Retrospective Evaluation of Skin prick Tests to Various Allergens in Patients with Atopic Dermatitis

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Abstract

Atopic dermatitis is a common disease affecting many people. Avoidance therapy to the aeroallergens is a cost-effective and safe measure to help atopic dermatitis patients. Skin prick test (SPT) is a well-established method to identify the responsible allergens.

The aim of this study is to determine most responsible allergens that provoke allergy in patients with atopic dermatitis in sallah Al-deen governorate.

A retrospective study were conducted on 111 patients with atopic dermatitis, 65(59%) of them were male and 46(41%) were female . Age of patients was between 8 to 64 years with a mean of age: 32.56± 9.82 yr.

These patients were referred to allergic clinic of Tikrit Teaching Hospital, and skin prick test(SPT) response to allergens was done which shows 100(90%) of the patients had positive SPT, (6%)of these patients were monosensitized against one allergen while others were polysensitized for more than one allergen in which (41%) sensitized against 2 allergens ,(36%) sensitized against 3 allergens and 7% were sensitized against ≥4 allergenic extracts. In regard to frequencies of main allergen groups, Pollens (51%) and Moulds(29%) were considered the most common aeroallergens, among pollen the bermuda (34%) had the highest rate of sensitization while sensitization to food allergens was(9%) .

We concluded that pollens and in particular bermuda were the frequent causative aeroallergens in patients with atopic dermatitis.

Introduction

Atopic dermatitis (AD) is a chronic, relapsing skin disease characterized by the major features include pruritis, typical morphology and distribution of the lesions. The skin distribution varies with age, in infancy, the face and extensor surfaces of the arms and legs are most commonly affected, infantile AD may resolve spontaneously or continue into the childhood phase, which is characterized by pruritic papules, xerosis, and lichenification. In the older child and adults, a scaly and lichenified dermatitis on the flexor surfaces of the extremities, neck, and upper trunk is observed. [1,2]

Numerous previous studies had focused on the prevalence of AD in children, and shown that the prevalence has been increasing recently [1, 3]. However, AD is often thought to be a disease predominantly afflicting children that few investigations had directed their attention to adult AD [4, 5].

The role of the inhalant allergen in causing or triggering the atopic dermatitis had been considered since 1930s [6]. Although its pathogenesis is still unknown, AD is considered a multifactorial disease triggered by the interaction of genetic and environmental factors (food, airborne allergens, infectious agents) [7].

During early infancy, food allergens are considered particularly important. In fact, a high percentage of children with atopic dermatitis showed food-specific circulating IgE and positive prick tests [8,9]. Experimental data showed that IgE is involved in immediate and delayed hypersensitivity-induced reactions, playing a crucial role in antigen processing and in the activation of T lymphocytes by antigen-presenting cells [10].

Allergic disorders as Atopic dermatitis, Allergic rhinitis and Asthma are diagnosed by a proper history, physical examination and some paraclinical investigations as serum total IgE,

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eosinophylic count, specific IgE, skin prick test, RAST test and respiratory function tests[11].

The aim of this study is to demonstrate the prevalence of skin reactivity by skin prick test to different allergens in patients with atopic dermatitis in sallah Al-deen governorate.

Patients and methods

A retrospective study was designed to include111 patients with atopic dermatitis who presented to allergic clinic of Tikrit Teaching Hospital in sallah Al-deen governorate between September 2008 and November 2009 .

A questionnaires of patients was reviewed which included data about sex, age, occupation, family history of atopy and types of exposed allergens.

All patients underwent skin prick test (SPT) with at least 30 allergenic extracts including extracts of Pollens such as [grasses , bermuda, plantain, tree I, tree II, tree III, chenopodium , mugwort], Moulds as;[mould I (alternaria), mould II (cladosporium), mould III (penicillium), mould IV (aspergillus), candida], Mites as ;[Dermatophagoides pteronyssinus (DP) and Dermatophagoides farina(DF)] , other inhalants such as(mosquito ,feather, cat ,dog and wool) and foods allergen as egg, onion, banana, cacao, coffee, wheat, mixed cereals, orange, potato and fish. Skin prick tests is the simple and available tools for evaluation of allergic patients and determination of the diseases frequency in communities.[12] SPTs were done by allergist, Glycerol buffer and histamine were included as negative and positive controls, respectively. The allergenic extract and positive-negative controls were applied to volar surface of forearm then introduced into the epidermis by a disposable hypodermic needle gauge 27. Skin reactions were evaluated according to the diameter of edema and erythema and compared with positive and negative control reactions after 15-20 minutes.

All data were analyzed on statistical program (SPSS, version 10).

Results

Out of 111 patients with atopic dermatitis, 65(59%)were male and 46(41%) were female. the age of patients was between 8 to 64 years with a mean of age: 32.56± 9.82 yr.

In skin prick test, 11(10%) of the patients had negative response while100 (90%) had positive SPT response(sensitized) to at least one of the allergens. In particular,7 (6%) of patients were sensitized against one allergen, 45(41%) against 2 allergens and 40(36%) against 3 allergenic extracts as shown in table (1).

As shown in figure(1) our study reported the prevalence rates of main allergen groups of the total positive allergens reaction and were Pollens:130(51 %), Moulds:75(29 %), Mite:25(10%), other inhalant allergens16(6%) and foods allergen 9(4%).

In addition, frequency of positive tests to individual allergen of the total positive cases is depicted in table 2 which shows high prevalence of skin reactivity to Pollens: Bermuda (34%), Grass (31%) and Moulds: Mould II (25%), Mould I (23%), while skin reactivity were low to feather(5%) and cat (3%), in addition our results showed sensitivity to foods allergen as egg, onion and cacao as (3%),(3%),(1%) respectively while other types of food allergens showed negative response.

Discussion

Allergens are the prominent causes of allergic symptoms in patients with atopic dermatitis and other allergic diseases, its finding that the most prevalent allergens has been the subject of many studies throughout the world, but studies in different parts of the world could not show a unique pattern of sensitization. The present study shows (90%) of the patients were sensitive to at least one allergen and (10%) had negative reaction while Indian study[13] had shown that 47% of the cases have positive reactions and astudy in Turkey[14] showed 58% of allergic patients had positive skin reaction to at least one allergen.

In other hand the present study demonstrate (6%) of the sensitized patients were monosensitized against one allergen,

these patients maybe sensitized to other allergens which were not investigated in our patients and others were poly sensitized to more than one allergen, where (41%) sensitized to 2 allergen ,(36%) sensitized against 3 allergens and (7%) sensitized against ≥4 allergen.

Regarding to the most frequent aeroallergen detected by SPT was Pollen (51%), this high frequency of sensitivities to pollens may related to different types varieties of plants in our region, this was agreed with a study in Switzerland[15] which showed (100%)of the AD patients had positive reaction to pollens.

Whereas a study in India had revealed parthenium allergen accounted for 42% of all positive reactions [13] .

The present study results had shown that among Pollens the bermuda (36%), had the highest rate of sensitization whilst grass pollen had the highest rate of sensitization in Switzerland study, though in Adinoff *et al*[16] study reported (36%) of the AD patients had positive reaction to grass pollen while Reitamo et al [17] study showed (46%) of the patients were sensitized to birch pollen.

Concerning moulds (29%), our study recorded it as the second important sources of sensitization while Adinoff et al [16] study report (19%) of the AD patients had positive skin reaction to moulds. Most allergenic moulds can grow on nonliving organic matter, while a few requires a living host. Both groups need moisture, oxygen, preformed carbohydrate and occasionally additional growth factors .Many familiar moulds grow actively at 20 °C and may flourish well above or below this temperature ;others require low temperature, proliferating even under refrigeration. Although fungal components may be ingestant allergens, inhaled spores are the major source of exposure. [14]

As well as this study reported the mites as a third in percent frequency(10%) , while study in Switzerland reported (48%) [15] of the patients had positive reaction to house dust mite .

This was expected since mite tends to require high humidity and moderate temperature to thrive and this important cause of sensitization in asthmatic and other allergic diseases[18,19] , in contrast, Iraqi had a dry climate during summer and autumn.

The present study had shown that sensitivity to animal dander (feather and cat) was found as(8%) where as in Western and European countries[20] there are a high incidence of domestic pets in their homes than our country so sensitivity to animal dander is found to be higher in those countries.

About food allergy our study showed (9%) of the patients were sensitized , this little percent of sensitization to the food allergens because food allergy had been mostly studied in infants and children and food allergy plays a role in this age group while the largest percent of our studied age group related to adult .

The role of food allergy remains controversial in older children and adult patients suffering from AD, few studies concerning the food allergy in this age group of patients are available [21].

Food allergy is now recognized as a worldwide problem in westernized nations, and like other atopic disorders, it appears to be on the increase [22]. Food allergy is an adverse immunologic reaction, a number of IgE-, cellular-, and mixed IgE- and cell-mediated food hypersensitivity disorders have been described. This means that type I and IV allergic reactions are dominant in the pathogenesis of AD[23,24].

The importance of food allergy in children with AD is confirmed by extensive studies particularly in sensitized infants to 3 years of age [25].

while Inhaled allergens and pollen related foods are of greater importance in older children and adults [21].

The present study conclude that the pollens and in particular bermuda had the highest percent of sensitization while least percent of sensitization were recorded to food allergens.

References

1. Mortz CG, Lauritsen JM, Bindslev-Jensen C, Andersen KE. Prevalence of atopic dermatitis, asthma, allergic rhinitis, and hand contact dermatitis in adolescents. The Odense Adolescence Cohort Study on Atopic Diseases and Dermatitis. Br J Dermatol. 2001;144:523–532.
2. J. M. Spergel & L. C. Schneider : Atopic Dermatitis . The Internet J. of Asthma, Allergy and Immunology. 1999; Volume 1 Number 1:6.
3. Halken S. Prevalence of allergic disease in childhood: clinical and epidemiological aspects of primary and secondary allergy prevention. Pediatr Allergy Immunol. 2004;15(Suppl 16):4–5.
4. Harrop J, Chinn S, Verlato S, Olivieri M, Norback D, Wjst M, Janson C, Zock JP, Leynaert B, Gislason D, Ponzio M, Villani S, Carosso A, Svanes C, Heinrich J, Jarvis D. Eczema, atopy and allergen exposure in adults; a population-based study. Clin Exp Allergy. 2007;37:526–535.
5. Hanifin JM, Reed ML. Eczema Prevalence and Impact Working Group. A population-based survey of eczema prevalence in the United States. Dermatitis. 2007;18:82–91.
6.Alain Taïeb and Georges Ducombs. Aeroallergen contact dermatitis Clinical Reviews in Allergy and Immunology .2004;Volume 14, Number 2, 220-223.
7. Schmid-Grendelmeier P, Simon D, Simon HU et al. Epidemiology, clinical features and immunology of the intrinsic (non-IgE mediated) type of atopic dermatitis. Allergy 2001;56:841–849.
8. Fiocchi A, Bouygue GR, Martelli A et al. Dietary treatment of childhood atopic eczema/dermatitis syndrome (AEDS). Allergy 2004;59(Suppl. 78):78–85.
9. Johnson E, Irons J, Patterson R, Roberts M. Serum IgE concentration in atopic dermatitis. J. Allergy Clin Immunol 1974;54:94–99.
10. Novak N, Bieber T. Immunoglobulin E-bearing antigen-presenting cells in atopic dermatitis. Curr Allergy Asthma Rep 2004;4:263–269.
11. Grossman J. One air way, one Disease: chest 1997; 111(suppl 1):11–16
12. Stazi MA, Sampogna F, Montagano G, Grandolfo ME,Couilliot MF, Annesi-Maesano I. Early life factors related to clinical manifestations of atopic disease but not to skin-prick test positivity in young children. Pediatr Allergy Immunol.2002; 13 (2): 105- 12.
13. DS Krupa Shankar, M Chakravarthi. Indian Journal of Dermatology, Venereology, and Leprology, Year 2008; Volume 74, 5 [p. 467-470]
14. D. Tezcan, N. Uzuner, C. S¸ule Turgut, Ö. Karaman and S. Köse. Retrospective evaluation of epidermal skin prick tests in patients living in Aegean region.Turkey Allergol et Immunopathol. 2003;31(4):226-30
15. S Michel, N Yawalkar, B Schnyder, B Fischer, A Helbling.Eczematous Skin Reaction to Atopy Patch Testing With Cockroach in Patients With Atopic DermatitisJ Investig Allergol Clin Immunol. 2009; Vol. 19(3): 173-179
16.Adinoff AD, Tellaz P ,Clark R A.Atopic dermatitis and aeroallergens contact sensitivities .J All Clin. Immunol 1988;81:736-742.
17.Reitamo S ,visa k, kahonenk,Kayhko K,Stabb S, Salo OP. Eczematous reactions in atopic patients caused by epicutaneous testing with inhalant allergens.Br J Dermatol 1986;114:303-309.
18. Sporik R, Holgate ST, Platts-Mills TA, Cogswell JJ. Exposure to house-dust mite allergen (Der p I) and the development of asthma in childhood. A prospective study. N Engl J Med. 1990;323(8):502-503.
19. Ontiveros CR, lopez SM, Cerino JR. Aeroallergens detected by skin prick test in children with respiratory allergy (asthma and rhinitis) from the south of Mexico city. Alergia Immunol Pediatr. 1995;4:112–116.
20.Charpin D, Veruloet D, Lanteaume A, Kleisbauer JP, Kulling G, Razzauk H, Charpin J. Respiratory allergy and domestic

animals.Survey in a sample of the general population. Rev Mal Respir.1989;6(4):325-328.
21. Jarmila Čelakovská , Jaroslava Vaněčková , Květuše Ettlerová , Karel Ettler, Josef Bukač.The role of atopy patches test in diagnosis of food allergy in atopic eczema/dermatitis syndrome patients over 14 years of age .Acta Medica. 2010; 53(2):101–108.
22. Sampson HA. Update on food allergy, J Allergy Clin Immunol .2004;113, 5:805–19.
23. Bos JD, van Leent EJ, Sillevis Smitt JH. The millennium criteria for diagnosis of atopic dermatitis. Exp Dermatol. 1998; 7:132-8.
24. Bindslev–Jensen C. Food allergy. BMJ 1998;316:1299-1302.
25. Samson HA, Scanlon SM. Natural history of food hypersensitivity in children with atopic dermatitis. J Pediatr. 1989;115:23–27.

Table (1) Frequency & severity of skin prick tests response of the patients with atopic dermatitis.

Prick test response	Atopic dermatitis	Total no (%)
Negative	11	10%
Positive to one allergen	7	6%
2+	45	41%
3+	40	36%
≥4	8	7%
Total	111	100%

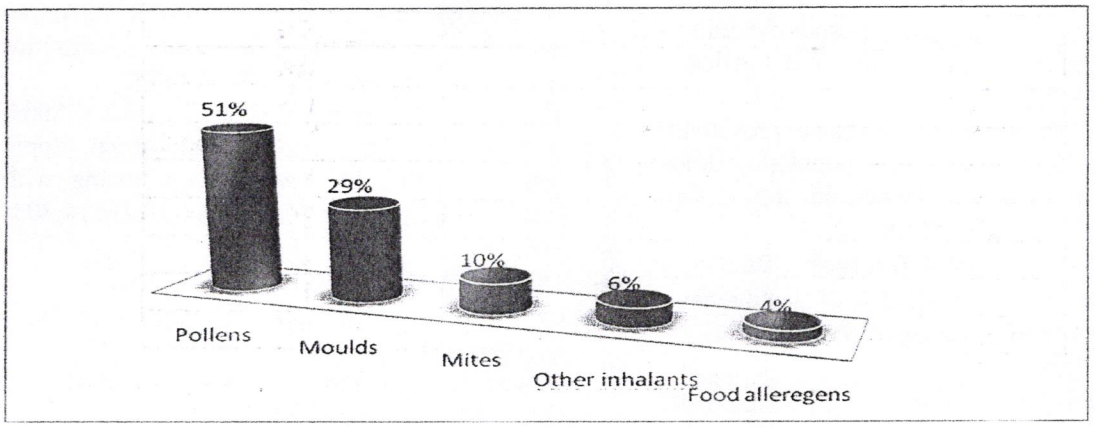

Figure (1) Showed percent frequency of positive skin prick test to main allergens groups of patients with a topic dermatitis.

Table (2) Frequency of positive SPT to the individual allergens among patients with atopic dermatitis.

Allergen	Number of subjects with positive SPT	% frequency of all positive cases
		Pollens:
Bermuda	34	34%
Grass	31	31%
Platain	14	14%
Chenopodium	11	11%
Tree I	14	14%
Tree II	14	14%
Tree III	6	6%
Mugwart	6	6%
		Moulds:
Mould I	23	23%
Mould II	25	25%
Mould III	20	20%
Mould IV	7	7%
Candida	0	0%
		Mites:
D . pteronyssinus	14	14%
D. farina	11	11%
		Other allergens:
mosquito	8	8%
Feather	5	5%
Cat	3	3%
dog	0	0%
Wool	0	0%
		Foods:
Egg	3	3%
Onion	3	3%
Banana	2	2%
cacao	1	1%
Other types of foods	0	0%