Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No. 9 (2025): September 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i9.2179
Original Article

Efficacy of Epley's Maneuver versus Vestibular Sedatives in the Management of Benign Paroxysmal Positional Vertigo: A Prospective Analytical Study.

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Abstract

Background:

Benign paroxysmal positional vertigo (BPPV) is a common vestibular disorder presenting with brief episodes of vertigo triggered by head movements. While vestibular sedatives are frequently used, canalith repositioning maneuvers such as Epley's are considered more effective. This study compared the efficacy of Epley's maneuver with vestibular sedatives in a tertiary care setting.

Methods:

A prospective analytical study was conducted at a government ENT hospital in Telangana over 24 months. Seventy-two patients aged 20–59 years with a positive Dix–Hallpike test were randomized equally into two groups: Group A (vestibular sedatives) and Group B (Epley's maneuver). Patients were assessed at the 2nd week, 1st month, and 2nd month using the Dix–Hallpike test and Visual Analogue Scale. Outcomes were analyzed using SPSS version 23.0, with $p < 0.05$ considered significant.

Results:

The mean age was 38.7 years, with nearly equal gender distribution. Symptomatic relief was significantly higher in Group B compared to Group A at all follow-up points: 66.7% vs. 6.7% at 2 weeks, 83.3% vs. 13.3% at 1 month, and 93.3% vs. 16.7% at 2 months (all $p < 0.001$). Outcomes at 2 months showed 94% complete relief with Epley's maneuver versus 16% with sedatives. Adverse events occurred only in the sedative group (hearing loss 6.6%, tinnitus 10%), while no complications were reported with Epley's maneuver.

Conclusion:

Epley's maneuver demonstrated superior efficacy and safety compared to vestibular sedatives in the management of BPPV, providing rapid and sustained symptom resolution.

Recommendations:

Epley's maneuver should be considered as the first-line therapy for BPPV in clinical practice. Training primary care physicians and ENT practitioners in performing this simple, cost-effective maneuver can reduce reliance on sedatives, minimize side effects, and improve patient outcomes.

Keywords: *Benign paroxysmal positional vertigo, Epley's maneuver, Vestibular sedatives, Dix–Hallpike test, Vertigo management.*
Submitted: *May 19, 2025* ***Accepted:*** *July 22, 2025* ***Published:*** *September 30, 2025*

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Introduction

Benign paroxysmal positional vertigo (BPPV) is the most frequent cause of peripheral vestibular dysfunction, accounting for nearly one-fifth of all patients presenting with vertigo in routine otolaryngology and neurology practice [1]. Epidemiological studies indicate a lifetime prevalence of approximately 2.4%, with incidence rising in middle-aged and elderly individuals, particularly among women, suggesting a possible influence of hormonal and degenerative factors [2]. The condition is therefore not only

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common but also clinically significant, as it affects a wide spectrum of patients across age groups.

Clinically, BPPV is characterized by transient but recurrent episodes of vertigo, typically lasting seconds to minutes, that are provoked by changes in head position relative to gravity, such as lying down, rolling in bed, or looking upward. These attacks are often accompanied by imbalance, nausea, and anxiety, and are associated with a characteristic torsional or vertical nystagmus elicited during the Dix–Hallpike positional test [3]. Because the attacks are sudden and unpredictable, BPPV can significantly affect daily activities, occupational performance, and mobility, with patients frequently reporting fear of movement or avoidance of routine tasks.

The underlying pathophysiological mechanism is attributed to canalolithiasis, a condition in which otoconia, dislodged from the utricular macula, migrate into one of the semicircular canals, most commonly the posterior canal. The abnormal presence of otoconia disrupts endolymphatic flow during head movements, resulting in inappropriate activation of the vestibular hair cells and subsequent vertigo [4]. Less frequently, cupulolithiasis may occur, where otoconial debris adheres to the cupula of the semicircular canal, producing persistent positional nystagmus.

Although BPPV is regarded as a benign disorder due to its non-progressive nature and tendency for spontaneous remission, its impact should not be underestimated. Recurrent or persistent episodes can markedly impair health-related quality of life, reduce independence in daily living, and increase the risk of falls and fall-related injuries, particularly in elderly populations [5]. These consequences underline the importance of timely recognition and effective management, as untreated BPPV is associated with functional disability, psychological distress, and substantial healthcare utilization.

The present study was undertaken to compare the efficacy of Epley's maneuver and vestibular sedatives in patients with BPPV, with emphasis on symptomatic improvement, clinical outcomes, and treatment safety.

Methodology

Study Design and Setting

This investigation was designed as a prospective analytical study, structured to compare treatment outcomes between two predefined intervention groups under real-world clinical conditions. The study was conducted in the Department of Otorhinolaryngology at the Government ENT Hospital, Koti, Hyderabad, a large tertiary-care referral center affiliated with Osmania Medical College. The institution caters to a high outpatient and inpatient turnover from urban, semi-urban, and rural areas of Telangana and offers specialized services in otology, rhinology, laryngology, and neuro-otology. The hospital's dedicated vertigo evaluation unit routinely performs positional tests, vestibular assessments, and canalith repositioning procedures, making it an appropriate setting for research involving benign paroxysmal positional vertigo (BPPV).

Study Duration and Timeline Clarification

The total study period spanned 24 months (July 2022 to June 2024). This included: Initial 18 months for patient recruitment, baseline clinical evaluation, and allocation into treatment groups. The subsequent 2 months per participant were dedicated to follow-up assessments at the 2nd week, 1st month, and 2nd month after initiation of treatment. Final 4 months for data collation, verification, statistical analysis, and manuscript preparation. This structure ensured continuous enrolment while allowing each recruited participant to complete the full 2-month follow-up window within the overall 24-month timeframe.

Study Population and Sampling

Seventy-two adult patients (20–59 years) with a clinical diagnosis of posterior canal BPPV confirmed by a positive Dix–Hallpike test were included. Recruitment was based on purposive sampling of eligible patients presenting to the vertigo clinic. Participants were randomized equally into:

Group A (n = 36): Treated with vestibular sedatives.

Group B (n = 36): Treated with Epley's maneuver.

Inclusion Criteria

Patients aged >20 years.

History suggestive of BPPV with brief episodes of positional vertigo.

Positive Dix–Hallpike test.

Willingness to participate and provide written informed consent.

Exclusion Criteria

Patients with cervical spine disease.

Known cerebrovascular disorders.

History of peripheral vestibular disease (vestibular neuronitis, Ménière's disease).

Central nervous system causes of vertigo.

Prior treatment with vestibular sedatives or repositioning maneuvers.

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Interventions and Follow-up

Group A received standard vestibular sedatives (betahistine/cinnarizine) in therapeutic doses. Group B underwent the Epley canalith repositioning procedure administered by an ENT specialist trained in vestibular rehabilitation techniques. Follow-up evaluations were uniformly conducted at:

2nd week, 1st month, 2nd month

Each visit included the Dix–Hallpike test and Visual Analogue Scale (VAS) scoring to assess positional vertigo and symptom severity.

Outcome Measures

Primary outcome: Resolution of vertigo and nystagmus as assessed by the Dix–Hallpike test.
Secondary outcome: Reduction in VAS-measured vertigo severity and documentation of adverse events.

Bias and Efforts to Minimize It

Multiple strategies were undertaken to reduce methodological and observer bias throughout the study. Selection bias was minimized by applying clearly defined inclusion and exclusion criteria and by using a computer-generated randomization sequence to allocate participants equally into the two intervention groups. To limit performance bias, both groups were managed according to standardized treatment protocols, and the Epley maneuver was performed exclusively by trained ENT specialists to ensure uniformity of technique. Detection and observer bias were addressed by having follow-up assessments, including the Dix–Hallpike test and VAS scoring, conducted, whenever possible, by clinicians who were not involved in delivering the interventions, using structured assessment templates to reduce subjective variability. Attrition bias was reduced by reminding participants of their scheduled visits through telephone communication, ensuring adherence to follow-up, and including only those who completed all assessment points in the final analysis. Reporting bias was minimized by prospectively documenting all predefined outcomes and ensuring that no selective or post-hoc reporting influenced the results.

Data Collection and Statistical Analysis

Data were entered into a structured database and analyzed using SPSS version 23.0. Categorical variables were summarized as frequencies and percentages, while continuous variables were presented as mean ± standard deviation. Comparisons between the two treatment groups were performed using the Chi-square test for categorical outcomes. A p-value < 0.05 was considered statistically significant.

Ethical Considerations

The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Ethical approval was obtained from the Institutional Ethics Committee of Osmania Medical College, Hyderabad, before the initiation of the research. All eligible participants were informed about the study objectives, procedures, potential benefits, and risks in their preferred language. Written informed consent was obtained from every participant before enrollment, ensuring voluntary participation and the right to withdraw at any stage without affecting their clinical care. Confidentiality of patient data was maintained throughout the study, and all information was used strictly for research purposes.

Results

A total of 72 patients diagnosed with benign paroxysmal positional vertigo (BPPV) were enrolled and equally divided into two treatment groups: Group A received vestibular sedatives, and Group B underwent Epley's maneuver.

Demographic Profile

The age distribution of participants is shown in **Table 1**. The majority of patients (41.6%) were in the 30–39 years age group, followed by 40–49 years (30.5%). Both treatment groups had a similar distribution across age ranges.

Table 1. Age-wise Distribution of Participants in Both Groups

Age Range (Years)	Group A (Vestibular Sedatives)	Group B (Epley's Maneuver)	Total
20–29	5	4	9
30–39	14	16	30
40–49	12	10	22
50–59	5	6	11
Total	36	36	72

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The gender distribution is presented in Table 2, with females accounting for 51.4% and males 48.6% of the study population, showing a nearly balanced representation in both groups.

Table 2. Gender Distribution of Participants

Group	Female n (%)	Male n (%)	Total
Group A (Sedatives)	17 (47.2%)	19 (52.8%)	36
Group B (Epley)	20 (55.6%)	16 (44.4%)	36
Total	37 (51.4%)	35 (48.6%)	72

Treatment Response Over Time

The comparative analysis of symptom relief by the Hallpike test at different follow-up points is summarized in Table 3. In the second week, only 6.7% of patients in the sedative group achieved relief, compared to 66.7% in the Epley group ($p < 0.001$). This trend continued at one month, with 13.3% relief in Group A versus 83.3% in Group B ($p < 0.001$). By the second month, the difference was even more pronounced, with 16.7% improvement in Group A compared to 93.3% in Group B ($p < 0.001$). Chi-square analysis showed statistically significant differences between the groups at all follow-up points: 2nd week ($\chi^2 = 25.92$, $p < 0.001$), 1st month ($\chi^2 = 30.72$, $p < 0.001$), and 2nd month ($\chi^2 = 35.28$, $p < 0.001$).

Table 3. Comparative Relief by Dix–Hallpike Test Over Time

Time Point	Group A – Relief n (%)	Group B – Relief n (%)	p-value
2nd Week	2 (6.7%)	20 (66.7%)	<0.001
1st Month	4 (13.3%)	25 (83.3%)	<0.001
2nd Month	5 (16.7%)	28 (93.3%)	<0.001

Final Outcome

At the end of two months, the overall efficacy of both interventions was compared (Table 4). In the Epley group, 94% of patients achieved complete resolution of vertigo and nystagmus, while only 16% of those in the sedative group reported similar improvement. This difference was highly statistically significant, underscoring the superiority of Epley's maneuver. The final comparison at 2 months also demonstrated a highly significant difference between the two groups ($\chi^2 = 45.03$, $p < 0.001$).

Table 4. Final Dix–Hallpike Test Outcome at 2 Months

Treatment Group	Negative (Relief Achieved) n (%)	Positive (No Relief) n (%)	Total
Group A (Sedatives)	6 (16%)	30 (84%)	36
Group B (Epley)	34 (94%)	2 (6%)	36
Total	40 (55.6%)	32 (44.4%)	72

Adverse Events

Adverse events were observed exclusively in the sedative group (Table 5). While no cases of nausea were reported, 6.6% experienced hearing loss and 10% reported tinnitus. In contrast, no adverse effects were documented among patients treated with Epley's maneuver, highlighting its favorable safety profile. The difference in adverse-event occurrence between the groups was statistically significant ($\chi^2 = 6.12$, $p = 0.013$).

Table 5. Adverse Events in Group A (Vestibular Sedatives)

Adverse Event	Number of Patients (n)	Percentage (%)
Nausea	0	0%
Hearing Loss	2	6.6%
Tinnitus	3	10%
Total	**5**	**16.6%**

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Discussion

This prospective analytical study compared the effectiveness of Epley's maneuver with vestibular sedatives in the management of benign paroxysmal positional vertigo (BPPV). The results clearly demonstrated that Epley's maneuver was significantly superior, with 94% of patients experiencing complete symptom resolution at two months compared to only 16% in the sedative group. These findings reinforce the role of canalith repositioning maneuvers (CRMs) as a first-line therapeutic option in BPPV.

These results are consistent with randomized controlled trials that have shown the sustained efficacy of Epley's maneuver, providing greater long-term symptom control compared with Brandt–Daroff vestibular training [6]. Further evidence indicates that the maneuver remains effective even in patients with BPPV associated with Ménière's disease, eliminating vertigo and positional nystagmus after repeated applications [7].

The limited benefit of vestibular sedatives observed in this study aligns with meta-analyses, which emphasize that pharmacological agents such as betahistine may only provide adjunctive benefit when combined with Epley's maneuver, whereas CRMs remain the cornerstone of management [8]. Early initiation of repositioning therapy has also been shown to significantly improve outcomes, particularly in cases of BPPV secondary to sudden sensorineural hearing loss [9].

The applicability of Epley's maneuver extends beyond specialist care. Evidence demonstrates that it can be effectively and safely performed by family physicians and emergency practitioners, thereby broadening its utility in primary and acute care settings [10]. Systematic reviews further highlight the superiority of Epley's maneuver compared with vestibular rehabilitation, strengthening its role as the preferred intervention [11].

Finally, the present findings align with authoritative reviews, which emphasize that repositioning maneuvers directly address the underlying canalolithiasis, offering rapid and durable relief, in contrast to sedatives that only suppress symptoms without modifying disease course [12].

Generalizability

The findings of this study provide strong evidence favoring Epley's maneuver over vestibular sedatives for the management of BPPV. However, as the study was conducted in a single tertiary care hospital with a limited sample size and short follow-up, extrapolation to broader populations should be done cautiously. Despite these constraints, the results apply to similar clinical settings, particularly in resource-limited regions, where simple, low-cost, and effective bedside interventions like Epley's maneuver can significantly improve patient outcomes.

Conclusion

This prospective analytical study demonstrated that Epley's maneuver is significantly more effective than vestibular sedatives in managing benign paroxysmal positional vertigo (BPPV). Patients treated with Epley's maneuver achieved rapid and sustained symptom resolution, with 94% showing complete relief at two months compared to only 16% in the sedative group. The maneuver also proved safe, with no reported adverse events, whereas vestibular sedatives were associated with minor side effects such as tinnitus and hearing loss. These findings underscore the superiority of Epley's maneuver as a first-line therapeutic option, offering a simple, cost-effective, and patient-friendly approach that addresses the underlying pathology of BPPV.

Limitations

The present study was conducted in a single tertiary care center with a relatively small sample size, which may limit the generalizability of findings. The short follow-up period of two months did not allow assessment of long-term recurrence rates. Randomization was performed, but blinding was not feasible due to the nature of the interventions, which could have introduced observer bias. Additionally, patient-reported outcomes using the Visual Analogue Scale may be influenced by subjective perception. Future multicenter studies with larger cohorts and extended follow-up are recommended to validate and strengthen the evidence regarding the superiority of Epley's maneuver over pharmacological management in BPPV.

Recommendations

Epley's maneuver should be adopted as the first-line management strategy for BPPV in both tertiary and primary care settings. Training of ENT specialists, general practitioners, and emergency physicians in performing the maneuver can ensure early and effective treatment. Vestibular sedatives may be reserved only for short-term symptomatic relief in patients unable to undergo repositioning due to cervical spine disorders or other contraindications. Incorporating structured guidelines and patient education on self-performed maneuvers can further enhance outcomes and reduce recurrence.

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Acknowledgements
The authors sincerely thank the Department of Otorhinolaryngology, Government ENT Hospital, Koti, Hyderabad, for providing clinical and infrastructural support. Special appreciation is extended to the patients who participated in the study for their cooperation and adherence to follow-up. The guidance and encouragement from the faculty of Osmania Medical College were invaluable throughout the research process. The authors also acknowledge the contribution of clinical and technical staff involved in patient assessment and data collection.

List of Abbreviations
BPPV – Benign Paroxysmal Positional Vertigo
SCC – Semicircular Canal
CNS – Central Nervous System
VAS – Visual Analogue Scale
CRM – Canalith Repositioning Maneuver
CRP – Canalith Repositioning Procedure

Source of funding
The study had no funding.

Conflict of interest
The authors declare no conflict of interest.

Author contributions
NCR-Concept and design of the study, results interpretation, review of literature, and preparation of the first draft of the manuscript. Statistical analysis and interpretation, revision of manuscript. **SR-**Concept and design of the study, results interpretation, review of literature, preparing the first draft of the manuscript, and revision of the manuscript.**PKK-**Review of literature and preparing the first draft of the manuscript. Statistical analysis and interpretation.

Data availability
Data available on request

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He has published two research papers in peer-reviewed journals and continues to contribute to academic scholarship in otorhinolaryngology. His areas of clinical and research interest include allergic rhinitis, endoscopic sinus surgery, and advances in otology and laryngology. In addition to his academic contributions, Dr. Praneeth Kumar is dedicated to patient-centered clinical practice and strives to integrate evidence-based medicine into daily teaching and healthcare delivery. **ORCID ID:** https://orcid.org/0009-0007-1056-815X

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PUBLISHER DETAILS:

Student's Journal of Health Research (SJHR)
(ISSN 2709-9997) Online
(ISSN 3006-1059) Print
Category: Non-Governmental & Non-profit Organization
Email: studentsjournal2020@gmail.com
WhatsApp: +256 775 434 261
Location: Scholar's Summit Nakigalala, P. O. Box 701432, Entebbe Uganda, East Africa