

Original Research Article

Compare the effectiveness of Epley's Manoeuvre and Brandt Daroff's exercise in relieving vertigo in patients with BPPV

Nirmala Maruthi^{1,*} and Jagannatha Bisanna¹

¹ Department of ENT, Kempegowda Institute of Medical Sciences, Bangalore, India.

* Correspondence: nimmi.santy@gmail.com

Received: 18 March 2023; Accepted: 20 May 2023; Published: 28 May 2023.

Abstract: Background: Benign Paroxysmal Positional Vertigo is the most frequent vestibular disorder characterized by brief episodes of vertigo caused by changes in the position of a person's head. It significantly affects the quality of life of elderly patients by interrupting their daily activities.

Methodology: The study was conducted at the Department of E.N.T, Kempegowda Institute of Medical Sciences. Sixty patients who fulfilled the inclusion criteria were included in the study. Patients were evaluated through proper history taking using a proforma and clinical examination. The Dizziness Handicap Inventory scoring system was used, and baseline (pre-treatment) scores were recorded. Patients were asked to come back after 3 weeks for follow-up (post-treatment) and then after 3 months for further follow-up.

Results: The mean age of subjects in the Epley's manoeuvre group was 43.60 years, while it was 40.97 years in the Brandt Daroff's exercise group. Among skilled workers in this study, tailors were most often affected, and the vibration associated with their work may be considered as one of the etiologies. The mean total symptom scores decreased in both treatment groups after the study period. There was a considerable reduction in the scores of physical, emotional, and functional symptoms in both groups. A marked reduction in emotional scores was observed in group I compared to group II in the post-treatment and follow-up assessments.

Conclusion: Epley's manoeuvre is superior in relieving vertigo in patients with BPPV compared to Brandt Daroff's exercise.

Keywords: Epley's; Brandt Daroff's; Vertigo; BPPV.

1. Introduction

Benign Paroxysmal Positional Vertigo is the most frequent vestibular disorder. It is an inner ear disorder often debilitating disease, characterised by brief periods of vertigo triggered by change in position of a person's head relative to gravity. It has a major effect on health quality of life of elderly patients and is associated with reduced activities of daily living falls and depression [1]. Otoconia are the crystals of calcium carbonate which are normal presents in otolithic membrane in utricle and saccule. Displacement of these otoconia into duct or cupula of semicircular canals due to changes in head position causes continuing movement of endolymph even after head movement has ceased. This causes movement of cupula bending of hair cells and provokes vertigo [2].

There are 2 primary theories for the mechanism of BPPV. The first is cupulolithiasis [2] in which the dislodged otoconia directly attach to the cupula, weighting this membrane. Reorientation of the canal relative to gravity deflects the cupula, exciting or inhibiting the ampullary organ. The second is canalithiasis, [3] in which the otoconia freely sediment in the canals. Reorientation of the canals causes the otoconia to move to the lowest part of the canals, creating a drag on the endolymph, resulting in fluid pressure on the cupula, and activating the ampullary organ. Posterior semicircular canal (93%) is most commonly affected this is diagnosed by Dix Hallpike manoeuvre [4].

A variety of management approaches to BPPV have been described such as Medical therapy with vestibular suppressants for partial relief of symptoms, it is generally ineffective [5]. Surgical procedures - highly effective for patients with frequent episodes of intractable vertigo showing no signs of spontaneous

Table 1. Distribution of patients according to age

Age in years	Group I		Group II	
	No	%	No	%
<=30	5	16.7	9	30.0
31-40	10	33.3	9	30.0
41-50	5	16.7	2	6.7
51-60	9	30.0	7	23.3
61 & above	1	3.3	3	10.0
Total	30	100.0	30	100.0
Mean \pm SD	43.60 \pm 13.58		40.97 \pm 12.50	

remissions. Several physical manoeuvre have been described. Brandt Daroff's exercises (Brandt 1980) [6] and Canalith reposition manoeuvre Epley's [7] (1992) Semont (1988) [8] are the main therapy for active treatment. They are proposed to act by dispersion of canal debris from posterior semicircular canal into utricle. These modalities of treatment all have a sequences of head and trunk positioning manoeuvre as a common factor. In recent years Epley's manoeuvre has become particularly popular. It involves a series of four movements of head and body from sitting to lying rolling over and back to sitting. The technique may be modified by addition of head band with vibrated to encourage the movement of particle through the semicircular canal [9].

Hence, the study was taken to evaluate efficacy of Epley's manoeuvre and Brandt Daroff's exercise in relieving vertigo in patients with BPPV.

2. Materials and methods

The study was conducted at Department of E.N.T, Kempegowda Institute of Medical Sciences, Bangalore, after getting approval by ethical committee. 60 patients who were aged between 17-70yrs with positive Dix Hallpike manoeuvre, with symptoms of bouts of vertigo lasting for upto 1min, having functional to normal range of motion of neck and back were included in the study. Patients with Negative Dix Hallpike manoeuvre, Positive Dix Hallpike for both sides, Prior history of ear surgery/ medications for BPPV with in last 3 weeks, orthopaedic / connective tissue disorders that impairs functional neck or trunk range of motion, severe neurological disorder / spinal cord damage /Vertebro basilar artery insufficiency meniere's disease/ acoustic neuroma/ central causes for BPPV were excluded from the study. Patients who were willing to participate in the study were evaluated means of proper history taking with help of a proforma, clinical examination.

Patients were sequentially randomized in to 2 groups, Group I underwent Epley's manoeuvre, and Group II underwent Brandt Daroff's exercise. Dizziness Handicap Inventory scoring system was used and baseline (pre-treatment) score recorded patients were asked to come back after 3 weeks for follow up (post treatment) and then after 3 months for follow up.

3. Results

The distribution of patients according to age is summarized in Table 1. The statistical analysis indicated that the samples were age-matched, with a p-value of 0.273.

The mean age of patients in Group I was 43.60, while in Group II it was 40.97. The samples were age-matched, and the p-value was 0.273.

The distribution of patients according to gender is presented in Table 2. The statistical analysis showed that the samples were gender-matched, with a p-value of 0.787.

There were a total of 21 males and 39 females in the study. The number of females was higher than males in both groups, with an approximate ratio of 2:1.

The occupation distribution of the studied patients is shown in Figure 1.

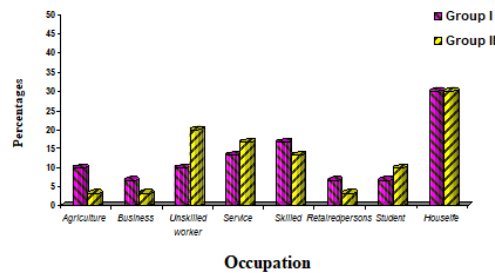
The duration of illness is provided in Table 3.

The distribution of the affected side is presented in Table 4. The statistical analysis revealed that the distribution of the affected side was similar in both groups, with a p-value of 0.196.

The effectiveness of the intervention on physical, emotional, and functional scores is presented in Table 5. The results are reported as mean \pm standard deviation (SD).

Table 2. Distribution of patients according to gender

Gender	Group I		Group II	
	No	%	No	%
Male	11	36.7	10	33.3
Female	19	63.3	20	66.7
Total	30	100.0	30	100.0

**Figure 1.** Occupation distribution of patients studied**Table 3.** Duration of illness

Duration (months)	Group I		Group II	
	No	%	No	%
<2.0 months	13	43.3	18	60.0
2.1-5.0 months	7	23.3	5	16.7
>5.0 months	10	33.3	7	23.3
Total	30	100.0	30	100.0
Mean \pm SD	3.85 \pm 3.29		3.41 \pm 3.84	

Table 4. Side involved

Side involved	Group I		Group II	
	No	%	No	%
Left	12	40.0	17	56.7
Right	18	60.0	13	43.3
Total	30	100.0	30	100.0

Table 5. Effectiveness on Intervention on Physical, Emotional and Functional scores

	Pre	Post	Follow up	Pre-Post	Pre-Follow up	Post-Follow up
Physical						
Group I	12.13 \pm 1.28	2.63 \pm 3.74	2.20 \pm 3.29	<0.001**	<0.001**	0.317
Group II	12.30 \pm 1.15	5.07 \pm 5.33	3.30 \pm 3.47	<0.001**	<0.001**	0.035*
P value	0.598	0.045*	0.213	-	-	-
Emotional						
Group I	10.70 \pm 2.41	2.40 \pm 3.96	1.97 \pm 2.37	<0.001**	<0.001**	0.373
Group II	10.33 \pm 1.99	6.10 \pm 6.59	3.23 \pm 3.73	0.002**	<0.001**	0.005**
P value	0.523	0.011**	0.122	-	-	-
Functional						
Group I	14.37 \pm 1.67	3.70 \pm 4.49	2.90 \pm 4.05	<0.001**	<0.001**	0.181
Group II	14.70 \pm 1.51	6.40 \pm 5.77	3.87 \pm 4.46	<0.001**	<0.001**	0.012*
P value	0.421	0.049	0.383	-	-	-
Total						
Group I	37.20 \pm 3.44	8.73 \pm 11.79	7.07 \pm 9.31	<0.001**	<0.001**	0.194
Group II	37.33 \pm 2.98	17.57 \pm 17.42	10.40 \pm 11.37	<0.001**	<0.001**	0.009**
P value	0.873	0.026*	0.219	-	-	-

4. Discussion

For many years there has been discussion about treatment of BPPV whether it is vestibular suppressants, particle repositioning manoeuvre, vestibular rehabilitation exercise or it is surgical management. Epley's manoeuvre and Brandt Daroff's exercise have been demonstrated to be effective in treating BPPV in studies, conducted by Epley JM *et al.*, [10] and Brandt T, Daroff RB [11], respectively.

In this study, 60 patients with BPPV were treated with either Epley's manoeuvre once on symptomatic side or Brandt daroff's exercise twice a day on alternate days, 3 days a week for 3 weeks, after randomisation.

The mean age of patients undergoing Epley's manoeuvre was 43.60 years and those undergoing Brandt daroff's exercise was 40.97 years. Both the groups has statistically same mean age group with $p=0.273$. The incidence of idiopathic bppv ranges from 11to 64 per 100,000 per year, increases by approximately 38% per decade of life as per studies of Froehling *et al.*, [12] and Mizukoshi *et al.*, [13].

There were more number of females compared to males in both the groups, Group I F-19, M-11, Group II F-20, M -10. Sex distribution is twice as common in females as in males [12,13]. It is proved in this study.

Both the groups were statistically similar in duration of illness.

Group I patients showed more of right side (18) involvement and Group II showed more of left side involvement (17). However, BPPV per se does not differ in its presentation and clinical course between sides. Hence, this difference in side does not affect the comparison of two groups, who were selected after randomisation.

Both treatment groups had comparable mean total symptom score at baseline indicating similar severity of symptoms among all patients at start of study. Before treatment physical emotional and functional scoring done and recorded in all patients

Epley's manoeuvre was effective in relieving physical, emotional and functional score in patients compared to Brandt Daroff's exercise.

Mean symptoms score decreased in both treatment group after 3 weeks study period with 78 % improvement in physical score 79% improvement in emotional score and 75% improvement in functional score as compared to 59% in physical ,53% in emotional , 57% in functional scores, of Brandt daroff's exercise.

Though considerable reduction in severity of symptoms in patients in both treatment groups, the Epley's manoeuvre had higher degree of reduction. This goes in favour of study conducted by Helminski JO *et al.*, [1].

Mean total symptoms score decreased in both treatment group after 3 weeks study period with 77% improvement in Epley's manoeuvre as compared to 54% improvement in Brand Daroff's exercise

Epley's manoeuvre was done once and immediate relief of symptoms seen, Brandt

Daroff's exercise was done for 3 weeks and then response noted.

In this study there was statistically significant improvement of symptoms in patients with Epley's manoeuvre compared to Brand Daroff's exercise.

This study compares favourably with meta-analysis of randomised control trials conducted in worldwide and published in from 1995-2010 , which was done by Helminski *et al.*, [1]. Sridhar *et al.*, [14], Lynn *et al.*, [15]. Froehling *et al.*, [16] which showed Epley's manoeuvre is produces significant relief in symptoms with BPPV. Brandt daroff's exercise should be considered as a second line of treatment if the PRM fail or recurrence is seen [1]

5. Conclusion

Epley's manoeuvre is superior in relieving vertigo in patients with BPPV compared to Brandt Daroff's exercise.

Author Contributions: All authors contributed equally to the writing of this paper. All authors read and approved the final manuscript.

Conflicts of Interest: "The authors declare no conflict of interests."

References

- [1] Helminski, J. O., Zee, D. S., Janssen, I., & Hain, T. C. (2010). Effectiveness of particle repositioning maneuvers in the treatment of benign paroxysmal positional vertigo: a systematic review. *Physical therapy*, 90(5), 663-678.
- [2] Schuknecht, H. F. (1969). Cupulolithiasis. *Archives of Otolaryngology*, 90(6), 765-778.

- [3] Hall, S. F., Ruby, R. R., & McClure, J. A. (1979). The mechanics of benign paroxysmal vertigo. *The Journal of otolaryngology*, 8(2), 151-158.
- [4] McClure, J. A., & Willett, J. M. (1980). Lorazepam and diazepam in the treatment of benign paroxysmal vertigo. *The Journal of otolaryngology*, 9(6), 472-477.
- [5] Brandt, T., & Daroff, R. B. (1980). Physical therapy for benign paroxysmal positional vertigo. *Archives of Otolaryngology*, 106(8), 484-485.
- [6] Furman, J. M., & Cass, S. P. (1999). Benign paroxysmal positional vertigo. *New England Journal of Medicine*, 341(21), 1590-1596.
- [7] Honrubia, V., Baloh, R. W., Harris, M. R., & Jacobson, K. M. (1999). Paroxysmal positional vertigo syndrome. *Otology & Neurotology*, 20(4), 465-470.
- [8] Semont, A., Freyss, G., & Vitte, E. (1988). Curing the BPPV with a liberatory maneuver. In *Clinical testing of the vestibular system* (Vol. 42, pp. 290-293). Karger Publishers.
- [9] Epley, J. M. (2001). Human experience with canalith repositioning maneuvers. *Annals of the New York Academy of Sciences*, 942(1), 179-191.
- [10] Epley, J. M. (1992). The canalith repositioning procedure: for treatment of benign paroxysmal positional vertigo. *Otolaryngology–Head and Neck Surgery*, 107(3), 399-404.
- [11] Brandt, T., & Daroff, R. B. (1980). Physical therapy for benign paroxysmal positional vertigo. *Archives of Otolaryngology*, 106(8), 484-485.
- [12] Froehling, D. A., Silverstein, M. D., Mohr, D. N., Beatty, C. W., Offord, K. P., & Ballard, D. J. (1991, June). Benign positional vertigo: incidence and prognosis in a population-based study in Olmsted County, Minnesota. In *Mayo Clinic Proceedings* (Vol. 66, No. 6, pp. 596-601). Elsevier.
- [13] Mizukoshi, K., Watanabe, Y., Shojaku, H., Okubo, J., & Watanabe, I. (1988). Epidemiological studies on benign paroxysmal positional vertigo in Japan. *Acta Oto-Laryngologica*, 105(sup447), 67-72.
- [14] Simhadri, S., Panda, N., & Raghunathan, M. (2003). Efficacy of particle repositioning maneuver in BPPV: a prospective study. *American journal of otolaryngology*, 24(6), 355-360.
- [15] Lynn, S., Pool, A., Rose, D., Brey, R., & Suman, V. (1995). Randomized trial of the canalith repositioning procedure. *Otolaryngology–Head and Neck Surgery*, 113(6), 712-720.
- [16] Froehling, D. A., Bowen, J. M., Mohr, D. N., Brey, R. H., Beatty, C. W., Wollan, P. C., & Silverstein, M. D. (2000, July). The canalith repositioning procedure for the treatment of benign paroxysmal positional vertigo: a randomized controlled trial. In *Mayo Clinic Proceedings* (Vol. 75, No. 7, pp. 695-700). Elsevier.



© 2023 by the authors; licensee PSRP, Lahore, Pakistan. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (<http://creativecommons.org/licenses/by/4.0/>).