Meta-analysis on the efficacy of Epley's manoeuvre in benign paroxysmal positional vertigo

M.P. Prim-Espada a,*, J.I. De Diego-Sastre a and Elia Pérez-Fernández b

a Servicio de Otorrinolaringología, Hospital Universitario La Paz, Universidad Autónoma de Madrid, Madrid, Spain
b Unidad de Investigación, Hospital Universitario La Paz, Universidad Autónoma de Madrid, Madrid, Spain

Received on 9th June 2009; accepted on 18th January 2010

Abstract

Introduction: Benign paroxysmal positional vertigo (BPPV) is one of the most common conditions that cause the physiognomy of peripheral vertigo.

Objective: To evaluate the effectiveness of Epley manoeuvre (EM) in the treatment of BPPV using a critical review of the medical literature and a meta-analysis.

Methods: Searches were made in the databases of MEDLINE (PubMed), in the Cochrane collection (Cochrane Register of controlled studies), BIREME and LILACS (all of them up to December 2008). The search words used were: canalith repositioning procedure, canalith repositioning manoeuvre, Epley manoeuvre, Dix-Hallpike, benign vertigo, benign positional vertigo, benign paroxysmal positional vertigo and BPPV. The meta-analysis was performed using the program RevMan 5.0.

Results: The patients on whom an EM was performed had a six and half times more chance of their clinical symptoms improving compared to the control group of patients (OR=6.52; 95% CI, 4.17-10.20). Similarly, the likelihood of having a negative Dix-Hallpike (DH) test are 5 times greater in patients had the EM performed than in those who did not (OR=5.19; 95% CI, 2.41-11.17).

Conclusions: The EM is effective in controlling BPPV.

© 2009 Sociedad Española de Neurología. Published by Elsevier España, S.L. All rights reserved.

PALABRAS CLAVE
Metaanálisis; Vértigo positional; Vértigo positional paroxístico benigno; Epley manoeuvre

Estudio metaanalítico de la eficacia de la maniobra de Epley en el vértigo posicional paroxístico benigno

Resumen

Introducción: El vértigo posicional paroxístico benigno (VPPB) es una de las enfermedades que más habitualmente producen vértigo de fisionomía periférica.
**Introducción**

El vértigo paroxístico benigno (BPPV) es una entidad relativamente frecuente en la oftalmología, y su incidencia aumenta alrededor de 38% por década de vida.1.2 Su tasa de aparición se sitúa entre 10.7 y 64 casos por 100,000 habitantes al año, y aumenta alrededor de 38% por década de vida.2.3 Su presentación clínica es muy característica, consistiendo de episodios de vértigo de segundos de duración, que ocurren durante la actividad normal de la persona.4.3

Hay dos teorías clásicas acerca de la patofisiología de esta enfermedad. La primera fue la teoría cupulolítica (Schuknecht, 1969), de acuerdo con la cual fragmentos de otolitos, típicamente encontrados en el utrículo y sacculo, se movieron hacia el conducto semicircular posterior (PSD).4.3.5 En el comienzo de los noventa, se publicó que en algunos casos los otolitos se quedaron "atrapados" en el PSD y se convirtieron en una fuente de síntomas (canalilitis).6.3.5 Une vez que las bases patofisiológicas del BPPV fueron establecidas, varias reasignaciones de los otolitos emergieron, como el procedimiento canalíltico (PC).3.1

**Métodos**

Se realizaron búsquedas en la base de datos MEDLINE (PubMed), en la colección Cochrane (Cochrane Register of controlled studies), BIREME y LILACS (todas ellas hasta diciembre de 2008). Las entradas empleadas incluyeron: canalith repositioning procedure, canalith repositioning maneuver, Epley maneuver, Dix-Hallpike, benign vertigo, benign positional vertigo, benign paroxysmal positional vertigo y BPPV. Para cada una de las búsquedas, se establecieron los siguientes límites: "meta-analysis", "clinical trial", "randomized controlled trial". No se establecieron restricciones adicionales.

En inclusión se consideró un caso clínico típico de BPPV con un resultado positivo en el test de Dix-Hallpike (DH) al inicio del estudio, estudio con sujetos de más de 18 años, el uso de controles aleatorizados, el uso del procedimiento descrito por Epley para eliminar la condición y al menos un control después de la implementación del procedimiento Epley en un plazo máximo de un mes. Los trabajos en los que otras intervenciones físicas se utilizaron se excluyeron. La selección de este periodo de tiempo se hizo con el fin de minimizar un confundidor: que la condición pueda mejorar y/o resolverse por sí misma. Para evaluar la eficacia de tratamiento, la resolución de síntomas o la negatividad de DH se consideró.4.3.5

A través de la metodología utilizada por diferentes autores, la información de cada artículo se separó y analizada en varios grupos como se muestra en la tabla 1. Cuando se recogieron varios períodos de seguimiento (en el mismo mes), se utilizó el periodo más corto porque con la menor cantidad de trabajos se minimizó el confundidor: que la condición pueda mejorar y/o resolverse por sí misma. Para evaluar la eficacia de tratamiento, la resolución de síntomas o la negatividad de DH se consideró.4.3.5

El metaanálisis se realizó con el programa RevMan 5.0.9

**Resultados**

Los pacientes a quienes se aplicó la técnica tienen un 6 veces y media más oportunidad de tener un resultado negativo en el test de Dix-Hallpike que aquellos sin tratamiento (OR=6,52; CI del 95%, 4,17-10,20). Igualmente, los pacientes a quienes se efectuó la técnica tienen un 5 veces más oportunidad de tener un resultado negativo en el test de Dix-Hallpike que aquellos sin tratamiento (OR=5,19; CI del 95%, 2,41-11,17).

**Conclusiones**

La técnica de Epley es efectiva en el control del BPPV.

© 2009 Sociedad Española de Neurología. Publicado por Elsevier España, S.L. Todos los derechos reservados.
Results

We found 6 studies that evaluated the EM according to clinical resolution of symptoms, with a total of 351 individuals participating in them. In the group that carried out the EM, the success rate was 74.15% (132/178), compared with 32.94% for the controls (57/173) (p<0.00001) (fig. 1). Thus, those patients who underwent the EM were about 6.5 times more likely to improve their clinical symptoms than patients in the control groups (OR=6.52; 95% CI, 4.17-10.20) (fig. 1). There does not appear to be heterogeneity in the selected articles (that is, variance in the observed effect of a treatment) because both the OR and its CI values are between 1 and 100. This is confirmed by the calculated probability of being heterogeneous, which is not statistically significant (p=0.32) (fig. 1); they are thus homogeneous studies. Similarly, on the funnel plot graph generated by RevMan 5.09 to that end, no publication bias can be observed in the series of publications reviewed.

Likewise, DH test negativity was more common in people treated by EM than in controls (7 studies with 389 participants). We found a resolution rate for the condition (measured with the DH test) of 74.88% (161/215) in individuals
who underwent EM, as opposed to 44.25% (77/174) for the controls (p<0.0001) (fig. 2). In this case, the chances of DH test negativity are slightly over 5 times higher in patients receiving EM (OR=5.19; 95% CI, 2.41-11.17). Heterogeneity was slightly higher, but still without reaching statistical significance (p=0.07) (fig. 3). This effect was due to the studies of Li13 and Sridhar et al.,15 whose CI upper limits were 405.31 and 1,135.59, respectively (that is, 4 times and slightly over 11 times the maximum limit of 100). This can be observed in studies evaluating the efficacy of the Epley manoeuvre through the Dix-Hallpike test; the statistical program thus fails to generate the “funnel” plot.

Similarly, those articles in which the EM was tested depending on the outcome of the DH test were also homogeneous (p=0.07) (fig. 2). However, they were homogeneous to a lesser extent, mainly due to the study by Sridhar et al.15

Discussion

In 1952, Dix and Hallpike at the National Hospital Queen Square in London observed patients in whom a finite nystagmus (usually rotatory) was induced after adopting a critical head position and after a period of latency.18 From this first description of the condition until the early nineties, patients generally received no treatment or else performed habituation exercises (for example, Brandt-Daroff).4 In the seventies and eighties, some surgical modalities (such as singular nerve neurectomy or the occlusion of posterior semicircular canal) arose, all aimed at trying to resolve those cases that evolved towards chronicity.6

All this range of therapeutic resources fell mostly into disuse after the description of particle repositioning manoeuvres, such as those of Epley or Semont.5,6 In the case of the EM (the most widely used by Anglo-Saxon doctors), the rates of condition resolution reported range between 60% (in studies in which the DH test was used as measurement) and 80% (in series in which evaluation was only clinical).4,19 In addition to its effectiveness, the widespread use of the EM in those latitudes represents a time saving compared with other techniques such as that of Semont, because in the EM it is not necessary to wait after the diagnosis to obtain a positive DH test. In general, both the EM and any of the other manoeuvres described for the particle repositioning (for example, the Semont manoeuvre) have in common their non-invasiveness, their ease of performance in consultation without the need for special equipment, their potential to resolve the vertigo with relative speed and the possibility of being repeated as many times as necessary.4

Meta-analysis is a very valuable tool for integrating the results of various studies on the effectiveness of a particular treatment.3,18 However, it has a number of limitations that we attempted to minimise in this study. It was not possible to avoid (as in no case in the reviewed literature on the subject) the fact that we could not include data from unpublished studies, especially knowing that many of them collected series whose results were the absence of beneficial effects.6 The reason is that these series have difficulties in being published, either because the reviewers of the journals are unwilling to accept them, or because this constraint appears directly in the publication conditions of the journal.4 In addition, we did not consider that potential conflicts of interest and/or economic conflicts about the therapies (for example, with chemotherapy) presented a bias in the case of BPPV and the EM. This was because, apart from the cervical collar employed after the manoeuvre...
Meta-analysis on the efficacy of Epley’s manoeuvre in benign paroxysmal positional vertigo

(5) Of scant economic cost and paid for by the health system in our environment, they are not burdensome procedures. On another note, the present study was not affected by other biases related to meta-analysis, such as restrictions based on languages or databases employed.

We found two previous meta-analysis on the effectiveness of the EM in the treatment of BPPV. Although the general conclusions coincide with ours (that the EM is effective in treating BPPV), we have tried to improve some of their methodological aspects. In the study by Teixeira et al, the authors placed a language limitation on the search, selecting only articles in English, Portuguese and Spanish. As for the study by Woodworth et al, their search for articles was carried out exclusively in the MEDLINE database, which, although one of the most widely used in medical literature, is not the only one or exclusive. There are some other useful ones, particularly in the case of meta-analysis (for example, Cochrane).

All studies selected and included in the present meta-analysis were Phase I clinical trials. They utilised only the EM (that is, there was no use of mastoid vibration or medications) and post-manoeuvre movement was restricted through the use of a cervical collar. However, it is curious to note that a few of them described the side effects of the procedure. Two examples are the study by Froehling et al, which collected vomiting during the EM and intolerance to it by neck problems, and also the study by Yimtay et al, with fainting, sweating, pale skin and hypotension.

Conclusions

There is solid scientific evidence showing that the EM is effective for the treatment of BPPV. Patients who undergo the EM are 6.5 times more likely to solve their acute clinical symptoms compared with controls and 5 times more if we evaluate DH test negativity.

Conflict of interests

The authors declare no conflict of interests.

References