

Striking the Right Balance – Vestibular Migraine

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In this edition of “Striking the Right Balance,” Dr. Jamie M. Bogle of the Mayo Clinic Arizona highlights the current knowledge and offers important information on vestibular migraine.

Michael Vekasi, MCIsc, R.Aud, Aud(C), FAAA and Erica Zaia, MSc, RAUD are coordinating the “Striking the Right Balance,” feature which will cover the latest information on ‘all things vestibular.’

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Migraine is one of the most common disorders in the world, impacting 16% of the world’s population over the course of a lifetime¹ and an estimated 2.7 million Canadians are impacted by migraine.² Migraine has long been associated with dizziness symptoms – up to 69% of patients diagnosed with migraine also report at least occasional vertigo or dizziness.³ While complex and poorly understood, the relationship between migraine and dizziness may be due to anatomical and pathophysiological factors, such as neural pathway and neurotransmitter overlap and vascular and inflammatory processes.^{4,5}

Updated Diagnostic Criteria

Dizziness and headache have long been associated; however, the definition of this disorder has been unclear and variously defined. Researchers have used several descriptions over the years to describe this relationship between dizziness and headache: migraine-associated vertigo, migrainous vertigo, vertiginous migraine, migraine-associated dizziness to name a few. In 2012, the Bárány Society⁶ and the International Headache Society⁷ provided consensus documents for proposed criteria for vestibular migraine (Figure 1) in order to better evaluate and manage these patients.

Vestibular Migraine Criteria⁷

- A. At least 5 episodes with vestibular symptoms^a of moderate or severe intensity^b, lasting between 5 minutes and 72 hours
- B. Current or previous history of migraine with or without aura
- C. One or more migraine features with at least 50% of the vestibular episodes:
 - 1. Headache with at least 2 of the following characteristics: unilateral location, pulsating quality, moderate or severe intensity, aggravation by routine physical activity
 - 2. Photophobia, phonophobia
 - 3. Visual aura
- D. Not better accounted for by another vestibular or ICHD diagnosis

Probable Vestibular Migraine⁶

- A. At least 5 episodes with vestibular symptoms^a of moderate or severe intensity^b lasting 5 minutes to 72 hours
- B. Criteria B or C (migraine history OR migraine features during the episode)
- C. Not better accounted for by another vestibular or ICHD diagnosis

^aSpontaneous vertigo, internal / external perception of motion; positional vertigo; visually-induced vertigo; head motion-induced vertigo; head motion-induced dizziness and nausea

^bModerate: interfere but do not prohibit activities of daily life;
Severe: discontinue activities of daily life

Figure 1. Current diagnostic criteria for +vestibular migraine and probable vestibular migraine.

Once these diagnosis criteria were put in place, earnest research could begin to evaluate the clinical presentation and management outcomes of this disorder when using a common diagnostic criterion. While we have understood dizziness to be a common concern in patients with migraine, recent epidemiological data suggest that those patients meeting the diagnostic criteria for vestibular migraine may be higher than previous expectations. Formeister and colleagues⁸ utilized a population-based survey of adults in the United States, finding that 23% of those who reported a one-year prevalence of dizziness or imbalance met the diagnostic criteria of vestibular migraine, translating into a prevalence of 2.7%. This means that vestibular migraine may be the most common cause of dizziness, surpassing benign paroxysmal positional vertigo (BPPV) and Ménière's disease. The authors found that vestibular migraine was more likely in those less than 40 years of age, in females, in those with a prior head injury, and in those with self-reported anxiety and/or depression. Unfortunately, this study found that, while a significant number met the diagnostic criteria for vestibular migraine, only 10% were given this diagnosis. This lack of identification is significant. These patients are likely to be limited in their ability to carry out

activities of daily life, including attending school or work. Awareness of vestibular migraine is an important step in developing appropriate management strategies for a large cohort of dizzy patients.

Episodic Vertigo – Differentiating the Possible Etiologies

There are significant challenges in diagnosing vestibular migraine. Keep in mind that there is no objective test specific for vestibular migraine – it is a diagnosis based on consensus criteria. These criteria are in beta form, meaning that they are still under evaluation and may be adjusted in the future as we learn more about this disorder. Additionally, not all patients with recurrent dizziness and headache history will meet the criteria for vestibular migraine, and therefore may need different management options. Other disorders that include recurrent dizziness, such as BPPV and Ménière’s disease may also be considered for these patients. To further complicate the diagnosis process, there is overlap among vestibular migraine and these other disorders presenting with recurrent dizziness. It is important to remember the diagnostic criteria for each of these disorders to determine the diagnosis; however, there is evidence that these pathologies may also co-exist in some patients.^{9,10}

Vestibular Laboratory Findings

Can we isolate the vestibulopathy and identify vestibular migraine? This is challenging as there is no clinical diagnostic test for vestibular migraine. Look at this in terms of what we do in the vestibular laboratory – the vestibular diagnostician evaluates the vestibular system for what is working and perhaps what is not, but a management team is needed to determine the etiology. Audiologists do provide significant input to this team by providing objective measures and functional data for these complex patients. Now that a consistent criterion is used for vestibular migraine diagnosis, we can better look to our diagnostics to determine a “laboratory profile” (Figure 2). The majority of vestibular laboratories start with videonystagmography (VNG). In our laboratory, the VNG has not provided much in the way of a clinical profile, aside from ruling out a peripheral vestibulopathy. Occasionally, patients will demonstrate significantly saccadic smooth pursuit (10%). Caloric asymmetry is rare in our patient cohort, with 7% demonstrating significant asymmetry. Importantly, there was no evidence that these asymmetries were uncompensated. These data are somewhat less significant than previous reports, which found a larger percentage of caloric asymmetry in patients with headache.¹¹ This is not too surprising as the diagnostic criterion have varied over time, leading to perhaps a wide range of patients included in these samples. Interestingly, recent literature suggests that otolith reflex pathway abnormalities may be a common characteristic in vestibular migraine. Our data found a significant proportion of bilaterally absent ocular VEMP responses (28%) as well as reduced amplitude and significant asymmetry as compared to controls.¹² Importantly, these otolith reflex pathways have shown functional abnormalities as well, as measured by subjective visual vertical and horizontal tasks.^{13,14}

Common Clinical Presentation

- Normal VNG results, except in those with additional / overlapping pathology
- Abnormal otolith reflex pathway function: ocular / cervical VEMPs, subjective visual vertical
- Abnormal function integration: reduced balance, poor gaze stability, increased symptoms with visual tasks such as smooth pursuit, optokinetic nystagmus

Because migraine impacts multisensory information processing,¹⁵ functional measures should be emphasized when a patient has suspected vestibular migraine. Posturography testing has found increased postural instability in patients with migraine while experiencing headache especially in eyes-closed conditions.¹⁶ Further, as many patients with vestibular migraine experience motion sensitivity, evaluating the influence of abnormal visual reference on postural stability is

important.¹⁷ Our clinical data finds abnormalities in 44% of patients diagnosed with vestibular migraine when using the Sensory Organization Test. The abnormality pattern, however, is variable and demonstrate patterns associated with vestibular (12%), somatosensory (10%), and visual preference (6%). Another 6% demonstrate global imbalance while 10% were described as “aphysiologic” or “physiologically inconsistent.” This concept of aphysiologic balance function is interesting and may not actually be “aphysiologic” as we would describe in a malingering patient.

It may relate more to the prevalence of anxiety in this population.^{18,19} Gaze stability is another functional metric that may be helpful in evaluating patient with vestibular migraine. Many patients with vestibular migraine describe increased dizziness with quick head turns. Tests such as the Dynamic Visual Acuity Test or Gaze Stability Test can quantify the changes in visual acuity with head movement and provide a target for rehabilitation services. The literature in this area is limited, but our clinical data has found abnormalities in 68% of patients with vestibular migraine using this test paradigm. Because semicircular canal function is generally appropriate in this group, these findings suggest atypical multisensory integration as contributing to dizziness symptoms.

Management Strategies

Vestibular migraine management requires a team approach for optimal outcomes. This team generally includes vestibular diagnosticians and otologists, physical therapists, psychiatrists, psychologists, and neurologists. The management strategy will vary based on the patient, but importantly there are numerous options that may be used for successful treatment. Table 1 provides a summary of the management options available as reported in the literature. Given that I am not a physician, I can only comment on what is reported in the literature regarding medical management. Collaboration with a headache specialist is best to manage these options. Recent literature has found valproic acid, venlafaxine, and flunarizine helpful as prophylactic treatment options to reduce the number, frequency, and severity of vestibular attacks.²⁰

Medication Options^{20,21}	Physical Therapy	Additional Considerations
Betablockers - Propranolol - Metoprolol Anticonvulsants - Topiramate - Valproic acid - Lamotrigine Calcium Antagonist - Verapamil - Flunarizine - Lamotrigine Antidepressants - Venlafaxine - Amitriptyline - Nortriptyline Supplements - Magnesium Carbonic Anhydrase Inhibitors - Acetazolamide Other - Prophylaxis OnabotulinumtoxinA	Balance Gaze stability Oculomotor function Visual motion sensitivity	Diet - Reduce caffeine, alcohol - Avoid foods associated with symptom increase Sleep hygiene Trigger avoidance Anxiety / depression management Cognitive behaviour therapy Exercise / re-conditioning

While medications may be indicated in many of these patients, the importance of vestibular rehabilitation should not be overlooked. Alghadir and Anwer²² provide a current review of available literature on the use of vestibular rehabilitation for those with diagnosed vestibular migraine. Because many of these patients do not effectively incorporate vestibular information, they are at risk for falls. Patients with vestibular migraine are challenging candidates for rehabilitation as they present with various comorbid conditions that also need to be addressed, including anxiety (overall anxiety as well as anxiety about dizziness), significant motion sensitivity, and hypervigilance.^{23,24} Even though this may be challenging for the patient to complete, our team finds that vestibular rehabilitation is a vital component of the management protocol, addressing the functional limitations present in these patients. Emerging literature that suggests that vestibular rehabilitation may also aid in reducing headache symptoms, anxiety, and self-report dizziness symptoms,²⁵ further highlighting the importance of this component.

Conclusion

Vestibular migraine is a common, but unfortunately, overlooked etiology for patients with recurrent dizziness symptoms. Because these patients are often evaluated in the vestibular laboratory, we have the opportunity to assist in guiding them to the appropriate management team by ruling out characteristics associated with other etiologies, as well as providing information

regarding the functional capabilities of the patient. All of this information helps to determine planning for rehabilitation options. Now that vestibular migraine has a standardized criterion, we can work together to better identify the patient characteristics and clinical laboratory findings associated with this patient group, further improving our ability to provide effective management.

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