SHORT REPORT

Short-term efficacy of Epley's manoeuvre: a double-blind randomised trial

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Background: Benign paroxysmal positional vertigo of the posterior canal (PC-BPPV) is a common vestibular disorder and can be easily treated with Epley's manoeuvre. Thus far, the short-term efficacy of Epley's manoeuvre for treatment of PC-BPPV is unknown.
Objectives: To evaluate the efficacy of Epley's manoeuvre for treatment of PC-BPPV 24 h after applying the manoeuvre.
Methods: The short-term efficacy of Epley's manoeuvre was compared with a sham procedure in 66 patients with PC-BPPV by using a double-blind randomised study design.
Results: 24 h after treatment, 28 of 35 (80%) patients in the Epley's manoeuvre group had neither vertigo nor nystagmus on positional testing compared with 3 of 31 (10%) patients in the sham group ($p<0.001$).
Conclusion: Epley's manoeuvre is shown to resolve PC-BPPV both effectively and rapidly.

Benign paroxysmal positional vertigo of the posterior canal (PC-BPPV) is caused by dislodged otoconia trapped in the posterior semicircular canal that move under the influence of gravity after changes of head position in the plane of the canal. The resulting inappropriate endolymph flow activates hair cell receptors, causing positional vertigo and nystagmus.

Epley's manoeuvre is used to clear the affected semicircular canal from mobile particles by a set of five successive head positions that are hand guided by a therapist.[1] The efficacy of Epley's manoeuvre for treatment of PC-BPPV has been shown in numerous studies. A recent meta-analysis identified seven randomised, controlled trials on Epley's manoeuvre in clearly defined cases of PC-BPPV that required the absence of nystagmus during positioning tests for a positive outcome. All studies showed higher remission rates in treated patients than in controls.[2] Outcome assessment, however, was blinded in only three of them.[3–5] Moreover, the magnitude of the effect of Epley's manoeuvre has been questioned, as PC-BPPV has the tendency to resolve spontaneously.[6] So far, none of the trials on the efficacy of Epley's manoeuvre has evaluated the short-term efficacy in terms of hours as required for treatment assessment of spontaneously resolving disorders.

METHODS

Patients

Sixty seven patients (57 from a dizziness clinic and 10 from a neurologist's practice specialised in neurotology) with acute unilateral PC-BPPV were included according to the following criteria:

1. A history of short-lasting vertigo (<1 min) precipitated by changes in head position
2. Mixed torsional or upbeating nystagmus beating with the torsional component towards the undermost ear in one of the lateral head hanging (Dix–Hallpike) positions lasting no longer than 30 s
3. Brief latency between head positioning and onset of nystagmus.

Patients with bilateral BPPV or involvement of the horizontal or anterior canal and patients who had previously received an Epley's manoeuvre during the present episode of BPPV were excluded.

Study design

Patients were randomly assigned to treatment with Epley's manoeuvre (n = 36) or a sham procedure (n = 31). Sealed envelopes with a computer-generated randomisation code were opened after written consent to participate had been obtained according to the local ethics committee. Treatment groups did not differ with respect to clinical and demographic baseline characteristics (table 1).

For treatment with Epley's manoeuvre, patients were brought rapidly from a sitting position to a supine, head-hanging position with the head turned 45° towards the affected ear. After 30 s, the head was rapidly turned by 90° to the non-affected side without elevating the head (thus facing 45° to the non-affected side). After 30 s, the head was turned by a further 90° to the non-affected side after the patient had rolled the trunk on this side. Finally, after waiting another 30 s, the patient was asked to sit up again. The sham manoeuvre consisted of an Epley's manoeuvre for the contralateral, non-affected side. In the Epley's manoeuvre group, Dix–Hallpike testing and Epley's manoeuvre were repeated during one treatment session until no more nystagmus and vertigo could be elicited. Patients in the Epley's manoeuvre group were treated with up to three manoeuvres, whereas patients in the sham group received a corresponding number of sham manoeuvres. Thus, each patient in the sham group was treated with the same number of manoeuvres as the previous patient in the Epley's manoeuvre group. Both manoeuvres were performed without vibration or prior treatment. Patients did not receive post-treatment instructions to stay upright.

Twenty four hours later, outcome was assessed by an investigator who was blinded to the patient's treatment. Early assessment of outcome immediately after treatment was not attempted, as the well-known phenomenon of a fatiguing response after repeated positioning can mimic successful treatment. Without interviewing the patient, the investigator performed a Dix–Hallpike manoeuvre. Successful treatment was defined as the absence of positional vertigo and nystagmus on positional testing. Dix–Hallpike testing was performed twice in rapid succession before being rated as

Abbreviations: PC-BPPV, benign paroxysmal positional vertigo of the posterior canal

Table 1 Clinical and demographic characteristics of patients with benign paroxysmal positional vertigo (BPPV)

	Epley (n = 35)	Sham (n = 31)	p Value
Median age in years (range)	59 (33–86)	63 (19–83)	0.2
Sex ratio (male:female)	1:1.9	1:3.4	0.3
Affected side (right:left)	1.7	1.6	0.9
Idiopathic BPPV*	82.9%	87.1%	0.6
First episode of BPPV	65.7%	77.4%	0.3
Median duration of episode in days (range)	36 (1–3960)	25.5 (1–1800)	0.7

*No history of acute vestibular loss, Menière's disease or head trauma within 6 months before onset of BPPV.

negative. At this time, patients in both groups with a still positive Dix–Hallpike test were treated with up to three Epley's manoeuvres for the affected ear. Subjective outcome was again assessed by means of a telephone interview 1 day (sham group only), 1 week and 1 month thereafter. One patient in the Epley's manoeuvre group did not return for positional testing. Therefore, the statistical testing was carried out on 66 patients. Comparisons were by χ^2 test or t test and at a significance level of $p<0.05$.

RESULTS

Twenty four hours after treatment, 28 of 35 (80%) patients in the Epley group were free of positional vertigo and nystagmus compared with 3 of 31 (10%) patients in the sham group ($p<0.001$) (table 2). In the Epley's manoeuvre group, 43% of successfully treated patients received a single Epley's manoeuvre, whereas 57% needed more than one Epley's manoeuvre to become asymptomatic. One day after receiving an Epley's manoeuvre for the affected side, 26 of 28 (93%) patients in the original sham group reported resolution of symptoms. Only 1 of 28 patients who were asymptomatic 24 h after treatment with Epley's manoeuvre reported relapse of positional vertigo 1 week thereafter. At 4 weeks, 85% of all patients were free of positional vertigo (table 2). Epley's manoeuvre could be readily performed in all participating patients and there were no serious adverse affects of treatment. In the Epley's manoeuvre group, side effects included transient nausea in eight patients and vomiting in four patients, whereas in the sham group, only one patient reported nausea.

Table 2 Treatment and outcome in patients with benign paroxysmal positional vertigo of the posterior canal

	Epley's manoeuvre (n = 35)	Sham procedure (n = 31)	p Value
Treatment			
Manoeuvres; mean (SD)	1.8 (0.8)	1.6 (0.7)	
One manoeuvre; n (%)	15 (43)	15 (48)	
Two manoeuvres; n (%)	13 (37)	13 (42)	
Three manoeuvres; n (%)	7 (20)	3 (10)	
Outcome after 24 h			
Absence of positional nystagmus; n (%)	28 (80)	3 (10)	<0.001
Absence of positional vertigo; n (%)	28 (80)	4 (13)	<0.001
Outcome after 1 week			
Absence of positional vertigo; n (%)	33 (94)	22 (82)*†	
Outcome after 4 weeks			
Absence of positional vertigo; n (%)	30 (86)	22 (85)*‡	

*Outcome of patients in the sham group who received the appropriate Epley's manoeuvre 24 h after inclusion in the study.
†Four patients lost to follow up.
‡Five patients lost to follow up. Outcome assessment after 24 h was carried out by a blinded investigator in the clinic, whereas assessment after 1 and 4 weeks was by telephone interview.

DISCUSSION

This study shows that treatment of PC-BPPV with Epley's manoeuvre is more effective than a sham procedure at short-term follow up. After 24 h, PC-BPPV had resolved in 80% of patients treated with Epley's manoeuvre compared with only 10% of those treated with the sham procedure. The study design comprises a short interval between treatment and evaluation, whereas previous studies assessed treatment outcome after 1–5 weeks.[3–5] Long follow-up periods, however, tend to confound the results because of either spontaneous particle migration out of the canal by natural head movements or reaccumulation of particles in the canal despite successful initial treatment. The first argument appears to be more relevant, as a considerable proportion of patients experience spontaneous remission within 1 week. Published figures vary widely, reaching 51% in one study.[7] On the other hand, the recurrence rate after successful treatment has been estimated at only 15% a year[8] and 26% within 60 months.[9] Thus, the design of our study with an early outcome assessment relates the recovery rate directly to the intervention and minimises the effect of spontaneous remission. The effect of Epley's manoeuvre is also long lasting as, 4 weeks after treatment, 85% of patients who underwent Epley's manoeuvre were still asymptomatic. Early relapses within the first week after successful treatment were noted in only 1 of 28 patients, indicating that post-treatment restrictions are usually not required.

All previous trials on the efficacy of Epley's manoeuvre in PC-BPPV showed a positive effect compared with no treatment or sham procedures,[2] except for one study that did not perform Epley's manoeuvre properly by applying insufficient head rotation.[6] Similar to our study, previous double-blind controlled studies on the efficacy of Epley's manoeuvre found that positional vertigo was abolished in 76% of patients after 1 week,[5] in 67% after 1–2 weeks[4] and in 89% after 1 month.[3] The remission rate in the control group, however, ranged from 27% to 48%, which is considerably higher than that in the present study, where only 10% were asymptomatic on follow-up.[3–5] We speculate that the difference between the Epley's manoeuvre group and the control group was more pronounced in our study than that in previous studies, as previous studies may have included a larger proportion of spontaneous remissions in their controls due to longer follow-up intervals.

Clinical experience suggests that repeating Epley's manoeuvre during one session increases its effectiveness. Accordingly, 57% of patients required more than one Epley's manoeuvre to convert the Dix–Hallpike test to negative at the initial treatment session. Most previous studies also repeated Epley's manoeuvre during the treatment session when necessary, as originally advised by Epley.[1 3–5] A recent study, however, that aimed to examine the benefit of repeated against single Epley's manoeuvres

during one treatment session showed only a trend for multiple manoeuvres that was not statistically significant.[10] Thus, the important question of whether repeated Epley's manoeuvres during one session are more effective than just one remains to be examined systematically.

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