

Presence of Headache and Migraine in Asthma Patients

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Abstract

OBJECTIVES: Migraine is a disease characterized with severe headaches, with neurological and systemic findings. The purpose of this study is to investigate the prevalence of migraine and to examine whether there is a relationship between atopic disorders, parental history and migraine in asthma patients.

MATERIAL AND METHODS: A total of 288 asthma outpatients, who had the diagnosis by an early or late test of reversibility showing a reversible airway obstruction according to hospital database were included. The presence of headache, atopic symptoms and parental history about asthma, atopic disorders and migraine were asked. The patients with headache were consulted by neurology department and investigated about the presence of migraine. The diagnosis of migraine headache was made if patients fulfilled the International Headache Society (IHS) criteria.

RESULTS: 60.4% of patients described a headache. There were 94 patients (32.6%) with headaches meeting the IHS criteria for migraine. Only 12 patients had migraine with aura. There were atopic symptoms in 86.8% of patients. According to parental history, there were asthma in 47.9%, atopic symptoms in 39.6% and migraine in 22.2% of parents. Patients with atopic symptoms were found to have significantly high rate of headaches (65.3%) “ $p=0.007$ ”. The prevalence of migraine was significantly high in patients with parental atopic symptoms (54%) “ $p=0.002$ ”. Multiple logistic regression analysis identified that gender, parental history of asthma, allergy and migraine, and smoking were independent risk factors for presence of migraine in asthmatics.

CONCLUSION: There is a high prevalence of migraine headaches in patients with asthma. The coexistence of asthma and headaches may be related with a similar pathophysiological mechanism; parental history, common genetic compounds and smoking may play role in this mechanism. The headaches in asthma patients, atopic symptoms and family history should be questioned, and clinicians should be careful about the presence of migraine.

KEYWORDS: Asthma, migraine, headache

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INTRODUCTION

Headache is the common name for pain felt in the head and sometimes in the neck and in the upper area of the back. Headaches can occur without any underlying disease (primary), or they can develop in association with many different conditions or diseases (secondary). The International Headache Society (IHS) has classified headaches in 14 main groups and many subgroups and defined their causes based on etiological factors [1].

Migraine is a primary headache disorder accompanied by neurological and systemic findings and characterized by severe headaches, and neurological, vascular, and genetic factors play a role in its etiology [2]. Its diagnosis is established in accordance with the criteria determined by the IHS (Appendix 1a and 1b). Its prevalence is reported to be 6-8% among males and 15-18% among females [3].

Similarities resulting from pathophysiological mechanisms exist between asthma and migraine [4]. Some mediators such as tumor necrosis factor-alpha (TNF- α) and interleukin-1 beta (IL-1 β) have a role both in the pathogenesis of asthma and in the development of migraine [5].

Allergic rhinitis is defined as inflammation of the nasal mucosa, and it is characterized by nasal itching, sneezing, nasal congestion, and rhinorrhea. The most important risk factor for allergic rhinitis is familial atopy. Another common feature of asthma and migraine is the presence of atopic characteristics that can be observed in patients. In a previous study, the prevalence of atopy in migraine patients was found to be near that in asthma patients [6].

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The common coexistence of migraine and allergic diseases suggests that allergic mechanisms have a role in the pathophysiology of migraine. In this study, it was aimed to investigate the prevalence of migraine in patients diagnosed with asthma and the relationship between allergic rhinitis symptoms in asthma patients and their families and the presence of migraine.

MATERIAL AND METHODS

The study included 288 patients with the diagnosis of asthma who were admitted to the outpatient clinic of Chest Diseases in Afyon Bolvadin State Hospital during a 6-month period in 2013 and whose early or late positive reversibility in the respiratory function test was confirmed by the recording system at the hospital.

Patients with a history of head or cerebral trauma, cranial or cervical vascular disease, substance abuse, cranial or facial structural impairments and infections, extravascular intracranial disease, psychiatric disorders, arterial hypertension, and homeostasis disorders such as hypothyroidism, which can lead to secondary headache, were excluded. Moreover, patients who used montelukast and antihistamine drugs, which could suppress allergic complaints and cause an incorrect anamnesis, were excluded.

Sociodemographic data of included patients were recorded. The presence of asthma and migraine in patients and their first-degree families was questioned. The patients were asked about whether they and their first-degree families had allergic complaints such as nasal congestion, sneezing, nasal itching, and nasal and post-nasal drainage, and related responses were recorded.

Asthma patients included in the study were asked about the presence of headache. Patients who had headache were referred to the Department of Neurology. Those who met the diagnostic criteria of IHS were considered to have migraine-type headache [1]. The presence of aura was investigated in patients having migraine, and patients were classified as those having migraine with aura and without aura.

The sample size was calculated as 264, with an α value of 0.05 and study power of 90%. Accepting that a loss ratio of 10% would occur, a study with 288 patients was planned.

Statistical Analysis

While evaluating the data obtained from the study, statistical analysis was performed using Statistical Package for Social Sciences for Windows 15.0 (SPSS Inc; Chicago, IL, USA). The chi-square test was used in the comparison of qualitative data. For evaluating the variance of slopes, chi-square and T-tests were used. The results were assessed with a confidence interval of 95% and a significance level of $p < 0.05$. In descriptive statistics, continuous variables were presented as mean and standard deviation and categorical variables as number and percentage. Multiple logistic regression analysis was performed for revealing the relationship between migraine, which was the dependent variable, and independent variables by calculating the odds ratio and 95% confidence interval.

RESULTS

Of 288 asthma patients included in the study, 236 (81.9%) were females and 52 (18.1%) were males, and their mean age was 42.9 ± 11.6 years (minimum, 17 years; maximum, 77 years).

Considering disease control, asthma patients were classified as controlled (49.3%), partially controlled (21.6%), and uncontrolled (29.1%). While 175 (60.8%) patients were non-smokers, 113 (39.2%) were smokers. Except the comorbidities included in the exclusion criteria, 27.8% of patients had additional comorbidities (mostly diabetes mellitus).

Allergic symptoms (nasal itching: 56%, sneezing: 42%, rhinorrhea: 30%, and nasal congestion: 27%) were present in 86.8% of the patients.

The complaint of headache was observed in 60.4% of the patients (after ruling out the causes of secondary headache). The number of patients who met the criteria for the diagnosis of migraine was 94 (32.6%). Only 12 patients had migraine with aura. The mean age of patients diagnosed with migraine was 44.3 ± 12.0 years (Table 1).

No statistically significant difference was found between the mean ages in the groups of patients with and without migraine ($p = 0.918$). While 39% of females and 16.7% of males had migraine-type headache, the rate of primary headache and the diagnosis of migraine were significantly higher among females than among males ($p < 0.001$ and $p = 0.002$, respectively). The existence of migraine was observed to be more common in patients who were smokers ($p = 0.046$).

The patients had family histories of asthma, allergic complaints, and migraine at rates of 47.9%, 39.6%, and 22.2%, respectively, in their first-degree relatives. In patients with allergic complaints, the frequency of headache was quite high (65.3%) ($p = 0.007$). The rate of the presence of migraine

Table 1. Information on the presence of headache and migraine in asthma patients

Patient characteristics	Number of patients n (%)
Presence of headache	174 (60.4)
Presence of migraine	94 (32.6)
Headache	
Unilateral headache	58 (33.3)
Type of pain	
Throbbing	99 (57)
Compressive	75 (43)
Aura	12 (7)
Aggravation with physical	93 (53.5)
Activity	
Nausea-vomiting	71 (41.2)
Photopsia	12 (7)
Disturbed by light and	69 (39.5)
Noise	
Visual loss	12 (7)

Table 2. Multiple logistic regression analysis of independent variables that can be associated with migraine

Independent variables	(95% confidence interval)			p
	OR	Lowest	Highest	
Gender (female)	2.229	1.089	4.143	0.005*
Age (continuous variable)	1.012	0.992	1.033	0.251
Allergy (+ or -)	1.108	0.427	2.871	0.834
Familial history of asthma (+ or -)	1.501	0.754	3.385	0.045*
Familial history of allergy (+ or -)	5.019	2.538	9.924	<0.001*
Familial history of migraine (+ or -)	2.108	1.085	4.094	0.028*
Smoking (+ or -)	6.961	2.091	23.172	0.002*

OR: odds ratio; *statistically significant

was found to be significantly high in patients with a familial history of allergic symptoms (54%) ($p=0.002$). A statistically significant relationship was detected between the complaint of headache and the presence of the familial histories of asthma, migraine, and allergic symptoms [42% ($p=0.01$), 80.6% ($p=0.015$), and 71.4% ($p=0.038$), respectively]. The complaint of headache was significantly common in patients having allergic symptoms ($p=0.007$). A significant relationship was found between the presence of the familial histories of asthma, migraine, and allergic symptoms and headache in asthma patients ($p=0.01$, $p=0.015$, and $p=0.038$). In patients having a familial history of allergic symptoms, the rate of migraine was significantly high ($p=0.002$).

Logistic regression analysis revealed that gender (female), smoking, and the presence of familial histories of asthma, allergic complaints, or migraine were independent risk factors for migraine in asthma patients (Table 2).

DISCUSSION

Headache is a disorder that is commonly defined in asthma patients and that negatively affects the quality of life. The relationship of headache and migraine with migraine was investigated in many studies. According to the results of the "Head Hunt" study, the frequency of asthma and chronic bronchitis was 1.5-times higher in patients with migraine and non-migraine headaches than in the normal population and the presence of asthma and bronchitis was found to be associated with the frequency of headache [7]. The fact that approximately 60% of our patients had headache indicates the high frequency of headache in asthma patients.

In our study, the prevalence of migraine was found to be 32.6% in asthma patients. In the literature, there are a few studies investigating the prevalence of migraine. Martin et al. [8] reported the rate of chronic migraine to be 5.4% in patients diagnosed with asthma. In a study conducted in Turkey on the prevalence of migraine, migraine was detected in 16.4% of the population (24.6% in females and 8.5% in males) [9]. This shows that migraine-type headache can be

more commonly seen in asthma patients than in the normal population.

In our study, the frequencies of both migraine and primary headache were found to be higher in females than in males (2.3- and 1.8-times higher, respectively). Other studies have also demonstrated that the rate of migraine was 2-3 times higher in females [10]. Therefore, more attention should be paid to female asthma patients in terms of the existence of migraine, and it should always be kept in mind that the possibility of migraine is higher in females.

It has been suggested that the coexistence of asthma and migraine and headache can result from a common pathophysiological mechanism and familial history and that common genetic components have a role in this common pathogenesis [11]. It was reported that the risk of the development of asthma was higher in children whose parents had migraine [12]. In our study, the relationship between familial histories of asthma, migraine, and allergic symptoms and headache and migraine in asthma patients was significant, and it was recommended to examine the presence of headache and migraine in asthma patients with such a familial anamnesis.

In our study, it was observed that headache and migraine were more common in atopic patients. The presence of an independent relationship between allergic diseases and migraine is known [13]. It is specified in the literature that there is a strong relationship among asthma, allergic rhinitis, and migraine and that increased levels of histamine have a role in the basis of this relationship [14]. A study conducted by Gazerani et al. [15] revealed high levels of serum histamine and IgE in patients having allergy accompanied by migraine. Allergic rhinitis is a chronic disease characterized by seasonal and perennial symptoms, and it affects the nasal mucosa in particular with IgE-dependent inflammation [16]. These results indicate a biochemical mechanism that represents atopy in the relationship among allergy, asthma, and migraine. A similar relationship was also detected in our study.

Although it is known that smoking can lead to migraine attacks, there are insufficient data on it being a risk factor for the development of migraine [17]. Chen et al. [18] reported that the rate of smoking was higher in women with migraine than in women without migraine. The theory that the frequency of migraine can increase due to decreased nitric oxide synthesis in smokers has been focused on [19]. In our study, it was found that the prevalence of migraine was higher in smoking asthma patients and that smoking was not only a trigger but also a risk factor for migraine.

One of the important limitations in our study was that the decision on patient selection was made by only considering existent diseases, although there were many causes that could cause secondary-type headache. Another limitation was that patients were selected from the hospital recording system. Moreover, the investigation of the prevalence of patients admitted to the outpatient clinic might have posed a problem and affected the results. In addition, considering subjective complaints such as headache and allergic symptoms and familial histories of asthma and migraine, which were verbally stated in the anamnesis, is another limitation. Better results

can be obtained using objective criteria such as IgE levels in the blood and the skin prick test for investigating the presence of allergic rhinitis, a health committee report for obtaining a positive familial history, or proof on the presence of these diagnoses in a patient's history.

In conclusion, migraine can frequently be seen in asthma patients. The coexistence of asthma and headache has been suggested to result from a common pathophysiological mechanism. Moreover, familial history, the presence of common genetic components, and smoking can have a role in this coexistence. Headache and migraine can be more frequently encountered in atopic patients. Therefore, in asthma patients, the following should be kept in mind: the complaint of headache should be thoroughly examined, familial history and allergic symptoms should be questioned while taking anamnesis, and attention should be paid with regard to the presence of migraine.

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Informed Consent: Written informed consent was obtained from patients who participated in this study.

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Appendix 1a: Diagnostic criteria for migraine without aura (1)

- A) At least five attacks including B–D items
- B) Headache lasting for 4–72 h
- C) Headache having at least two of the following characteristics
 - 1. Unilateral location
 - 2. Pulsating quality
 - 3. Moderate or severe pain intensity
 - 4. Aggravation by routine physical activity (walking, etc.)
- D) During headache, at least one of the following
 - 1. Nausea and/or vomiting
 - 2. Photophobia and phonophobia
- E) Headache not attributed to another disorder

Appendix 1b: Diagnostic criteria for migraine with aura (1)

- A) At least two attacks including B–D items
- B) Aura including at least one of the following, but not motor weakness:
 - 1. Reversible visual symptoms with positive or negative features
 - 2. Reversible sensory symptoms with positive or negative features
 - 3. Fully reversible dysphasic speech disturbance
- C) At least two of the following:
 - 1. Homonymous visual symptoms and/or unilateral sensory symptoms
 - 2. Aura symptoms develop in approximately 5 min, and different aura symptoms develop at 5-min intervals.
 - 3. Each symptom lasts for ≥ 5 and ≤ 60 min.
- D) Headache beginning during aura or following aura within 60 min and fulfilling the criteria for migraine without aura
- E) Headache not attributed to another disorder