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AN EFFECTIVE AND COMBINED APPROACH FOR MANAGEMENT OF BENIGN PAROXYSMAL POSITIONAL VERTIGO(BPPV)

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ABSTRACT BPPV is the leading cause of peripheral vertigo in ENT setting and this vestibular disorder leads to significant morbidity, psychosocial impact, and medical costs. In all previous studies particle repositioning manoeuvre (Epley's manoeuvre) is either compared with medicines for BPPV or either conducted to prove the efficacy of this manoeuvre and has been found that Epley's manoeuvre was more effective than medicines alone,not only in treating the condition but also in preventing the recurrence. Here in this study we have kept Epley's manoeuvre common to all 4 study groups (who are positive on Dix Hallpike)and drawn comparison between patient treated with [A] Epley's manoeuvre alone [,B] Epley's manoeuvre with Betahistine(06 weeks) , [C] Epley's manoeuvre with Brandt Daroff exercises and [D] Epley's manoeuvre, Betahistine(06 weeks) and Brandt daroff exercises to frame most efficient treatment line for post BPPV in clinical settings.

KEYWORDS :

INTRODUCTION

BPPV was first described by Barany in 1921, and he attributed the disorder to otolith disease [1]. The clinical diagnosis of this disorder was not well defined until Dix and Hallpike described the classic positioning which causes a characteristic nystagmus [2]. Benign paroxysmal positioning vertigo is a disorder characterized by brief attacks of vertigo, with associated nystagmus, precipitated by certain changes in head position with respect to gravity [3]. BPPV is the most common cause of vertigo in patients seen by the otolaryngologist. The incidence is difficult to estimate because of the benign, typically self-limited course of the disease. It is thought to range from 10.7 per 100,000 to 17.3 per 100,000 populations in Japan [4] and has been reported as 64 per 100,000 in a population study from Minnesota [5]. The mean age at onset is in the fourth and fifth decades, but BPPV also may occur in childhood. Overall, the incidence increases with age. Symptoms usually occur suddenly and last for few seconds. The subjective impression of attack reported by the patient frequently is usually longer. In most cases of BPPV, no specific etiologic disorder can be identified. The most common known cause was closed head injury, followed by vestibular neuritis. BPPV will eventually develop in nearly 15% of patients suffering from vestibular neuritis. Other cited predisposing events include infections and certain surgical procedures, including stapedectomy and insertion of a cochlear implant [6]. Prolonged bed rest and Meniere's disease [7] also are predisposing factors. Schuknecht observed granular deposits on the cupula of the posterior semicircular canal in temporal bone specimens and proposed the "cupulolithiasis" theory to explain the pathophysiology. This theory provides a basis for understanding the disorder, although more recent work has shown that the disorder is more commonly due to free-floating particles in the semicircular canal ("canalolithiasis"), rather than cupulolithiasis. The suggestion that the mechanism of BPPV could result from deflection of the posterior canal cupula by the movement of debris in the posterior canal was revisited by Hall and colleagues [8]. The posterior semicircular canal was affected in the majority of cases of BPPV (93% of cases), with 85% being unilateral and 8% affecting the PSC on both sides. The horizontal semicircular canal was affected in 5% of cases. Involvement of anterior canal is rare. The positioning examination (Dix-Hallpike test) is important for identifying BPPV. A Dix-Hallpike manoeuvre produces transient vertigo and nystagmus and is diagnostic. The bedside Dix-Hallpike test combined with an appropriate history is key in making the diagnosis [2]. Standard electrooculography and the many videonystagmography devices do not record the torsional eye movements associated with BPPV. It was noted that the disease could be cured by a chemical labyrinthectomy and eighth nerve section. Gacek proposed transection of only the posterior ampullary nerve for relief of BPPV, confirming the posterior canal origin. In most patients, however, Epley's canalolith repositioning manoeuvre is adequate treatment [9], and no surgery is required. First-line therapy for BPPV is organized around repositioning manoeuvre. For posterior canal BPPV, the manoeuvre developed by Epley is particularly effective [10].

AIM AND OBJECTIVES

To compare effect on the symptomology as per vestibular questionnaire taken on 05 point Likert scale analysing relief in a patient of BPPV between all 04 groups treated differently as

[A] Epley's manoeuvre alone
[B] Epley's manoeuvre with betahistine (06 weeks)
[C] Epley's manoeuvre with Brandt Daroff exercises and
[D] Epley`s manoeuvre, betahistine and Brandt Daroff exercises.

MATERIAL AND METHODS

General settings: The study was done in Zonal Hospital, Jabalpur.
Study site: Dept of ENT Military Hospital, Jabalpur.
Study population: A prospective study will be carried out on the adult patients (>18 years) with Dix Hallpike positive.

Study design:

A consecutive series of 120 adult patients (age > 18 years) distributed equally in 4 groups (30 each) with Dix hallpike maneuver positive will each undergo [A] Epley's maneuver alone [,B] Epley's maneuver with betahistine(16mg TDS for 06weeks) , [C]Epley's maneuver with Brandt daroff exercises and [D] Epley's maneuver, betahistine(16 mg TDS for 06 weeks) and Brandt daroff exercises. Symptoms will be assessed prior to treatment and post treatment on follow up period at 02 weeks, 01 month, 03 months and 06 months. These symptoms are based on questionnaire and measured on 5 point likert scale.

Sample Size

Sample size was calculated keeping in view at the most 5%risk with minimum 80% power and 5% significance level (significant at 95% confidence level). However, considering the past data with idea of variation in the variables, which play important role in calculating the sample size, the sample size should be 25 in each group to be on the safer side for the normality of the data. Therefore, a sample size of 30 patients in each group was determined for comparative study.

Time Frame:

Preliminary action and data collection: June 2018 to Aug 2019
Analysis, follow up and write up: Sept19 to Nov2019

Inclusion criteria for selection of patients

Patients with vertigo in which central cause being ruled out by medical division and later diagnosed with post BPPV after Dix Hallpike being

positive based on clinical symptoms.

Exclusion criteria

Patients with

1) Hypertension
2) Postural hypotension
3) Poor glycemic control
4) Pheochromocytoma
5) Pt with deranged LFT/RFT

METHODOLOGY:-

A consecutive series of 30 adult patients(age≥ 18 years) with posterior canal BPPV will each undergo [A]Epley's manoeuvre alone [,B] Epley's manoeuvre with betahistine , [C]Epley's manoeuvre with Brandt daroff exercises and [D] Epley's manoeuvre, betahistine and Brandt daroff exercises. Subjective symptoms will be assessed prior to treatment and 15 days, 01 month, 3months and 6 months intervals after treatment with short vestibular symptom questionnaire measuring on a 5 point likert scale:

1) Intensity of vertigo
2) Frequency of vertigo
3) Associated symptom of nausea
4) Impact over quality of life
5) Overall symptoms

Likert scale

1.	Intensity	Severe	Moderate to severe	Moderate	Mild to moderate	mild
2.	Frequency	Several times a day	In every 1-2 days	In every 3-4 days	In every 5-7 days	Lesser than score 2
3.	Associated nausea	Severe	Moderate to severe	Moderate	Mild to moderate	Mild/none
4.	Impact over quality of life	Confined to bed	Managing daily body routine	Managing household activity	Can perform walking outdoor with Avoidance of travelling/ social gathering	Less than score 2
5.	Overall symptoms	Severe	Moderate to severe	Moderate	Mild to moderate	Mild
6.	Score	05	04	03	02	01

So out of maximum score of 25 and minimum score of 5, each patient was allotted a symptomology score initially as pretreatment score n thereafter on subsequent follow up periods as mentioned. Average score of each study group is taken into consideration for statistical analysis.

Allocation:-

RANDOMIZATION

Patients were randomised by picking up patients in OPD after Dix hallpike being positive and numbered as 1, 2, 3 with carry forward to next OPD. Pt with no 1 will go to treatment plan [A], 2 will go to plan [B] and so on.

OBSERVATIONS AND RESULTS

In our study all 4 groups are compared on pre-treatment score based on 5 point Likert scale which was found statistically insignificant thus comparable.

Pre-Treatment Score			
Group	**Pre-Treatment Score**	**P value**	**Result**
Group A	480	0.9	Insignificant
Group B	480		
Group C	477		
Group D	476		

At 15 days		
Group	**Pre Treatment Score**	**Score at 15 days Case#1**
Group A	480	248
Group B	480	176
Group C	477	221
Group D	476	172

At 15 days it has been observed that group A and group C are having scores insignificant statistically whereas when group B was compared, it has shown statistically significant improvement. When group D compared at the same stage it has shown more improvement on Likert scale which was statistically confirmed depending upon P value.

At 1 month		
Group	**Pre Treatment Score**	**Score at 1 month**
Group A	480	220
Group B	480	169
Group C	477	206
Group D	476	167

At 1 month group A and group C scores minor differences which are statistically insignificant. Group B and group D scores showing better improvement but when statistically compared, showed insignificance.

Score at 03 months		
Group	**Pre Treatment Score**	**Score at 03 months**
Group A	480	222
Group B	480	178
Group C	477	198
Group D	476	165

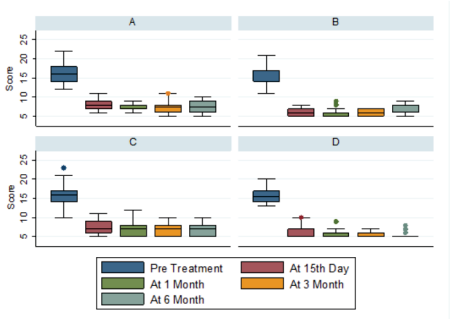
At 3 months group B (Epley's manoeuvre with betahistine) shows some deterioration in scores from previous score at 1 month.

Score at 06 months		
Group	Pre Treatment Score	Score at 06month
Group A	480	222
Group B	480	220
Group C	477	198
Group D	476	162

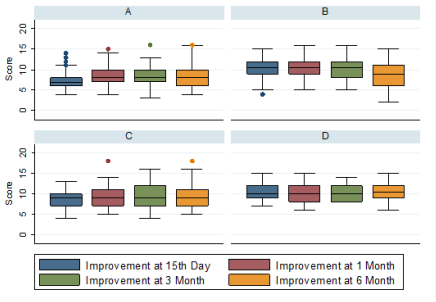
At 06 months group A and group C were having minor variation in scores. Group B shows further deterioration from 3 months scores whereas group D still shows comparatively better score which was found to be statistically significant .

Statistical analysis:

Normality of data checked before applied to any statistical test.



Whisker – Box plot showing distribution of score at pre and post treatment in different treatment groups



Whisker – Box plot showing improvement in score from pre to post treatment in different treatment groups

Mean score at pre and post treatment of different treatment groups

Point of Treatment	Treatment Group			
	A	**B**	**C**	**D**
	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Pre treatment	16.00±2.75	16.00±2.52	15.90±3.07	15.87±2.06***
At 15th Day	8.27±1.36***	5.87±0.94***	7.37±1.77***	5.73±1.23***

At 1 Month	7.33±0.92***	5.63±1.07***	6.87±1.89***	5.57±0.94***
At 3 Month	7.40±1.38***	5.93±0.87***	6.60±1.61***	5.50±0.82***
At 6 Month	7.40±1.40***	7.33±1.40***	6.60±1.40***	5.40±0.81***

*** P<0.0001 (Paired t test)

Mean Difference of score from pre treatment	Treatment Group				Test statistics					
	A	B	C	D	P value					
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	A vs B	A vs C	A vs D	B vs C	B vs D	C vs D
At 15th Day	7.73±2.46	10.13±2.76	8.53±2.45	10.13±1.85	0.001	1	0.001	0.067	1	0.067
At 1 Month	8.67±2.95	10.37±2.85	9.03±2.95	10.30±2.28	0.115	1	0.146	0.390	1	0.476
At 3 Month	8.60±3.06	10.07±2.95	9.30±3.45	10.37±2.01	0.322	1	0.123	1	1	0.953
At 6 Month	8.60±3.20	8.67±2.75	9.30±3.29	10.47±2.21	1	1	0.083	1	0.105	0.727

Analysis revealed that a significant changes in Likert scale score from pre-treatment and different intervals of follow up periods was observed in all treatment groups (P<0.0001). However, the improvement in mean score was significantly higher among patients enrolled in group D and group B as compared to group A (P=0.001) while it was not significant statistically when compared with group C (P>0.05) at 15th day of follow up. Although the higher improvement was also recorded in group D and B than group A during 1 to 6 months of follow up but it was not found significant statistically (P>0.05).

Finding of the study suggested that the efficacy of the treatment schedule for group D was highest followed by group B and C and least for group A.

DISCUSSION

The study design comprises a 06 months follow up between treatment and evaluation, whereas previous studies assessed treatment outcome after 1–5 weeks[13,14,15].Long follow-up periods, however, tend to confound the results because of either spontaneous particle migration out of the canal by natural head movements or reaccumulation of particles in the canal despite successful initial treatment.

All previous trials on the efficacy of Epley's manoeuvre in PC-BPPV showed a positive effect compared with no treatment or sham procedures,[12] except for one study that did not perform Epley's manoeuvre properly by applying insufficient head rotation.[16]. In this study the Epley`s manoeuvre kept common to all groups and note being kept of the necessity of repeat Epley`s among all 4 groups.

Clinical experience suggests that repeating Epley's manoeuvre during one session increases its effectiveness. Accordingly, 57% of patients required more than one Epley's manoeuvre to convert the Dix–Hallpike test to negative at the initial treatment session. Most previous studies also repeated Epley's manoeuvre during the treatment session when necessary, as originally advised by Epley [11,13,14,15].

Other studies concluded [11] that there is a high recurrence rate of BPPV after treatment (36%). Outcomes for Epley's manoeuvre treatment are comparable to treatment with Semont and Gans manoeuvres, but superior to Brandt-Daroff exercises. In our study Epley's manoeuvre was kept common and different treatment modalities along with Epley's manoeuvre are compared among study groups.

A recent study, however, that aimed to examine the benefit of repeated against single Epley's manoeuvres during one treatment session showed only a trend for multiple manoeuvres that was not statistically significant[17] Thus, the important question of whether repeated Epley's manoeuvres during one session are more effective than just one remains to be examined systematically by further study. In our study a need was felt to repeat the Epley's manoeuvre but the frequency of repetitions was different in different groups.

In our study,group D patient who were treated with Epley`s manoeuvre with betahistine and brand daroff exercises shows more improvement symtomatically on likert scale and statistically as well with least requirement of repeat Epley`s manoeuvre.

Whereas, group B patients treated with Epley`s manoeuvre and betahistine shows fairly good results in terms of Likert scale score which was statistically significant at follow up periods at 15 days. At 03 months and 06 months group B scores are statistically insignificant statistically which demands further study on long period use (continuous or intermittent) of betahistine

Group A and group C patients who were treated with Epley`s manoeuvre alone and Epley`s manoeuvre and brand daroff exercises respectively shows similar results with minor variation which was statistically insignificant.

CONCLUSION

To conclude, by this study we hereby can apply a particle repositioning manoeuvre in the form of Epley`s manoeuvre along with betahistine and Brandt Daroff exercises to be continued at home for better improvement in patient`s symptoms. In addition to it, this will also lessen the requirement and frequency of Epley`s manoeuvre to be repeated. However need for Epley`s to be repeated and frequency of the same with impact on the all 4 groups with different treatment strategies yet demands further study.

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Conflicts of interest
There are no conflicts of interest.

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