The Journal of Laryngology & Otology (2011), ***125***, *572–575*.

doi:10.1017/S0022215110002781

MAIN ARTICLE

Epley's manoeuvre versus Epley's manoeuvre plus labyrinthine sedative as management of benign paroxysmal positional vertigo: prospective, randomised study

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Abstract

Introduction: We report a prospective, randomised study of 51 patients with benign paroxysmal positional vertigo treated with Epley's manoeuvre alone or Epley's manoeuvre plus labyrinthine sedative, at Sundaram Medical Foundation, Chennai, India.

Aim: To compare the efficacy of Epley's manoeuvre versus Epley's manoeuvre plus labyrinthine sedative in the treatment of benign paroxysmal positional vertigo.

Materials and methods: Consecutive patients were selected based on history and positive Dix–Hallpike test. Patients were randomised to receive either Epley's manoeuvre alone or Epley's manoeuvre plus labyrinthine sedative for one week. Both groups were followed up for four weeks.

Results: Univariate analysis showed that one- and four-week outcomes were influenced by the number of episodes, symptom duration and treatment type. Multivariate logistic regression analysis showed that the one-week outcome was significantly influenced by symptom duration and treatment type, while the four-week outcome was significantly influenced by symptom duration alone. Patients receiving Epley's manoeuvre alone showed better recovery than those receiving both Epley's manoeuvre and labyrinthine sedative.

Conclusion: Labyrinthine sedatives do not aid recovery from benign paroxysmal positional vertigo when used in addition to Epley's manoeuvre.

Key words: Vertigo, Paroxysmal; Therapeutics

Introduction

Vertigo is a common problem encountered in medical and otorhinolaryngological practice. Causes may be otological, neurological, medical or psychogenic. Benign paroxysmal positional vertigo (BPPV) is probably the most common cause of vestibular vertigo, accounting for approximately 31 per cent of all cases seen in dizziness clinics.[1] Other causes of vertigo, in decreasing order of frequency, include recurrent vestibulopathy, Meniere's disease and central causes.

Benign paroxysmal positional vertigo is defined as an abnormal sensation of motion which is elicited by certain provocative positions. Barany first described BPPV in 1921.[2] In 1952, Dix and Hallpike first performed the provocative positional test named in their honour.[3] In 1962, Harold Schuknecht proposed the cupulolithiasis theory (i.e. basophilic particles or densities adherent to the cupula of the posterior semicircular canal) as an explanation for BPPV. In 1980, Epley proposed that the symptoms of BPPV were due to free-moving densities (canaliths) in the posterior semicircular canal, rather than fixed densities attached to the cupula.[4] Particles in the canal may slow or even reverse the movement of the cupula, creating new or incorrect neural signals, such that vestibular impulses are incongruous with actual head movements. This mismatch of sensory information results in the sensation of vertigo.

In 1992, Epley described a revolutionary technique for the management of BPPV, involving repositioning the patient's head in a series of manoeuvres.[5] These manoeuvres moved the displaced particles in the posterior semicircular canal back into the utricle, resulting in resolution of symptoms.

Labyrinthine sedatives have often been used in the treatment of BPPV, with or without Epley's manoeuvre.

Our study design was based on the following rationale. The described particle repositioning manoeuvre has a very high reported cure rate.[6–8] Therefore, we believed it was ethically appropriate to provide all

Accepted for publication 19 August 2010 First published online 27 January 2011

patients with this treatment. Furthermore, the treatment of BPPV with medication alone has been strongly discouraged.[9] However, particle repositioning manoeuvres are still not used by many clinicians.[10] Despite the condition's prevalence, considerable variation exists in the management of BPPV across different disciplines.[11] Our study assessed the use of a labyrinthine sedative together with the particle repositioning manoeuvre, as there was only sparse published information on whether the addition of such medication improves the outcome of BPPV patients treated with Epley's manoeuvre.

Aim

We aimed to conduct a randomised study to compare the efficacy of Epley's manoeuvre versus Epley's manoeuvre combined with labyrinthine sedative, in the treatment of patients with BPPV.

Materials and methods

The study was approved by the Institutional Research Oversight/Ethics committee. Informed consent was obtained from all the patients prior to inclusion.

The study was conducted at Sundaram Medical Foundation, Chennai, India, a 200-bed, non-profit, teaching hospital. All patients with postural giddiness who presented to the emergency department, medical department or otorhinolaryngology department were referred for the study, for a period of six months. No prior treatment was given to these patients before referral.

Patients with BPPV often give a clear history of discrete, episodic periods of vertigo lasting one minute or less whenever the patient changes their head position relative to gravity, such as when rising from bed, rolling over in bed (onto one particular side, or both sides) or tilting the head to look upward. In the present study, BPPV was diagnosed as per published diagnostic criteria, including a positive Dix–Hallpike test.[11]

Patients with severe neck problems, retinal detachment, uncontrolled blood pressure or a recent history of cerebrovascular accidents were excluded from the study.

Patients were randomly assigned to one of two treatment groups, using rapid number generation.

The modified version of Epley's manoeuvre, i.e., without any pre-medication or mastoid vibration, was administered to all the patients only once.

Patients in the second treatment group were prescribed cinnarizine 25 mg thrice daily for one week, in addition to receiving a modified Epley's manoeuvre.

Standard post-procedure instructions were given to both treatment groups.

A consultant blinded to patient treatment evaluated the patients one and four weeks after treatment. Response to therapy was classified, based on the patient's symptoms (subjectively rated on a scale of 1 to 10), reported resolution (or otherwise) of vertigo, and positional nystagmus (on Dix–Hallpike testing), as follows: cured, 50 per cent improvement in symptoms, no improvement, or worsened.

Statistical analysis was performed using Stata 7.0 software. Level of probability $p < 0.05$ was regarded as significant.

TABLE I
PATIENT DEMOGRAPHICS

Parameter	Value
Age (years)	
– Range	25–77
– Mean	51.3*
Gender (F/M; *n*)	
– Group A	13/12†
– Group B	15/11

*$p = 0.47$, group A *vs* group B. †$p = 0.69$, group A *vs* group B. F = female; M = male; group A = Epley's manoeuvre; group B = Epley's manoeuvre + labyrinthine sedative

Results

Fifty-one patients were included in the study. Twenty-five patients were treated with modified Epley's manoeuvre alone, and the remainder with Epley's manoeuvre plus labyrinthine sedative for one week. Patient demographics are shown in Table I.

The median duration of symptoms in the total group was seven days. The duration of symptoms did not differ significantly between the groups ($p = 0.19$), suggesting appropriate randomisation.

In the total group, the number of previous episodes of vertigo ranged from one to 20, with a mean number of 4.85. The median number of episodes (calculated due to skewed distribution) was two. The distribution of number of previous episodes in both groups was comparable ($p = 0.19$), confirming that randomisation was appropriate.

Table II shows the treatment outcomes in the two groups.

The association between the outcome at four weeks and the number of previous BPPV episodes and duration of symptoms is shown in Table III. Patients who had more than three previous episodes of BPPV, and those who had symptoms lasting more than seven days, were less likely to benefit from Epley's manoeuvre.

TABLE II
TREATMENT OUTCOME

Outcome	Group A		Group B	
	1 wk	4 wk	1 wk	4 wk
Cured	20	21	8	15
50% improved	2	1	16	7
Lost to FU	3	3	2	4

Data represent patient numbers. Group A = Epley's manoeuvre; group B = Epley's manoeuvre + labyrinthine sedative; wk = weeks; FU = follow up

https://doi.org/10.1017/S0022215110002781 Published online by Cambridge University Press

TABLE III
FOUR-WEEK OUTCOME BY BPPV EPISODES AND SYMPTOM DURATION

Parameter	Cured	Not cured
BPPV episodes (*n*)		
<3	22	7
>3	4	11
Symptom duration (d)		
<7	22	7
>7	4	11

BPPV = benign paroxysmal positional vertigo; d = days

Upon univariate analysis, the variables seen to influence the outcome at one and four weeks were number of previous episodes, duration of symptoms and treatment type (Table IV). Chi-square testing indicated that treatment with modified Epley's manoeuvre alone was a much stronger predictor of improvement at one week, compared with treatment with modified Epley's manoeuvre plus labyrinthine sedative (chi-square = 14.02, $p < 0.001$).

Multivariate logistic regression analysis was constructed to assess the contribution of the various significant factors identified on univariate analysis. This showed that symptom duration and treatment type were significant influences on one-week outcome, while symptom duration was the only significant influence on four-week outcome.

Discussion

Our results show that, at both one and four weeks post-treatment, patients with BPPV treated with Epley's manoeuvre alone had a much higher rate of symptom resolution, compared with patients treated with Epley's manoeuvre plus labyrinthine sedative. However, the difference between the groups was less statistically significant at four weeks (chi-square = 5.8) than at one week (chi-square = 14). When the significant predictors identified by univariate analysis were subjected to multivariate logistic regression analysis, the significant factors predicting one-week outcome were symptom duration and treatment type. When the same analysis was repeated for four-week outcome, the only significant factor affecting outcome was symptom duration alone.

TABLE IV
UNIVARIATE ANALYSIS: VARIABLES *VS* OUTCOMES

Variable	Outcome	
	1 wk	4 wk
No of previous episodes	0.001*	0.002*
Symptom duration	0.02*	0.03*
Treatment group	0.01*	0.016*
Gender	0.17	0.48
Age	0.18	0.39

Data represent p values. *Significant at $p < 0.05$. Wk = weeks; no = number

These results suggest that (1) Epley's manoeuvre is a very effective method for alleviating the symptoms of BPPV, and (2) the use of labyrinthine sedatives in addition to Epley's manoeuvre does not improve treatment outcome.

Several reasons could explain the delay in symptom resolution in those patients treated with Epley's manoeuvre plus labyrinthine sedative, based on current knowledge of the pathophysiology of BPPV and the mechanism of action of Epley's manoeuvre and labyrinthine sedatives. Labyrinthine sedatives prolong central compensation in cases of peripheral vestibular injury, thereby delaying recovery.[11] As they sedate the labyrinth, they thus attenuate the signals sent by the labyrinth to the brain, delaying the recovery process despite the particle repositioning achieved by Epley's manoeuvre.

We found that resolution of symptoms was directly related to the chronicity of illness. Our results showed that prolonged duration of symptoms (especially more than seven days) and a history of multiple previous vertigo episodes (i.e. more than three) were associated with persistence of symptoms at four weeks post-treatment. This occurred irrespective of the treatment patients received. A prolonged duration of symptoms suggests that disease may be more advanced and thus harder to treat.

None of our patients had previously undergone Epley's manoeuvre. In patients receiving this treatment alone, response was excellent. It is possible that this treatment is more useful earlier in the disease course. A poor response may indicate advanced disease or concomitant factors.

Neuhauser *et al.* have suggested that the incidence of BPPV is significantly greater in women and rises with age.[12] However, other authors have found no association between BPPV incidence and sex or age.[13,14] In our study, neither age nor sex had any significant association with BPPV incidence. This could be due to either small sample size or referral bias in our centre.

Epley's manoeuvre is a relatively simple procedure which can be conducted in the clinic. Our findings indicate that this treatment should be routinely administered for the management of BPPV. In our study, a trainee ENT surgeon performed the procedure. However, it can be safely performed by primary care physicians, provided the proper sequence is followed. Training of primary care physicians in the correct performance of Epley's manoeuvre would be highly beneficial.

Study limitations

The scope of the current study was limited by several factors.

Firstly, the duration of follow up was only four weeks. Much longer follow up may have been useful to assess any recurrence of symptoms, as BPPV is an episodic disease.

Secondly, we did not include a control group receiving no treatment, although this would have provided

https://doi.org/10.1017/S0022215110002781 Published online by Cambridge University Press

the most appropriate comparison. However, we judged such a control group to be unnecessary, as sufficient published evidence exists to prove beyond doubt that Epley's manoeuvre is better than placebo.[6–8]

- **Epley's manoeuvre is a very effective treatment for benign paroxysmal positional vertigo (BPPV)**
- **The addition of a labyrinthine sedative does not improve treatment outcome**
- **Prolonged symptom duration (more than seven days) and multiple BPPV episodes (more than three) were independently associated with persistent BPPV**

Thirdly, our results came from only one centre and may thus have been influenced by systematic bias. This possibility would have been avoided by a multicentre study.

Conclusion

The modified Epley's manoeuvre is a very effective treatment for BPPV. It is a simple procedure which can be performed in an out-patient setting. Patient compliance is very good. The use of labyrinthine sedatives together with Epley's manoeuvre delays the recovery process. The response to Epley's manoeuvre is limited in patients with long-standing BPPV.

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Dr V Rangachari takes responsibility for the integrity of the content of the paper
Competing interests: None declared