

# Benign Paroxysmal Positional Vertigo; a Comparison between Particle Reposition Maneuver (Modified Epley's Maneuver) and Medical Therapy

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## Abstract

**Background and objectives:** paroxysmal positional vertigo is the most common disorder causing dizziness. Most of the studies confirm the effectiveness of particle reposition maneuver in the management of benign paroxysmal positional vertigo but still many otologists recommending medical therapy for this disorder; therefore this study has been conducted to evaluate the effect of particle reposition maneuver versus medical therapy by Betahistine-HCl for treatment of benign paroxysmal positional vertigo. **Methods:** This prospective comparative study was conducted in Otolaryngology department at Rizgary hospital from January 2014 till December 2015. One hundred & fifty patients were selected randomly for either PRM or treatment by Betahistine-HCl as modalities for treatment of posterior canal benign paroxysmal positional vertigo. **Results:** The mean age of the patients was (54.56 ±11.160) years. The male to female ratio was 1:2. 60% of patients presented with previous history of vertigo, 30.5% of patients had an associated age related hearing loss. The number of patients, who responded to particle reposition maneuver, was 60 patients out of 72 patients with success rate of 83.3%. While the number of patients who responded to treatment by Betahistine-HCl and had negative Dix-Hallpike maneuver were 27 patients out of 70 patients with a success rate of 38.3%. **Conclusions:** The study confirms effectiveness of the particle reposition maneuver in the management of benign paroxysmal positional vertigo, compared to medical therapy by Betahistine, which has inferior outcome in the treatment of BPPV. Betahistine-HCl may have a role when particle reposition maneuver fails or contraindicated.

**Keywords:** Benign paroxysmal positional vertigo; Dix-Hallpike maneuver; Betahistine-HCl; Particle Reposition Maneuver.

## Introduction

Vertigo or dizziness is an illusion of rotational motion<sup>1</sup>. One of the most common causes of vertigo or imbalance is benign paroxysmal positional vertigo (BPPV), which is a disorder of the inner ear characterized by episodes of vertigo which is triggered by changes in the head position<sup>2-3</sup>. It accounts for 17-30 % of all cases of vertigo presenting to vestibular clinics<sup>4-6</sup>. Several studies have concluded a higher incidence in women<sup>7-8</sup>. The age of onset is most commonly between the 5th and 7th decades of life<sup>8-11</sup>. By the age of 65 one third of the population has suffered symptoms of imbalance. Thus conditions affecting the vestibular system are important both numerically and also in terms of social and economic morbidity<sup>12</sup>. The pathophysiology of BPPV can be due to either canalithiasis (describes free-floating particles within a semicircular canal (SCC)), or cupulolithiasis; describes particles adherent

to the cupula of a SCC. Theoretically these pathological changes can affect each of the 3 SCCs, with posterior canal involvement being the commonest type and superior canal involvement is exceedingly rare<sup>13</sup>. The gold standards for diagnosing BPPV are the history, positive nystagmus and vertigo during positional testing (Dix Hallpike maneuver). Additional testing isn't normally necessary<sup>14</sup>. Even if BPPV diagnosed properly, this condition is rarely treated adequately (e.g. by various forms of physical therapy developed during last decades). Instead, physicians often routinely choose pharmacotherapeutical options<sup>15</sup>. Treatment options include watchful waiting, vestibulosuppressant medications, vestibular rehabilitation, canalith repositioning and surgery. The aim of PRM is to move the displaced otoliths from the semicircular canal back to the utricle where they belong<sup>16</sup>. To date, the treatment of vestibular disorders remains mostly empirical, owing

to the paucity of high-quality clinical drug trials, thus an evidence-based approach is not always possible<sup>17</sup>. Treatment with PRM is simple & effective. The procedure takes less than 5 minutes to be completed for most patients with BPPV. With a successful maneuver, there should be no nystagmus or vertigo when the patient returns to the sitting position<sup>18</sup>. Clinicians may prescribe medications to either reduce the spinning sensations of vertigo or to reduce the accompanying motion sickness symptoms<sup>19</sup>. Therapy with Betahistine hydrochloride has been widely prescribed in patients with vestibular disorders for symptomatic treatment of vertigo as in Meniere's disease patients<sup>20</sup>. Betahistine hydrochloride (histamine analogue with weak action of both H1 and H2 and moderate antagonistic action of H3) has a mechanism of action based on interactions with H1 and H2 receptors. This molecule acts through inhibition of activation in vestibular nuclei, diminishing the resting flow of ampullary hair cells in the labyrinth and increasing cochlear blood flow<sup>21</sup>. Most of the studies confirm the effectiveness of the PRM in the management of BPPV, but still many otologists prescribing the medicines for the treatment of BPPV<sup>6</sup>. Therefore this study has been conducted to evaluate the effect of PRM (a modified Epley's maneuver) versus medical therapy by Betahistine HCL (Betaserc) for treatment of BPPV.

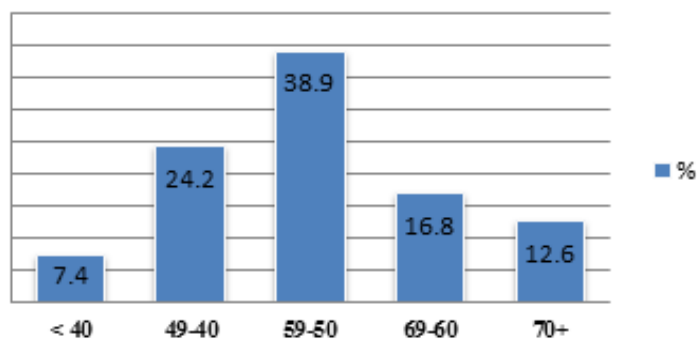
### Patients and methods

This prospective comparative study was performed on 150 patients. They were selected for either PRM (particle reposition maneuver) or medication by Betahistine HCl as modalities for treatment of posterior canal PC-BPPV. (We randomly selected patients for PRM or medical treatment by Betahistine HCl). Each group is composed of 75 patients. The study period was 23 months from January 2014 till December 2015 and conducted in Otolaryngology department in Rizgary teaching hospital – Erbil city/Iraq. Patients diagnosed as BPPV by positive Dix Hallpike maneuver (DHM) were included in the study, while the following conditions were excluded from this study; patients with bilateral positive DHM, atypical cases complaining of positional vertigo with no visible nystagmus (subjective BPPV),

pregnancy or breast feeding (Betaserc is type C category), contraindications to Betahistine administration, previous or current diagnoses of labyrinthine diseases such as Meniere's disease, labyrinthitis or vestibular neuronitis, recent history of hearing loss, tinnitus or upper respiratory tract infection, neurological diseases which may change the diagnosis or interfere with the management, any patient with contraindications to DHM, patients taking neuroleptics medications, patients with discharging ear or with previous otological surgery & those whom lost from follow up. All the patients were seen in the outpatient clinic. Full history was taken from all of them concentrating on the details of vertigo regarding the type (spontaneous or evoked), duration, associated tinnitus, aural fullness, hearing loss, nausea and vomiting and any associated headache or neurological symptoms to rule out cases other than BPPV. Examination was followed including otological and DHM. Investigations were requested accordingly including, hemoglobin percent if there was possibility of anemia and pure tone audiogram (PTA) if there was history of hearing loss. Informed consent was taken from every patient in the beginning of the study with explanation of the aim of the study before baseline study assessment. The patients were divided into 2 groups; group A (75 patients) treated by PRM; while group B (75 patients) treated with Betahistine Hydrochloride (Betaserc) 16mg TDS for one week. Follow-up visits: 1 week after the initial treatment for both groups DHM was repeated. During the study 3 cases from group A and 5 cases from group B were lost from follow up & re-evaluation. Therefore the final number of examinees was 142 (72 patients in Group A and 70 of them in Group B). Data were analyzed using the Statistical Package for Social Sciences (SPSS, version 19). Student's t test was used to compare means of two groups. Chi square test of association was used to compare between proportions. When the expected count of more than 20% of the cells of the table was less than 5, Fisher's exact test was used. A p value of 0.05 was considered as statistically significant.

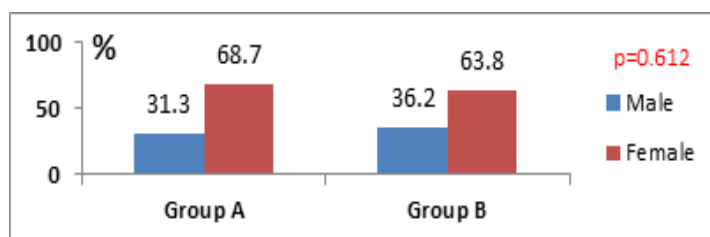
**Results**

The mean age  $\pm$  SD of the patients was (54.56  $\pm$  11.160) years with a range between 25 years and 85 years, Figure 1.



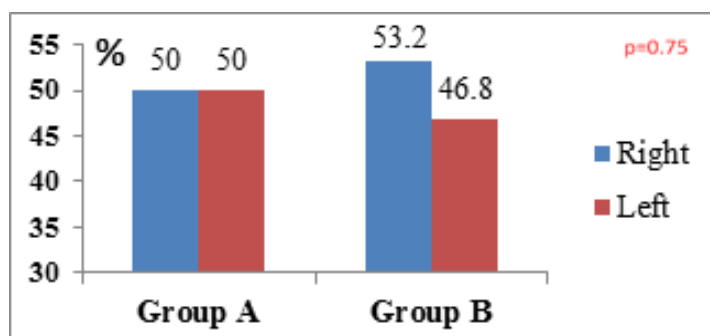
**Figure (1):** Age distribution.

Forty eight patients were males (33.7%) while 94 patients were females (66.3%), with a female: male ratio of 2:1. There was no significant difference in gender between both groups (P value = 0.612), Figure 2.



**Figure (2):** Sex distribution

The right ear affected in 73 patients (51.6%) and the left ear in 69 patients (48.4%). There was no significant difference in the side of vertigo between both groups (p value = 0.756), Figure 3.



**Figure (3):** Side of the vertigo

The number of patients who presented with previous history of vertigo was 85 (60.0%) and the number of patients who had no previous history of vertigo was 57 (40.0%). There was no significant difference in the previous history of vertigo between the two groups (p value = 0.933), Figure 4.

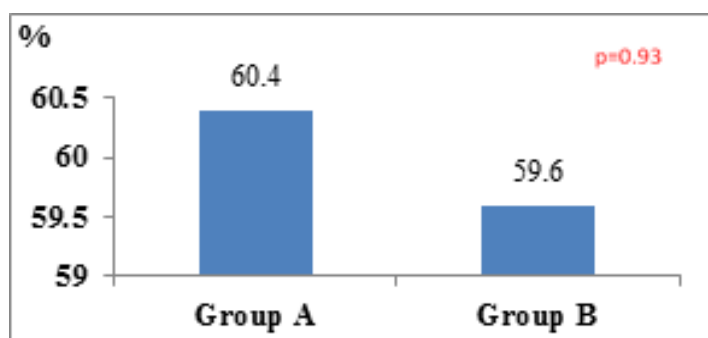


Figure (4): Previous history of vertigo

The number of patients who had an associated age related hearing loss was 43(30.5%) while the number of patients who do not have an associated age related hearing loss was 99 (69.5%). There was no significant difference in the associated hearing loss between the two groups (p value = 0.771), Figure 5.

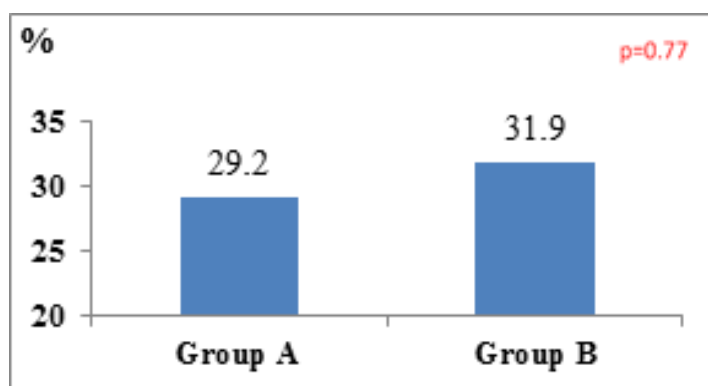


Figure (5): Age associated hearing loss

The direction of nystagmus was vertical torsional- upbeating (Geotropic) in 118 patient (83.2%) and it was vertical torsional- downbeating (Ageotropic) in 24 patient (16.8%). There was no significant difference in the nystagmus direction between the two groups (p value = 0.963), Figure 6.

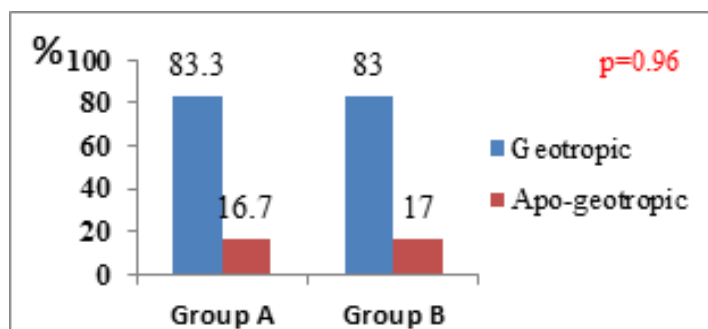


Figure (6): Nystagmus direction

**Treatment modality group:**

After one week all patients of both groups were seen and re-evaluation by history and DHM and the results was as followings:

- In group A the number of patients who responded to PRM was 60 patients out of 72 patients with a success rate of 83.3%. While number of patients who failed to respond to PRM were 12 patients out of 72 patients with a failure rate of 16.7%.
- In group B the numbers of patients who responded to treatment by Betahistine hydrochloride was 27 patients out of 70 patients with a success rate of 38.3%, while those who failed to respond to medical treatment were 43 patients out of 70 patients with a failure rate of 61.7%. There was a significant difference between the two groups in response to treatment modality (p value is < 0.001), Table 1.

**Table (1):** Modality of treatment which shows significant difference between the two groups.

		Group		Total	P value
		Group A	Group B		
DHM after 1wk	Negative	60	27	87	< 0.001
		83.3%	38.3%	61.1%	
	Positive	12	43	55	
		16.7%	61.7%	38.9%	
<b>Total</b>		<b>72</b>	<b>70</b>	<b>142</b>	
		<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	

**Discussion**

The age of patients with BPPV in our study varied between 25 to 85 years, a variation similar to the study by Macias et al<sup>22</sup>. In which age varied between 20 and 93 years. In our study the right side affection was (51.6%) and it was slightly higher than the left (48.4%). which is similar to study performed by Lopez-Escmes et al<sup>23</sup> has shown that the sidewhich affected by BPPV correlates with the preferred sleep position in bed. About 60% (85) of our patients gave a positive history of vertigo in the past in comparison to 40% who had the vertigo for the first time. Our results are similar to study performed by Baloh et al<sup>24</sup>. And by Zucca et al<sup>25</sup>. Most of our patients are in their late middle age and older, nearly 1/3 of our patients in this study had an associated sensory-neural age related hearing loss (30.5%). This is an associated co-morbidity. The direction of nystagmus was vertical torsional-upbeating (toward the affected ear) i.e. Geotropic in more than 2/3 of our patients (83.2%). It was Ageotropic i.e. vertical torsional-downbeating (away from the affected ear) in less than 1/3 of

patients (16.8%). Our results are similar to study performed by Bourgeois et al<sup>7</sup> in which concerning the nystagmus direction, it was mostly Geotropic (87.91%), which matches the posterior semicircular canalolithiasis. Whereas only a minority of examinees showing the opposite, Ageotropic nystagmus direction (12.09%) can be considered as those suffering from cupulolithiasis<sup>7</sup>. All patients in group A (72 patients) were treated by PRM, and the result was tested one week later by DHM. The success rate was 83.3% (60 patients), our results are similar to study performed by Lynn et al. that compared Epley maneuver (n=18) with placebo (n=15) without previous medication. The patients were reassessed one month after the procedure. The success rate was 88.9% in the procedure group, and in 26% in the placebo group<sup>26</sup>. Another study performed by Froehling et al. Epley maneuver was performed on 24 patients, and this was compared to a placebo group (n=26), re-assessment one week later showed significant difference favoring the treated group (67% vs. 38%)<sup>27</sup>. Another study by Angeli et al., Epley was adopted in 28 patients, and 19

patients were a control group. Reassessment one month later showed significant difference favoring the treated group (64% vs. 5.26%)<sup>28</sup>. Furthermore, in a recent double-blind randomized controlled trial, symptoms and signs of BPPV were absent in 80% of patients treated with the Epley maneuver 24 hours after a single treatment, indicating that the maneuver induces remission both effectively and rapidly<sup>29</sup>. Repeated treatments may improve the remission rate<sup>30</sup>. Betahistine was given for 1 week to all patients in group B in a dose of 16mg TDS; the number of patients that showed clear improvements after 1 week was 18 patients (38.3%). Our results are similar to study performed by Bhattacharyya et al. they found that the success rate with the use of medication alone was (30.8%), after two weeks of follow up<sup>31</sup>. Fife et al. concluded that no evidence was found to support the recommendation of any medication in the routine treatment of BPPV<sup>32</sup>. In this study the number of patients who responded to PRM after one week was 60 (out of 72) patients with an 83.3% success rate. While the number of patients who respond to medical treatment by Betahistine for one week duration was 27 patients (out of 70) and the success rate was 38.3%. There is a significant difference between the two modalities of treatment (p. value <0.001). A study performed by Parnes and Price-Jones in which treatment with PRM was compared with treatment by medication alone. (93.3%) versus (30.8%) showed improvement after 2 weeks<sup>33</sup>.

## Conclusions

Our study confirms the effectiveness of the PRM in the management of BPPV, compared to medical therapy by Betahistine. Medications (Betahistine) were found to have no significant outcome in the treatment of BPPV and are better to be avoided. Betahistine may have a role when PRM failed or is contraindicated. It is considered a secondary option in the management of BPPV.

## Conclusions

Our study confirms the effectiveness of the PRM in the management of BPPV, compared to medical therapy by Betahistine. Medications (Betahistine) were found to have no significant outcome in the treatment of BPPV and are better to be avoided. Betahistine may have a role when PRM failed or is contraindicated. It is considered a secondary option in the management of BPPV.

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