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Research Paper

Role of Atopic March in the Development of Adult Asthma

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ABSTRACT

Background: Atopic march is defined as a natural progression of atopic manifestations characterized by a sequential development of allergic diseases in infancy. However, the atopic march does not always follow the typical sequence and the complete spectrum of atopic manifestations and may occur at any age. The aim of this study was to investigate the relationship between atopic march and the development of asthma versus the occurrence of asthma without a history of other allergies in the studied patients.

Materials and Methods: All patients with different types of allergy referred to the Asthma and Allergy Clinics of Azad University Hospitals from June 2021 to June 2022 were included in this case-control cross-sectional study. After the diagnosis by an allergist, the patients were asked to participate in a 5-minute interview to describe their allergy history.

Results: A total of 156 individuals with allergies were interviewed, of whom 94 patients had the asthma criteria. The mean age of the surveyed subjects was 32.03±13.35 years. The sample included 93 females (59.6%) and 63 males (40.4%). Asthma and atopic march were detected in 94(60.3%) and 12(7.7%) patients, respectively. Among the studied patients, 11.7% of the asthmatic patients had experienced atopic march throughout their lives.

Conclusion: Classification of the patients based on the clinical phenotype of their disease, as well as the environmental triggers, can help create more targeted treatment to achieve better outcomes.

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1. Introduction

Atopic march is defined as a natural progression of atopic manifestations characterized by a sequential development of allergic diseases with atopic dermatitis as the starting point in infancy prior to the later development of other allergic disorders [1]. Atopic dermatitis (AD) is associated with the gradual development of other allergic disorders, including food allergy, which appears before allergic rhinitis or asthma [2, 3]. The concept of atopic march primarily stresses the relationship between asthma and other childhood allergies [4], while Morales et al. found that although genetics and environmental variability are the causes of atopic march, the role of environmental variability is dominant in adulthood [5]. Furthermore, the atopic march does not always follow the typical sequence and the complete spectrum of atopic manifestations and may occur at any age [6]. Several factors, including disrupted skin barrier, genetics, allergic sensitization, elevated IgE levels, microbiome, Th2 immunity, and some environmental triggers, are connected to the development of the atopic march [7].

However, there are still controversies as to whether atopic march is the causal factor in childhood allergic diseases, particularly when considering the confounding impact of genetic and environmental factors [4]. Current evidence suggests that the existing relationship between eczema, allergic rhinitis, and asthma is independent of early-life environmental factors and further causal risk factors should be discovered despite this clear sequential association represented by atopic march [4].

The aim of this study was to investigate the relationship between atopic march and the development of asthma versus the sporadic occurrence of asthma in the patients studied.

2. Materials and Methods

Study design and population

All patients diagnosed with different types of allergies at the Asthma and Allergy Clinics of Islamic Azad University Hospitals from June 2021 to June 2022 were included in this case-control study. Then, they were interviewed to collect their demographic information as well as allergy history.

Methods

After confirming the diagnosis of asthma and assessing its severity by an allergist based on the Global Initiative for Asthma Management (GINA) [8], the patients were asked to participate in a 5-minute interview to describe their allergy history.

Data analysis

Study data were collected and managed using SPSS software, version 25. For all of the four allergic conditions (atopic asthma, allergic rhinitis, AD, and food allergy), as well as atopic march, we calculated the prevalence using the total number of patients in each group.

3. Results

A total of 156 individuals with allergies were interviewed, of whom 94 patients had the asthma criteria, while the remaining patients had other types of allergic disorders. The mean age of the surveyed subjects was 32.03±13.35 years with a median of 32.50 years. The sample included 93 females (59.6%) and 63 males (40.4%).

Table 1 summarizes the number of patients with different allergic disorders and atopic march.

Table 2 demonstrates other allergic disorders associated with asthma.

4. Discussion

The atopic march is defined by the progression from AD towards asthma and allergic rhinitis [9] and refers to the natural history of allergic diseases from infancy to childhood and even adulthood [1]. In this study, we evaluated the rate of atopic march in asthmatic patients referred to allergy clinics and found that 11.7% of the asthmatic patients had experienced atopic march throughout their lives. Approximately, 37.1% of the patients with AD developed asthma in the present study, whereas 29.8% of the patients had a history of food allergy and 76.6% had a history of allergic rhinitis.

Although several studies have referred to atopic march, it is not uniformly accepted as a progressive development, and it is considered a distinct allergy phenotype [10].

Table 1. Frequency of patients with different types of allergic disorders and atopic march

Allergic Disorder	No. (%)
Asthma	94(60.3)
Allergic rhinitis	115(73.7)
Food allergy	32(20.5)
Atopic dermatitis	44(28.2)
Atopic march	12(7.7)

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Table 2. Associated allergic disorders in patients with asthma

Allergic Disorders in Asthmatic Patients	No. (%)	P
Allergic rhinitis	72(76.6)	0.355
Food allergy	28(29.8)	0.000
Atopic dermatitis	23(37.1)	0.035
Atopic march	11(11.7)	0.028

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AD and food allergy develop in 17-24% and 10% of children, respectively [11]. However, our data showed a higher occurrence of AD (28.2%) and food allergy (29.8%) among the studied population, which could be explained by the method of the current study. Since the patients were selected from asthmatic patients attending clinics and not from the general population, it seems logical that the prevalence rate is higher among the allergic population. However, as both of these disorders were recognized upon the patients' recall of their allergic situations in their childhood, and the majority of the patients outgrow these conditions by adolescence [11], there might have been some bias regarding the recall of allergic disorders during adulthood. Therefore, the potential overestimation of the patients should be taken into consideration [12]. Hill et al. reported the classical march in 5% of their patients with atopy manifestations [1]. In the Roduit study [13], only a minority of the patients (<5%) had AD, asthma, and allergic rhinitis at any age, suggesting that such a progression to asthma or allergic rhinitis in the course of the disease is not a definite occurrence. In addition, AD, allergic rhinitis, and asthma may coexist because of sharing genetic risk loci with subsequent dysregulation of immune genes [14]; thus, the patients may suffer from distinct allergic diseases at different time points during their lives, and not necessarily as "atopic march".

As described earlier, Hill et al. reported atopic march in one out of 20 patients in their study [2]. However, we found an atopic march with the development of asthma in one out of 11 patients. We found that many patients did not have a prior history of asthma and yet experienced it in their adulthood for the first time. We explained this discrepancy by the fact that many of our patients experienced asthma for the first time in their lives after a COVID-19 infection or because of the long-term persistent air pollution in the city during the year of the study, causing an inflammatory situation but without a prior asthma history.

The major limitation of the study was the small size of the population studied. Also, the diagnoses were not necessarily confirmed by physicians and were self-reported by the patients at the time of the interview.

5. Conclusion

Classification of the patients based on the clinical phenotype of their disease as well as the environmental triggers can help create more targeted treatment to achieve better outcomes. However, there may be different profiles of rhinitis, eczema, and wheezing with different levels of sensitivity. This could be related to different immune trajectories they follow rather than the expected classical march.

Ethical Considerations

Compliance with ethical guidelines

This study was conducted in accordance with the principles of the Declaration of Helsinki and approved by the Ethics Committee of Tehran Medical Sciences Branch, Islamic Azad University (Code: IRCT:2013081214305N2). Written informed consent was taken from all the patients willing to participate in the study.

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Authors' contributions

Conceptualization and study design: Sepideh Darougar and Shadi Askari; Data analysis: Shadi Askari; Writing: Sepideh Darougar and Seyed Karen Hashemitari; Data collection and final approval: All authors.

Conflicts of interest

The authors declared no conflict of interest.

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