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Original Article

The characteristics of episodic migraine vs. chronic migraine at high altitude and the relationship with body mass index, education level and MIDAS

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Abstract

Aim: Migraine is a common neurological disorder which negatively influencing the life quality of life. In a study from Turkey, migraine prevalence was reported to be 16.4%. It was determined that chronic migraine (CM) accounts for 10.8% of overall migraine cases. Some studies alleged that migraine is more prevalent at high altitudes. Furthermore, a relationship has been reported between CM and body mass index (BMI) and education level. We investigated the characteristic features of migraine and their effects on the activities of daily living, as well as the body mass index and sociodemographic characteristics of the patients, who have been diagnosed with migraine in our outpatient clinic in the city center of Erzurum, which is located nearly 2,000 meters above the sea level.

Material and Methods: Characteristics of migraine, sociodemographic data, body mass index and MIDAS scoresof 1347 patients aged 18-45 years, who have been living in the city center of Erzurum and have been diagnosed with migraine based on the ICHD-2 in neurology outpatient clinic between December 2012 and October 2015, were retrospectively evaluated. Patients were divided into two groups as episodic and chronic migraine.

Results: Of the patients, the mean age was 30.4 (±8.4) years, 81.8% (n=1104) were female, and 32.3% (n=435) had chronic migraine. Statistically significant differences were observed between the two groups in terms of education level, MIDAS scores and BMI ($p<0.005$).

Conclusion: We detected high CM prevalence in such high altitude. Characteristic features of the disease were consistent with the literature. The rate of illiterate patients was higher in the CM group. The prevalence of CM increased with BMI. CM group had higher MIDAS scores. We think that high altitude, as well as BMI and education level, contributes to the disease to become chronic.

Keywords: Migraine; MIDAS; High altitude; Body Mass Index.

INTRODUCTION

Migraine is among the leading diseases in terms of prevalence and cause of disability (1). It can be classified as episodic migraine (EM) and chronic migraine (CM) depending on the frequency of migraine attacks (2.3). Numerous prodromal symptoms such as nausea, vomiting, photophobia, phonophobia and osmophobia may accompany migraine attacks. Different studies have reported different prevalence rates for these symptoms (4-6). The first-degree relatives of migraine patients as well suffer from similar complaints at high rates. The percentage of migraine patients with positive family history among migraine population is reported to be high as 45-70% (7). Studies investigating the prevalence of migraine reported the prevalence to be 14.7-16.4% with CM accounting for 7.7-10% of migraine population (8-10). It was reported that migraine prevalence is influenced by high altitude and that it is more prevalent at high altitude together with increased pain severity and frequency (11). Another conspicuous situation in CM is the lower education level (12).

It is known that quality of life is affected in migraine patients, more frequently in the patients with CM (13). Studies conducted with Migraine Disability Scale (MIDAS) determined higher disability in CM patients (14). The disease's becoming chronic has been associated with

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many comorbid conditions (15). Obesity as well is a comorbid condition contributing to the chronicity of migraine, and body mass index (BMI) has been reported to be higher in CM vs. EM patients (16).

In the present study as well, we investigated sociodemographic characteristics of the patients diagnosed with migraine in Erzurum city center located at an altitude of approximately 2,000 m above sea level, as well as the rates of CM and EM, frequency of prodromal symptoms, the scores of migraine disability scale, and their relationship with body mass index.

Migraine characteristics, body mass index, MIDAS scores, marital status (married, divorced/widowed, single), economic status (low, moderate, high), education status (illiterate or unable to complete 8-year basic education, education of 8-12 years, education >12 years), and smoking and alcohol consumption of the patients aged 18-45 years, who have been living in Erzurum and diagnosed with migraine based on the second edition of International Classification of Headache Disorders (ICHD-2) between December 2012 and October 2015 in the neurology policlinic, were retrospectively evaluated (17). The patients were dichotomized as EM and CM. Whether the data are consistent with normal distribution was determined by D'Agostino-Pearson test. Student t-test was used for the comparison of independent variables that were consistent with normal distribution, whereas Mann-Whitney U test was used for the comparison of variables that were not consistent with normal distribution. Nominal variables were compared using chi-square test. A two-tailed p value of <0.05 were considered statistically significant. Statistical analysis was done using Medcalc program (Medcalc version 12, Ostend, Belgium).

This study was approved by our institutional ethics committee and written informed consent was obtained from all subjects.

RESULTS

The mean age of the patients was 30.4 (±8.4) years and there was significant difference between EM and CM. CM patients accounted for 32.3% (n=435) of overall patient group. The ratio of female patients (81.8%, n=1102) was higher than that of the male patients (18.2%, n=245). CM and EM were not different in terms of gender distribution. Disease duration (median year) was longer in CM vs. EM patients. There was no difference between the VAS scores of the groups, however, MIDAS score was weakly significant in favor of CM.

Prevalence of smokers was higher in CM group; there was no difference between the groups in terms of the rate of alcohol consumers. The prevalence of illiterate patients was higher and, again, BMI was higher in CM group. Economic status and distribution of marital status were similar between both groups (Table 1).

Table. Distribution of demographic characteristics among episodic migraine and chronic migraine and corresponding p values.

	Episodic (n=912)	Chronic (n=435)	p
Age (mean year±SD)	29.3±9.0	34.3±8.1	<0.001
Gender (Female %)	80.7	81.8	0.947
Disease duration (median year)	4	10	<0.001
VAS (median)	9	9	0.486
MIDAS (median)	2	2	0.042
Smoking (nonsmoker %)	67.5	75.6	0.028
Alcohol non-consumer %)	95.3	95.1	0.783
Marital status (Married %)	58.2	53.5	0.097
Education status (illiterate %)	8.3	14.1	0.009
Economic status (high %)	7.2	5.4	0.201
BMI (>30 %)	3.6	10.8	<0.001

Overall, the prevalence of aura was 32.2%, family history was 55.3%, unilateral pain was 64.7%, nausea was 70.9%, vomiting was 36%, photophobia was 61.6%, phonophobia was 88.7%, and osmophobia was 42.9%. No correlation was determined between VAS and BMI (r: -0.03; p:0.186). There was weak correlation between BMI and MIDAS (r:0.105; p: 0.043).

DISCUSSION

In the present study, we investigated sociodemographic characteristics, certain characteristic features, VAS, and MIDAS, as well as their relationship with BMI. Interestingly, we determined the prevalence of chronic migraine in overall study population to be higher than the literature; again, consistent with the literature, daily living has been influenced more in chronic migraine patients and it was correlated with BMI. We aimed to share our data regarding migraine, which is worldwide the third leading disease and the sixth leading cause of disability (1). The etiology of migraine remains unclear, and it is reported to be a chronic disease presenting itself with attacks (18-19). Moreover, features that indicate progression such as increase in the frequency and duration of attacks and continuing attacks for days are observed in some migraine patients, which is called as chronic migraine. Episodic and chronic migraine are distinguished from each other by the days with headache in a month, which is <15days/month for EM and >15 days/month for CM; again, there should be migraine-like pain for more than 8 times in a month for CM (20).

Migraine is a neurological disorder characterized by intermittent headache accompanied by nausea, vomiting, photophobia and phonophobia (20). Paroxysmal migraine has certain prodromal symptoms before the attack. Prodromal symptoms are divided into two groups depending on the inhibition or excitation of the central nervous system (CNS). Excitatory symptoms include

vomiting, photophobia, phonophobia, osmophobia, irritability, hyperactivity, obsessional behaviors, repartee, over-yawning, neck stiffness, extreme desire for eating, increased intestinal motility, frequent urination, and excessive thirst (4.21). In many studies, the frequencies of these symptoms have been reported as following: nausea 65-78%, vomiting 19-36%, photophobia 75-89%, phonophobia 50-95% and osmophobia 41.8% (5.6.12.22). In a study investigating the effects of EM and CM on the quality of life, the prevalence of photo-phonophobia was reported to be 42-69% in both groups with no difference determined between the groups (12). In the present study, we found the prevalence rates of the symptoms as following: nausea 70.9%, vomiting 36%, photophobia 61.6%, phonophobia 88.7%, and osmophobia 42.9%, which were consistent with the literature.

Some studies in the literature reported migraine in more than half of the 1st-degree relatives of migraine patients (23.24). In the present study, we determined history of migraine in the 1st-degree relatives in 53.5% of the study group.

The prevalence of CM has been reported to be approximately 1-3% (27-29). In a study from the United States, CM was reported in 7.7% of the migraine population (9). A study from Turkey reported the prevalence of migraine to be 16.4%, with nearly 10% having CM (10). In a study from America, CM was detected in 2% of the population (28). Moreover, this study reported that the mean age is higher and education level is lower in CM patients as compared to EM patients. In a different study, duration of education was found to be longer in EM vs. CM patients (12). The present study determined the prevalence of CM to be 32.3%, which is higher than the data from the United States and Turkey. We think this might have resulted from high altitude. Again, the rate of illiterate patients was significantly higher in the CM group and this was consistent with the literature.

CM substantially affects the social life and physical and professional performance (16.29). The lives of these patients are affected more as compared to the patients with less frequent migraine attacks (13.30). Disability is higher in CM vs. EM as the number of painful days and burden of comorbid conditions are higher in CM (13.30). Evaluation of the patients using migraine disability scale (MIDAS) (31) revealed that the mean score is higher and disability is two timesmore common in CM (CM: 20% and EM: 11.1%) (14.32). During follow-up of the EM patients, it was observed that nearly 2.5-3% of them has become chronic (15.33). Risk factors for migraine to become chronic include low socioeconomic level, obesity, snoring, comorbid pain, neck and head trauma, stressful events, high caffeine consumption, analgesic overuse, anxiety, depression, and allodynia (15.34).

The rate of ability to work all day was reported to be 37.8% in CM and 52.3% in EM group (16). In the present study, we determined significant difference between the MIDAS scores of the groups in favor of CM.

In the literature, comparison of the highest rate the patients have given to the pain they have been experiencing indicated no difference between CM and EM (12). In the present study, we determined no difference between the VAS scores of the groups.

Obesity is an important health problem with increasing prevalence in the populations. In the recent years, studies investigating the comorbidity of obesity with primary headache have attracted attention. In a study, obesity was reported to be a risk factor for the development of chronic daily headache (33). In the other study investigating the relationship between obesity and migraine reported that BMI does not contribute to the migraine prevalence but is associated with the frequency and severity of migraine attacks (35). Another study investigating the same patient population reported that obesity is associated with transformed migraine (≥ 15 attacks/month), in which the frequency and severity of attacks and the rate of disability have increased (35).In a different study, BMI was found to be higher in CM vs. EM group (30). Obesity and many comorbid conditions are more common in CM than EM (16). In the present study, we as well determined that the patients with BMI >30 were significantly higher in number in the CM group as compared to the EM group. This was consistent with the literature.

Headache is a common sign of several disorders related to high altitude. Acute mountain sickness (AMS), high altitude headache (HAH) and migraine triggered by high altitude are frequently encountered at high altitude (36). Nearly 80% of the subjects experience headache at high altitude (37). High altitude has been previously linked to the prevalence of migraine (38). A study in the literature reported that high altitude not only increases migraine prevalence but also enhances the severity of symptoms. High altitude was also reported to be an environmental factor associated with migraine and that the prevalence is increased by 31-63% at a height over 1,000 m (11). The region where the present study has been conducted is high as 1,820 meters above sea level, which is considered as high altitude. Hence, we think that the high prevalence of CM determined in the present study can be explained by the study population's living at high altitude.

CONCLUSION

In the present study conducted with migraine patients visiting the hospital and living in the city center of Erzurum, we determined that CM is prevalent in the residential area located at high altitude and that CM patients were different from EM patients in terms of interaction with BMI, education level and functions of daily living. We concluded that high altitude, education level and BMI are effective in the disease to become chronic.

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