

## ORIGINAL RESEARCH

### Canalith Repositioning for Benign Paroxysmal Positional Vertigo

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#### ABSTRACT

**Background** – Benign paroxysmal positional vertigo (BPPV) is a self-limiting condition that is characterized by vertigo and nystagmus induced by certain head positions. Canalith repositioning maneuver (CRM), as defined by Epley, can be an effective treatment for benign paroxysmal positional vertigo (BPPV).

**Aim & objective** – To evaluate the effectiveness of canalith repositioning maneuver / Epley's maneuver which is non-invasive, inexpensive, and easily administered in patients of BPPV.

**Method** – A prospective observational study was done on 50 patients of both the sex, with sensation of vertigo caused by head movements or body posture changes. Epley's manoeuvre canalith repositioning manoeuvre was done in all the patients and evaluate the response. Responses after manoeuvre graded as Grade I response, i.e., no vertigo on provocative head/body positioning, Grade II partial response (>50% reduction on provocative positioning or ill-defined imbalance only) and Grade III no response or <50% reduction in positional vertigo.

**Result** – Out of 50 patients 43 patients (85.2%) had complete resolution (grade I response), 6 patients (12%) had grade II response i.e., partial response and one patient (3%) had no response.

**Conclusion** –Epley's manoeuvre is an effective treatment for patients of benign paroxysmal positional vertigo. It is safe, short and inexpensive procedure for patients of posterior canal BPPV.

**Key words** – Epley's manoeuvre, Benign paroxysmal positional vertigo, Canalith repositioning.

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#### Introduction

Benign paroxysmal positional vertigo (BPPV) is the most common cause of dizziness. It is characterized by episodic vertigo induced when the subject assumed a critical head position relative to gravity. First clinical description of positional vertigo is given by Barany in 1921.[1]

In 1952, Dix & Hallpike were the first to clearly describe provoking maneuvers. and coined the term 'benign paroxysmal positional vertigo'. They also identified correctly the under most ear as the ear causing the rotatory nystagmus, which is characteristic of BPPV.[2]

The provoking maneuvers elicits a pathognomonic "classic" nystagmus characterized by: predominantly rotatory motion with the fast phase directed toward the under most side, latency, limited duration, reversal on return to upright, and response decline on repetition of the provocative manoeuvre.[3]

Dix and Hallpike described destructive surgical procedure for BPPV. These usually provided relief of

symptoms, but involved significant risk and postoperative morbidity. Thus, there has been a search for an effective non-invasive treatment.[4][5] Posterior canal BPPV occurs most commonly (93%) followed by horizontal (5%) then anterior canal BPPV (2%). The diagnosis of BPPV is made by Dix Hallpike maneuver. In which all patients develop up beating counter clockwise torsional nystagmus which is confirming the diagnosis that it is posterior canal BPPV. Two theories describe pathogenesis of BPPV. Canalithiasis in which otoconia in break & fall into the semicircular canal then swimming in the endolymphatic fluid, inappropriately stimulate vestibular nerve, it is most accepted theory described by Hall et al in 1979 [6] whereas in Cupulolithiasis otoconia detached from degenerating maculae & adhere to cupula of semicircular canal making it denser than the surrounding endolymph, and become more susceptible to the effects of gravity.[7]

A variety of treatment modalities has been used in patients with BPPV. Since there is still no proven

effective pharmacotherapy. the most effective means of controlling vertigo has been avoidance of the specific head movements which induces the attacks.[8][9]

The displacement of the otolith to the semicircular canal is the most convincing theory to explain nystagmus and the associated symptoms, serving as the basic concept for canalith repositioning procedures (CRPs).

These particles can be repositioned and the symptoms completely resolved in a high percentage (nearly 90%) of cases by means of the Epley's canalith-repositioning manoeuvre. Epley's maneuver, which is non invasive, inexpensive, and easily administered, the objective of it is to move the canaliths out of the canal to the utricle where they no longer affect the canal dynamics.

The aim of our study to analyze the response to Epley's manoeuvre in a series of patients with BPPV.

#### **Material & method –**

This were the prospective observational study which was done on 50 patients who came to ENT OPD at tertiary care centre with complaining of vertigo on head moment from September 2022 to March 2023 of both the sex and age of 20 to 65 year.

#### **Inclusion criteria**

1. The sensation of vertigo caused by head movements or body posture changes on history
2. Positional vertigo and nystagmus brought on by Dix and Hallpike positioning tests, i.e., rotatory nystagmus with upbeat vertical and horizontal components appearing after a short latent period, directed toward the lowermost ear in the lateral head position, continuing for a limited time and diminishing on repetition of the test.
3. Occurrence of rotary nystagmus of short duration and in the opposite direction after returning the patient to the sitting position.
4. Elimination of possible diseases of central origin through a careful history, examination and diagnostic tests if indicated.

#### **Exclusion criteria–**

1. Patients having central cause of origin of vertigo.
2. Patients is suffering from cervical spondylitis and restricted neck moment.
3. Woman with pregnancy as she will have problem with doing Epley's manoeuvre because it requires frequent changing of body posture which is harmful for baby.
4. Patients with mental retardation.
5. Extreme of age like very elderly patients or those with poor general condition.
6. unstable heart disease.
7. ongoing CNS disease (Stroke/TIA).

All cases underwent a detailed clinical history with special reference to the cochleo-vestibular symptoms, and other systemic illnesses like diabetes and hypertension to evaluate the cause of vertigo. A complete general physical examination and ear, nose, and throat examination was carried out to rule out other source of infection (ophthalmic and neurological consultation was done whenever indicated).

All patients underwent complete haemogram including Hb%, TLC, DLC, and Urine analysis was done in all the cases. Blood sugar fasting and postprandial was done to rule diabetes. Each patient was subjected to the pure tone audiometry. X-ray cervical spine – anteroposterior and lateral views was done in all the cases to look for cervical spondylosis. X-ray mastoids were done and advised to return only if symptoms recurred.

whenever indicated. All patients returned for a follow-up visit within 2–5 days. The patient was regarded as cur

#### **Diagnosis of BPPV –**

Patients of peripheral vertigo were subjected to Dix–Hallpike's positional test to differentiate between benign paroxysmal positional vertigo and other peripheral causes. The diagnosis of Benign paroxysmal positional vertigo was based on the criteria laid down by Dix and Hallpike. Latency before onset of vertigo and nystagmus when the patients head was moved into a position in which the plane of posterior semi-circular canal was vertical, observation of an up beating, torsional nystagmus (fast phases of the superior pole beating towards the under most ear), vertigo and nystagmus lasting less than 60 s, fatigability of the nystagmus on repeated Dix–Hallpike testing and reversal of rotatory nystagmus with return to the upright position confirms the diagnosis.

#### **Application Of Epley's Canalith Repositioning Manoeuvre on patient-**

All patients underwent canalith repositioning procedure. Premedication was not required in all patients. The six-position CRP manoeuvre as described by Epley was performed.[3] In each position the procedure was paused until there is no vertigo or induced nystagmus. (Average 15–20s). The sixth-position cycle was repeated till there is no nystagmus in any position. Guiding head movements from behind. Maintain each position for at least 30 s and if vertigo is severe, premedicate patient with a vestibular sedative, such as prochlorperazine or dimenhydrinate, 30–60 min before performing the procedure. Responses after applying canalith repositioning maneuver are graded as –

Grade I response, i.e., no vertigo on provocative head/body positioning  
Grade II partial response (>50% reduction on provocative positioning or ill-defined imbalance only)

Grade III no response or <50% reduction in positional vertigo.

**Post procedure Instructions** - Wait for 10 min after the maneuver is performed. This was to avoid 'quick spins', or brief bursts of vertigo, do not move head violently to avoid quick spins. Patient is asked to lie in semi reclining position while sleeping for the following 48 h. For at least 1 week avoiding provoking head positions that might bring about BPPV. Use two pillows at night. Patient is asked to avoid sleeping on the affected side and not to turn the head far up or far down.

#### Result –

Patients' ages ranged between 20 and 65 years. In study population 32 patients were females (64%) whereas 18 patients were male (36%). Twenty-eight patients (55%) were affected on the right side and 22 (45%) on the left. No one patient found as bilateral involvement and opposite side involvement. The duration of vertigo in the patients varied from 1 day to 5 months, the average being 1.5 months. The latent period of nystagmus recorded in the initial Dix Hallpike maneuver was 3–20 sec.

In the first group 43 patients (85.2%) had complete resolution (grade I response, i.e., no vertigo on provocative head/body positioning during the entire follow up), another 6 patients (12%) had grade II, i.e., partial response (>50% reduction on provocative positioning or ill-defined imbalance only). One patient had no response. Diazepam and dimenhydrinate were prescribed in the patients not responding to CRM.

**Table 1: Subjective response after Epley's manoeuvre in our study**

Response	No of patient	%
Grade 1	43	85.2
Grade 2	06	12
Grade 3	01	3

**Table 2: Comparison with Various Study**

Author name	Follow up		
	7 days	15 days	1 month
Asawavichianinda et al	88.6%	88.6%	94.2%
Dal et al	72%	88.2%	91.1%
Harvey et al	60.6%	78%	-
Present study	53.2%	82.3%	82.3%

#### Conclusion

With regard to both the low incidence of concomitant pathology and high cure rates associated with CRM, we conclude that for patients diagnosed as BPPV on the bases of history and the Dix-Hallpike test should undergo for CRM. Epley's manoeuvre is an effective treatment for patients of benign paroxysmal positional vertigo. It is safe, short and inexpensive procedure for patients of posterior canal BPPV and can be practiced in out-patients without the need of sophisticated gadgets. It should be the initial procedure of choice in the treatment of BPPV. Further investigation is indicated if symptoms and nystagmus do not resolve or if there are other neurologic symptoms present.

#### Discussion

All the phenomena observed in BPPV patients could be explained by the presence of canaliths in the posterior semicircular canal, CRM was devised as a new treatment modality based on the outmigration of the canaliths through the nonampullated end of the canal to the utricle this is explained by Epley's report of clinical and laboratory investigations.[10] Although aging, trauma, inactivity and other ear pathologies are accepted as predisposing factors in the etiology of BPPV. Most cases are considered to be idiopathic. [11][12]

Semont et al. reported high cure rates by using a different head-positioning maneuver that consisted of rapid continuous movements of the head from the symptomatic position to a sitting position to the contralateral head prone position.[13] Epley's maneuver has been more widely accepted as it is being better tolerated by patients [14].

In our study, 50 cases of BPPV, at 1 week of follow-up, 53.2% of our patients were totally relieved of their symptoms while 43 patients (85.2%) resolved completely during the entire follow up period. In 1999 Froehling had reported relief in 50% of their cases which is slightly lower than our study.

In 1988 Asawavichianinda et al have found 88.6% complete relief from symptoms at 1<sup>st</sup> week.[15] Harvey et al [16] in 2000, found 60.6% resolution of symptoms at 1<sup>st</sup> week while Dal et al found 72 % complete recovery from symptoms at one week of canalith Repositioning Maneuver[17]

In our study, 82.3% patients were totally relieved after 15 days, which is slightly lower than Asawavichianinda et al [15] and Dal [17] who had reported complete relief in nearly 88% of their patients while Harvey et al found 78% recovery in their patients.[16]

At the end of 1 month, 85.2% were totally asymptomatic. This is slightly lower than Asawavichianinda et al and Dal [16][17] who reported 91 and 94% patients, respectively, to be totally relieved.

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