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Asthma in Patients with Atopic Dermatitis

Z. Pourpak^{1,2}, H. Mozaffari¹, M. Gharagozlou^{1,2}, Z. Daneshmandi¹ and M. Moin¹

¹*Immunology, Asthma and Allergy Research Institute, Medical Sciences/ University of Tehran. Tehran, IR. Iran*

²*Department of Clinical Immunology and Allergy, Children Medical Center, Medical Sciences/ University of Tehran, Tehran. IR Iran*

ABSTRACT

Objective. This cross-sectional study was designed to estimate the frequency of asthma in patients with atopic dermatitis (AD), and its related factors.

Methods. The study population consisted of 236 patients with AD who were referred to Children Medical Center in 1997-2002 and their diagnosis was based on Hanifin & Rajka criteria. Severity of AD was categorized based on Severity Scoring of Atopic Dermatitis (SCORAD) index. Asthma was diagnosed with medical history and clinical examination (three or more episodes of wheezing and/or dyspnea and/or cough after 1 year old). The patients were divided in two groups according to having or not having asthma.

Results. The mean age of patients with AD was 38.67 ± 2.68 month and the mean age at onset of asthma was 20 ± 2.5 month. The frequency of asthma in AD patients was 27.5%. The mean of SCORAD in nonasthmatic patients was 52.27 ± 2.52 and in asthmatic patients was 56.2 ± 4.2 ($P = 0.4$). The mean of duration of breastfeeding in asthmatic patients was 12.2 ± 1.6 month and in non-asthmatic patients was 11.16 ± 6.3 month ($P = 0.87$). There was no significant difference between asthmatic patients and others in serum IgE levels ($P = 0.65$) and blood eosinophil count. ($P = 0.49$)

Conclusion. These results confirmed that development of asthma in patients with AD is more than normal population and AD can be a significant predisposing factor to developing asthma but the causative factors are not clear. [*Indian J Pediatr* 2008; 75 (2) : 139-141] E-mail : pourpakz@sina.tums.ac.ir

Key words : Atopic dermatitis; Asthma; Atopy; Dermatitis; Allergy

Atopic Dermatitis (AD) is a chronic, pruritic, eczematous eruption that generally begins in the first year of life and usually occurs in children with a personal or family history atopic diseases.^{1,2} Population studies suggest that the prevalence of AD has been increasing and it now affects more than 10% of children^{3,4} the persistence rate after puberty is about 10-15% of cases and 10-20% of these children developed asthma.^{5,6} Development of atopic disease seems to depend on both genetic factors and the exposure to several environmental factors.⁷ Increased exposure to various kinds of pollutants and indoor allergens and a decline in breast-feeding, along with an increased awareness of AD have been suggested as reasons for

the increased frequency of AD.⁸ The protective role of breast-feeding in relation to AD has been the subject of debate, some studies found that it had a beneficial effect and other findings showed no protective effect, so the association between breast-feeding and AD has been controversial.⁹⁻¹² Asthma is a disease characterized by hyperresponsiveness of bronchi to various stimuli, changes in airways resistance, with symptoms of cough, wheezing dyspnea, or shortness of breath.¹³ Most studies have concluded that a significant increase in asthma prevalence has occurred in the last decades.¹⁴ The lifetime prevalence of asthma in general population has been reported 3-13%.¹⁵ One study showed that the prevalence of asthma in subjects with AD was higher than in those without AD (5.1% vs 1.8%) and the odds ratio of asthma in patients who had a personal history of AD was 2.34 (CI: 1.62- 3.38).¹⁶ Recent studies suggest that the mechanisms underlying asthma and AD have lots of similarities.⁴

Although there are several evidence that show the development of asthma in children with AD, there are still many questions to be answered in order to explain

Correspondence and Reprint requests : Dr. Zahra Pourpak, Immunology, Asthma & Allergy Research Institute, Children Medical Center, No .62, Gharib St., Keshavarz Blvd. Tehran , 14194, I. R. Iran P.O. Box: 14185-863, Tel: +98 21- 6693 58 55; Fax: +98 21- 6642 89 95

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the relationship between these two diseases. It is important to determine any risk factors leading to asthma in patients with AD. So this cross-sectional study was designed to estimate prevalence of asthma in AD children and to find any related factors in developing asthma.

MATERIALS AND METHODS

Two hundred and thirty six patients with definite diagnosis of AD who were referred to Allergy and Immunology Clinic in Children Medical Center enrolled in this study (from 1997 to 2002). All patients fulfilled the criteria of Hanifin and Rajka in at least 3 major and 3 minor criteria.¹⁷ The severity of AD was evaluated according to the Severity Scoring of Atopic Dermatitis (SCORAD) index, established by the European Task Force on AD from 0-100 and in this survey it was divided into 3 groups (0-50, 50-70 and 70-100).¹⁸⁻²¹ For diagnosis of asthma, in addition to taking medical history and physical exam, consulting with a specialist was done and asthma was diagnosed (three or more episodes of wheezing and/or dyspnea and/or cough after 1 year old). The patients were divided in two groups according to having or not having asthma. From each patient, 2 ml blood was taken and their serum was separated and saved in -20 °C, then total serum IgE level with ELISA method (Genesis Diagnostic- Cambridge- UK) was measured. In addition 0.5 ml whole blood for CBC and eosinophil count was also taken.

Eventually, in order to determine the relationship between the severity of AD and asthma, Pearson Correlation Test was applied. Differences in IgE, eosinophil count and SCORAD means between children with asthma and without asthma were analyzed by T-test. Also patients were divided into three age groups: 0-1, 1-3, >3 year of age, analyzed the relation between age with asthma, and severity of the AD with asthma. P values <0.05 were considered to indicate statistical significance.

RESULTS

A total of 236 well-known patients with AD were enrolled in this survey (60% male and 40% female). The mean age of all patients was 38.67 ± 2.68 month (1 month to 16 year) and 30.9% of infants were less than 1 year old. (Table 1).

Prevalence of asthma in patients with AD was 27.5% (63% in females and 37% in males). Prevalence in different age groups is shown in table 1. The older age was related with high prevalence of asthma ($P=0.005$). The mean age in asthmatic patients was 42.07 ± 4.96

TABLE 1. The age Relationship with Asthma in Patients with and Without Atopic Dermatitis

Age (yr)	Without Asthma N (%)	With Asthma N (%)	Total
0-1	69 (86.3)	11 (13.8)	80
1-3	52 (68.4)	24 (31.6)	76
>3	52 (65)	28 (35)	80
Total	173 (73.5)	63 (26.5)	236

month and in nonasthmatic patients it was 38.02 ± 3.34 month ($P=0.52$). The mean age of onset of asthma was 20 ± 2.5 month. The positive family history of allergic disease was identified in 85% of the patients, did not show significant difference between asthmatic and nonasthmatic patients ($P=0.08$). The mean of SCORAD in nonasthmatic patients was 52.27 ± 2.52 and in asthmatic patients was 56.2 ± 4.2 ($P=0.4$). The mean total serum IgE level in nonasthmatic patients and asthmatic patients was 611.22 ± 99.92 IU/ml and 681.98 ± 122.78 IU/ml respectively ($P=0.68$).

The mean eosinophil count in nonasthmatic patients was 819.13 ± 239.4 count/ml and in asthmatic patients was 1048 ± 229.32 count/ml ($P=0.54$). There was no significant difference in severity of AD in different age groups ($P=0.73$). The mean of duration of breastfeeding in asthmatic patients was 12.2 ± 1.6 month and in nonasthmatic patients was 11.16 ± 6.3 month and there was no significant difference between them ($P=0.87$).

DISCUSSION

AD and asthma are mirrored in common pathophysiologic mechanisms.^{9, 4} The most common association of AD is a risk of developing disorders such as asthma (40%-60%).⁵ The previous studies showed the prevalence of asthma in subjects with AD was higher than in those without asthma.^{5, 16} In the present study, the patients who were considered to have asthma were (65 patients out of 236 patients). 27.5% and advance age was a risk factor for developing asthma in AD patients (13.8 % was under 1 year). In a study in Iran, physicians confirmed the prevalence of asthma 2.1% in the 6-7 year olds.²² The Global Initiative for Asthma (GINA) program reported the prevalence of clinical asthma in general population in Iran 5.5%.²³ In another study in Iran, results showed that 15% of the 6-7 year olds and 17% of the 13-14 year olds had positive history of wheezing.²⁴ Positive family history of allergy was confirmed as an increasing risk of contributing asthma like another survey in Sweden.⁶ Also in asthmatic patients it was shown that girls are affected more than boys, but it still needs more studies to establish a relationship between sex and asthma because in some studies it was found that male sex is a risk factor for developing asthma.¹⁴ The severity of AD was much more but not significant

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in asthmatic patients. Total serum IgE level and eosinophil count were also more in asthmatic patients but they had no statistical significance. Also the relationship between IgE and SCORAD in AD patients shows that IgE can be used as a severity index of AD in patients and this correlation is stronger in patients with asthma. Some studies revealed that male sex, increasing age and family history of allergic disease contributed to an increased risk of each allergic disease^{14, 16, 25} and family history of allergy was associated with a high risk of developing asthma.⁶ There was a significant association between disease severity and eosinophil count. Elevated eosinophil count observed in AD^{4, 26} and it was significantly related to respiratory allergic disease such as asthma.^{27, 28} In another study, the high eczema score was significantly associated with an increased risk of developing asthma.⁶

CONCLUSION

These results confirmed that development of asthma in patients with AD is more than with normal population. AD can be a significant predisposing factor to developing asthma but the causative factors are not yet clear. More surveys need to establish related factors for developing asthma in AD.

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