Original Article

Effect of Betahistine Treatment on Dizziness and Anxiety Symptoms of BPPV Patients

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Abstract

Background: Patients with benign paroxysmal positional vertigo (BPPV) may experience significant deterioration in their quality of life due to dizziness and anxiety symptoms. **Aim:** To evaluate the effect of betahistine add-on therapy on dizziness and anxiety symptoms of BPPV patients. **Materials and Methods:** Eighty-four patients who were diagnosed as having posterior canal BPPV were included in the study. Patients were divided into two groups according to the treatment regimen: Group 1 included 42 subjects who were treated with the Epley maneuver alone and Group 2 included 42 subjects who received betahistine 48 mg/day for ten days with the Epley maneuver. Dizziness handicap inventory (DHI) and Beck anxiety inventory (BAI) were evaluated at the time of diagnosis and at the control examination on the tenth day. **Results:** The mean before and after treatment DHI scores were 38.8 ± 14.6 and 5.47 ± 6.4 for Group 1 ($P < 0.001$), and 45.8 ± 21.1 and 10.3 ± 12.9 for Group 2 ($P < 0.001$). The mean before and after treatment BAI scores were 11.8 ± 6 and 1.33 ± 1.8 for Group 1 ($P < 0.001$), and 13.6 ± 8.3 and 2.9 ± 3.8 for Group 2 ($P < 0.001$). There was no significant difference between the before and after treatment DHI and BAI score differences of the two groups ($P = 0.27$, $P = 0.43$). **Conclusion:** Canalith repositioning maneuvers (CRMs) should be the main treatment modality in the management of BPPV patients and adding on betahistine treatment to CRMs have no impact in the relieving of dizziness and anxiety symptoms.

Keywords: *Anxiety, betahistine, dizziness, Epley maneuver, vertigo*

Introduction

Benign paroxysmal positional vertigo (BPPV) accounts for up to 42% of the patients presenting with vertigo complaints and is the leading cause of peripheral vestibular disorders.[1,2] The prevalence of BPPV has been reported to range from 10.7 to 140 per 100,000 individuals.[3,4] It usually occurs between the fifth and seventh decades of life with a female-to-male ratio of 2.2 to 1.[3,4] Posterior canal BPPV constitutes 85–95% of cases, followed by lateral canal BPPV, which accounts for approximately 5–15% of all cases.[4-6]

There are two main theories, canalithiasis and cupulolithiasis, used to explain the etiopathogenesis of BPPV. According to the canalithiasis theory, free-floating calcium carbonate particles (otoconia) descend from the utricle into the semicircular canal, resulting in inappropriate vestibular stimulation.[4,7] On the other hand, the cupulolithiasis theory suggests that inappropriate vestibular stimulation occurs due to otoconia adhering to the cupula of the affected semicircular canal.[4,5,7] While the majority of BPPV cases are idiopathic, hypertension, osteoporosis, hyperlipidemia, head trauma, and vestibular neuritis have been described as the main risk factors in the etiology of BPPV.[6,8]

The main treatment modality for BPPV is canalith repositioning maneuvers (CRMs). Additionally,

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alternative treatment options such as vestibular rehabilitation exercises, medical therapy involving benzodiazepines, antihistamines, or betahistine, as well as surgical procedures, particularly in resistant cases, can also be considered.[4,7] Improving the quality of life, alleviating dizziness, and managing anxiety symptoms in BPPV patients are of crucial importance and should be among the primary goals in BPPV management.

This study was conducted to evaluate the impact of betahistine treatment on dizziness and anxiety symptoms of BPPV patients.

Materials and Methods

Eighty-four patients who were admitted with dizziness complaint and diagnosed with posterior canal BPPV using Dix-Hallpike provocation test were included in the study. Patients who have anterior or lateral canal BPPV, central vertigo, age <18 years, not suitable for performing provocation maneuver because of physical disability or cervical spine disorder, history of previous ear surgery, vestibular disorder, psychiatric disorder, use a vestibular suppressant or taking medications for psychiatric disorders were excluded from the study Following the diagnosis of posterior canal BPPV, all study participants underwent the Epley maneuver. Based on the treatment regimen recorded in their medical records, the patients were divided into two groups: Group 1 consisted of 42 patients who received the Epley maneuver alone, while Group 2 comprised 42 patients who received the Epley maneuver along with a daily dosage of 48 mg of betahistine for ten days. Epley maneuver was performed to all patients in both groups. This was a one-off treatment. Subsequently, patients were scheduled for a follow-up examination ten days later in both groups and were re-evaluated using the provocation maneuver to assess the presence of nystagmus.

The Turkish version of the dizziness handicap inventory (DHI) was utilized to assess the psychosocial handicapping effects of vestibular disorders.[9,10] The DHI is a widely used questionnaire that quantifies the impact of dizziness on the quality of daily life. It consists of 25 questions, each scored as 4, 2, or 0 based on the patient's responses of "yes," "sometimes," or "no," respectively.[9,10] The total score ranges from zero (indicating no disability) to 100 (indicating severe disability). The scale encompasses a 7-item physical subscale, a 9-item emotional subscale, and a 9-item functional subscale. In most studies investigating factors associated with elevated DHI scores, patients are classified into three groups based on their DHI scores: those with mild handicap (scores of 0–30), moderate handicap (scores of 31–60), and severe handicap (scores of 61–100).[11-13]

In order to assess the severity of anxiety symptoms in the patients, we utilized the Beck anxiety inventory (BAI), a widely employed and validated questionnaire consisting of 21 items.[14,15] The BAI allows patients to rate the severity of their symptoms over the past seven days using a scale of 0 (not at all), 1 (mildly), 2 (moderately), and 3 (severely)[11,12] Both the DHI and the BAI were evaluated at the time of diagnosis and during the follow-up examination on the tenth day.

The study was approved by the Institutional Review Board (reference number: PR284R01/5), and we obtained informed consent from all of the participants in the study.

Statistical analysis

Statistical analysis was performed using the SPSS version 15.0 software (SPSS Inc., Chicago, IL). Continuous data are stated as mean ± standard deviation (SD), and categorical data as number (*n*), percentage (%). Dependent group analyses were performed using paired *t*-test for data with normal distribution, and the Wilcoxon test for non-normal distribution. Independent group analyses were performed using the Student's *t*-test. Categoric variables were compared with the Chi-square test. *P* values <0.05 were considered statistically significant. G*power 3.1.9.2 software was used to calculate a sample size of 84 people with a 5% type 1 error, 90% power, and an effect size of 0.65.

Results

A total of 84 patients were enrolled in the study, consisting of 52 females (61.9%) and 32 males (38.1%). The mean age of the participants was 54.3 ± 13.2 years, ranging from 22 to 81 years. Among them, Group 1 (Epley maneuver) comprised

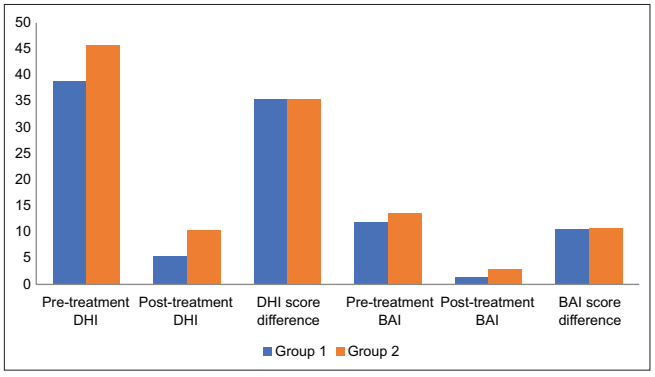

Figure 1: Before and after treatment DHI and BAI scores and comparison of the pre- and post-treatment DHI and BAI score differences of two groups

Table 1: Demographic data of the study population

		Total (*n*=84)	Group 1 (*n*=42)	Group 2 (*n*=42)	*P*
Age, Mean±SD		54.3±1.2	53.6±13.7	55.1±12.8	0.30
Gender, Number (%)	Male	28 (33.3)	15 (35.7)	13 (30.9)	0.64
	Female	56 (66.7)	27 (64.3)	29 (69.1)	

DHI=Dizziness handicap inventory, BAI=Beck anxiety inventory

Table 2: Before and after treatment DHI and BAI scores

	Pre-treatment DHI	Post-treatment DHI	*P*
Group 1	38.8±14.56	5.47±6.38	<0.001
Group 2	45.76±21.15	10.28±12.92	<0.001
	Pre-treatment BAI	**Post-treatment BAI**	
Group 1	11.85±5.99	1.33±1.83	<0.001
Group 2	13.64±8.3	2.9±3.82	<0.001

DHI=Dizziness handicap inventory, BAI=Beck anxiety inventory

Table 3: Comparison of the pre- and post-treatment DHI and BAI score differences of two groups

	Group 1	Group 2	*P*
DHI score difference	33.33±15.67	35.47±16.99	0.27
BAI score difference	10.52±5.76	10.73±6.86	0.43

DHI=Dizziness handicap inventory, BAI=Beck anxiety inventory

42 patients (27 females, 15 males) with a mean age of 53.6 ± 13.7 years (range, 22–81 years), while Group 2 (Epley maneuver plus betahistine) included 42 patients (29 females, 13 males) with a mean age of 55.1 ± 18.3 years (range, 23-74 years). There were no significant differences between the two groups in terms of age and gender [Table 1].

During the tenth day control examination, two patients in Group 1 and two patients in Group 2 exhibited provoked nystagmus, resulting in a success rate of 95.2% for the Epley maneuver.

The mean DHI scores before and after treatment were as follows: for Group 1, the scores were 38.8 ± 14.6 and 5.47 ± 6.4, respectively, while for Group 2, the scores were 45.8 ± 21.1 and 10.3 ± 12.9, respectively. A significant decrease was observed in the post-treatment scores for both groups ($P < 0.001$) ($P < 0.001$) [Table 2].

The mean BAI scores before and after treatment were as follows: for Group 1, the scores were 11.8 ± 6 before treatment and 1.33 ± 1.8 after treatment, while for Group 2, the scores were 13.6 ± 8.3 before treatment and 2.9 ± 3.8 after treatment. A significant decrease was observed in the post-treatment scores for both groups ($P < 0.001$) ($P < 0.001$) [Figure 1].

There was no significant difference in the DHI score differences and BAI score differences between the two groups before and after treatment ($P = 0.27$) ($P = 0.43$) [Table 3].

Discussion

BPPV generally has a favorable prognosis, with spontaneous recovery occurring in approximately 20% of cases by 1-month follow-up and up to 50% at 3 months.[4] However, untreated BPPV can significantly reduce the quality of life and increase the risk of falls and subsequent injuries.[16,17] CRMs are the primary treatment approach for managing BPPV, and patients treated with CRMs have shown a 6.5-fold higher recovery rate for clinical symptoms compared to controls.[18] While the CRM is considered the mainstay of treatment for BPPV, it may not be effective in a significant number of patients. CRMs have been shown to have a 70% to 85% success rate after a single treatment session and greater than 90% after two sessions.[19] Furthermore, the timeframe for experiencing the benefits of CRM is variable and not standardized.[4] Although paroxysmal positional nystagmus is successfully resolved with CRMs, residual dizziness and anxiety symptoms or abnormal postural control may persist longer time and it has been reported that the overall prevalence of these residual symptoms ranges between 31% and 61%.[20,21] Vestibular rehabilitation, medical therapy, and surgical procedures, especially in resistant cases, are the other treatment options.

Betahistine is a histamine analog, and although its exact mechanism of action is still unknown, it has H1 receptor agonistic and H3 receptor antagonistic effects.[22] Betahistine is very effective in the management of Meniere's disease because it increases vasodilation and microcirculation in the inner ear, thereby decreasing the pressure in the endolymphatic sac.[22]

Furthermore, studies have suggested that betahistine may have potential effectiveness in promoting vestibular compensation in recurrent cases of BPPV. This is thought to be attributed to its capacity to improve microcirculation and vasodilation in the inner ear.[23] Additionally, betahistine increases histamine synthesis in the central nervous system.[24] Notably, betahistine has been used safely in daily clinical practice for over four decades, with doses ranging from 8 mg to 48 mg per day, for the treatment of peripheral vertigo.[23]

Several studies in the literature have been conducted to assess the efficacy of betahistine treatment in patients

with BPPV. In a randomized controlled trial, patients were divided into three groups: Epley maneuver alone, betahistine alone, and Epley maneuver plus betahistine. The study concluded that patients treated with the combination of Epley maneuver and betahistine had a better response and lower rates of relapse and recurrence.[25] Sayın *et al*.[26] investigated the effect of betahistine treatment by comparing the CRM group and CRM + betahistine group by evaluating the study participants with DHI and visual analog scale. The results indicated that the addition of betahistine treatment improved symptom control in BPPV patients.[26]

In contrast, a study involving the grouping of patients into an Epley maneuver group, Epley maneuver plus betahistine group, and Epley maneuver plus dimenhydrinate group did not demonstrate the superiority of betahistine or dimenhydrinate as additional therapies.[6] Similarly, Acar *et al*.[27] reported that the addition of betahistine, trimetazidine, or ginkgo biloba extract to the CRM did not have a beneficial effect on symptom control in BPPV patients. In the current study, as there was no significant difference in the pre-treatment and post-treatment DHI score differences between both groups, it was concluded that the addition of betahistine treatment to CRM had no impact on controlling dizziness symptoms in BPPV patients.

Anxiety is a significant issue among BPPV patients, likely due to the paroxysmal nature of vertigo. Anxiety can hinder medical care, exacerbate physical symptoms, impose postural restrictions, and lead to social limitations.[28,29] Özdilek *et al*.[28] conducted a study assessing anxiety levels in BPPV patients using the BAI, similar to our current study. They found that BPPV patients had significantly higher mean BAI scores compared to healthy individuals. Kahraman *et al*.[29] also investigated anxiety levels in BPPV patients using BAI scores, evaluating patients before undergoing CRM and at 7 and 14 days of follow-up, with a comparison to healthy controls. The mean BAI scores were significantly higher than controls in the initial and subsequent measurements, but no significant difference was observed at 14 days. The researchers performed CRM to treat BPPV and reported that the mean BAI scores of BPPV patients were highest at the time of diagnosis and lowest at 14 days after CRM[29] Similarly, Gunes *et al*.[30] found that mean BAI scores significantly decreased in BPPV patients after undergoing CRM.

In our study, we found that the mean BAI scores were significantly higher at the time of diagnosis compared to the scores on the tenth day after treatment for both groups. However, the lack of a significant difference in the pre-treatment and post-treatment BAI score differences between the two groups suggests that the addition of betahistine to the Epley maneuver did not have a significant impact on anxiety levels in BPPV patients.

The main limitations of the current study are the relatively small study population, short follow-up time, and the absence of a placebo control group. Further studies with larger study population and including a placebo-controlled group are still needed to achieve exact conclusions.

Conclusion

CRM is the main treatment modality in the management of BPPV patients and adding on betahistine treatment to CRMs has no impact in the relieving of dizziness and anxiety symptoms.

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Conflicts of interest

There are no conflicts of interest.

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