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Effectiveness of using Epley's manoeuvre in benign paroxysmal positional vertigo

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Abstract

Introduction: Generally BPPV is a self-limiting disorder that can resolve spontaneously due to the ability of the endolymph to dissolve otoconia. Traditionally, fatiguing vestibular rehabilitation exercises were given to patients with persistent BPPV. The introduction of the Canalith Repositioning procedure (CRP) or Particle Repositioning Manoeuvre (PRM) by Semont and Epley has revolutionized the management of BPPV to the point that most physicians, paramedical health care providers and even self-treated patients have used these manoeuvre. Our study is conducted to prove the efficacy of particle repositioning manoeuvres in the treatment of BPPV.

Aim: To evaluate the outcome of Epley Maneuver in treating Benign Paroxysmal Positional Vertigo (BPPV).

Materials and Methods: This study was conducted in the ENT department of Sree Mookambika Institute of Medical Sciences, Kulasekharam, Kanyakumari district in a time period from December 2019 to February 2020. The sample size was taken as 35 patients who had presented with complaints of giddiness, dix hallpike's and Epley's maneuver were done for those patients who fulfilled the inclusion criteria. The study was conducted after obtaining the clearance from Institutional Human Ethical Committee.

Study Design: Prospective descriptive study.

Results and analysis: When interviewed at the time of conducting the study, the vast majority of the patients claimed a dramatic improvement reflected in complete cessation of vertigo in 31 patients (88 %). In the remaining 4 patients, 2 patients showed improvement at the end of 1 week and two patient claimed no relief at all. Even though literature claims up to 30% of recurrence within one year in our study no patient had recurrence within this six months follow up.

Conclusion: Epley Maneuver is safe, reliable and effective procedure that can be performed in general practice at the bedside without having any significant side effects in treating patients with Benign Paroxysmal Positional Vertigo.

Posterior semicircular canal involvement is most common. Right side is predominant to left. Particle repositioning manoeuvre is effective way to treat and give immediate relief to the patients even though it is a self-limiting disease.

Keywords: Epley's, BPPV, positional vertigo

Introduction

Benign paroxysmal positional vertigo (BPPV) is the most common peripheral vestibular disorder. The incidence is estimated to be 64 cases per 100 000 population per year, the lifetime prevalence 2.4% [1, 2, 3]. It is characterised by short-standing episodes of vertigo precipitated by a change in head position, the most common provoking movements being looking upwards, bending over and rolling over in bed.

It is believed that dislodged otolithic debris inside one of the semicircular canals causes continuing movement of the endolymph, even after head movement has ceased. This results in bending of the cupula, thus provoking vertigo. In a vast majority of cases, the posterior semicircular canal is affected [4]. The pathophysiology of BPPV is a source of controversy. In 1969, Schuknecht proposed the concept of *cupulolithiasis*; he hypothesized that canal debris adheres to the cupula and makes it abnormally sensitive to gravity [5, 6]. Ten years later, an alternative explanation was offered by Hall *et al.* who proposed that in *canalithiasis*, degenerative debris does not adhere to the cupula but rather floats freely in the endolymph of the long arm of the canal [7]. Hall *et al.* suggested that ampullary stimulation by these loose particles causes vertigo and nystagmus when the head is moved in the same plane as the posterior semicircular canal [8].

Benign Paroxysmal Positional Vertigo (BPPV) can be diagnosed clinically, it usually occurs in elderly individuals. Warning signs include focal neurological deficit, numbness, ataxia, sudden unilateral loss of hearing and history of unconsciousness which needs to be evaluated and full neurological exam should be performed^[9]. Based on the canalithiasis theory, Epley developed the *canalith repositioning procedure*, which came to be known as the *Epley maneuver*. This maneuver was designed to cause the free canaliths to migrate by gravitation from the posterior semicircular canal to the utricle, where they would no longer interfere with the dynamics of the semi-circular canals^[10]. Generally BPPV is a self-limiting disorder that can resolve spontaneously due to the ability of the endolymph to dissolve otoconia. Traditionally, fatiguing vestibular rehabilitation exercises were given to patients with persistent BPPV. The introduction of the Canalith Repositioning procedure (CRP) or Particle Repositioning Manoeuvre (PRM) by Semont and Epley has revolutionized the management of BPPV to the point that most physicians, paramedical health care providers and even self-treated patients have used these manoeuvre. Our study is conducted to prove the efficacy of particle repositioning manoeuvres in the treatment of BPPV. Systems such as the EOS are assumed to be particularly useful in treating suspected BPPV in cases where adequate positioning is not possible, the BPPV is refractory to treatment manoeuvres, involves greater than one canal, or if the BPPV recurs at a high frequency. There is an increasing number of commercially available systems, including the Epley Omniax System (EOS)^[11] and the Thomas Richard-Vitton (TRV) chair^[12] however at present there is only a very limited number of studies which have examined their effectiveness in the treatment of BPPV^[13].

AIM of the Study

To evaluate the outcome of Epley Maneuver in treating Benign Paroxysmal Positional Vertigo (BPPV).

Materials and Methods

Study Place: Sree Mookambika Institute of Medical Sciences, Kulasekharam, Kanyakumari district.

Study Design: Prospective Descriptive Study

Study Period: December 2019 to February 2020

Inclusion criteria

Patients who have experienced recurrent attacks of vertigo related to change in posture were included in the study

Exclusion criteria

Patients who have history of recurrent neck pain, cervical spine injuries, atlantoaxial subluxation, cervical spine spondylolysis and carotid or vertebral artery dissection were excluded from performing Epley maneuver.

Procedure

When diagnosis was established and the affected side identified by means of the positioning maneuvers, each patient was treated with EM. The patient was placed seated with legs stretched in a horizontal position and head turned 45° toward the affected side (step 1). The patient was then placed quickly in a provocative head-hanging position and remained in this position for 2 min

(step 2). Next, the patient was rotated slowly, over the course of 1 min, onto the opposite (unaffected) side, with head and body turned 45° downward, and was kept in this new position for 2 min (step 3). Finally, the patient was returned smoothly to the seated position with the head turned 45° toward the unaffected side, and was kept in this position for a further 2 min (step 4). Following this, the patient was re-examined with the Hallpike maneuver to detect any residual vertigo or nystagmus. In the two cases in which this was found, EM was repeated. The treatment efficiency was evaluated by obtaining subjective relief of the patient which was graded (I to III). This was noted by the patient in his diary for two weeks when it is relieved completely. The diagnosis of posterior semicircular canal BPPV was confirmed by observation of upbeat torsional nystagmus when the head was moved in the plane of the posterior semicircular canal. Anterior canal BPPV was identified by a downbeating torsional nystagmus and horizontal canal BPPV by a direction changing horizontal nystagmus after brisk horizontal head movements.

Response to treatment was categorized as follows:

- i. All vertigo (and nystagmus) resolved.
- ii. BPPV resolved, other vertigo remains: Free of positional vertigo and induced rotatory nystagmus, but nonpositional vertigo still present.
- iii. Partially resolved: Positional vertigo symptoms
- iv. Significantly improved, though still present.

Instructions for Patients after Epley Maneuver

Wait for 10 minutes after the maneuver is performed before going home. All patients were requested to avoid sudden head movements and keep a straight head position for 2 days after treatment. Avoid sleeping on the affected side in order to prevent otolithic debris from returning into the posterior semicircular canal. Two days after treatment, all patients were checked again with the Hallpike maneuver.

Results and Analysis

Demographic details

Thirty five patients were included in the study. Their age ranged between 14 and 60 years. All the patients had giddiness and were found to have a positive Dix-Hallpike/supine roll test confirming the clinical diagnosis of BPPV.

Symptoms

None of the patients had history of preceding viral URTI, or any associated visual, cervical or neurological complaints. Six patients were diabetic. The follow up period was for a minimum of six months. All the patients claimed a strict compliance with post-PRM Manoeuvre's instructions after the procedure. When interviewed at the time of conducting the study, the vast majority of the patients claimed a dramatic improvement reflected in complete cessation of vertigo in 31 patients (88 %). In the remaining 4 patients, 2 patients showed improvement at the end of 1 week and two patient claimed no relief at all.

Even though literature claims up to 30% of recurrence within one year in our study no patient had recurrence within this six months follow up.

Table 1: Side Distribution

Right	Left
21	14

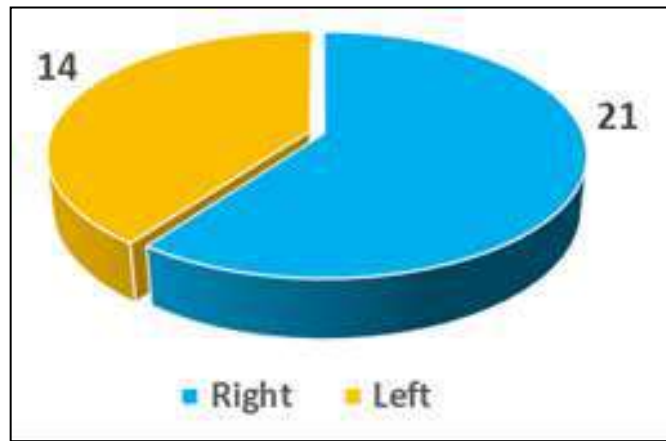


Fig 1: Shows Right and left

Table 2: Duration Distribution

Duration	No. of Patients
< 1 Week	3
1-4 Week	11
1-6 Month	8
7-12 Month	8
>1 Year	5

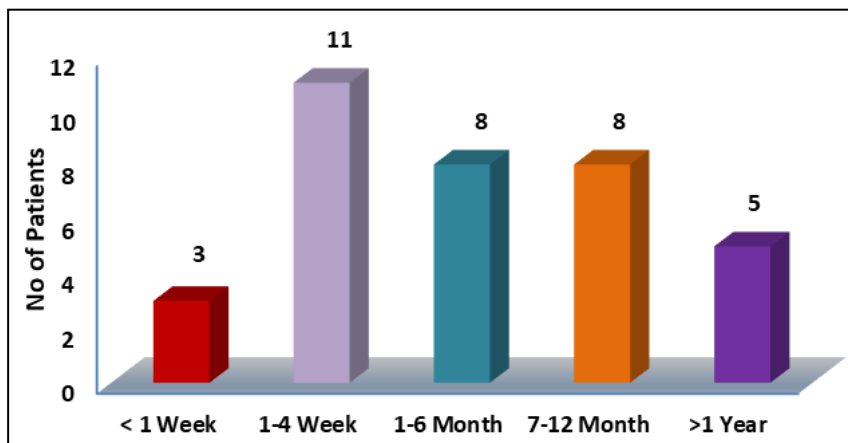


Fig 2: Duration

Table 3: Canal Distribution

Posterior SCC	Lateral SCC	Anterior SCC
29	4	2

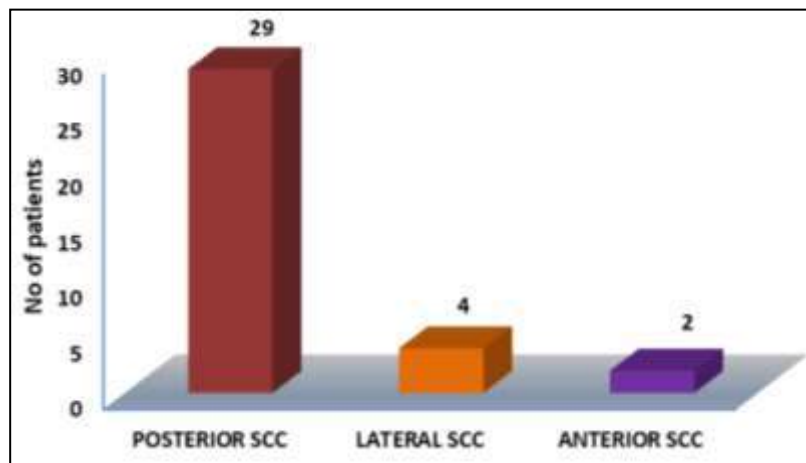


Fig 3: Canal Distribution

Discussion

In this study, it was able to clearly demonstrate the effectiveness of particle repositioning manoeuvre (PRM) in the treatment of BPPV, with success rate approaching 88 %. Other single-session

of Epley's manoeuvre publications, their success is usually ranging from 78 - 90%. An overlooked important aspect of the BPPV is the dramatic improvement achieved post-therapy is addressed and stressed in this study.

Table 4: Assessment of BPPV patients treated with Epley's manoeuvre in different studies:

S. No.	Author	Year	No. of patients	Type I response	Type II response	Type III response
1.	Epley ^[14]	1992	30	90%	10%	-
2.	Nunez and Cass ^[15]	1996	151	91.3%	7.9%	0.8%
3.	Jose <i>et al.</i> ^[16]	2000	51	83%	9%	-
4.	Verma ^[17]	2001	30	90%	10%	-
5.	Khatri <i>et al.</i> ^[18]	2003	34	88.2%	8.8%	2.94%
6.	Present Study	2009	50	88%	11%	5%

The recurrence rate of BPPV after particle repositioning manoeuvre was nil within the following year and 4 patients required a second session. The typical signs and symptoms of BPPV are now believed to be produced by an ampullofugal deflection of the cupula of the posterior semicircular canal as the result of cupulolithiasis or canalolithiasis. However, it is not possible to ascertain its pathogenesis from the usual signs and symptoms.

The therapeutic maneuver developed by Epley is based upon a hypothesis assuming the presence of free floating otolithic debris within the long crns of the posterior semicircular canal.

When an affected patient is placed in a vertical plane with the cupula at the top (as in Hallpike positioning), after a brief latency period otolithic debris reaches the most dependent part of the canal under the influence of gravity.

Epley classified the result after treatment with the manoeuvre into

- i. Resolution of vertigo,
- ii. Presence of nonpositional vertigo,
- iii. Partial resolution
- iv. Same or worse.

On the other hand, Herdman *et al.* classified the result into: 1. No symptoms, negative Dix-Hallpike manoeuvre, 2. Improvement with abnormal manoeuvre, 3. No change.

Summary

Patients coming to ENT opd are screened by questionnaire and direct history taking. History of treatment with vestibular sedative drugs are taken, as it interferes with diagnosis and treatment.

Following which a detailed ENT examination, tuning fork tests, pure tone audiogram and vestibular function tests are done.

Then positional tests like Dix-hall pike and supine roll test done, the nystagmus is carefully watched for, semicircular canal involvement diagnosed. Posterior semicircular canal most commonly involved and it is prevalent in middle aged female with right sided predominance.

After diagnosing posterior canal BPPV Epley's manoeuvre used primarily as well as secondarily.

After doing Epley's manoeuvre patients are then asked to wait in the OPD for half an hour and they are then given post manoeuvre instruction.

Patients were followed up on 7th day, one month and sixth month.

Correctly diagnosed and appropriately executed particle repositioning manoeuvre will give maximum benefit to the patients. Avoiding long-term medication, and the consequent

side effects, is another aspect of the cost-effectiveness of the manoeuvre.

Conclusion

Epley Maneuver is safe, reliable and effective procedure that can be performed in general practice at the bedside without having any significant side effects in treating patients with Benign Paroxysmal Positional Vertigo.

Posterior semicircular canal involvement is most common. Right side is predominant to left. Particle repositioning manoeuvre is effective way to treat and give immediate relief to the patients even though it is a self-limiting disease.

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