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Factors associated with prognosis of vestibular migraine, in relation to Meniere's disease.

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Factors associated with prognosis of vestibular migraine, in relation to Meniere's disease.

Directed by Professor Sung Huhn Kim

The Master's Thesis
submitted to the Department of Medicine,
the Graduate School of Yonsei University
in partial fulfillment of the requirements for the degree of
Master of Medical Science

SeungMin Kwak

December 2023

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Factors associated with prognosis of vestibular migraine, in relation to Meniere's disease.

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Background:
Vestibular migraine (VM), characterized by migrainous headaches and dizziness, poses a diagnostic challenge due to its clinical overlap with Meniere's disease (MD). This study aims to investigate the clinical characteristics of VM patients, focusing on the aural symptoms. Distinct features of VM patients with MD diagnosis (MDVM) were explored.

Methods:
A retrospective review of 169 VM patients at a single center (2016-2020) was conducted. Clinical features, audio-vestibular test results, and clinical outcomes after prophylactic therapy were analyzed. Logistic regression was undertaken to identify factors associated with symptom improvement. Diagnosis of definite MD was made according to the 2015 consensus document from Barany society. Comparative analysis between VM and MDVM was done.

Results:
VM patients commonly reported aural symptoms (47.9% ear fullness, 40.2% tinnitus) and hearing fluctuations (17.2%). Logistic regression revealed associations between aural symptoms and poor headache (p=0.005) and dizziness improvement (p=0.033). Eleven (6.5%) VM patients with aural symptoms were later diagnosed with MD. MDVM patients

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exhibited a distinct hearing pattern compared to VM patients with hearing fluctuations, demonstrating a greater drop at low frequencies (mean hearing threshold at 250 and 500Hz of 33.6±6.7 dB vs. 20.6±11.1 dB in MDVM and VM, p=0.002), and worsening of final hearing level (mean 30.8±23.0 dB vs 12.6±7.1 dB, p=0.027). Other clinical features and vestibular testing failed to distinguish between VM and MDVM.

Conclusion:
Aural symptoms are common in VM patients. Such symptoms are related to persistence of migraine symptoms. MDVM patients showed a distinct pattern of hearing loss, leading to hearing deterioration.

Key words : Vestibular migraine, Meniere's disease, differential diagnosis, hearing fluctuations, aural symptoms, prognosis

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Factors associated with prognosis of vestibular migraine, in relation to Meniere's disease.

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(Directed by Professor Sung Huhn Kim)

I. INTRODUCTION

Vestibular migraine (VM) is a disease entity defined by the International Classification of Headache Disorders (ICHD-3), characterized by migrainous headaches combined with dizziness.[2, 3] Its prevalence among the general population is estimated at 1-3%, making it one of the most common causes of recurrent vertigo.[4, 8] The nature of dizziness in VM is highly variable, and other aural symptoms such as aural fullness, tinnitus, hearing loss, and otalgia are common.[3, 8] The dizziness and aural symptoms of VM often lead physicians to confusion with Meniere's disease (MD), which also presents with vertigo, fluctuating hearing loss, aural fullness, and tinnitus.[9, 10, 19, 20] Furthermore, migraine is reported to be more common among patients with MD. MD patients exhibit twice the lifetime prevalence of migraine, reaching 56%.[15] Also, co-existence of MD and VM (MDVM) in a single patient is frequent, comprising as much as 25% of the subjects who has either VM or MD.[11] Several studies have suggested commonalities in pathophysiology, such as shared genetic susceptibility[16] and underlying channelopathy.[17] Migraine-induced neurotransmitter and microvascular ischemic damage were suggested to cause a MD-like presentation.[6, 15] However, the definitive pathophysiological relationship between VM and MD remains unclear.

In VM patients, severe hearing loss is very unlikely to be developed, although aural

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symptoms may occur.[22, 25] On the other hand, MD is known for its progressive nature, leading to profound hearing loss, chronic vestibulopathy, and hazardous events such as Tumarkin falls.[21] The treatment methods for VM and MD are different. VM is mostly treated with lifestyle modification and some prophylactic or acute medication. For MD, along with lifestyle modification, different kinds of medication from VM are administered, such as betahistine and diuretics for initial treatment. More aggressive therapeutic methods include intratympanic steroid injection and intratympanic aminoglycoside injection for ablation of vestibular hair cells. Even surgical options such as endolymphatic sac decompression or vestibular neurectomy are considered for intractable cases. Thus, differential diagnosis between VM and MD is crucial. However, it is challenging, especially to differentiate VM from early-stage MD patients without significant hearing loss.

In this study, we investigated the frequency and characteristics of aural symptoms in VM. We also explored the differences in clinical symptoms and audio-vestibular test results between VM and MDVM, to provide clues for predicting the development of MD in VM patients. We believe that this study can serve as a basis for understanding the commonalities and differences in the clinical nature and pathophysiology of VM and MD.

II. MATERIALS AND METHODS

1. Patient enrollment criteria

A retrospective review encompassing 288 patients diagnosed with vestibular migraine at a single tertiary center was conducted for the period 2016 to 2020. The diagnosis of VM was made in accordance with the third edition of the International Classification of Headache Disorders (ICHD-3).[2] The exclusion criteria were: 1) Age of <18 years old, 2) Baseline central neurologic or other otologic pathology potentially altering the disease course, 3) Follow-up loss before proper treatment, and 4) Unavailable audio-vestibular exam results. A diagram regarding patient selection is provided in **Figure 1**.

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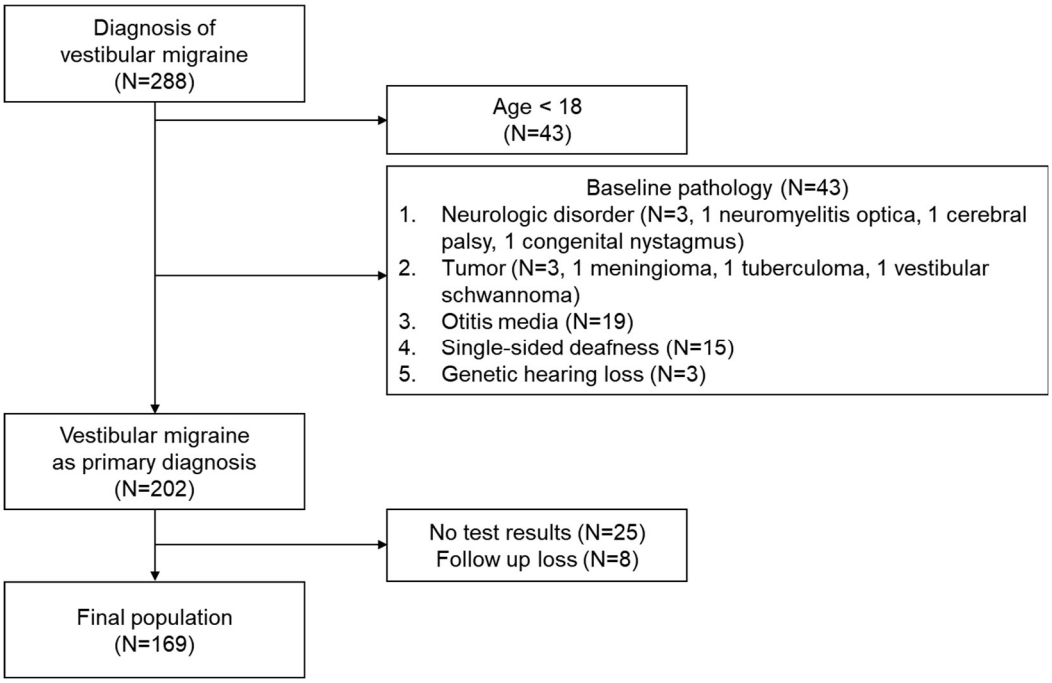

Figure 1. Diagram of patient selection

2. Clinical factors for analysis

All patients underwent examination by experienced otologists at the center, and brain MRI was performed as necessary to exclude central vertigo. Data collection encompassed variables such as age of onset, character of dizziness (vertigo-type was defined as a form of dizziness characterized by a perceptible spinning or rotational sensation, while other types of dizziness, such as lightheadedness or unsteadiness, were categorized as 'non-vertigo.'), associated otologic symptoms (ear fullness, tinnitus), presence of nystagmus, headache characteristics (visual aura, VAS score, photophobia, phonophobia, aggravation by physical activity, nausea/vomiting), fluctuation of hearing on pure tone audiometry (PTA), baseline PTA threshold (in four-tone average of 0.5, 1, 2, 4 kHz), caloric test result, cervical and ocular vestibular evoked myogenic potential (VEMP) result, and SP/AP ratio in electrocochleography (ECoG). Cervical VEMP (cVEMP) and

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ocular VEMP (oVEMP) tests were conducted using 95dB click stimuli, and Interaural ratio (IAR) was calculated for both, with IAR $\geq$ 0.4 considered abnormal for cVEMP and IAR $\geq$ 0.33 for oVEMP or 'no response' to the stimulus. Electrocochleography was performed using the extratympanic method with 95dB click stimuli, and the SP/AP ratio was subsequently calculated. Clinical outcomes were analyzed after patients received suitable prophylactic medications such as anti-epileptics, beta blockers, tricyclic antidepressants, and/or calcium channel blockers. Symptom improvement was defined as the relief of symptoms following therapy to the extent that allows for the tapering of prophylactic medication. For patients experiencing hearing fluctuations, their latest PTA results were collected. A diagnosis of definite Meniere's Disease (MD) was made during any follow-up period by the 2015 consensus document on diagnostic criteria from Barany Society.[19]

3. Statistics

Statistical analysis was conducted using SPSS software (version 18.0, SPSS Inc., Chicago, IL, USA). To identify factors associated with symptom improvement after medical therapy, multivariate logistic regression analysis was undertaken, with selected variables including sex, age, and those demonstrating clinical importance from univariable analysis. Additionally, a comparison of data within the group exhibiting otologic symptoms was performed, contrasting patients diagnosed with MD against other VM patients with otologic symptoms. Chi-square test, Fisher's exact test, two-sample t-test, and Mann-Whitney test were employed as appropriate.

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Table 1. Demographics, clinical characteristics, audio-vestibular test results, and clinical outcomes of patients diagnosed with vestibular migraine. The audiometry thresholds represent the four-frequency average at 500, 1000, 2000, and 4000 Hz. Low-frequency fluctuation is determined by calculating the average increase in threshold at 250 and 500 Hz, compared to the baseline. (PTA: Pure tone audiometry, cVEMP: cervical vestibular evoked myogenic potential, oVEMP: ocular vestibular evoked myogenic potential, ECoG: Electrocochleography, MD: Meniere's disease)

	Total (N=169)
Demographics and clinical characteristics	
Sex (male:female)	20:149
Age of onset, years old	36.7±13.7
Vertigo-type dizziness, n (%)	121 (71.6%)
Associated otologic symptoms, n (%)	**92 (54.4%)**
Aural fullness, n (%)	81 (47.9%)
Tinnitus, n (%)	68 (40.2%)
Presence of nystagmus, n (%)	30 (17.8%)
Migraine-related Symptoms	
Visual aura, n (%)	38 (22.5%)
VAS score, 0 (none) – 10 (severe)	6.9±1.5
Photophobia, n (%)	47 (27.8%)
Phonophobia, n (%)	64 (37.9%)
Aggravation by physical activity, n (%)	71 (42.0%)
Nausea, n (%)	134 (79.3%)
Audio-vestibular test results	
Baseline PTA threshold, dBHL	12.1±8.8
Low frequency fluctuation on PTA, n (%), dBHL	**29 (17.2%),** 25.5±11.6
Canal paresis on caloric test, % (N=162)	11.4±11.5
cVEMP abnormality (N=158)	
Normal, n (%)	96 (60.8%)
Unilateral loss, n (%)	46 (29.1%)
Bilateral loss, n (%)	16 (10.1%)

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oVEMP abnormality (N=94)	
Normal, n (%)	23 (24.5%)
Unilateral loss, n (%)	26 (27.7%)
Bilateral loss, n (%)	45 (47.9%)
ECoG SP/AP ratio (N=80)	0.27±0.09
Clinical outcomes	
Headache improvement, n (%)	112 (66.3%)
Dizziness improvement, n (%)	116 (68.6%)
Diagnosis of definite MD, n (%)	**11 (6.5%)**

III. RESULTS

1. Demographics and audio-vestibular symptoms of patients

Demographics, clinical characteristics, and vestibular function test results are presented in **table 1**. The study comprised a total of 169 patients diagnosed with vestibular migraine (**Figure 1**), including 20 (11.8%) males and 149 (88.2%) females. Among these, 121 (71.6%) experienced vertigo-type dizziness, and 30 (17.8%) displayed either spontaneous or evoked nystagmus. Visual aura was present in 38 (22.5%) cases, photophobia in 47 (27.8%), and phonophobia in 63 (37.3%).

All patients demonstrated hearing levels within normal range. The mean hearing threshold on pure tone audiometry (PTA) was 12.1±8.8dB. Despite the normal hearing, a notable number of patients reported accompanying otologic symptoms, with 81 (47.9%) experiencing aural fullness and 68 (40.2%) reporting tinnitus. Fluctuation of hearing, evident on PTA as a transient increase in low-frequency threshold, was observed in 29 (17.2%) cases. In these patients, average increase of 25.5±11.6dB was observed at 250Hz and 500Hz. Overall, 92 patients (54.4%) had any aural symptom and 29 patients which is nearly a third of them (31.5%) exhibited low frequency hearing level fluctuation. Following appropriate medical therapy, headache was improved in 112 (66.3%) cases, and dizziness improved in 116 (68.6%) cases (**Table 1**).

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2. Vestibular function test results

Vestibular function test results were mostly within the normal range. On the caloric test, 24 (14.8%) showed canal paresis larger than 20%, and 3 of them were diagnosed with definite MD (30.0% of MD patients with caloric test results). Of the 80 patients who underwent ECoG testing, 6 (7.5%) had an elevated SP/AP ratio (> 0.35), and only 2 of them were diagnosed with definite MD (22.2% of MD patients who underwent ECoG). Out of the 153 individuals who underwent the video head impulse test (vHIT), only 4 (2.6%) exhibited abnormalities, with one patient showing decreased gain and three displaying catch-up saccades on one of the semicircular canals with normal gain.

3. Prognostic factors for headache and dizziness

Logistic regression analysis was performed to identify factors related to chances of improvement (**Table 2-a** and **2-b**). Not having vertigo-type dizziness (OR 95% CI 0.13 to 0.69, p=0.005) and having associated aural fullness or tinnitus (OR 95% CI 0.15 to 0.71, p=0.005) were found to be predictors of a poor chance of improvement regarding headache. Similarly, predictors related to a poor chance of dizziness improvement were not having vertigo-type dizziness (OR 95% CI 0.18 to 0.81, p=0.013) and the presence of aural fullness (OR 95% CI 0.23 to 0.94, p=0.033). Tinnitus had no significant relationship with the improvement of dizziness, unlike headache. Thus, the presence of aural symptoms can be an indicator for persisting headache and dizziness after medical therapy in VM.

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Table 2-a. Logistic regression analysis of predictive factors for headache improvement after medical therapy. The table displays variables associated with a lower likelihood of improvement. (OR: Odds ratio) (*: p-value <0.05, **: p-value <0.01)

	OR (95% CI)	p-value
Male sex	0.41 (0.14-1.21)	0.107
Age	1.00 (0.97-1.02)	0.787
Non-vertigo	0.30 (0.13-0.69)	**0.005****
Associated aural fullness or tinnitus	0.33 (0.15-0.71)	**0.005****
Visual aura	0.67 (0.30-1.52)	0.337

Table 2-b. Logistic regression analysis of predictive factors for dizziness improvement after medical therapy. The table displays variables associated with a lower likelihood of improvement. (OR: Odds ratio) (*: p-value <0.05)

	OR (95% CI)	p-value
Male sex	0.65 (0.22-1.87)	0.420
Age	0.99 (0.97-1.02)	0.661
Non-vertigo	0.38 (0.18-0.81)	**0.013***
Associated aural fullness	0.46 (0.23-0.94)	**0.033***

4. Differences in clinical characteristics and audio-vestibular function between VM and MDVM patients

Among the 92 patients who complained of related aural symptoms, 29 (31.5%) showed fluctuations of hearing on PTA, and 11 (12.0%) were diagnosed with definite MD (MDVM). Sex, age, aural symptoms, and other migrainous features showed no statistically significant difference between VM and MDVM groups. Furthermore, there was no statistically significant difference in vestibular test results (**Table 3**). In contrast, MDVM patients exhibited a distinct pattern of hearing fluctuation compared to VM patients with hearing fluctuations. While both groups showed hearing fluctuations in low frequencies (250Hz and 500Hz), MDVM patients demonstrated a greater drop in hearing

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from the baseline (mean hearing threshold at 250 and 500Hz of 33.6±6.7 dB vs. 20.6±11.1 dB in MDVM and VM, p=0.002). VM patients with hearing fluctuations showed normal hearing thresholds on the final PTA (mean 12.6±7.1 dB, median follow-up period of 29.9 months, IQR 9.0 to 69.7), with no difference compared to the initial baseline PTA threshold (mean 12.5±8.1 dB, p=0.945). On the other hand, MDVM patients had significant hearing loss by the end of follow-up (mean 30.8±23.0 dB, p=0.027, median follow-up period of 70.1 months, IQR 39.0 to 109.7).

Table 3. Comparison between patients with or without a concurrent diagnosis of Meniere's disease (MD). The audiometry thresholds represent the four-frequency average at 500, 1000, 2000, and 4000 Hz. Low-frequency fluctuation is determined by calculating the average increase in threshold at 250 and 500 Hz, compared to the baseline. (*: p-value <0.05, **: p-value <0.01) (PTA: Pure tone audiometry, ECoG: Electrocochleography, cVEMP: cervical vestibular evoked myogenic potential, oVEMP: ocular vestibular evoked myogenic potential, MD: Meniere's disease)

Total (N=92)	**Aural fullness or tinnitus, and stable hearing (N=63)**	**Hearing fluctuations, non-MD (N=18)**	**definite MD (N=11)**	p-value (MD vs. the rest)
Sex (male:female)	6:57	3:15	2:9	0.616
Onset age, years old	34.1±13.2	33.9±11.7	35.3±12.9	0.763
Vertigo-type dizziness, n (%)	51 (81.0%)	12 (66.7%)	11 (100%)	0.114
Visual aura, n (%)	18 (28.6%)	5 (27.8%)	1 (9.1%)	0.277
Photophobia, n (%)	21 (33.3%)	3 (16.7%)	2 (18.2%)	0.722
Phonophobia, n (%)	28 (44.4%)	5 (27.8%)	2 (18.2%)	0.196
Baseline PTA threshold, dBHL	10.9±8.5	12.5±8.1	12.4±7.9	0.682
Low frequency fluctuation, dBHL (during aggravation)		**20.6±11.1 ** **	**33.6±6.7 ** **	**0.002****
Final PTA threshold, dBHL		**12.6±7.1 * **	**30.8±23.0 * **	**0.027***

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Canal paresis, % (N=88)	11.1±10.9 (N=60)	15.0±13.8 (N=18)	19.4±19.2 (N=10)	0.097
cVEMP results (N=88)	(N=60)	(N=17)	(N=11)	0.252
Normal, n (%)	40 (66.7%)	11 (64.7%)	7 (63.6%)	
Unilateral loss, n (%)	17 (28.3%)	5 (29.4%)	2 (18.2%)	
Bilateral loss, n (%)	3 (5.0%)	1 (5.9%)	2 (18.2%)	
ECoG SP/AP ratio (N=59)	0.27±0.10 (N=40)	0.29±0.12 (N=10)	0.30±0.10 (N=9)	0.229

IV. DISCUSSION

We investigated the clinical characteristics of VM patients, particularly focusing on aural symptoms and hearing fluctuations. A comparative analysis was conducted between patients diagnosed with MDVM and VM, who share similar clinical presentations. The distinction between VM and MD is an area of research under continuous investigation, with previous studies highlighting factors such as older age, male gender, prolonged duration of dizziness, presence of hearing loss, absence of migraine history, and lack of migrainous features (aura, photophobia, phonophobia) favoring MD over VM.[9, 11] Abnormal findings on audio-vestibular tests, including audiometry, vestibular evoked myogenic potential (VEMP), or electrocochleography (ECoG), have been reported to lean towards MD rather than VM.[7, 9-12, 35-39] However, the significance of these differences in the early stages of the diseases remains unclear. In addition, there are few studies that have investigated the distinct clinical characteristics that could serve as evidence suggesting the coexistence of VM and MD. To our knowledge, our study is the first to evaluate potential MD patients before hearing deterioration, aiming to identify factors related to the diagnosis of Meniere's disease.

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The diagnostic process is particularly challenging due to the overlapping clinical symptoms between MD and VM. In our study, 71.6% of total VM patients experienced true vertigo, and 17.8% exhibited nystagmus as observed by a clinician. Over half (54.4%) of VM patients reported aural fullness or tinnitus associated with headache or dizziness, and nearly a third of such patients (31.5%) displayed fluctuation of hearing, mainly in low frequencies below 1kHz (**Table 1**). Moreover, we found that the presence of aural fullness or tinnitus indicates prolonged symptom severity requiring medication. Patients with these symptoms had a lower chance of headache improvement after medical therapy (p=0.009). Logistic regression revealed that the presence of tinnitus or ear fullness significantly predicted a lesser chance of headache improvement (OR 95% CI 0.15 to 0.71, p=0.005). Aural fullness was also associated with a poorer chance of dizziness improvement (OR 95% CI 0.23 to 0.94, p=0.033) (**Table 2**). Therefore, the differential diagnosis in such patients can be even more confusing due to persisting VM symptoms, which may lead to inappropriate treatment. Caution and careful observation are crucial for accurate discernment, and hasty diagnoses of MD in VM patients should be avoided.

In logistic regression analysis, not having vertigo-type dizziness emerged as a predictor for a poor chance of headache and dizziness improvement (OR 95% CI 0.13 to 0.69, p=0.005; OR 95% CI 0.18 to 0.81, p=0.013, respectively) (**Table 2**). The reason why true vertigo responds better to medicine remains uncertain, with one possibility being the more direct involvement of the vestibular pathway targeted by medication in use. As there are no established guidelines for treating vestibular migraine supported by evidence,[3,24] further research is necessary to elucidate factors associated with clinical improvement or response to therapy.

VM patients in our study exhibited normal initial audiometry and vestibular function, as well as MDVM patients. The decline of audio-vestibular function is known to be rare in vestibular migraine.[22, 25] In our study, VM patients who were not diagnosed with MD maintained normal hearing levels, and even those with hearing fluctuations did not show further deterioration of hearing (**Table 3**). However, MDVM patients experienced a

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gradual decrease in hearing level, and their final pure tone audiometry (PTA) results were significantly worse than the other patients. The degree of hearing fluctuation in low frequencies was greater in MDVM patients (**Table 3**). This distinction can be considered a characteristic feature of MDVM in contrast to VM. While some predisposing factors or pathogenic pathways may be shared between MD and VM,[6,15] the diagnosis of MD reflects an immediate pathological process in the inner ear. None of the other patients showed a significant decline in hearing, aligning with the well-established favorable prognosis of VM.[22, 25]

In Meniere's disease, sensorineural hearing loss may precede the onset of vertigo by several months or years in the form of delayed hydrops (DH). Conversely, tinnitus or aural fullness is typically associated with the first episode of vertigo.[19] In our study, all 11 patients diagnosed with MDVM had aural symptoms from the initial visit (p=0.002). None of the VM patients without aural symptoms developed hearing loss during follow-up. In a study on the long-term prognosis of vestibular migraine, the proportion of patients with concomitant aural symptoms increased from 16% to 49%, with none of them developing a severe form of hearing loss indicative of inner ear pathology.[23] Although VM patients without aural symptoms might eventually experience tinnitus or aural fullness, the development of sensorineural hearing loss is considered highly unlikely.

In prior investigations, including the work by Neff et al., [11] migrainous traits such as aura, photophobia, and phonophobia were reported to occur less frequently in the MD population compared to VM. Our study found that MDVM patients exhibited a lower incidence of visual aura (28.4% versus 9.1%, p=0.277), photophobia (29.6% versus 18.2%, p=0.722), and phonophobia (40.7% versus 18.2%, p=0.196) (**Table 3**). Despite these observations, statistical significance was not achieved, and these traits do not seem to offer a satisfactory reference for clinical decision-making.

Abnormal findings on caloric tests, VEMP, and EcoG are more commonly associated with MD than VM.[7, 9-12, 35-39] However, in our study, vestibular testing failed to distinguish MDVM patients from VM. Although slightly higher caloric canal paresis (12.0±11.6

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versus 19.4±19.2, p=0.097) and ECoG SP/AP ratio (0.28±0.11 versus 0.30±0.10, p=0.229) were noted in MD patients, the differences were not statistically significant (**Table 3**). Despite its role in evaluating MD patients, vestibular testing did not prove to be a distinguishing factor. Presumably, the role of vestibular function tests as diagnostic tools in early MD may not be significant.

Our study has several limitations. It is a retrospective study conducted in a single center. In terms of assessing symptom improvement in patients, there was no effective parameter available to quantitatively measure the degree of headache or dizziness due to a lack of details in the medical records. A standardized protocol for prescribing medications was lacking, with decisions being made subjectively by individual clinicians. After initial treatment, patients were referred to local centers once symptoms stabilized, resulting in variable follow-up periods among patients. To enhance the applicability of our findings, a prospective study with standardized treatment protocols and consistent follow-up periods is warranted. Additionally, factors known to differ in VM and MD patients, such as familial history, attack frequency, duration of dizziness, and type of nystagmus, could not be analyzed due to inconsistent records. Future research should explore the role of these factors in greater detail.

V. CONCLUSION

Tinnitus, aural fullness, and hearing fluctuations are common complaints from VM patients. Aural symptoms are also associated with the persistence of migraine symptoms. MDVM, in contrast to VM, progresses to eventual hearing deterioration, indicating a substantial change in the inner ear physiology. Careful observation and adherence to the established clinical criteria is required for accurate diagnosis.

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ABSTRACT(IN KOREAN)

전정편두통 환자의 예후 관련 인자 분석: 메니에르병과 관련하여

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곽 승 민

전정편두통(VM)은 두통과 동반된 어지럼증으로 나타나며, 메니에르병(MD)과 임상증상이 겹치기 때문에 감별진단에 어려움이 있다. 본 연구에서는 전정편두통에서 이과적(otologic) 증상과 예후와의 관련성을 밝히고, 또 메니에르병이 함께 진단된 환자(MDVM)의 구별되는 특징을 탐구하였다.

세브란스병원에 2016년부터 2020년까지 내원하여 전정편두통으로 진단받은 환자들에 대한 후향적 연구를 하였다. 총 169명의 성인 환자에 대하여 임상적 특징에 관한 자료와 청각, 전정기능검사 결과를 수집하였다. 로지스틱 회귀를 통해 이 환자들의 증상 개선에 영향을 미치는 요인을 분석하였다. 그리고 Barany 학회의 진단기준에 따라 definite MD로 진단된 환자들을 타 군과 비교하여 분석하였다.

전정편두통 환자는 이과적 증상(이충만감 47.9%, 이명 40.2%)을 흔하게 호소했으며 17.2%에서 청력 변화가 관찰되었다. 로지스틱 회귀 분석 결과, 이과적 증상이 있으면 두통 호전(p=0.005)과 어지럼증 호전(p=0.033)의 가능성이 낮았다. 이과적 증상이 있는 VM 환자 중 11명(6.5%)이 이후 MD로 진단되었다. MDVM 환자는 저주파수 청력 변동의 폭이 더 컸으며, (평균 33.6±6.7 dB 대 20.6±11.1 dB, p=0.002) 최종적으로 유의미한 수준의 청력 저하를 보였다. (평균 30.8±23.0 dB 대 12.6±7.1 dB, p=0.027) 다른 임상적 특성이나 전정기능 검사로는 MDVM를 VM과 구별할 수 없었다.

전정편두통 환자가 흔히 호소하는 이명, 이충만감 등의 증상은 메니에르병과의 감별을 어렵게 만들며, 이런 환자에서는 편두통 증상도 오래

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지속될 수 있기 때문에 더욱 MD의 진단에 각별한 주의가 필요하다. 두 질환이 서로 다른 예후를 나타내는 개별 진단이라는 인식과 함께 임상적 진단기준에 따른 판단이 중요하다.

핵심되는 말 : 전정편두통, 메니에르병, 감별 진단, 청력 변화, 이과적 증상, 예후 인자