Falling sensation in patients who undergo the Epley maneuver: A retrospective study

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Abstract
The author conducted a retrospective study to determine the prevalence of a falling sensation in patients who underwent the Epley canalith repositioning maneuver for the treatment of benign paroxysmal positional vertigo. The author studied a total of 436 maneuvers performed on 412 patients and observed 58 episodes (13%) of a strong falling sensation, some very severe. In almost every case, the sensation occurred when the patient was moved to the final (sitting) position; in 1 case, the sensation occurred nearly 30 minutes later. The author recommends that physicians who perform the Epley maneuver warn patients of the risk of a falling sensation, take steps to prevent its consequences, and monitor their patients for at least 30 minutes after the completion of the procedure.

Introduction
Two mechanisms have been proposed to explain the cause of benign paroxysmal positional vertigo (BPPV): cupulolithiasis and canalithiasis.

The cupulolithiasis theory holds that BPPV is caused by the presence of otoconial debris that adheres to the cupula of the posterior semicircular canal. This theory dates back to 1969, when Schuknecht reported autopsy findings of basophilic deposits on the cupula in subjects who had had a history of BPPV.

The canalithiasis theory was first advanced by Hall et al 10 years later. They proposed that BPPV is caused by the presence of free-floating debris in the endolymph of the semicircular canal. Evidence and experience gained since then strongly support canalithiasis as the primary cause of BPPV. In particular, support for this theory was provided by Parnes and McClure, who observed free-floating amorphous material in the posterior semicircular canal during semicircular canal occlusion surgery in patients with BPPV.

Most cases of BPPV involve the posterior semicircular canal, but other canals can be involved, as well. When a patient is in a nystagmus-provoking position, gravity causes particles in the posterior semicircular canal to move along the canal, thereby creating a hydrodynamic pull of the endolymphatic fluid in an ampullofugal direction. Ampullofugal stimulation of the cupula of the posterior semicircular canal leads to vertigo and to an up-beating and torsional nystagmus secondary to the contraction of the ipsilateral right superior oblique muscle ipsilateral to the posterior semicircular canal and of the contralateral inferior rectus muscle. Given that the cross-sectional diameter of the ampulla is greater than that of the canal, the hydrodynamic pull deflects the cupula and provokes classic nystagmus.

In 1993, Herdman et al attempted to explain how the Epley maneuver works in the context of the canalithiasis theory. Since then, many reports have been published on the effectiveness and outcomes of particle repositioning maneuvers and modifications of various maneuvers. However, until now, there have been no reports describing falling sensations experienced by patients at the end of the Epley maneuver when they are in the sitting position. In this article, we describe our study of these sensations.

Patients and methods
We retrospectively reviewed the records of 412 consecutively presenting patients—264 (64%) females and 148 (36%) males, aged 13 to 86 years (mean: 44.8 ± 12.5)—who had undergone the Epley maneuver at the author’s institution for the treatment of posterior semicircular canal BPPV between Jan. 1, 1996, and Dec. 31, 2001. Twenty-four of these patients had recurrent disease, bringing the total number of Epley maneuvers to 436. Of the 436 maneuvers, 253 (58%) were performed on the right and 183 (42%) on the left. Among the 24 patients who experienced second attacks, 19 experienced a recurrence on the same side and 5 on the opposite side. The interval between the first and second attacks varied from 1 month to 5 years.

The particle repositioning maneuver was performed in the manner described by Epley. Since our first experience...
with a patient who had experienced a falling sensation and panic, we have warned all patients about this sensation and instructed them to hold the table tightly when they return to a sitting position.

Each Epley maneuver was performed two or three times until no nystagmus was detected. All sequences were recorded by videonystagmography. Afterward, all patients were given a soft cervical collar and instructed to keep their head in an upright and level position for 48 hours. Thereafter, they were permitted to lie down at a 45° angle for 7 days. All patients were reevaluated 2 weeks after treatment. In the meantime, they had been asked to report any complaints, such as vertigo or dizziness, by telephone.

Results
During the final (sitting) position of the 436 Epley maneuvers, there were 58 episodes (13%) of a strong falling sensation and a strong down-beating nystagmus of 5 to 10 seconds’ duration. Of the 58 affected patients, 43 (74%) were males. The falling sensations were so strong that patients were unable to sit upright; in fact, 9 of these patients almost fell off the examination table despite our firm support. No patient was injured, but the experience was stressful for both patients and medical personnel.

In 2 patients, the falling sensation occurred in a delayed fashion; 1 patient experienced this feeling 3 to 5 minutes after the completion of the maneuver and the other nearly 30 minutes later. After witnessing these delayed sensations, we began to stay with our patients for 30 minutes. We performed the maneuver again on these 58 patients a few minutes after they recovered from their falling sensation. After the repeat maneuver, no patient experienced nystagmus, vertigo, or a falling sensation, and all appeared to be completely cured.

The 58 patients underwent a follow-up Dix-Hallpike maneuver 48 hours later, and all responded well; there were no episodes of nystagmus, vertigo, or a falling sensation. At follow-up assessments ranging from 1 to 6 years, only 2 patients complained of an attack of vertigo; 1 experienced a BPPV attack on the same side, and the other experienced the weak spontaneous nystagmus of a vestibular attack.

Discussion
BPPV, first described by Dix and Hallpike in 1952, is the most common type of vertigo of peripheral origin. During the Dix-Hallpike maneuver, posterior semicircular canal BPPV is indicated by the onset of a burst of up-beating and torsional nystagmus in a counterclockwise direction on the right and a clockwise direction on the left; the nystagmus subsides in a few seconds.

Particle repositioning maneuvers are effective for treating most patients with typical BPPV. Semont et al reported success rates of 84 and 93%, respectively, after treatment with one and two liberatory maneuvers, and Epley reported a 100% success rate with particle repositioning maneuvers in 30 patients. We have performed the Epley maneuver for patients with posterior canal BPPV at our institution since 1996, and our success rate is excellent (99.5%).

As mentioned, we were unable to find any studies in the literature regarding falling or falling sensations during particle repositioning maneuvers, despite the fact that such episodes are not uncommon at our institution. We assume that the mechanism of the falling sensation is related to the fact that the particles fall into the utricle during the final (sitting) position of the Epley maneuver. This event provokes a utricular response similar to that believed to precipitate a drop attack (Tumarkin’s otolithic crisis) in patients with long-standing Ménière’s disease. It is plausible that particle cloths in BPPV patients who experience a falling sensation may be more dense and heavy than those in patients who do not experience such a sensation.

Every physician who performs particle repositioning maneuvers should be aware of the risk of falling sensation, should inform their patients of this sensation, and should take steps to prevent its consequences. In particular, patients should be held tightly as they are moved to...
the sitting position. The assistance of a colleague may be necessary for large patients. Finally, because the falling sensation can be a delayed reaction, patients should be watched for at least 30 minutes following the completion of the maneuver.

References