

Original research article

## A study on analysis of posterior semi-circular canal benign paroxysmal positional vertigo in a tertiary care centre

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### Abstract

**Introduction:** Benign paroxysmal positional vertigo (BPPV) is a common peripheral vestibular disorder encountered in otolaryngology clinics. It is associated with a characteristic paroxysmal positional nystagmus, which can be diagnosed with specific positional manoeuvres, such as the Dix-Hallpike test. It is usually not recognised by general practitioners and as such is diagnosed late. There is a long delay between onset of symptoms and diagnosis, often with multiple healthcare contacts.

**Objective:** to evaluate the relationship between age, gender and affected ear, in patients presenting with posterior canal benign paroxysmal positional vertigo.

**Materials and methods :** This is a prospective observational study was conducted among patients attending the Department of ENT, Krishna Rajendra Hospital, Mysore Medical college and research institute , Mysore ,for a period of one year from June 2020 to June 2021. A total of 50 patients were included and analysed for demographic data, age, gender, affected ear and efficacy of epley's manoeuvre in treating posterior canal BPPV.

**Results:** females are more prone to BPPV seen frequently in middle age with right ear being more commonly seen. Resolution of symptoms were observed in maximum cases subjected to epley's manoeuvre within one week follow up.

**Conclusion:** Dix Hallpike manoeuvre is the specific test to diagnose BPPV. Treatment of posterior canal BPPV is simple and cost effective.

**Keywords:** Benign paroxysmal positional vertigo, Dix Hallpike maneuver, and posterior canal

### Introduction

Benign paroxysmal positional vertigo (BPPV) is the most frequent disorder of vertigo in the community. BPPV is a 'clinical syndrome characterised by recurrent, brief episodes of severe vertigo and rotatory nystagmus, precipitated by specific positions of the head relative to gravity' <sup>[1]</sup> Motions such as lying down, rolling over, or raising the head to look up induces vertigo. The spells may be particularly violent but usually occur 5 to 10 seconds following the movement, last 10 to 20seconds in most of them <sup>[2]</sup>. It is usually not recognised by general practitioners and as such is diagnosed late. There is a long delay between onset of symptoms and diagnosis, often with multiple healthcare contacts.

BPPV reflected cupulolithiasis affecting the posterior semicircular canal on the basis of the temporal bone histopathologic finding of particles adhering to the ampulla of the posterior semicircular canal this was proposed by Schuknecht and Ruby <sup>[3]</sup>. According to this theory, otoconia from the utricle become dislodged

and attach to the posterior semicircular canal ampulla, rendering it sensitive to gravity. Others have postulated that canalolithiasis (free-floating particles) underlies BPPV [4].

Although the diagnosis can be frequently delayed, once it is suspected, BPPV can be easily diagnosed using the Dix-Hallpike manoeuvre [5]. Based on Epley's theory of the etiology of BPPV in 1992, he described a therapeutic maneuver-the canalolith repositioning procedure (CRP) for BPPV [6]. The theory espoused by Epley differs from that advocated by Schuknecht [7]. Free-floating debris (canalolithiasis) in the posterior semicircular canal in the vertigo of BPPV was implicated by Epley's theory. It is thought that with the CRP, the debris can be moved from the posterior semicircular canal to the vestibule, thereby eliminating its effect on the canal.

## Materials and Methods

This prospective observational study was conducted among patients attending the Department of ENT, Krishna Rajendra Hospital, Mysore Medical College and Research institute, Mysore, for a period of one year from June 2020 to June 2021. Cases of age between 18 yrs to 70 yrs having posterior semicircular canal BPPV with eligible criteria were included in this study. Informed written consent was taken from all the patients included in the study. The study protocol was approved by the institutional ethics committee. Patients with a history of inner ear surgery, cervical spondylosis, cardiovascular disease and Meniere disease were excluded from the study.

From all patients with posterior canal BPPV detailed demographic characteristics and clinical data were collected including complete otolaryngological examination were done and recorded.

The diagnosis of BPPV confirmed with positional manoeuvre such as Dix-Hallpike through the observation of typical nystagmus. Each case once diagnosed was made to undergo Epley's manoeuvre or Canalolith Repositioning Procedure. The patient was placed in a sitting position, then laid supine, with the head hanging off the table in a modified Hallpike position with the head rotated 45degrees to the affected ear. While still in the head-hanging position, the head is rotated to 45 degrees to the opposite side. The patient's head and body are rotated until facing downward 135 degrees from supine. With the head still turned to the right, the patient is brought to the sitting position. The head is turned forward with the chin down 20 degrees. At each step, there is a pause while the induced nystagmus resolves.

The demographic data, the side and the number of sessions required for the treatment and resolution of symptoms were evaluated and tabulated accordingly. These cases were followed upto 3 months with visits at 1<sup>st</sup> week, 3<sup>rd</sup> week, 6 weeks and 3months. These cases were not given any form of medical line of therapy like labyrinthine sedatives or antihistamines. Statistical analysis was done using SPSS v20 software.

## Results

Fifty patients were enrolled in our study which included 32 females and 18 were males, females being more commonly involved (figure 1).

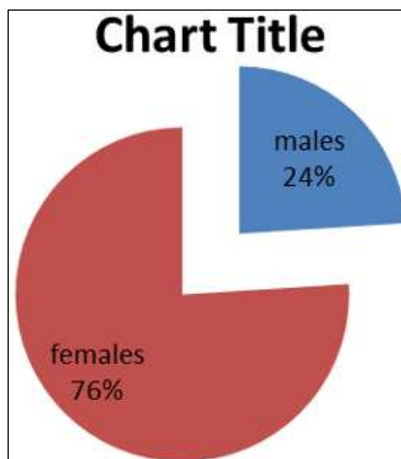
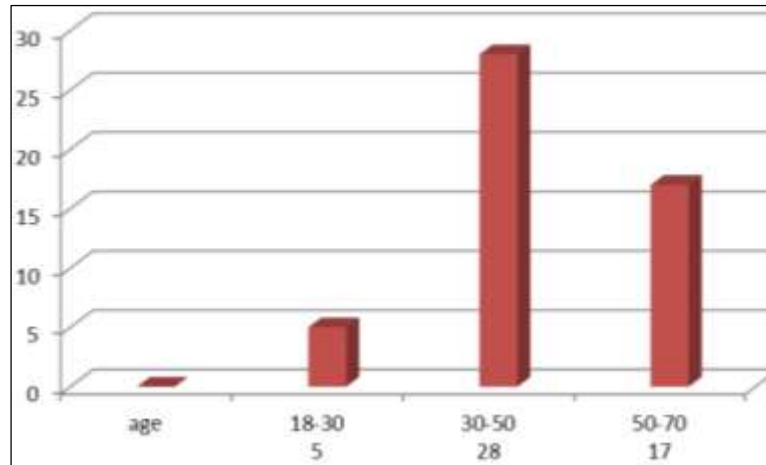


Fig 1: Sex distribution

Age of patients was between 18 to 70 years with maximum 28 patients (56%) in the age group of 30-50 years (table 1).

**Table 1:** Age distribution of patients

Age (in years)	Number of cases
18-30	5
30-50	28
50-70	17

**Fig 2:** Age distribution

Right sided BPPV was more common with 30 cases (60%) and in rest of cases left ear were involved. Among the cases, 40 (80%) recovered from vertigo immediately after the Epley's manoeuvre in first week and 7 (14%) patients recovered from vertigo at second week of follow-up. One patient recovered from vertigo during third follow-up visits. Remaining two patients were lost to follow up.

### Discussion

It is the most common cause of the syndrome of provoked vertigo. BPPV has an annual incidence of about 0.1 percent, although this may be an underestimate as many patients with this condition do not come to medical attention<sup>[8]</sup>

Following a Dix-Hallpike manoeuvre, the characteristic clinical sign of BPPV is nystagmus<sup>[9]</sup>.

Female subjects were being more affected in our study, also reported by Korkmaz *et al.*<sup>[10]</sup>. Especially in the elderly women other studies also have suggested that women had a higher incidence of BPPV than in men<sup>[11]</sup>. It has been reported that female BPPV prevalence could be linked/correlated to hormonal variations, such as menopause and associated demineralization and metabolic changes. The latter condition could reduce bone mineral density, facilitating the detachment of otoconia from the utricular neuroepithelium<sup>[12]</sup>.

Also it has been found a common finding in several studies and females have more psychiatric disorders associated with BPPV like depression, demoralization, phobia and anxiety<sup>[13]</sup>.

We found an increased incidence of BPPV at middle age groups. BPPV is known to be a disease of the elderly population. But more recently, it occurs across all age groups<sup>[14]</sup>.

More frequent involvement of right ear was observed in this series. This is more consistent with other studies. Von Brevern *et al.* have found that BPPV affects predominantly the right labyrinth. They have reported that most patients had the habit of sleeping on their right side<sup>[15]</sup>.

Most recently, a significant correlation has been found between head position during sleep and the side affected by BPPV<sup>[16, 17]</sup>.

Treatment is simple, safe and highly effective. With only one session of epley's manoeuvre, upto 80% of patients experience symptom resolution in our study. In a study by Sushil Gaur *et al.*, up to 92% of patients reported benefit after the first follow-up period of one week<sup>[18]</sup>.

Studies by Lynn *et al.* and Von Brevern in their Randomized controlled trials while evaluating the effectiveness of CRP for posterior canal BPPV found that time for resolution of vertigo symptoms were 2weeks with 61% and 24 hrs with 80% improvement accordingly<sup>[19, 12]</sup>.

Soon after CRP patients were asked to avoid sudden head movements for 2 weeks.

Epley initially recommended that after a CRP the patient should sleep propped up for two nights to prevent repositioned particles from returning<sup>[6]</sup>. However, numerous studies have not shown any advantage from post treatment restrictions<sup>[20, 21]</sup>.

## Conclusion

Patients with BPPV present with a history of brief, episodic, position-provoked vertigo with characteristic findings on Dix-Hallpike testing and typically does not require additional ancillary testing, it's benign and often self-limiting. BPPV can have a considerable impact on quality of life. The particle repositioning manoeuvre is a simple and effective way to treat posterior canal BPPV. Repositioning procedures for BPPV depend primarily on gravity and inertia. For a successful repositioning maneuver, correct orientation, and angulation of the semicircular canals during the maneuver play a crucial role.

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