The efficacy of Epley manoeuvre in the treatment of posterior canal paroxysmal positional vertigo

Gandomi B. MD¹, Koochak Alavi K. MD², Niknejad N. MD³, Chohedri A. MD⁴

¹Assistant professor of otorhinolaryngology-Shiraz University of Medical sciences,
²Assistant professor of otorhinolaryngology-Semen University of Medical Sciences,
³Otorhinolaryngologist, ⁴Assistant Professor of Anesthesiology-Shiraz University of Medical Sciences, Shiraz, Iran

Abstract

Introduction: Benign paroxysmal positional vertigo is the most common peripheral vestibular disorder. Canalith repositioning manoeuvres are an established method for treatment of this disorder but efficacy of these manoeuvres, including Epley canalith repositioning manoeuvre are reported differently in various studies. In this study the efficacy of the Epley canalith repositioning manoeuvre has been evaluated in 43 patients.

Materials and Methods: 43 patients with a history and physical examination consistent with posterior canal benign paroxysmal positional vertigo were studied. Patients were treated with a modified Epley canalith repositioning manoeuvre. Patients were provided with a preprinted diary in which they had to circle the answers most relevant to their symptoms for 7 days after the manoeuvre. Patients were reevaluated at one week after the manoeuvre, The Hallpike manoeuvre was performed at this time to corroborate the response to therapy.

Results: The mean duration of the BPPV before treatment was 7 weeks. A resolution of vertigo as a result of the manoeuvre was obtained during the first 24 hours in 59% of the patients after one canalith repositioning manoeuvre. 20% of patients had a resolution of vertigo during the first week however it is not evidently possible to conclude that these patients definitely benefited from the canalith repositioning manoeuvre. In 21% of the patients vertigo persisted after the first week. Residual symptoms of lightheadedness, imbalance or both, were frequent (55% of cases) but rarely required any intervention.

Conclusions: Epley canalith repositioning manoeuvre resulted in immediate resolution of vertigo in 59% of our cases after one treatment. This manoeuvre is safe and requires no special equipment or investigations; and it should be regarded as the treatment of choice for BPPV.

Keywords: Benign paroxysmal positional vertigo, Epley manoeuvre, Treatment, Efficacy

Introduction

Benign paroxysmal positional vertigo (BPPV) is the most common peripheral vestibular disorder (1,2). In 1962 Schuknecht presented what has become known as cupulolithiasis or heavy cupula theory, which held that the posterior semicircular canal(PSC) is rendered sensitive to gravity by dense particles attached to or impinging on its cupula (3). Today there is general recognition that the majority of cases result from free-floating debris within the posterior semicircular canal (4,5).
This theory of canalithiasis has largely supplanted Schuknecht's model of cupulolithiasis. Variants of BPPV have been recognized, including diseases affecting the superior and horizontal semicircular canals (6,7).

Treatment strategies specifically designed based on the pathophysiology of the disorder have been developed and have supplanted ineffective or overly aggressive therapies. Specifically, single treatment strategies such as Epley canalith repositioning maneuver and the Semont libatory maneuver have become the standard care for patients with active BPPV(8).

For rare patients with intractable disease, posterior semicircular canal occlusion has proven to be a safe and effective surgical treatment that provides reproducible results in the hands of various surgeons (9).

Despite the fact that overwhelming evidence supports the use of single treatment positional manoeuvres in the treatment of BPPV, a number of questions persists pertaining to the efficacy of these manoeuvres. Questions have been raised pertaining to whether some of the beneficial results attributed to these manoeuvres may result from spontaneous recovery and not from the specific effects of the kind of treatments (10,11).

If the resolution of symptoms is related to the effects of the maneuver and not the spontaneous recovery from the disorder, the recovery from BPPV after the performance of a positional maneuver should be virtually immediate. This prospective study of 43 patients with BPPV was designed to evaluate the efficacy of the Epley canalith repositioning maneuver in the treatment of posterior canal benign paroxysmal positional vertigo.

**Materials and Methods**

Sixty-one patients with BPPV referred to the outpatient clinic of the Ear, Nose and Throat Department of the Shiraz University of Medical Sciences between May 2000 and December 2003. Entry into the study required the presence of active BPPV confirmed by a positive finding on Dix-Hallpike maneuver that reproduced the patient's symptoms and demonstrated characteristic nystagmus. Four patients with signs of horizontal canal positional vertigo and one with anterior canal involvement were excluded from the study.

Thirteen one patients were also lost to follow up, so 43 patients with history and physical examination typical of posterior canal benign positional vertigo completed the study.

Outcome measures included the results of a daily diary designed to identify the precise time when the vertigo resolved and whether the patients had residual symptoms of lightheadedness and imbalance. The results of a Dix-Hallpike maneuver that was performed 7 days after the treatment were also used to determine therapeutic efficacy.

The patients were treated with an Epley maneuver without mastoid oscillation. Specifically, the patient was placed in the supine position with the neck slightly extended and the head turned so that the affected ear was facing the floor.

The patient’s head was then turned so that the contralateral ear was facing the floor. The patient’s body was then rotated so that the head completed a further 90 degree turn. Each position was maintained for 2 minutes. Neck extension was maintained throughout the steps of the maneuver.

Eye movements were directly visualized without the aid of Frenzel glasses. If the direction of the nystagmus reversed during the maneuver, the procedure was halted and repeated.

When the patient was brought back to the sitting position, he or she was instructed to tuck his or her chin to the shoulder to prevent the conversion to a horizontal canal BPPV.
The efficacy of Epley manoeuvre in the treatment of posterior... Gandomi B. MD, and...

The manoeuvre was performed only one time per session. Because of the known fatigability of BPPV, it was not thought to be useful to repeat the manoeuvre until the nystagmus was no longer visualized. The patients were not instructed to maintain any restrictions on head movement or position after the performance of the manoeuvres.

Each patient was given a preprinted diary to maintain on a daily basis for 7 consecutive days. The patient was required to circle the entry that pertained to his or her symptoms on that particular day. The five possible answers were the following:
1) My vertigo did not change.
2) My vertigo was improved but not gone.
3) I had no vertigo.
4) I was lightheaded and/or imbalanced;
5) I felt fine.

The first three answers pertained to the presence or absence of vertigo. The fourth answer pertained to the presence or absence of any residual symptoms.

Patients were instructed that they could circle more than one answer. For example, their vertigo may have resolved (answer 3) but they still may be having residual symptoms (answer 4).

The patients were instructed to return to the office with the diary 7 days after the performance of the manoeuvre, and their condition was evaluated with the Dix-Hallpike manoeuvre.

A negative manoeuvre was needed to confirm response to the canalith repositioning manoeuvre. Other data that were recorded pertained to the patient’s age and sex, the duration of symptoms and the presence or absence of any predisposing factors for BPPV.

Results
Forty-three patients with posterior canal benign paroxysmal positional vertigo were treated with Epley manoeuvre. The number of female patients was 2.4 times that of the male patients.

The mean duration of symptoms was approximately 7 weeks. The age distribution of patients is given in figure 1.

![Fig 1: Age distribution of the patients](image)

The most common age of presentation was 50-59 years. The disorder was relatively uncommon in patients less than 30 years old. Predisposing factors are detailed in table 1.

<table>
<thead>
<tr>
<th>Table 1: Predisposing factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous history of benign paroxysmal vertigo</td>
</tr>
<tr>
<td>Head trauma</td>
</tr>
<tr>
<td>Vestibular neuritis/labyrinthitis</td>
</tr>
<tr>
<td>Otosclerosis</td>
</tr>
<tr>
<td>Prolonged bed rest</td>
</tr>
<tr>
<td>Idiopathic SNHL</td>
</tr>
<tr>
<td>Menière’s disease</td>
</tr>
<tr>
<td>Chronic otitis media/mastoidectomy</td>
</tr>
<tr>
<td>Chemoradiation to the head and neck</td>
</tr>
</tbody>
</table>

SNHL = Sensorineural hearing loss

Approximately 19% of patients had a history of BPPV. Other predisposing factors included head trauma, vestibular neuritis or labyrinthitis and otosclerosis. Two patients had Menière’s disease. The therapeutic response to the Epley canalith repositioning manoeuvre is detailed in figure 2.

![Fig 2: Therapeutic results after the first canalith repositioning manoeuvre](image)
Fifty nine percent of cases had a complete resolution of vertigo within the first day after treatment. 79 percent of cases had a resolution of vertigo within the first week of treatment. In 9 cases (21%) vertigo persisted after one week follow-up period.

Residual symptoms of lightheadedness or imbalance or both were common in this patient population. 55% of cases manifested these symptoms after a successful resolution of vertigo but these symptoms were generally not disabling and no intervention was needed.

Discussion

The hypothesis of this study was that if the Epley canalith repositioning manoeuvre is successful in alleviating BPPV, its effect should be virtually immediate. The rationale for this hypothesis was that riding the semicircular canal of the canaliths should provide immediate relief from vertigo and this study attempted to determine the precise time of resolution of the vertigo.

The study also hypothesizes that a portion of patients in whom the true vertigo has resolved will complain of residual symptoms of lightheadedness and/or imbalance so it was attempted to differentiate the symptom of vertigo from the residual symptoms of lightheadedness and imbalance that may exist after resolution of the vertigo(3).

The results of this study reveal that 59% of cases had a resolution of their vertigo within 24 hours of the performance of the canalith repositioning manoeuvre.

Given that most of these patients had BPPV for a long time (mean 7 weeks) it is reasonable to conclude that the canalith repositioning manoeuvre was responsible for the resolution of their symptoms.

An additional 20% of patients had a resolution of their vertigo within the first week after the treatment. The role of the canalith repositioning manoeuvre in their recovery must be considered questionable.

It is possible to say that the manoeuvre may have loosened the canaliths and allowed them ultimately to pass from the semicircular canal.

Conversely, it is possible that the resolution in these cases may have resulted from spontaneous recovery. 21% of the patients did not report any significant improvement of their vertigo and no additional manoeuvre was performed for these patients. Results of this study are in keeping with another similar study performed by Ruckenstein (12) who also reported the timing of recovery on a daily basis in 86 patients table 2.

<table>
<thead>
<tr>
<th>Author</th>
<th>NO</th>
<th>Efficacy (No of Rss)</th>
<th>Efficacy (No of Rss)</th>
<th>Follow-up (Wk)</th>
<th>Mastoid oscillation</th>
<th>Post-maneuver restrictions</th>
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<tbody>
<tr>
<td>Ruckenstein12</td>
<td>95</td>
<td>70%(1)</td>
<td>74%(2)</td>
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<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Epley8</td>
<td>30</td>
<td>80%(1)</td>
<td>97%(2)</td>
<td>1</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Barnes and Price-Jones13</td>
<td>26</td>
<td>79%(1)</td>
<td>3-4</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Herdman et al14</td>
<td>30</td>
<td>90%(1)</td>
<td>2</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Wellin and Barnes15</td>
<td>27</td>
<td>84%(1)</td>
<td>1</td>
<td>No</td>
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<td>Yes</td>
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<tr>
<td>Lynn16</td>
<td>18</td>
<td>89%</td>
<td>4</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Massoud et al17</td>
<td>23</td>
<td>96%</td>
<td>1</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Blakely10</td>
<td>16</td>
<td>44%</td>
<td>?</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
The efficacy of Epley manoeuvre in the treatment of posterior... Gandomi B. MD, and...

The only difference between Ruckenstein study and ours is that he used mastoid vibration in 86% of his patients which we did not use.

In his study no selection was done with regard to type of canal involved while we selected patients with only posterior canal BPPV for study. No post manoeuvre restriction of head position was used in either of these two studies. Results of several other studies are shown in table 2.

It seems that the use of a diary is the only way to obtain results on a daily basis (2) but as pointed out by lynn et al (16) a diary may be subject to error of omission and they emphasized the need to corroborate the results obtained in the diary with objective findings on physical examination. Thus like Ruckenstein, this study required a negative finding on Dix Hallpike manoeuvre at 7 day follow-up as corroboration of the results recorded in the diary. Factors predisposing the patients to BPPV was similar to other studies(12). The most common predisposing factor was head trauma, found in 9% of our patients (table 1).

The patients in our study reported a high incidence of previous episodes of BPPV (19%). These results are consistent with the concept that BPPV is a recurrent condition as other studies also report a 15% recurrence rate per year (12). The age range and the female to male ratio of patients in this study is consistent with those reported in other major studies (12).

A significant number of patients (55%) reported subjective sensations of lightheadedness and imbalance after resolution of their vertigo. The origin of these symptoms are unclear (2). Possible explanations may include the persistence of small caliber otoliths that can elicit minor symptoms but not vertigo.

Another possibility is that the presence of otoliths causes some damage to the inner ear, for which adaptation must take place.

Another possible explanation is that the presence of active BPPV causes some recalibration at the level of central nervous system that must be readjusted after the canalolithiasis (2). Whatever the origin, these residual symptoms are short-lived and rarely require any specific therapy.

Conclusion

In this study, the Epley’s canalith repositioning manoeuvre resulted in an immediate resolution of symptoms in 59% of cases with posterior canal benign paroxysmal positional vertigo after a single manoeuvre.

Another 20% of our cases may have benefited from the manoeuvre. Only 21% of cases manifested BPPV that persisted after one Epley canalith repositioning manoeuvre. Post manoeuvre restrictions of head position do not appear to offer any advantage in therapeutic efficacy. Residual symptoms of lightheadedness and imbalance are common but usually resolve soon after resolution of the vertigo and rarely require any intervention.

References

تاثیر مانور Epley در درمان سرگیجه خوش خیم گانال خلفی

درمان سرگیجه خوش خیم گانال خلفی با استفاده از مانور Epley (canalith repositioning) بود. این مانور به منظور جایگاه‌برداری بیشتر مایکروتودولهای میزان هوا در مطالعات مختلف مورد سطح مشاهده شده است. در این مطالعه میزان تاثیر این مانور بر روی 43 بیمار بررسی شده است.

مواد و روش‌ها: این مطالعه بر روی 43 بیمار که شرح حال و معاونتی آنها متصل بر تشخیص میزان سرگیجه خوش خیم وضعیتی بوده، انجام شده است. جهت انجام مانور Epley از آثار عمده میزان میزان Epley هفته روز یک شنبه با انجام مانور، تحقیق آنها جمع آوری و مانور انجام می‌گردد. در این مطالعه، هر بیمار به صورت تصادفی به محیط Epley وارد می‌شود.

نتایج: توزیع دوره بیماری قبل از درمان 7 هفته بود. 59% بیماران به دنبال یک بار انجام مانور بهبود کامل سرگیجه را در 24 ساعت اول گزارش کردند. در 20% بیماران بهبود سرگیجه در طی یک هفته بعد از انجام مانور مشاهده شد ولی نوشتاری نتیجه نگیری. این وقوع از این بیماران انتخاب شده است. در 21% بیماران سرگیجه تا بعد از هفته اول ادامه داشت. علل این بود که این بیماران شامل احساس سکیسی در سر، عدم تغییر در 55% بیماران به عنوان علل خیز بودند. ولی به عنوان تدریجی، هر بیماران به درمان پیشنهاد گردید.

نتیجه گیری: یک بار انجام مانور Epley در 59% از بیماران سرگیجه شد. تجدید میزان سرگیجه خوش خیم و وضعیتی در طول مدت مطالعه نفرات شباهت فیزیکی در دو مانور Epley دلمان، میزان تأثیر