

Prevalence of Vestibular Migraine in Obstructive Sleep Apnea Patients in Rajavithi Hospital

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Background: Vestibular migraine is a common disease that can cause balance problems related to sleep difficulties. Sleep apnea is now easy to diagnose accurately, and its considerable influence on the vestibular system has been recognized. Although there has been ample research into sleep and balance problems, there has been little investigation into vestibular migraine in patients with obstructive sleep apnea (OSA).

Objective: To specifically explore the prevalence of vestibular migraine in OSA and their relation.

Materials and Methods: In the present study, a survey was performed of patients suspected of having sleep apnea who later underwent investigation with polysomnography at Rajavithi Hospital.

Results: The results showed that all 130 patients had severe OSA, and that 10.8% of these individuals also had vestibular migraine

Conclusion: The prevalence of vestibular migraine in the OSA patients was 10.8%. Treatment of OSA could help solving vestibular migraine and should be investigated further in the future. This highlights the importance of recognizing sleep apnea as a trigger of vestibular migraine.

Keywords: Migrainous vertigo; Obstructive sleep apnea

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Vestibular migraine (VM) is a subset of migraine, and the main symptoms are dizziness and vertigo. Diagnosis is made by the diagnostic criteria⁽¹⁾. The condition has also been known as migraine-associated vertigo/dizziness, migraine-related vestibulopathy, and migrainous vertigo. The pathophysiology of VM has not been established. VM is classified entirely based on clinical features as reported by the patient. Just as in migraine itself, there are no biological markers for VM. VM is the second most common cause of vertigo after benign paroxysmal positional vertigo (BPPV)⁽³⁻⁵⁾ and found in about 1% of the population⁽²⁾. It can be provoked by stress (39.7%), bright light (26.7%), and insufficient sleep (26.0%)⁽⁵⁾. Poor sleep quality is a major provoking factor of

migraine^(6,7). Snoring problems affect up to 40% of the general population, and these people are prone to having obstructive sleep apnea (OSA), a condition that afflicts up to 10% of the population. After waking up, affected individuals may experience daytime somnolence and exacerbated vestibular problems. Studies have shown that OSA may decrease the supply of oxygen to the brain, resulting in damage to parts of the nervous system and causing disorders of the balance system, including dizziness⁽⁸⁾. OSA patients usually fall asleep easily and do not usually suffer from insomnia, so that identifying factors that trigger migraine can be difficult without focusing on other sleep disorders. Studies have shown that recurrent vertigo, both vestibular and non-vestibular, is found in up to 30% of the general population⁽⁹⁻¹¹⁾. German researchers surveyed the prevalence of VM and found that it occurred in 0.98% (95% CI 0.70 to 1.37) of the population⁽¹²⁾ and in people of all ages^(13,14). Symptoms may include headache and dizziness, separately or in combination. Although its existence has long been recognized, there has been little research into this disease in Thailand. One study performed by the author in 2014 reported that lack of sleep was the most common cause⁽⁵⁾. Research conducted in Italy found dizziness in 8.8% of OSA patients and revealed

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that 77.1% of participants had balance system (VNG) dysfunction⁽¹⁵⁾. Additionally, it has been reported that morning headaches are more common in patients with OSA and that symptoms improve with treatment^(16,17). Most studies have focused on the relationship between sleep disturbance and migraine headaches rather than VM⁽¹⁶⁻¹⁸⁾. The present research was conducted to specifically explore the prevalence of OSA and VM, which has not been reported yet, and how they are related.

Materials and Methods

Data were collected by professional nurses trained to conduct interviews. The researchers examined all patients who had snoring problems and were suspected of having OSA, and diagnoses were confirmed with polysomnography in Rajavithi Hospital between June 2018 and May 2019. The data included general demographic information, factors provoking symptoms of dizziness, headache, symptom severity and frequency, co-morbidities such as photophobia, phonophobia or aversion to loud noise, the degree of sleep apnea, and its risk factors. VM was analyzed with criterion⁽¹⁾ and its prevalence was calculated in groups diagnosed with OSA. Patients who did not wish to participate in the present study were excluded. The study was approved by the Ethics Committee, Rajavithi Hospital (No. 062/2019).

Statistical analysis

Data were analyzed using IBM SPSS Statistics, version 22.0 (IBM Corp., Armonk, NY, USA). Demographic data were analyzed using descriptive statistics and reported as number, percentage, mean and standard deviation, and minimum and maximum. Factors affecting VM were compared using chi-square test and logistic regression analysis. A p-value of less than 0.05 was considered statistically significant.

Results

All 130 participants underwent polysomnography, and all were diagnosed with severe OSA. Fifty-four-point-six percent of the population were male, 65.1% were aged over 40, and 49.1% were overweight as defined by the World Health Organization for Asian populations (Table 1).

The factors associated with VM in OSA were identified as age ($p=0.018$) and marital status ($p=0.034$). Regarding age, patients in the age group 20 to 40 years accounted for 71.4% of the affected patients, followed by individuals aged 20 to 40 years

Table 1. Demographic data (n=130)

Factor	n (%)
Sex	
Male	71 (54.6)
Female	59 (45.4)
Age	
Mean±SD	48.74±14.19
Min-max	18 to 79
<20 years	2 (1.5)
20 to 40 years	43 (33.1)
40 to 60 years	58 (44.6)
>60 years	27 (20.8)
BMI (kg/m ²) WHO BMI cutoff for Asians	
Mean±SD	30.81±8.35
Min-max	14.67-63.27
Underweight	1 (0.8)
Normal	15 (11.5)
Overweight	63 (48.5)
Obese	51 (39.2)
Marital status	
Single	53 (40.8)
Married	61 (46.9)
Widowed, divorced	16 (12.3)

SD=standard deviation; BMI=body mass index; WHO=World Health Organization

Table 2. Factors associated with vestibular migraine in patients with sleep apnea (n=130)

Factor	Vestibular migraine		p-value
	Yes (n=14)	No (n=116)	
Sex; n (%)			0.350
Male	6 (8.5)	65 (91.5)	
Female	8 (13.6)	51 (86.4)	
Age (years); mean±SD	41.00±12.95	49.67±14.10	0.030*
BMI (kg/m ²); n (%)			0.748
Underweight	0 (0.0)	1 (100)	
Normal	1 (6.7)	14 (93.3)	
Overweight	6 (9.5)	57 (90.5)	
Obese	7 (13.7)	44 (86.3)	
Marital status; n (%)			0.034*
Single	9 (17.0)	44 (83.0)	
Married	2 (3.3)	59 (96.7)	
Widowed, divorced, or separated	3 (18.8)	13 (81.3)	
Alcohol consumption; n (%)			0.241
Non-drinker	10 (9.2)	99 (90.8)	
Drinker	4 (19.0)	17 (81.0)	
Exercise; n (%)			0.246
No exercise	10 (13.5)	64 (86.5)	
Exercise	4 (7.1)	52 (92.9)	

SD=standard deviation; BMI=body mass index

Table 3. Logistic regression analysis with vestibular migraine in patients with sleep apnea (n=130)

Factor	Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Age (years)	0.954 (0.913 to 0.997)	0.036	0.958 (0.913 to 1.005)	0.079
Marital status				
Single	Ref.		Ref.	
Married	0.166 (0.034 to 0.805)	0.026	0.264 (0.050 to 1.402)	0.118
Widowed, divorced or separated	1.128 (0.266 to 4.789)	0.870	2.428 (0.444 to 13.297)	0.306

OR=odds ratio; CI=confidence interval

and those over 60 years of age (each at 14.3%). No patient under 20 years had VM. Marital status was also associated with VM, with single people accounting for 64.3% of sufferers, followed by those who were widowed, divorced, or separated at 21.4% and married people at 14.3%, as shown in Table 2.

Factors which associated with VM in patients with sleep apnea was shown by Logistic regression analysis. Only widowed, divorced, or separated group had an increased risk of VM but not significant ($p=0.306$) as shown in Table 3.

Discussion

VM, one of the most common diseases that cause dizziness⁽⁵⁾, can be confirmed by means of established diagnostic criteria⁽¹⁾. In the present study, patients were interviewed prior to undergoing polysomnography for diagnosis. These 130 individuals who were prone to sleep apnea voluntarily enrolled in the study, and all had diagnosis of OSA confirmed by polysomnography. VM was found in 10.8% of the participants, whereas a previous study in Germany found a prevalence in the general population of about 1%. Factors that trigger vertigo include dieting, type of food, sleep, stress, and daily activities⁽²⁾. A prior study in Thailand found sleep problems to be the most common conditions that triggered symptoms⁽⁵⁾. Sleep apnea may be a major trigger of VM because patients are often awake unconsciously. Sleep disordered, breathing, and snoring are risk factors for chronic daily headache and chronic migraine^(19,20). In addition to induce daytime somnolence, VM can also cause severe headaches and dizziness. Most OSA patients fall asleep easily and do not suffer from insomnia. This makes it difficult to identify factors that trigger migraine symptoms if the sleep problems other than insomnia were ignored, resulting in a prolonged period of investigation. The data from the present study revealed that no related factor such as gender, age, body mass index, marital status, and exercise, was a significantly associated factor of VM.

Conclusion

The prevalence of VM in patients with sleep apnea in the present study was 10.8% suggesting that there is a substantial high prevalence. There has been no report about the prevalence of VM in patients with sleep apnea yet. Patients suffering from OSA should be investigated for VM because of the high prevalence.

What is already known on this topic?

VM is common around the world, and studies have shown relationships between OSA and vestibular dysfunction. One common trigger factor of VM is lack of sleep, which can be caused by OSA.

What this study adds?

This is the first study to investigate the correlation between VM and OSA, as well as the prevalence of VM in an OSA group.

Conflicts of interest

The author declares no conflicts of interest.

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