

Research Submission

The Point Prevalence of Dizziness or Vertigo in Migraine – and Factors That Influence Presentation

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Objective.—To ascertain and characterize the point prevalence of dizziness or vertigo in migraineurs presenting for routine appointments at a specialty headache clinic.

Background.—Migraine, dizziness, and vertigo are all common in the general population, affecting 13%, 20-30%, and 5-10% respectively. Thereby, chance concurrence of migraine with either dizziness or vertigo would be expected in roughly 4% of the general population. It is the authors' clinical impression that severe attacks of migraine are far more commonly associated with these complaints than chance would predict.

Methods.—This is a prospective, cross-sectional study of 462 consecutive patients who presented for consultation at a specialty headache clinic over a 4-month period of time. During routine check-in procedures, patients were asked to report their headache pain on a 1-10 Likert scale. Patients were also asked to report if they were currently experiencing dizziness or vertigo. Responses to these questions were recorded along with vital signs. Diagnosis of migraine with or without aura was made by headache medicine specialists in accordance with International Classification of Headache Disorders – second edition criteria. Chi-square analysis was used to examine the prevalence of vertigo or dizziness in subjects with varying intensity of headache, and by history of aura.

Results.—Of the 425 evaluable subjects, 28% experienced aura. Subjects' average age was 43.8 years (range 15 to 76 years); 89.5% were female. At the time of evaluation, 72.4% of subjects reported some degree of ongoing headache pain and 15.7% reported concurrent dizziness or vertigo. The prevalence of dizziness or vertigo was twice as high (24.5% vs 12.1%) in migraine with aura compared to migraine without aura ($P < .01$), and prevalence increased with age ($P < .05$). There was a strong correlation between migraine pain and subjective complaint of vertigo ($P < .001$). When migraine pain was present at an intensity of 7 or greater (on a scale of 1-10), almost half of the subjects (47.5%) reported concomitant dizziness or vertigo.

Conclusions.—Subjective complaints of dizziness or vertigo appear to be relatively common accompaniments of migraine, particularly migraine with aura, and prevalence increases with age. Disequilibrium symptoms have a strong and positive association with the severity of migraine pain. With co-occurrence higher than expected by chance, the relationship either reflects comorbidity or these symptoms may be part of the migraine presentation. With a point prevalence of 15.7%, and factors that link expression both to the intensity of migraine pain and to migraine aura, the authors believe that the true relationship may prove to be the latter.

Key words: migraine, vertigo, dizziness, prevalence, aura, pain

(*Headache* 2011;51:1388-1392)

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Funding: This investigator-initiated research was funded by GlaxoSmithKline.

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Accepted for publication June 9, 2011.

Conflict of Interest: None.

Our objective was to determine the point prevalence of dizziness or vertigo in a cohort of migraineurs presenting for routine appointments at a specialty headache clinic.

Dizziness is a general sense of disequilibrium. Vertigo is a subtype of dizziness, defined by an illusion of movement due to asymmetric involvement of the vestibular system. Migraine, dizziness, and vertigo are all common in the general population, affecting 13%, 20-30%, and 5-10% respectively.¹⁻³ Thereby, chance concurrence of migraine with either dizziness or vertigo would be expected in up to 4% of the general population. But the co-occurrence of these conditions has been noted for over a century.⁴ It is the authors' clinical impression that severe attacks of migraine are far more commonly associated with these complaints than chance would predict.

Animal models have demonstrated that 5-HT(1B) and 5-HT(1D) receptors are expressed in parallel sites in peripheral vestibular and trigeminal systems, which may help explain the efficacy of triptans in alleviating migrainous vertigo.⁵ In the rat, 5-HT(1F) receptors co-localize with calcitonin gene-related peptide (CGRP) in vestibular nuclei, suggesting a role for 5-HT(1F) receptors in regulating release of CGRP at these sites.⁶

It is not fully understood why some migraineurs complain of vestibular symptoms and some do not. Evidence suggests that neuro-otologic abnormalities may be no more common in migraineurs who complain of dizziness than in those who do not. These abnormalities were observed in roughly one-third of a sample of migraineurs, with similar incidence in those with vestibular symptoms as those without (36% vs 32%),⁷ suggesting that vestibular examination alone does not inform the diagnosis of migrainous vertigo.

Migraine is also associated with a slight but significant postural instability of central vestibular origin, manifested in greater sway velocity, an offset center of gravity alignment and wider step width in tandem walking.⁸

The lifetime prevalence of vertigo or dizziness in migraineurs has been reported to be 51.7%, significantly higher than the 31.5% lifetime prevalence among controls. Those experiencing migraine with

aura were more likely than those without aura to report attacks associated with vertigo or dizziness.⁹

There is no information in the literature regarding the prevalence of vertigo in migraineurs seen in headache specialty clinics. It is our specific objective to report on this association, and secondarily, to examine possible influences on its prevalence, such as pain, age, gender, or presence of aura. Based on clinical observation, our hypothesis was that the prevalence of dizziness or vertigo would increase as migraine pain levels increased.

METHODS

This is a prospective, cross-sectional study of 462 consecutive patients who presented for routine appointments at a specialty headache clinic over a 4-month period of time from November 2009 to February 2010. To avoid statistical bias from multiple visits by 1 individual, only the first visit by each patient during this time frame was recorded. During check-in procedures, patients were asked to report their headache pain on a 1-10 scale. Patients were also asked if they were currently experiencing dizziness or vertigo. Diagnosis of migraine with or without aura was made by headache medicine specialists in accordance with International Classification of Headache Disorders – second edition criteria.

Institutional review board approval was obtained for this study. Chi-square analysis was used to examine the prevalence of vertigo or dizziness in subjects with varying intensity of headache, by age, by gender, and by presence of accompanying aura.

RESULTS

Of the 462 patients, 35 patients had non-migraine headache diagnoses and 2 additional patients had missing data for either pain or vertigo, leaving 425 evaluable subjects (Fig. 1). Of the migraineurs, 28% experienced aura. Subjects' average age was 43.8 years (range 15 to 78 years); 88.5% were female.

At the time of evaluation, 72.4% of subjects reported some degree of ongoing headache pain and 15.7% reported concurrent dizziness or vertigo. The prevalence of dizziness or vertigo was twice as high (24.5% vs 12.1%) in migraine with aura compared to migraine without aura ($P < .01$) (Fig. 2), and preva-

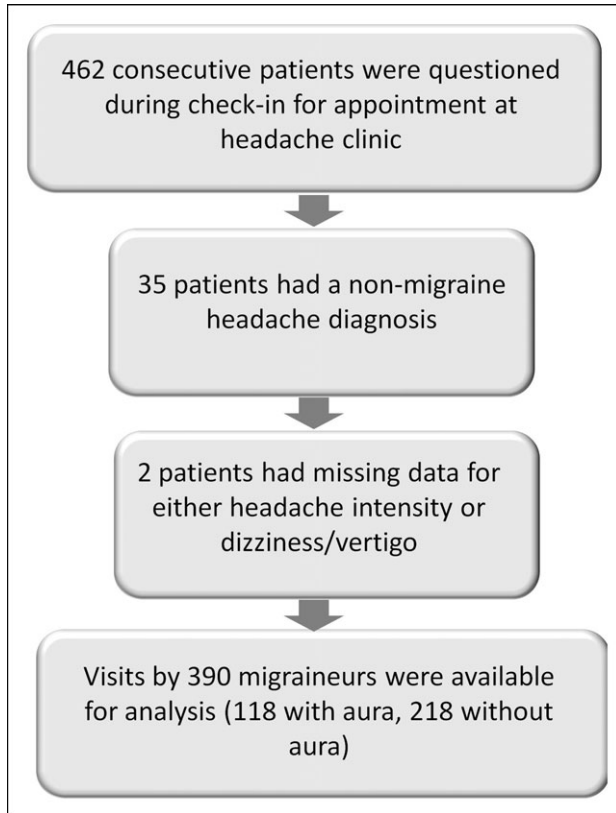


Fig 1.—Study flow chart.

Prevalence increased with age ($P < .05$) (Fig. 3). There was a strong correlation between migraine pain and subjective complaint of dizziness or vertigo ($P < .001$) (Fig. 4). When migraine pain was severe – graded at

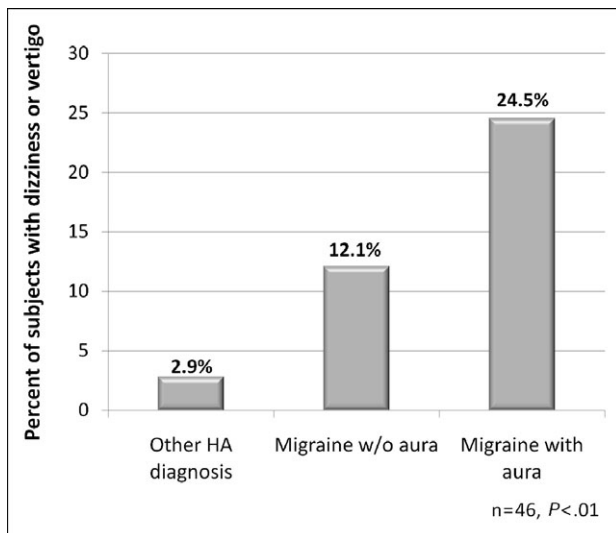


Fig 2.—Dizziness/vertigo is more prevalent in migraine with aura. HA, headache; w/o, without.

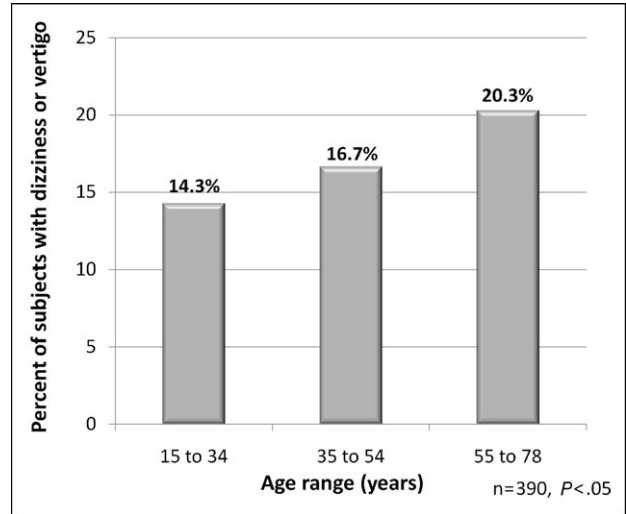


Fig 3.—Prevalence of dizziness/vertigo in migraine increases with age.

an intensity of 7 or greater on a Likert scale of 1-10 – almost half of the subjects (47.5%) reported concomitant dizziness or vertigo.

Sixteen percent of the 355 female subjects and 11% of the 35 men had vertigo at the time of clinic check-in, a difference that did not reach statistical significance.

DISCUSSION

Dizziness or vertigo appears to be common in migraine. It has been previously reported to be

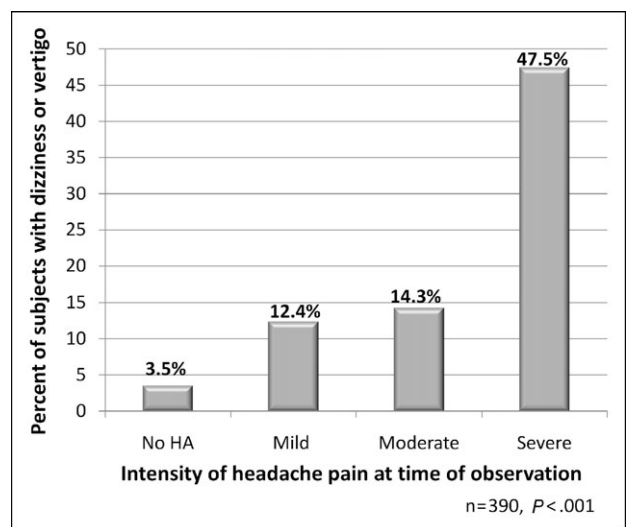


Fig 4.—Prevalence of dizziness/vertigo increases with migraine intensity. HA, headache.

endorsed by 36.3% of migraineurs,¹⁰ making it as common as vomiting and osmophobia *combined*.¹⁰

It is intriguing that the prevalence of dizziness and vertigo is greater in migraineurs who carry a diagnosis of migraine with aura – even in those with infrequent aura and when the current attack is free of their typical aura symptoms. No subject reported ongoing aura at the time of clinic check-in. The strong association of these symptoms coinciding with greater intensities of headache pain would argue against vertigo representing an aura equivalent, as aura typically precedes the pain phase of migraine. Yet, if this were simply a pain-related phenomenon, one would have expected more than the lone individual among 35 non-migraine headache patients to be experiencing dizziness or vertigo when evaluated (an individual with post-traumatic headache experiencing moderate pain at the time of evaluation). This was, admittedly, a small sample, but the prevalence of severe headache pain at the time of presentation in this group was similar to or slightly higher than that among the migraine groups.

The increased prevalence of symptoms with increasing age was not anticipated and is counter to a report by Kelman,¹⁰ in which patients were queried for a general history of dizziness with migraine at the intake interview, rather than a point prevalence study such as ours. One might hypothesize that the increase with age might be related to a greater lifetime burden of illness or to migraine chronicity, but more studies will be needed to evaluate this. A potential confounder is that with advancing age, individuals are more likely to develop healthcare issues beyond migraine or take medications that could cause vertigo or dizziness as a side effect. Co-occurring medical conditions and medication use are important variables to take into account in future studies investigating this population.

The excess comorbidity of dizziness and migraine may be explained by one of 3 factors:

1. These entities may be linked by a common underlying comorbidity. Anxiety is both a required constituent of anxiety-related dizziness and a prominently comorbid condition with migraine. It has been shown that when subgroups of vertigo –

benign paroxysmal vertigo, vestibular neuritis, vestibular migraine, and Meniere's disease – are compared at baseline and 1 year later, only patients with vestibular migraine showed higher rates of psychiatric disorders and somatoform dizziness 1 year later. The degree of vestibular dysfunction did not correlate with the development of psychiatric disorders.¹¹ Similarly, when children and adolescents with benign paroxysmal vertigo of childhood – a migraine precursor – were compared to pediatric migraineurs and to normal controls, both those with vertigo and those with migraine displayed higher indices of behavioral and emotional symptoms than their normal peers.¹²

2. Migraine may precipitate dizziness or vertigo as an accompanying symptom. It is common in migrainous vertigo for vertiginous episodes to be triggered by common migraine precipitants such as estrogen withdrawal, stress, or sleep deprivation. Headaches are often absent with these attacks, whereas other migraine features, such as aura or photophobia, may be present. Although interictally vestibular testing is often unremarkable, acute attacks may be accompanied by central spontaneous or positional nystagmus, or occasionally, unilateral vestibular hypofunction.¹³
3. Vertigo may trigger migraine. Migraineurs undergoing rotation/caloric vestibular testing are more likely than non-migraineurs to report a migraine attack in the subsequent 24 hours, suggesting that induced vertigo can act as a migraine trigger.¹⁴

CONCLUSIONS

Subjective complaints of dizziness or vertigo appear to be relatively common accompaniments of migraine, particularly migraine with aura, and the prevalence increases with age. Vertigo/dizziness has a strong and positive association with the severity of migraine pain, which has not been previously reported. As dizziness is not currently included among the diagnostic criteria for migraine with or without aura, many physicians evaluating headache patients do not query for this symptom. Equally important, physicians evaluating dizziness often neglect to consider migraine as part of the differential diagnosis. With co-occurrence higher than expected by chance,

the relationship either reflects comorbidity, or these symptoms may be a constituent part of migraine. With a point prevalence of 15.7%, and factors that link expression of these symptoms both to the intensity of migraine pain as well as to migraine aura, the authors believe that the true relationship of dizziness/vertigo to migraine may prove to be the latter.

STATEMENT OF AUTHORSHIP

Category 1

(a) Conception and Design

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(b) Acquisition of Data

Karen Fisher

(c) Analysis and Interpretation of Data

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Category 2

(a) Drafting the Manuscript

Anne Calhoun

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Category 3

(a) Final Approval of the Completed Manuscript

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