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**A comparative study on the response to Epley's manoeuvre and betahistine dihydrochloride management among patients with benign paroxysmal positional vertigo**

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**Abstract**

The objective of this study is to evaluate the effectiveness of Epley's maneuver and Betahistine dihydrochloride on the improvement of patients from BPPV and to comparing the outcome of the use of Betahistine dihydrochloride with the outcome of the use of Epley's maneuver. This is a prospective and comparative randomized study in Basra Teaching Center of Otolaryngology in which fifty patients were included in this study their age range between (42-65) years, all of them complaining from BPPV. These patients divided into two groups. The first group was treated by Epley's maneuver and the second group was treated by oral intake of Betahistine dihydrochloride tablet. All patients evaluated at the end of this period by presence or relieving from symptoms and by positive or negative Dix-Hallpike test. A 50 patients were 33 males (66%) and 17 females (34%) and the mean age value for all the patients were in the sixth decade (56.5) years. The improvement from vertigo symptom was statistically significant for the two groups and it was also significant when comparing the two groups which was better in first group and the improvement from associated symptoms like nausea and vomiting and headache was significantly different between the two groups and it was better in the second group. Epley's maneuver gave a good result in relieving patients of vertigo in patients had BPPV while Betahistine dihydrochloride gave a good result in relieving patients from associated symptoms of BPPV.

**Keywords:** Betahistine dihydrochloride, Paroxysmal positional vertigo, Epley's maneuver

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**Introduction**

BPPV is the commonest presenting cause of vertigo with an estimated lifetime prevalence of 2.4% [1]. In studies of both young adults and the elderly a prevalence of 9% has been described [2]. It has a characteristic history and can easily be diagnosed on examination. Treatment can be performed in the clinic with a good outcome, making it the most rewarding vestibular condition to manage. BPPV may, however, be associated with a reduced quality of life, falls and depression, in which case the term 'benign' may be misleading, particularly when unrecognized and therefore untreated. The first clinical description of positional vertigo is attributed to Barany in 1921 and in 1952 Dix and Hallpike were the first to clearly describe the provoking maneuvers [3].

Dix and Hallpike coined the term 'benign paroxysmal positional vertigo' in view of the associated benign (non-cancerous) origin and momentary (paroxysmal) bursts of intense vertigo upon head

movements (positional). Lanska and Remler provide a concise historical account of the work that has led to our understanding of this condition [3].

### **Patients and methods**

This is a follow up and comparative randomized study that had been done from 1<sup>st</sup> of December 2017 to the 30<sup>th</sup> of May 2019, in Basra Teaching Hospital/department of Otolaryngology. The study involved fifty patients their age range between 40-67 years 33 males (66%) and 17 females (34%). Fifty patients reported repeated episodes of vertigo with change in head position in relation to gravity, these patients collected from ENT outpatient clinic, rheumatological clinic, emergency unite, private clinics, neurological and internal medicine clinic. Some patients that excluded from this study for cervical spinal disease, cardiovascular disease like carotid stenosis. Patients who had other otolaryngological problems that cause vertigo like Meniere's disease, chronic drug use, patients with vertigo due to central causes like CVA, patients with thyroid disease. All the examinations, tests and the entire questionnaire was done in a room which was equipped with otolaryngological instruments.

The main features for history taken were the analysis of vertigo including onset of attack, the duration of each attack, frequency of vertigo attacks, the precipitating factors such as neck movements or head and body positions. A specific question for BPPV was taken regarding repeated episodes of vertigo that were occurred when the patient changed head position relative to the gravity like sitting, bending over, turning over in bed and looking up. The patients were also asked about any associated symptoms like nausea and vomiting and if these were present always or only at the time of the attack of vertigo or aggravating by the attack.

A routine and full otolaryngological and otoneurological examination were done for all patients by the same doctor with a special emphasis on otoscopic examination and hearing assessment by tuning fork test, audiological study and vestibular function test. Positional test was done for all the patients. It was examined by performing a Dix-Hallpike maneuver in which the patient is sat on a couch and head was held firmly between the examiner's hands, and turned 45 to right (and to left later) to face the examiner, then the patient was rapidly laid back ward with the head over the edge of the couch 30 degree below the horizontal and maintained for 60 seconds and patient was instructed to keep the eyes open and fixate upon the examiner's forehead, while the eyes were carefully observed and reported the results for PSCC, ASCC or LSCC involvement.

All patients were strongly reassured about the nature of their dizziness and prognosis. A treatment strategy was discussed with them and also discussing the importance of persisting with the treatment protocol. All the patients were monitored and followed up for 4 months, the patients were divided into two groups, the first group of patients (25) with BPPV and positive Dix-Hallpike maneuver that were treated by Epley's maneuver without use of any other drugs, the other group of patients (25) with BPPV and positive Dix-Hallpike maneuver that were treated by Betahistine dihydrochloride drug (24mg) per day without use of any other treatment.

The patients were randomly selected regarding age and sex for the two groups.

All the patients were advised to avoid Looking up or down for long periods, rolling over in bed, tilting the head, sudden head movement and sleeping for a good period of time sleep. The patients were followed up for four months for making the final assessment. The first visit after initial treatment was after 10 days. The second visit was after one month, and the last visit was after 4 months. The patients were informed to return back to the hospital at any time if their condition worsen.

## Result

The study included fifty patients with vertigo were 33 males (66%) and 17 females (34%), their age range was 40-67 year, with a mean age of (56.5) year with Std. Deviation (7.112). The cases were appropriately divided into two groups according to treatment strategy:

- 1- Group A: those patients treated by Epley's maneuver were 25 patients (18 males 72% and 7 females 28%).
- 2- Group B: those patients treated by Betahistine dihydrochloride drug (24mg) per day one month and followed them by a period of one to four months and they were 25 patients (15 males 60% and 10 females 40%)

The first group of patients were 25 patients, age of them ranged from (42-65) years ,5 patients in the fifth decade from (42 to 47) ,6 patients in the sixth decade from (54 to 57) ,14 patients in the seventh decade from (60 to 65), with a mean (57.24) years and Std. Deviation (7.518).

The duration and severity of symptoms were more in age group >55 years.

This group of patients were had symptoms of nausea and vomiting in 13 patients which represented (52%) of total patients in this group.

Headache symptom in this group of patients were represented in 7 patients only that represented (28%) of total patients in this group.

Data was collected at the end of the 4 months of treatment and results were collected and analyzed.

Regarding the vertigo symptom, there were 22 (88%) of patients improved from vertigo and only 3 patients (12%) were not improved (subjective feeling of vertigo persist and negative Dix-Hallpike maneuver). There was a significant difference regarding improvement from vertigo symptom and the (p-value <0.05). The recurrence of symptoms in group A was mainly significant in 11 patients (50%) from patients that was had recurrence attack of BPPV, and all the 11 patients was had history of physical exercise. The second group of patients were 25 patients suffered from vertigo symptom, age for them ranged from (40-67) years, 5 patients from (40 to 47),6 patients from (54 to 57) ,14 patients from (60 to 67), with a mean (57.28) years and Std. Deviation (7.829). The duration and severity of symptoms also were more in age group >55 years. This second group of patients were diagnosed of being had BPPV by clinical symptoms and positive Dix-Hallpike maneuver (outward upbeating torsional nystagmus and vertigo). This group of patients also were had symptoms of nausea and vomiting in 19 patients (76%),12 patients were had headache (48%).

Data was collected at the end of the 4 months of treatment and results were collected and analyzed.

Improvement from vertigo symptom in this group was presented in 15 patients (60%), and 10 patients (40%) were not improved. As shown from (table 1) there is a significant correlation between the use of

Epley's maneuver in relieving of vertigo in comparison with Betahistine dihydrochloride ( $p$ -value=0.025) (table 1).

Type of treatment	Vertigo		Total
	Improved	Not improved	
Epley's maneuver	22 88%	3 12%	25 100%
Betahistine dihydrochloride	15 60%	10 40%	25 100%
Total	37 74%	13 26%	50 100%

( $P$ -value=0.025)

As seen from (table 2), the nausea and vomiting symptom was improved in group B significantly, from 19 patients suffered from these symptoms in this group, 16 patients (84.2%) were improved and 3 patients (15.8%) were not improved while in group A, 5 patients (38.5%) were improved and 8 patients (61.5%) were not improved and there was significant difference when comparing between the two group of patients and the ( $p$ -value =0.011), (table 2).

Type of treatment	Nausea after treatment		Total
	Improved	Not improved	
Epley's maneuver	5 38.5%	8 61.5%	13 100%
Betahistine dihydrochloride	16 84.2%	3 15.8%	19 100%
Total	21 65.6%	11 34.4%	32 100%

( $P$ -value =0.011)

Also there were 19 patients (38%), that were had attacks of headache symptom with vertigo episodes before treatment 7 patients in group A and 12 patients in group B. After treatment 1 patients (14.3) in group A improved from headache and 9 patients (75%) in group B improved from headache, while 6 patients (85.7) in group A and 3 patients (25%) in group B were still had headache.

There was significant difference between two groups in regarding improvement from headache between the two groups ( $p$ -value = 0.017) (table 3).

Type of treatment	Headache after treatment		Total
	Improved	Not improved	
Epley's maneuver	1 14.3%	6 85.7%	7 100%
Betahistine dihydrochloride	9 75.0%	3 25.0%	12 100%
Total	10 52.6%	9 47.4%	19 100%

(P-value = 0.017)

## Discussion

Resent modalities of treatment for BPPV include various vestibular rehabilitation exercises, use of drugs and surgery in resistant cases. Betahistine dihydrochloride drug is a histamine analogue used in the treatment of various vestibular disorders of peripheral and central origin, vertigo and motion sickness [5].

Our study was performed on 2 groups of patients group A and group B. The effectiveness and response to treatment of the two groups was evaluated and compared based on the symptomatic improvement and negative Dix-Hallpike test. According to Katherine et al. long presence of otoconias in the cupula or the lumen of the semicircular canal for long duration could damage the normal vestibular motion function of inner ear and hairs cells .This study was suggested that the treatment by Betahistine dihydrochloride drug after Epley's maneuver was effective and postural stability was normalized for patients .This study concluded that the use of Betahistine dihydrochloride drug accelerates the recovery of vestibular system and improved its functions by improving the inner ear blood flow and restore its normal vestibular and motion function [6].

Also according to a study that was done by Katerina Stambolieva et al., treatment with Betahistine dihydrochloride drug can lead to restore the postural stability in patients who were treated with Betahistine dihydrochloride drug and canal repositioning manoeuvres.It was noted that after treatment with Betahistine dihydrochloride for 10 days the sway velocity was stable and normalized and did not differ from that in normal subject [6].

Our study showed significant improvement from vertigo symptom in patients group A in comparison with patients in group B, in group A ,22 patients which represented (88%) were improved, and in group B,15 patients that represented (60%) were improved and the (p-value = 0.025). Our study was similar to a study that was done by Epley in 1992, he studied 30 patients with BPPV. All his patients were tested by Dix-Hallpike test and they were positive. All his patients were treated by Epley's maneuver and follow them after 1 week. The cure rate was 90% after Epley's maneuver [7].

Also our study was similar to study done by Parnes and Price in 1993 and Hardman et al. whom done a study on patients with BPPV. They treated their patients by Epley's maneuver and follow up those patients for 3-4 weeks and found their treatment were significant [8, 9].

There was good improvement from nausea and vomiting symptoms in group B ,16 patients that represent (84.2%) of patients were improved and 3 patients were not improved, while in group A, 5 patients that represented (33.3%) were improved while 8 patients were not improved and the p-value was significantly different when comparing the two groups (p-value=0.011) ,which is similar to the study done by RA Bradoo who found significant difference in patients who treated by Betahistine dihydrochloride drug in response to improvement from symptoms of nausea and vomiting [10].

T. J. Wilmot and G. N. Menin found a significant difference in the response of patients treated by Betahistine dihydrochloride drug over placebo in relieving patients from symptoms of vertigo, tinnitus and fullness of ear [11].

As Betahistine dihydrochloride acts on lessening the associated symptoms with vertigo like nausea and vomiting so this may lead to improve the general condition and psychological upset which may decrease the stress on patients, and this lead to decrease headache symptom in those patients so there were significant differences in improvement of patients from headache symptom, 9 patients which represented (75%) improved from headache in group B and 3 patients were not improved, while in group A ,1 patients which represented (14.3%) was improved from headache and 6 patients were still having headache after treatment sessions ,and the p-value was significantly difference (p-value=0.017) which is also similar to a study done by RA Bradoo who found significant difference in patients who treated by Betahistine dihydrochloride in improvement from headache symptom that associated with vertigo [10].

The recurrence of symptom of vertigo in patients treated by Epley's maneuvers were in 11 patients (50%), and this can be explained by the nature of their work (hard work associated with physical stress like construction workers) and this agreed with the results that obtained by Pier Giorgio who found recurrence of BPPV symptoms after successful Epley's repositioning procedure in patients that had physical exercise in their lifestyle [11, 12].

## Conclusions and Recommendations

We concluded the followings:

1. Treatment by Epley's maneuver was faster, not expensive, more effective and give good results but need to be repeated in failure of maneuver.
2. Betahistine dihydrochloride drug is not recommended as routine use for a treatment of vertigo in BPPV and need to be taken for a long period of time but could be used for associated symptoms that accompany BPPV.
3. Our recommendation is to use both of the lines of treatments due to that Epley's maneuver is faster in relieving the vertigo and Betahistine dihydrochloride drug is useful to alleviate the associated symptoms like nausea, vomiting and headache.

## Conflict of Interest

The authors declare that there is no conflict of interest.

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