Comparison of clinic and demographic characteristics in vestibular migraine and migraine only patients

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Abstract

Background & Objective: The relationship between vertigo and migraine has been known for a long time. Many migraine patients are accompanied by vertigo. The term vestibular migraine (VM) is a clinical entity defined recently. Treatments for migraine only (MO) and VM patients differ partially. Therefore, it is essential to distinguish between these two clinical conditions. This study aims to reveal the clinical and demographic differences between MO and VM and determine the factors that will help diagnose and manage VM. *Method:* A total of 80 patients, 40 diagnosed with MO according to ICHD-3 and 40 diagnosed with VM, who applied to the Neurology clinic of a tertiary hospital between January and July 2023, were included in this prospective study. The patients' ages, genders, education levels, medical and family history, migraine duration, migraine onset age, migraine attack frequency, and medication use were recorded. All patients completed a battery of questionnaires, including the Migraine Disability Assessment (MIDAS), Headache Impact Test (HIT-6), Visual Analog Scale (VAS), World Health Organization Quality of Life-Bref (WHOQOL-BREF), Dizziness Handicap Inventory (DHI), Activities-Specific Balance Confidence Scale (ABCS), and Beck Depression Inventory (BDI). *Results:* Patients with VM experienced significantly more sleep disturbances, depressive symptoms, movement disorders, imbalance, menstruation-related headaches, and aura compared to those with migraine MO. In contrast, MO patients reported more throbbing headaches and a better response to analgesics.

Conclusion: MO and VM patients have distinct clinical characteristics. Recognizing these basic differences has important clinical benefits, allowing for precise diagnosis and treatment of VM.

Keywords: Migraine, vestibular migraine, vertigo, depression, aura

INTRODUCTION

Migraine is a common type of headache affecting millions of people worldwide. The World Health Organization (WHO) estimates that migraine affects 15% of adults. Migraine is more common in women than men and is the second highest cause of disability among young adults. While the prevalence of migraine is 20% in women, it is 10% in men. Migraine usually begins in adolescence and peaks in the 40s. It is estimated that vestibular migraine (VM) occurs in 1% of the population, but underdiagnosis may be the reason for this low prevalence.[1] Although the coexistence of headache and vertigo has been reported at a prevalence of 3.5%, it has been observed that approximately half of the patients with severe migraine attacks have associated symptoms of dizziness.[2]

The relationship between vertigo and migraine has been known for a long time. Vertigo symptoms are experienced by many migraine patients. Studies investigating the relationship between migraine and vertigo have been conducted since the early 20th century. Terms such as migraine-related vertigo, vestibulopathy, and migrainous vertigo were previously used to describe this entity.[3] The third edition of the International Classification of Headache Disorders (ICHD-III) redefined migraine and VM in 2018. VM is regarded as a vestibular paroxysmal disease characterized by paroxysmal vertigo and migraine.[4] VM can be seen in all age groups. Just like migraine, VM is more common in women than men.[5]

This study aims to reveal the clinical and demographic differences between migraine only

(MO) and VM patients and to determine the features that help differentiate both conditions so as to enable effective management.

METHODS

Ethical approval was obtained from the Kastamonu University Clinical Research Ethics Committee (Decision No: 2022-KAEK-114, Date: 16.11.2022). All procedures performed in studies involving human participants were in accord with the institution's ethical standards (Kastamonu University Ethics Committee) and the 1964 Helsinki Declaration. Additionally, written informed consent was obtained from each study participant.

A total of 80 patients, 40 patients diagnosed with MO according to ICHD-3 and 40 patients diagnosed with VM, who presented to Kastamonu Training and Research Hospital Neurology clinic between January and July 2023, were included in this prospectively designed study. Those with a history of active psychiatric disorders, patients under 18 and over 60, and patients with pathology detected on MRI were excluded from the study.

All patients were examined by a Neurology and a Otorhinolaryngology specialist. Their age, gender, education level, medical and family history, migraine duration, migraine onset age, migraine attack frequency, and medication use were recorded. All patients were administered Migraine Disability Assessment (MIDAS), Headache Impact Test (HIT-6), Visual Analog Scale (VAS), WHOQOL-BREF, Dizziness Handicap Inventory (DHI), Activities-Specific Balance Confidence Scale (ABCS) and Beck Depression Inventory (BDI) scales.

The MIDAS scale comprises 5 questions and questions about the productivity at work in the preceding three months. A high score on this test indicates a high loss of productivity.[6] HIT-6 is a scale that shows how much patients' work and social lives have been affected by migraine pain in the preceding month.[7,8] The VAS is a visual scale where the headache intensity is scored out of 10, with 0 representing 'no pain' and 10 'pain as bad as it could possibly be'. The WHOQOL-BREF scale is applied to evaluate the quality of life of patients, and includes questions that assess general health, psychological health, physical health, social relations, and the environment.[9] The DHI consists of 25 questions that assess emotional, functional, and physical status, and considers the self-perceived level of disability associated with dizziness. It is an evaluation

scale. Four points are given for the "yes" answer to each question, 2 points are provided for the "sometimes" answer, and 0 points are given for the "no" answer. Scores range from 0 to 100.[10,11] The ABCS asks the question, "How confident are you in keeping your balance and standing still while doing the following?" It is expressed as a percentage for various daily activities.[12,13]

Statistical analysis

Histogram, q-q plot, and Shapiro-Wilk testing were used to evaluate the normality of data distribution. Pearson chi-square and corrected Fisher tests (Fisher Exact Test) were used to compare groups with categorical variables. For comparisons between groups with quantitative variables, an independent two-sample t-test was applied for normally distributed variables, and the Mann-Whitney U test was used for variables that were not normally distributed. Data analysis was performed with IBM SPSS 22 statistical software. The significance level was accepted as $p<0.05$.

RESULTS

No statistically significant relationship was found between the MO and VM groups with respect to age, age of migraine onset, gender, place of residence, marital status, familial characteristics, alcohol, smoking, headache frequency, and pain characteristics ($p>0.05$). VM was more common in those with secondary school education or lower, and MO was more common in university graduates ($p<0.05$). VM was more common in those unemployed, and MO in those who worked at a desk job ($p<0.05$). VM was more common in those with low income, and MO, in those with higher income levels ($p<0.05$). A migraine aura was more common in the VM group. ($p<0.05$). A relationship with menstruation was more common in the VM group ($p<0.05$). While patients in the MO group tended to consult a neurologist, patients with VM tended to consult a general doctor. A comparison of sociodemographic characteristics of migraine and VM groups is shown in Table 1.

When the applied scale results were examined, WHOQOL-BREF Environmental Health and ABCS scores were found to be significantly higher in the migraine group, and BDI total, DHI total, emotional, functional, and physical variables were found to be significantly higher in the vestibular migraine group ($p<0.05$). There was no significant difference between the groups in WHOQOL-BREF total, global health, social relationship, physical health, psychological health,

Table 1: Comparison of sociodemographic characteristics in migraine and vestibular migraine groups

Variables	Migraine Only (*n*=40)	Vestibular Migraine (*n*=40)	*p*
Age			
20-30	11(27.5)	9(22.5)	0.720
31-40	13(32.5)	16(40.0)	
41-50	12(30.0)	9(22.5)	
51-60	4(10.0)	6(15.0)	
Migraine Onset Age	26.30±3.23	25.30±3.11	0.163
Gender			
Female	33(82.5)	36(90.0)	0.330
Male	7(17.5)	4(10.0)	
Place of Residence			
Urban	31(77.5)	24(60.0)	0.091
Rural	9(22.5)	16(40.0)	
Marital Status			
Married	30(75.0)	26(65.0)	0.378
Single	8(20.0)	8(20.0)	
Divorced	2(5.0)	6(15.0)	
Family history of migraine			
Yes	22(55.0)	21(52.5)	0.823
No	18(45.0)	19(47.5)	
Alcohol Use			
No	38(95.0)	40(100.0)	0.494
Yes	2(5.0)	0(0.0)	
Cigarette Use			
No	31(77.5)	35(87.5)	0.239
Yes	9(22.5)	5(12.5)	
Educational Status			
Middle School And Below	10(25.0)[a]	22(56.4)[b]	**<0.001**
High School	5(12.5)[a]	11(28.2)[a]	
University	25(62.5)[a]	6(15.4)[b]	
Job			
Not Working	15(37.5)[a]	31(77.5)[b]	**<0.001**
Office Job	13(32.5)[a]	1(2.5)[b]	
Physical Labor	12(30.0)[a]	8(20.0)[a]	
Aura			
Yes	12(30.0)[a]	25(62.5)[b]	**0.004**
No	28(70.0)[a]	15(37.5)[b]	
Headache Frequency			
1 or Less Per Month	6(15.0)	5(12.5)	0.116
1-4 Per Month	19(47.5)	11(27.5)	
4 Or More Per Month	15(37.5)	24(60.0)	
Relationship With Menstruation			
Yes	0(0.0)[a]	9(22.5)[b]	**0.006**
No	33(82.5)[a]	25(62.5)[b]	
Characteristics Of Pain			
Unilateral	22(56.4)	17(42.5)	0.216
Bilateral	17(43.6)	23(57.5)	
Referred Physician			
Neurologist	35(87.5)[a]	24(61.5)[b]	**0.030**
General Doctor	4(10.0)[a]	12(30.8)[b]	
Other Specialist Physicians	1(2.5)[a]	3(7.7)[a]	

MIDAS total, HIT, and VAS scores (p>0.05). These results are detailed in Table 2.

Relief with analgesics was significantly more likely in the MO group. (p<0.05). MO patients had more regular sleep (p<0.05). Excessive sleepiness was more common in patients with VM (p<0.05). There was no statistically significant difference between the groups with respect to whether headache pain was unilateral or bilateral, or with respect to accompanying symptoms of pain such as nausea, vomiting, photophobia, phonophobia, osmophobia, and the time of day the headache began (p>0.05). A comparison of pain and sleep-related characteristics between groups is shown in Table 3.

DISCUSSION

The pathophysiological mechanisms underlying VM are not precisely known. However, the pathogenetic features of VM are generally thought to be similar to migraine.[2] The most commonly accepted theory is that the vasospasm seen in the brain due to migraine also occurs in the internal auditory arteries, and dizziness occurs due to decrease in blood flow in the inner ear.[14]

Patients with VM typically complain of spontaneous or positional vertigo.[15] However, positional vertigo differs from VM, especially in a shorter duration of vertigo attacks. VM patients have an intolerance to head movements and nausea triggered by head movements.[16] In these patients, vertigo may precede the headache, begin with the headache, or occur after the headache. Patients may experience attacks of dizziness without headache. VM headache attacks are milder compared to attacks in MO.[17] In our study, no statistical difference was found between the groups regarding the severity of headaches. Additionally, a throbbing headache character was significantly more common in the MO group.

In addition to dizziness, photophobia, phonophobia, osmophobia, and visual or other aura symptoms in patients may help distinguish VM from other causes of vertigo.[18] In our study, nausea, vomiting, phonophobia, photophobia, and osmophobia were associated with headaches in both MO and VM patients. Stress, hunger, insomnia, food and heat, and loss of appetite were all found to similarly trigger headaches in both groups. However, aura symptoms were more

Table 2: Comparison of scores of scales by diagnosis

Variables	Groups		p
	Migraine Only (n=40)	Vestibular Migraine (n=40)	
WHOQOL-BREF -Total	88.82±12.09	88.15±15.19	0.827
WHOQOL-BREF –Global Health	5.78±1.4	5.73±1.4	0.874
WHOQOL-BREF –-Physical Health	22.7±3.38	22.62±3.16	0.919
WHOQOL-BREF –-Psychological Health	20.3±3.72	20.85±3.76	0.512
WHOQOL-BREF –-Social Relationship	10.53±1.91	10.13±2.58	0.433
WHOQOL-BREF –-Environmental Health	31.13±6.07	27.97±5.05	**0.014**
MIDAS Total	6(0.5-33.5)	5(0-15.5)	0.236
HIT	61.5(59-67)	61(54-66.5)	0.491
VAS	8(7-9)	8(7-9)	0.930
BDI	11.0(3.5-17.0)	16.0(10.0-23.0)	**0.007**
ABCS	88.44(70.63-95.94)	61.88(50.94-79.69)	**<0.001**
DHI Total	24(2-47)	56(39-64)	**<0.001**
DHI Emotional	3(0-11)	10(6-16)	**<0.001**
DHI Functional	11(0-18)	26(17-29)	**<0.001**
DHI Physical	7(2-14)	20(15-22)	**<0.001**

WHOQOL-BREF: World Health Organization Quality of Life-Bref, MIDAS: Migraine Disability Assessment, HIT-6: Headache Impact Test, VAS: Visual Analog Scale, BDI: Beck Depression Inventory, ABCS: Activities-Specific Balance Confidence Scale, DHI: Dizziness Handicap Inventory.

Table 3: Comparison of pain and sleep-related features between groups

Variables	Migraine Only (n=40)	Vestibular Migraine (n=40)	p
Headache Character			
Throbbing	37(92.5)	27(67.5)	**0.005**
Compressing	5(12.5)	12(30.0)	0.056
Explosive	7(17.5)	6(15.0)	0.762
Fatigue	10(25.0)	12(30.0)	0.617
Reamer	5(12.5)	4(10.0)	0.723
Numbness	10(25.0)	9(22.5)	0.793
Relationship With Menstruation			
Yes	1(2.9)	9(26.5)	**0.006**
Characteristic Of Pain			
Single Sided	22(56.4)	17(42.5)	0.216
Headache Companion			
Nausea	27(67.5)	30(76.9)	0.350
Vomiting	10(25.0)	10(25.6)	0.948
Photophobia	32(80.0)	29(74.4)	0.550
Phonophobia	28(70.0)	30(76.9)	0.486
Osmophobia	21(52.5)	24(61.5)	0.417
Anorexia	20(50.0)	16(41.0)	0.423
Headache Start Time			
In Morning	25(62.5)	19(50.0)	0.266
At Noon	11(27.5)	19(48.7)	0.052
In The Evening	15(37.5)	20(51.3)	0.218
During Sleep	7(17.5)	10(25.6)	0.379
Factors That Relieve Pain			
Analgesics	37(92.5)	23(59.0)	**<0.001**
Resting In a Dark Room	12(30.0)	20(51.3)	0.054
Sleeping	12(30.0)	16(41.0)	0.306
Headache triggers			
Stress	39(97.5)	33(84.6)	0.057
Hunger	17(42.5)	12(30.8)	0.279
Insomnia	21(52.5)	24(61.5)	0.417
Food	5(12.5)	5(12.8)	0.999
Heat	12(30.0)	19(48.7)	0.088
Other	14(35.0)	7(17.9)	0.086
Sleep Status			
Regular	16(40.0)	5(12.8)	**0.006**
Insomnia	7(17.5)	11(28.2)	0.257
Frequent Waking- Difficulty Falling Asleep	9(22.5)	8(20.5)	0.830
Waking Up Early	11(27.5)	13(33.3)	0.573
Oversleeping	9(22.5)	18(46.2)	**0.027**

common in patients with VM. It is known that migraine aura may vary from patient to patient and even from attack to attack in the same patient.[19]

Imaging studies have revealed hypoperfusion in the aura phase. Migraine visual aura symptoms are mapped on the visual cortex and are thought

to occur under the influence of cortical spreading depression.[19] The frequent occurrence of aura symptoms in VM patients may be due to cortical spreading depression activating the vestibulo-ocular system.[19] Additionally, the analgesic response was decreased in VM patients. This result may be caused by accompanying depression and ictal dizziness.[20]

A study examining sleep disorders in migraine and VM patients showed poorer sleep quality in VM patients than in MO patients.[2] Excessive sleepiness has been emphasized in VM patients.[2] This situation may be due to physiological compensation for sleep deprivation that develops during a VM attack. VM attacks may cause sleep disorders, and improving sleep disturbances may reduce the frequency of VM, as seen in MO patients.[2] In our study, consistent with the literature, the rate of regular sleep was lower, and excessive sleepiness was higher in VM patients compared to MO patients.

Migraine and menstruation are related. Hormonal changes during the menstrual cycle are a common trigger for migraine attacks. Estrogen and progesterone play a role in migraine. Estrogen levels increase before ovulation and fall sharply before menstruation. This sudden drop in estrogen may trigger attacks in patients. Progesterone levels rise after ovulation and peak before menstruation, which may worsen symptoms in some patients.[21] In our study, the relationship with menstruation was statistically significantly higher in the VM group. VM patients may be more sensitive to hormonal fluctuations than MO individuals. Furthermore, the hormonal changes in VM patients may have greater effects on their vestibular symptoms.[22]

It is reported in the literature that depression and anxiety are more common in VM patients than in MO patients.[23-25] DHI scores are higher in VM patients, which is thought to reflect the increased disability associated with vertigo.[26] In our study, consistent with the literature, the depression level and dizziness disability inventory in all areas were significantly higher in the VM group. In contrast, the activity-specific balance confidence scale was significantly lower. Patients with VM experience restrictions in their daily activities due to vertigo, which may cause loss of confidence and increase patients' anxiety and depression levels.

In conclusion, there are significant clinical differences between VM and MO patients. Idetnification of these differences can be clinically relevant in correctly diagnosing and managing VM.

DISCLOSURE

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