this compensatory drive. By transiently dampening vestibular asymmetry during the acute post-repositioning phase, betahistine likely delays the central nervous system from recalibrating to new sensory baselines. Once the drug is discontinued after one week, patients experience unmasked, protracted residual dizziness and subjective imbalance, reflected in their elevated Week 3 and Week 6 DHI scores.

These findings align with Josna et al. and Panuganti et al., who highlighted that pharmacological interventions provide no added benefit over physical maneuvers and can hinder recovery. The current clinical practice guidelines from the American Academy of Otolaryngology–Head and Neck Surgery (AAO-HNS) explicitly recommend against the routine prescription of vestibular suppressants for uncomplicated BPPV. Our findings reinforce this stance, showing that standalone repositioning is clinically superior, eliminates medication side effects, and prevents unnecessary healthcare costs.

Limitations

This trial has several limitations. The study followed patients for 6 weeks, which prevents evaluating very late recurrence rates. Additionally, an inert placebo arm was not used for the control group, leaving the possibility of psychological expectation bias in open-label medication use. Further double-blind, multicenter studies with longer follow-ups are recommended to assess recurrence dynamics.

CONCLUSION

The Epley maneuver alone is superior to combination therapy with oral betahistine in providing long-term symptomatic and functional recovery in posterior semicircular canal BPPV. Adjunctive betahistine offers no therapeutic benefit and appears to prolong residual imbalance, likely by interfering with central vestibular compensation. Standalone physical repositioning remains the most effective, safe, and cost-effective treatment for BPPV.

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