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To Evaluate The Efficacy Of Repeated Epley's Maneuver Over And Above Betahistine In The Treatment Of Patients Diagnosed With Benign Paroxysmal Positional Vertigo (BPPV)

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ABSTRACT:
Vertigo is an illusion of motion characteristically described as "the room isspinning". It occurs when an imbalance or disturbance in vestibular function is present anywhere in the peripheral or central vestibular system. Vertigo is one of the commonest presenting complaints in the OPD, spanning various age groups. A thorough history & clinical examination can reliably exclude central causes such as Vertebro-basilar ischemia, posterior fossa space occupying lesions or demyelinating lesions. The common causes of peripheral vestibulopathy are vestibular neuronitis, BPPV, labyrinthitis (which would have associated deafness),Meniere's disease and drug induced vestibulopathy. Differentiation between these can be done on the basis of a good history, audiometry and specialized VFTs (vestibular function tests).

BPPV can be diagnosed by the Dix Hallpike maneuver. A positive Dix-Hallpike test consists of a burst of torsional nystagmus with slow component downwards towards the dependent diseased ear.Treatment modalities of BPPV include medication and the canalith repositioning procedures (CRP). To date, physical therapy for BPPV has achieved the best clinical results.The pharmacological treatment includes commonly used vestibular sedatives like Betahistine andCinnarizine.Betahistine is an orally active H_1 selective histamine analogue.The introduction of therapeutic positioning maneuvers has made BPPV the most successfully treatable cause of vertigo. CRP, with several modifications since Epley's original description, has become an essential and efficient therapeutic tool because of its simplicity and noninvasive nature. There is a paucity of data regarding head to head comparison of the canalitih repositioning maneuvers v/s pharmacological treatment. The present study was designed to test the efficacy of the canalith repositioning maneuvers v/sBetahistine.This study involving serial recruitment of patients with BPPV, was carried out at a tertiary care hospital, the patients being recruited from Neurology, Medicine, and ENT OPDs.Total 34 BPPV patients satisfying criteria were included into the study.

I. BACKGROUND AND INTRODUCTION :

Vertigo is an illusion of motion characteristically described as "the room isspinning". It occurs when an imbalance or disturbance in vestibular function is present anywhere in the peripheral or central vestibular system. Vertigo is one of the commonest presenting complaints in the OPD, spanning various age groups. A thorough history & clinical examination can reliably exclude central causes such as Vertebro-basilar ischemia, posterior fossa space occupying lesions or demyelinating lesions. The common causes of peripheral vestibulopathy are vestibular neuronitis, BPPV, labyrinthitis (which would have associated deafness),Meniere's disease and drug induced vestibulopathy. Differentiation between these can be done on the basis of a good history, audiometry and specialized VFTs (vestibular function tests).

A common form of vertigo is **Benign Paroxysmal Positional Vertigo(BPPV)[1].** Barany initially described BPPV in 1921 and suggested a macular pathology as its cause [2] . This was further elaborated by, Dix and Hallpike in 1952 by finding degeneration of hair cells and the otolithic membrane of the utricular macula [3] . Shuknecht in 1969 proposed that BPPV resulted from a lesion of the posterior semicircular canal(p-SCC) and introduced the term cupulolithiasis[5]. Hall et al. in 1979 [7] proposed the

more convincing theory of **canalolithiasis.** They proposed that free-floating particles, derived from the otoconia of the utricular membrane, moving within the p-SCC could cause BPPV [6].

BPPV can be diagnosed by the Dix Hallpike maneuver. In this test, a person is brought from sitting to a supine position, with the head turned 45 degrees to one side and extended about 20 degrees backward. A positive Dix-Hallpike test consists of a burst of torsional nystagmus with slow component downwards towards the dependent diseased ear.

Treatment modalities of BPPV include medication and the canalith repositioning procedures (CRP) [8]. To date, physical therapy for BPPV has achieved the best clinical results.The Vestibular Habituation Technique used by Norre and the exercises to disperse otolithic debris by Brandt and Daroffhave had successful clinical outcomes.[9,10]

The pharmacological treatment includes commonly used vestibular sedatives like Betahistine andCinnarizine.[11]Betahistine is an orally active H_1 selective histamine analogue.

The introduction of therapeutic positioning maneuvers has made BPPV the most successfully treatable cause of vertigo. CRP, with several modifications since Epley's original description, has become an essential and efficient therapeutic tool because of its simplicity and noninvasive nature [4].

There is a paucity of data regarding head to head comparison of the canalitih repositioning maneuvers v/s pharmacological treatment. The present study was designed to test the efficacy of the canalith repositioning maneuvers v/sBetahistine.

AIMS AND OBJECTIVE :

To evaluate the efficacy of repeated Epley's Maneuver over and above Betahistine in the treatment of patients diagnosed with Benign Paroxysmal Positional Vertigo (BPPV).

II. MATERIALS AND METHODS:

Subjects :

This was a prospective study involving serial recruitment of patients with BPPV,carried out over 1 year at a tertiary care urban hospital, the patients being recruited from Neurology, Medicine, and ENT OPDs.

Inclusion criteria :

1. History of short-lasting (< 1 minute) rotational vertigo precipitated by changes of head position.
2. A mixed torsional / upbeating nystagmus on performing the DH maneuver.

Exclusion criteria :

Patients having any evidence of ongoing central nervous system disease (eg. transient ischemic attack), Otitis media, Otosclerosis and inability to tolerate a diagnostic DH maneuver because of restricted head movement or severe positional vertigo with nausea, were excluded.

Methodology :

A comprehensive interview was obtained from all the patients. This included the following symptoms- nausea, vomiting, feeling of imbalance, true vertigo, headache, anxiety, inability to move in crowd, history of falls, autonomic symptoms like sweating or cold feeling with or without vertigo. Each of these 10 symptoms was graded on a visual scale of 1-10 by the patients, a higher score implying worse symptoms. Average score of the 10 symptoms was calculated.Onset of symptoms, medical history and provoking factors were obtained.

Benign paroxysmal positional vertigo was diagnosed as per the history and physical examination of the patients. No vestibular or other laboratory studies were performed. All patients gave written informed consent in their own language before entering the study.

34BPPV patients satisfying inclusion criteria were included into the study. The patients were then serially grouped into two groups (A & B).(refer fig 3). The patients in group A were given Betahistine 16mg thrice daily for 5 days, and asked to follow up after 5 days.The patients in group B had Epley's maneuver performed on them at first contact and were also given Betahistine 16 mg thrice daily for 5 days.

On the first follow up –

The signs and symptoms of the patients were assessed. The patients were asked to rate their improvement of each symptom on a scale of 1 to 10 and the average of the scores were taken. A lower score implied improvement. Patients who hada drop in score of less than 3 from their original score, were treated with Epley's maneuver (in the case of Gp A, the first Epley's maneuver, and in Gp B, the second Epley's maneuver) along with the standard medication i.e.,Betahistine 16mg thrice daily. Patients who had a drop in score of 3 or more from their original score were considered to have improved, and were continued on Betahistine only. All the patients were asked to follow up after 5 days.

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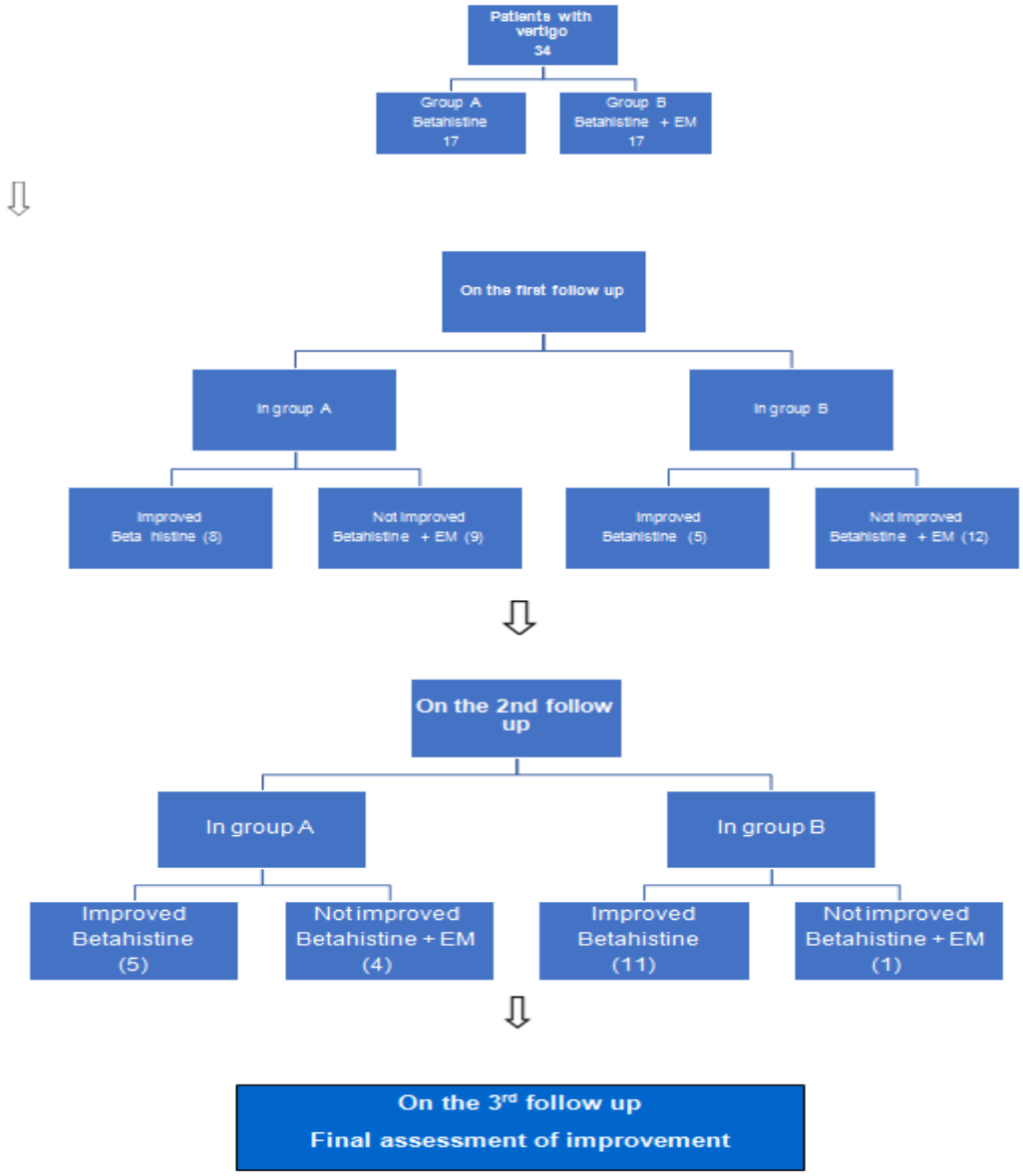
On the second follow up –

The signs and symptoms of all the patients were assessed and similar procedure as the 1st follow up was repeated.

On the third follow up –

The patients were asked to rate their improvement on a scale of 1 to 10.Thusa patient was followed up every 5 days for 15 days after his initial recruitment into the study. The same protocol was carried out for 2 months of study period, with weekly review.

Study Design:



III. RESULTS :

34 patients were studied.There were 16 - men and 18- women ranging in age from 29 to79 years. (Mean age 54 years).Table1 shows baseline demographics, which were not significantly different in the 2 groups.

In groupA there were totally 17 patients out of which 8 patients **(47 %)** improved at the first follow up with medication alone.The remaining 9 patients**(53 %)** did not improve at the 1st follow up and hence were treated with the Epley's maneuver.

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On the second follow up, 5 **(55.55%)** out of the 9 patients who were treated with the Epley's maneuver improved.Theother 4 **(44.45%)** patients did not show improvement and thus were treated with a 2nd Epley's maneuver.On the 3rd follow up all the patients improved.

In groupB there were 17 patients - 5 **(29.41 %)** patients improved after a single maneuver. The remaining patients were thus treated with the 2nd Epley's maneuver at the 1st follow-up. On the second follow up, 11 **(91.67 %)** out of the remaining 12 improved. 1 patient who did not improve was again treated with an Epley's maneuver.On the 3rd follow up the patient showed improvement.

As seen in following tables majority of the patients (44 %) required two Epleys maneuvers for improvement of their symptoms. At least 1 Epleys maneuver was required by 77% patients.

Table 1: Patient Baseline Characteristics

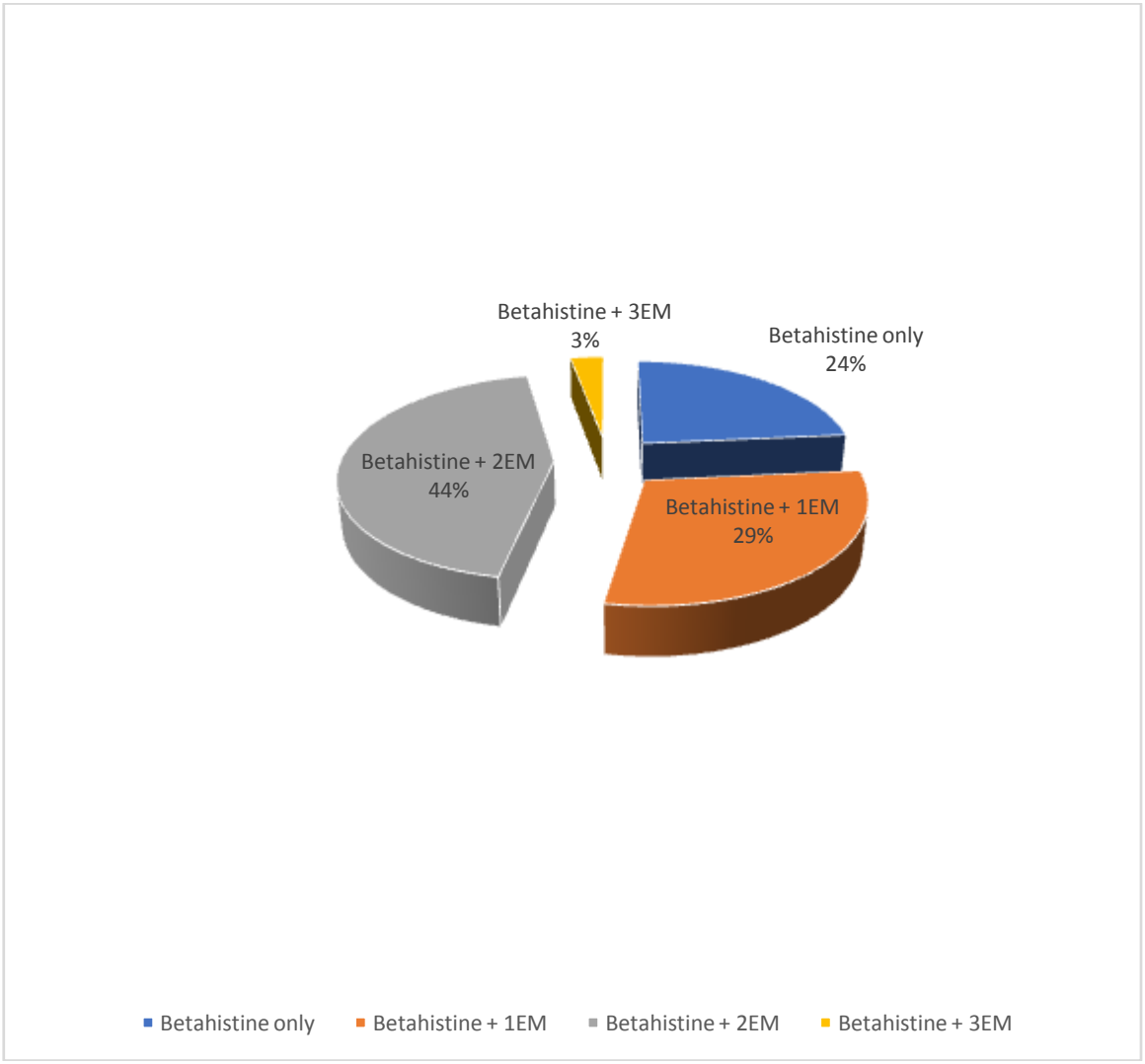
	Group A (n=17) Betahistine	Group B (n=17) Betahistine + EM
Mean Age (yrs)	55.8	42.77
Onset of symptoms (days)	4	5
Previous history of vertigo (%)	27	10

Table 2 : Response Rate

Time	Procedure details	Group A Response rate	Group B Response Rate	Total response rate
At 7 days	Epley1- 17 pts	8/17 (47.05 %)	5/17 (29.4 %)	13/34 (38.2 %)
7-14 days	Epley1 -9 pts Epley2-12 pts	5/9 (55.5 %)	11/12 (91.6 %)	16/21 (76.1 %)
14-21 days	Epley2-4 pts Epley3-1 pt.	4/4 (100 %)	1/1 (100 %)	5/5 (100 %)

Efficacy of Betahistine v/s Betahistine + EM

FIGURE 1.



* EM – Epley's Maneuver
26 /34 (76 %) patients received EM. Taken as a percentage of 26, 38.15 % patients improved with 1 EM, 57.69 % after 2 EM , and3.84 % after 3 EM.

Efficacy of Betahistine v/s Betahistine + Epley`s maneuver correlated with time

In 1st week

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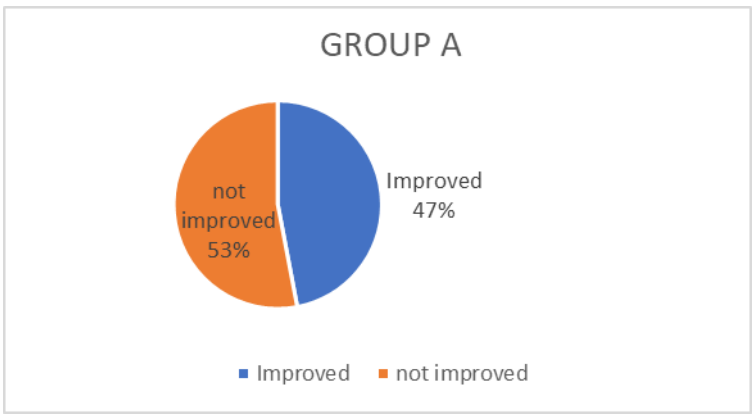
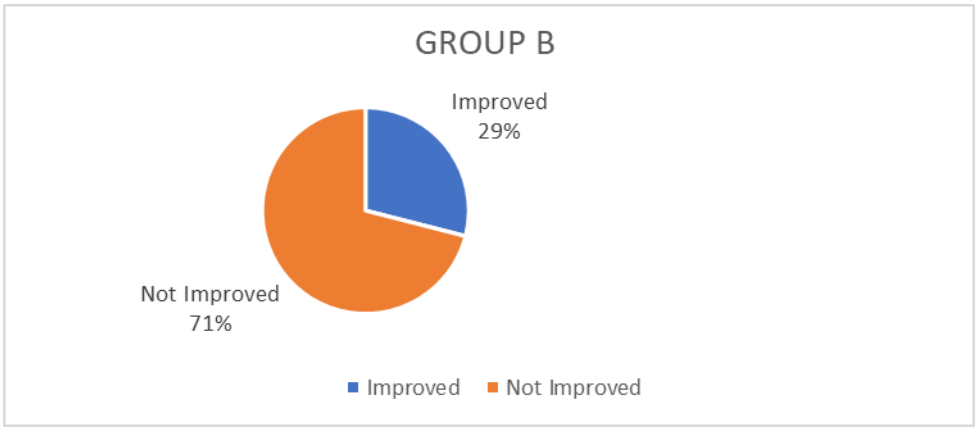
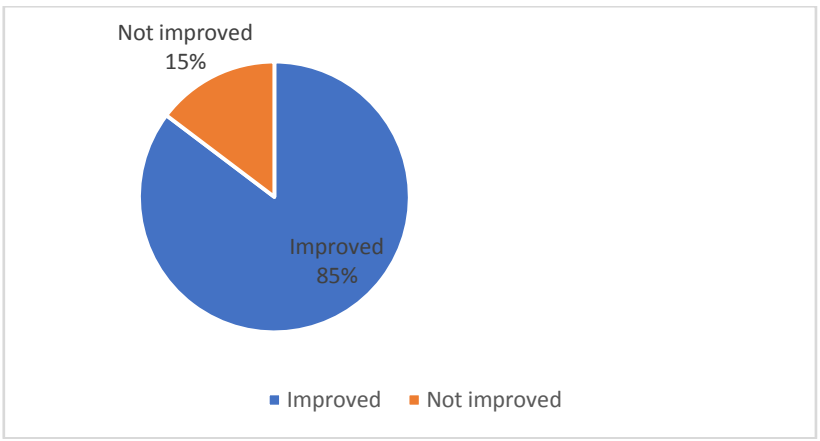




In 2nd week



IV. DISCUSSION :

The typical signs and symptoms of BPPV are now believed to be produced by ampullofugal deflection of cupula of posterior semicircular canal as a result of cupulolithiasis or canalolithiasis.

The Epley's maneuver is based upon a hypothesis which assumes the presence of free floating otolithic debris within the long crus of the posterior semicircular canal.Epley's maneuver slowly"walks" the debris around the long arm of the posterior canal back into the utricle.

Lynn et al described 88.9% response rate to CRP, Smouha et al andSermont et al reported 63 % and 92.7 % response rates respectively , after 2 CRP maneuvers[13] . In all the former studies including that of Epley's, it was found that

the symptoms disappeared after 1st Epley's maneuver in about 70% cases and 2nd Epley's maneuver in 90% cases[11,12]

In our study, 29% patients improved after 1st Epley's maneuver and 44% of patients improved after the 2nd Epley's maneuver. 3% patients required 3 maneuvers for improvement of the signs and symptoms (in group B).

After the 1st follow up of all the patients from both groups at 1 week, it was found that 47% of patients improved with the medication (betahistine) alone in group A as compared to 29% patients who were treated with the Epley's maneuver in addition to the standard medication in group B. The two groups were comparable in gender, age and severity of symptoms at onset. If all patients receiving Epley-1 are taken into account, we have 9 patients from Gp A who had received pre-treatment with Betahistine(and received Epley-1 after 1 week), and we have 17 patients from Gp B who did not have any pre-treatment. Clearly, Gp A did better with 47% improvement, as compared to 29 % in Gp B.

The efficacy of betahistine in the present cohort of patients, was probably due to its central sedative effect on the vestibular nuclei.It is possible that partial repositioning of otoliths following early 1st Epley's maneuver and reviewing in a week, could even negate the beneficial central vestibular sedative effect of betahistine, as the study suggests. However, we did not find any previously recorded reference pertaining to this effect in an extensive literature search. This finding merits elucidation by means of follow up of a larger cohort of patients in a similar design.

Among the 16 patients who received Epley-2, 4 were from Gp A (receiving Epley-2 at end of 2 weeks), and 12 from Gp B (receiving Epley-2 at end of 1st week). There was comparable improvement in the 2 groups.

Overall,26/34 (76 %) patients were subjected to Epley's, as 8 patients showed sustained improvement with Betahistine alone. Taken as a percentage of 26, 38.15 % patients showed improvement with 1 Epley's, 57.69 % with 2 Epley's, and 3.84 % required 3 Epley's maneuvers to show response.

In the present study,CRP appeared to be of maximum benefit in the 2nd to 3rd week. This finding could be accounted for by the following mechanisms-a)the study design included a symptomatic rating scale for improvement. In the acute phase (1st week),vestibular sedation by medications probably improves the symptoms best in contrast to repositioning maneuver which might work better over the long term as a prophylactic therapy.

b)Partial repositioning of the otoliths/drifting back of the otoliths following a single maneuver could act as a trigger for vertigo. Following the 2nd or 3rdEpleys,complete relocation of the otoliths would achieve symptom freedom.

The 1 patient who did not improve after 2 Epley's maneuvers and who gave a score of 6/10 after the 3rd maneuver could have had partial removal of the debris. Additionally, individual anatomical differences in the spatial orientation of the semi circular canals could account for differences in response.

In this study, Group B comprised patients who received betahistine plus Epley's maneuver at the first contact in contrast to patients in Group A where only betahistine was given. Although a sizeable proportion of the study patients had had a chronic/recurrent history of vertigo, none were on betahistine therapy in the last 3 months and none had ever been exposed to Epley's maneuver. In the community at large, the use of vestibular sedatives by the physician/self-medication by patients who are chronically or intermittently vertiginous, is very common. Hence there is a high likelihood that a patient, when seen by a physician, would already be on some vestibular sedative medication. Epley's maneuver, on the other hand, is surprisingly ill-utilized and even unknown by the majority of the practicing physicians. This factor prompted the design of the present study where the therapy with "BetahistineOnly" comprised only 1 wing of the cohort. The design thus allowed a larger number of patients to enter "Epley Maneuver Cohort" at some point, so that comparisons could be made between subgroups requiring Epley-2 or Epley-3 v/s Epley1.

The performance of audiometry/VFT is time and resource consuming, both of which are difficult in a busy government hospital setting with financial constraints. These constraints are true of large numbers of hospitals in India, especially in rural areas. Instituting Epley's maneuver should not be postponed till these investigations are done, as early intervention means better and faster symptomatic recovery. Furthermore, Epley's maneuver does not involve additional costs or tests . It only requires knowledge on the part of the physician and compliance on the part of the patient.

A limitation of this study is the short period of 2 months follow-up after improvement.Although no relapse/recurrences were seen during this period, a longer follow up would be required to accurately assess the efficacy of the Epleys maneuver in successfully preventing recurrent vertigo. **Dornhoffer et al [14]** have

reported 32 % recurrence rates in their three months follow up of BPPV cases.

V. CONCLUSIONS :

1. Dix Hallpike maneuver as a diagnostic tool and Epley's maneuver for therapy , is surprisingly ill-utilized and even unknown by the majority of the practicing physicians. More physicians need to be trained in these maneuvers.
2. In the present study, Epleysmaneuver appeared to be of maximum benefit in the 2nd to 3rd week. Partial repositioning of the otoliths/drifting back of the otoliths following a single maneuver could act as a trigger for vertigo. Following the 2nd or 3rd Epleys, complete relocation of the otoliths would achieve symptom freedom.
3. In the acute phase (1st week), vestibular sedation by medications probably improves the symptoms best in contrast to repositioning maneuver which might work better over the long term as a prophylactic therapy. More studies needed .
4. Instituting Epley's maneuver should not be postponed till advanced vestibular investigations are done, as early intervention means better and faster symptomatic recovery.

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APPENDIX 1

Epley's maneuver:

The Epley's maneuver, also known as the canalith repositioning maneuver, was first described in 1992 (11 ,12). A simple modified version of the epley's maneuver has been found to be effective in the treatment of BPPV. The modified Epley's maneuver is as follows:

Step 1 The patient's head is turned 45 degrees to the side that demonstrated nystagmus and reproduction of symptoms during the diagnostic Hallpike test.

Step 2 As in the Hallpike test, the patient is guided to the supine position with the head hanging over the edge of the gurney head is maintained for 30 seconds.

Step 3 The head is then rotated 90 degrees in the opposite direction with the face upwards,

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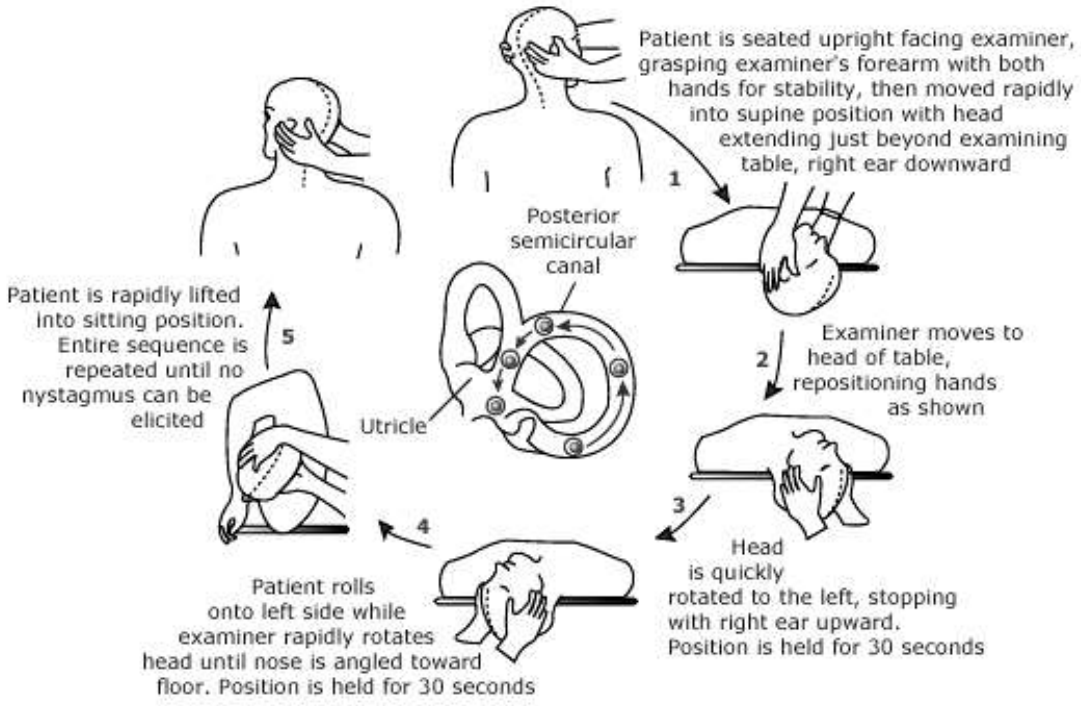
maintaining a dependent position at least 30 seconds.

Step 4 The patient is then asked to roll onto his side and rotate his head so that he is looking straight to the ground for 30 seconds.

Step 5 The patient is then raised to a sitting position while maintaining head rotation.

Finally, the head is rotated to a central position and moved forward 45 degrees.



The Epley's Maneuver

Post maneuver the patient is instructed to rest for 10 minutes, sleep in the semi- recumbent position and avoid provoking head positions for the next 2 days.