Migraine and benign paroxysmal positional vertigo: An outcome study of 476 patients

Alev Uneri, MD

Abstract

To investigate whether migraine is more common in patients with benign paroxysmal positional vertigo (BPPV) than in the general population, the author conducted a retrospective study of 476 patients with BPPV seen over 12 years at a tertiary referral center. Records of patients with a confirmed diagnosis of BPPV followed for 1 to 7 years were reviewed. The typical history of BPPV and the characteristic torsional positional nystagmus were identified in all patients. A modified Epley maneuver was performed for all patients with posterior semicircular canal BPPV, with a 98% success rate. The survey consisted of detailed patient questionnaires and vestibular tests. Migraine and motion sickness were three times more common in patients with BPPV than in the general population. A family history of migraine (58.4%) and vertigo (44.9%) was also more common in patients than in a control group.

Introduction

Benign paroxysmal positional vertigo (BPPV), a problem restricted to the inner ear, is the most common cause of recurrent vertigo. The main diagnostic criteria of BPPV are the presence of a nystagmus associated with some degree of vertigo that is elicited by position changes of the head. Displacement of calcite fragments from the degenerating otoconia into the semicircular canals is known to be responsible for this process.[1-3] In the majority of patients, the posterior semicircular canal is affected, but other semicircular canals can also be involved.[4] Most patients with BPPV present no evident cause, although head trauma, Ménière's disease, and ear surgery have been accepted in the literature as eliciting events.[5,6]

Migraine is a common cause of episodic vertigo and disequilibrium. It has been reported that 26 to 33% of patients with migraine experience true episodic vertigo.[7-9] Only a few articles in the literature address the relationship between migraine and BPPV.[5,8,10,11]

From the Neurotology and Balance Center, Institute of Neurologic Sciences, Marmara University, Istanbul, Turkey.

Reprint requests: Alev Uneri, MD, Bagdat caddesi, No: 519/6 Usakligil Apt. Suadiye, Istanbul, Turkey. Phone: 90-216-399-5326; fax: 90-216-399-9682; e-mail: cuneri@superonline.com

To assess the etiopathology of BPPV, the author attempted to estimate the association between migraine and BPPV. Additionally, family histories of migraine and episodic vertigo were cross-examined to investigate a genetic propensity.

Materials and methods

The study group consisted of 476 patients with BPPV seen over a 12-year period at a tertiary referral center. Records of patients with a confirmed diagnosis of BPPV followed for 1 to 7 years were reviewed. Each patient completed a detailed questionnaire summarizing the key features of his or her complaints, migraine, motion sickness, and family history of migraine and episodic vertigo attacks. The presence of one or more attacks of vertigo in first-degree relatives of the patients was accepted as a positive family history for episodic vertigo. The criteria of the International Headache Society (IHS)[12] were used for the diagnosis of migraine.

One hundred seventeen patients who were treated for any other causes of dizziness or vertigo, or without a history of vertigo or migraine, were established as a control group for family history of migraine and episodic vertigo.

Videonystagmography (VNG) (Visual Eyes, Micromedical Technologies, Inc., Chatham, Ill.) with accompanying videotape records were collected for all patients. A Dix-Hallpike maneuver was done in each patient by VNG, and the entire process was monitored. The presence of a burst of rotary nystagmus, which is counterclockwise at the right side and clockwise at the left side in the Dix-Hallpike test and subsides within seconds, indicated a typical posterior semicircular canal BPPV.[5,13,14] Patients with horizontal and anterior semicircular canal variants of BPPV and other types of positional nystagmus were excluded.

Results

The medical follow-up of the 476 study patients, aged 12 to 85 years (mean: 41.55 $\pm$ 6.7 years), lasted 1 to 7 years (mean: 3.8 years). Each patient was seen at least twice. Three hundred thirty-five of the patients (70.4%) were female and 141 (29.6%) were male.

Two hundred sixty-one patients (54.8%) had a history of migraine headaches, 321 (67.4%) reported motion sickness, 278 (58.4%) had a positive family history of migraine, and 214 (44.9%) had a positive family history of episodic vertigo.

The Dix-Hallpike maneuver with VNG revealed that 276 cases (58%) of posterior canal BPPV were right-sided and 200 (42%) were left-sided. A modified Epley[15] maneuver was performed for all patients with posterior canal BPPV, with a 98% success rate.

Discussion

BPPV is the most common cause of vertigo in adults and has a female preponderance.[4,16] The typical attack of BPPV is usually a self-limited condition, and many cases resolve spontaneously.

Dix and Hallpike described classic characteristics of BPPV in 1952.[5,13,14] It was initially thought to be a unique condition caused by the presence of cellular debris in the posterior semicircular canal. However, BPPV is now considered a vestibular end-organ disorder caused by the otoliths detaching from the maculae and floating as free particles in the vestibular endolymphatic space.[3,4,17] Other semicircular canals also may be affected, and more than one canal can be involved simultaneously.[3,4,17]

Migraine is a complex, usually inherited, neurologic disorder in which headache is but one of the symptoms.[18] Epidemiologic studies report that 18% of women and 6% of men in the United States have migraine.[19] Although the majority of migraine sufferers do have headaches, migraine can also occur without headaches. Under the IHS classification,[12] this is described as migraine aura without headache. Particularly in middle-aged or older adults, the aura may become the predominant feature of the migraine attack with little or no headache.[20]

The vertigo that has been associated with migraine in adults is more difficult to classify. The clinical association of dizziness and migraine has been noted since the 1873 publication by Liveing.[21] It is still difficult to prove a causal relationship between migraine and any of the transient symptoms that may accompany it. In 1926, Bramwell and McMullen noted that many neurologic symptoms associated with migraine headache, including episodic vertigo, might also occur without headache.[22]

Only a few articles in the literature address the relationship between migraine and BPPV.[5,8,10,11] Ishiyama et al theorized that patients with migraine suffer recurrent damage to the inner ear (because of vasospasm or some other mechanism), which predisposes them to recurrent bouts of BPPV.[5]

In the author's series, 54.8% of the patients had a history of migraine headaches. This is three times the incidence in the general population and correlates with the series reported by Ishiyama et al.[5] Of patients with migraine, 26 to 60% have a history of severe motion sickness, compared with 8 to 24% of individuals in the general population.[8] The author found motion sickness in 67.4% of patients in the present study.

In this series, 36 of 476 patients (7.6%) were first-degree relatives; 58.4% had a family history of migraine; and 44.9% had a family history of episodic vertigo. These percentages were also higher than those reported by the control group: 12.6% reported a family history of migraine, and 18% reported a family history of episodic vertigo.

These data indicate that there may be a causal connection between migraine and BPPV.

Acknowledgment

The author thanks Ayfer Kucukmentin, AS, for her skillful work.

References

1. Lindemann HH. Studies on the morphology of the sensory regions of the vestibular apparatus with 45 figures. Ergeb Anat Entwicklungsgesch 1969;42:1-113.
2. Parnes LS, McClure JA. Free-floating endolymph particles: A new operative finding during posterior semicircular canal occlusion. Laryngoscope 1992;102:988-92.
3. Welling DB, Parnes LS, O'Brien B, et al. Particulate matter in the posterior semicircular canal. Laryngoscope 1997;107:90-4.
4. Honrubia V, Baloh RW, Harris MR, Jacobson KM. Paroxysmal positional vertigo syndrome. Am J Otol 1999;20:465-70.
5. Ishiyama A, Jacobson KM, Baloh RW. Migraine and benign positional vertigo. Ann Otol Rhinol Laryngol 2000;109:377-80.
6. Gross EM, Ress BD, Viirre ES, et al. Intractable benign paroxysmal positional vertigo in patients with Meniere's disease. Laryngoscope 2000;110:655-9.
7. Selby G, Lance JW. Observations on 500 cases of migraine and allied vascular headache. J Neurol Neurosurg Psychiatry 1960;23:23-32.
8. Kayan A, Hood JD. Neuro-otological manifestations of migraine. Brain 1984;107:1123-42.
9. Kuritzky A, Ziegler DK, Hassanein R. Vertigo, motion sickness and migraine. Headache 1981;21:227-31.
10. Baloh RW, Honrubia V. Childhood onset of benign positional vertigo. Neurology 1998;50:1494-6.
11. Hughes CA, Proctor L. Benign paroxysmal positional vertigo. Laryngoscope 1997;107:607-13.
12. Headache Classification Committee of the International Headache Society. Classification and diagnostic criteria for headache disorders, cranial neuralgias and facial pain. Cephalalgia 1988;8(suppl 7):19-73.
13. Baloh RW, Honrubia V, Jacobson K. Benign positional vertigo: Clinical and oculographic features in 240 cases. Neurology 1987;37:371-8.
14. Cohen HS, Jerabek J. Efficacy of treatments for posterior canal benign paroxysmal positional vertigo. Laryngoscope 1999;109:584-90.
15. Epley JM. The canalith repositioning procedure: For treatment of benign paroxysmal positional vertigo. Otolaryngol Head Neck Surg 1992;107: 399-404.
16. Baloh RW, Jacobson K, Honrubia V. Horizontal semicircular canal variant of benign positional vertigo. Neurology 1993;43:2542-9.
17. Fife TD. Recognition and management of horizontal canal benign positional vertigo. Am J Otol 1998;19:345-51.
18. Johnson GD. Medical management of migraine-related dizziness and vertigo. Laryngoscope 1998;108:1-28.
19. Stewart WF, Lipton RB, Celentano DD, Reed ML. Prevalence of migraine headache in the United States. Relation to age, income, race, and other sociodemographic factors. JAMA 1992;267:64-9.
20. Solomon S. Migraine diagnosis and clinical symptomatology. Headache 1994;34:S8-S12.
21. Liveing E. On Megrim, Sick Headache, and Some Allied Disorders: A Contribution to the Pathology of Nerve Storms. London: Churchill, 1873:120-30.
22. Bramwell E, McMullen WH. Discussion on migraine. BMJ 1926;2: 765-75.