

Atopic Dermatitis in Infants and Children in Israel: Clinical Presentation, Allergies and Outcome

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Abstract

Background: Atopic dermatitis is a common disease in infants and children and the incidence appears to be rising.

Objectives: To determine the presentation, allergies, and outcome among Israeli infants and children.

Methods: Children with atopic dermatitis referred to the allergy clinic at a regional pediatric center were evaluated for their medical history and their allergy. The allergic assessment was determined by utilizing skin prick tests and/or serum specific immunoglobulin E concentrations. The children were reexamined again for all parameters at the end of the follow-up period.

Results: Forty-six children with atopic dermatitis were studied, 27 males (58.7%) and 19 females (41.3%). A family history of allergy was found in 19 (41.3%). The median age at presentation was 17 months. Of the 46 children 33 (71.7%) revealed an allergy to one or more of the allergens. The most common combination was allergy to food and house-dust mites. The mean follow-up time was 64 months. By the age of 8 years full recovery was seen in 16 patients, half of whom recovered within 3.3 years from the date of presentation. The probability of complete remission was 58%, and for either complete or partial remission 76%. Upon reevaluation at the end of the follow-up period some patients lost their sensitivities, while others, who had been allergic to foods, became sensitive to house-dust mites and/or pollens.

Conclusions: Atopic dermatitis is an allergic problem in the northern region of Israel, as it is in other parts of the world. Food allergy and house-dust mites are major contributors to the evolution of eczema.

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Atopic dermatitis is a common disease among infants and children and its prevalence has increased in recent years [1,2]. The incidence tends to be lower in tropical climates and rural areas. Atopic dermatitis usually begins in infancy. Sixty-five percent of cases have their onset within the first year of life and 90% before age 5. Its prevalence and intensity decrease with age. In some patients allergens may exacerbate atopic dermatitis. The most controversial aspect of allergen-induced dermatitis relates to the magnitude and frequency of the problem. The only arena in which there has been reproducible demonstration of allergen exacerbation of atopic dermatitis is that of food [3-6]. Genetic factors are also important in the occurrence of the disease.

This study was conducted to prospectively examine the occurrence of atopic dermatitis in a rural population in the northern region of Israel, the major allergens associated with atopic dermatitis, and the clinical course and outcome of the disease in infants and children in this region.

Patients and Methods

We studied children who were referred to the allergy clinic at the regional pediatric center in Nazareth. This facility is a major referral center for children living in the lower Galilee area, serving both the Jewish and Arab population. Children were examined and followed prospectively from 1993 to 1997. Medical history included the children's demographics, symptoms, age at onset, and family history of atopy. All children with atopic dermatitis underwent an allergic evaluation, which utilized skin prick tests and/or serum specific IgE concentrations. Skin prick tests were performed using commercial reagents (Center Laboratories, USA). A positive reaction was considered 5 mm or more, or 3 mm larger than the reaction produced by saline diluent. Specific IgE concentrations were determined by enzyme-linked immunosorbent assay (DPC, Los Angeles, CA, USA).

Children were followed and reexamined again for all parameters in 1997. Repeat allergy tests by prick skin tests and/or specific IgE in the serum were performed according to their initial evaluation and were compared.

Statistical analysis was performed by SPSS. The relations between the parameters were evaluated by Chi-square or Fisher's exact test.

Results

In total, 46 patients with atopic dermatitis were examined. The patients comprised 27 males and 19 females (58.7% and 41.3%, respectively) [Table 1]. Thirty-seven patients were Jews (80.4%) and 9 were Arabs (19.6%). Family history for allergy was positive in 19

IgE = immunoglobulin E

Table 1. Patients' demographics

Variable	No.	%
Gender		
Male	27	58.7
Female	19	41.3
Origin		
Jews	37	80.4
Arabs	9	19.6
Family history of allergy		
Yes	19	41.3
No	27	58.7
Total	46	100

patients (41.3%) [Table 1], with no difference between Jews and Arabs (not shown).

Atopic dermatitis appeared clinically during the first year of life in 58.7% of patients, by 2 years in 76.1%, and by the age of 5 years in all patients. The mean age of presentation was 1.4 years with a standard deviation of 1.2 years.

Total IgE was determined at onset of symptoms in 13 patients, and showed a mean concentration of 198 ± 174 IU/ml. IgE concentrations were 255 IU/ml and above in 7 patients (53.8%) and 34 IU/ml and below in 6 patients (46.2%). A concentration of over 100 IU/ml is considered high for any age. These results show that in about half of the patients with atopic dermatitis IgE concentrations were above the normal concentrations for the age group.

Patients' sensitization was examined for common allergens including foods and aeroallergens. The allergic sensitization was determined for the different allergenic groups and to individual allergens. Thirteen patients (28.3%) had no sensitization for any allergen [Figure 1A]. Sixteen patients (34.7%) were sensitive to more than one allergen, 15 of whom were sensitive to two different groups of allergens (i.e., food and house-dust mite). Two patients (4.3%) were sensitive to three groups of allergens or more. The most common combination was sensitization to food and house-dust mite (8 patients, 17.4%). The results of the major sensitizations among the sensitized patients are presented in Figure 2. The most common single allergenic sensitivity was to house-dust mite (30%). Food allergy was detected in 51% of cases. The major specific foods were, in order: eggs, peanuts, milk, vegetables, fish, and almonds [Figure 2].

Patients were followed for 5.31 ± 2.37 years. During and at the end of the follow-up patients were examined for their degree of recovery from the atopic dermatitis, appearance of other allergic manifestations, and status of their allergic sensitivities. The time to recovery from atopic dermatitis is presented in Table 2. Complete recovery appeared in 16 patients (34.7%) and partial recovery in 19 (41.3%). In total, 35 patients (76.1%) showed partial or complete recovery. Eleven of the 46 patients (24.0%) showed no change. The mean time from onset to complete recovery was 3.89 years, 3.92 for partial recovery, and 3.68 for both [Table 2]. Based on these results, the calculated probability for complete recovery is 0.35 (0.12–0.58 at the 95% confidence level). Taken together, these results showed that about a third (34.8%) of patients had complete recovery, over two-thirds (76.1%) had partial or complete recovery, and that the mean time from onset to such recovery was 3.7 years. We further examined if gender or origin had any effect on the occurrence of clinical manifestations. The results showed that boys had a non-significant tendency for a quicker time to recovery (less than 3 years) compared to girls (75% vs. 37.5%, $P = NS$), and Arabs compared to Jews (75% vs. 50%, $P = NS$).

Atopic dermatitis is often the first allergic manifestation in an atopic individual. We therefore examined the associated allergic conditions that developed during follow-up. Asthma was the most common condition and appeared in 30.4% of patients with atopic dermatitis, allergic rhinitis in 8.7%, and urticaria in 2.1%. Asthma and allergic rhinitis together appeared in 26.0% of patients.

At the end of follow-up for their atopic dermatitis, 16 patients

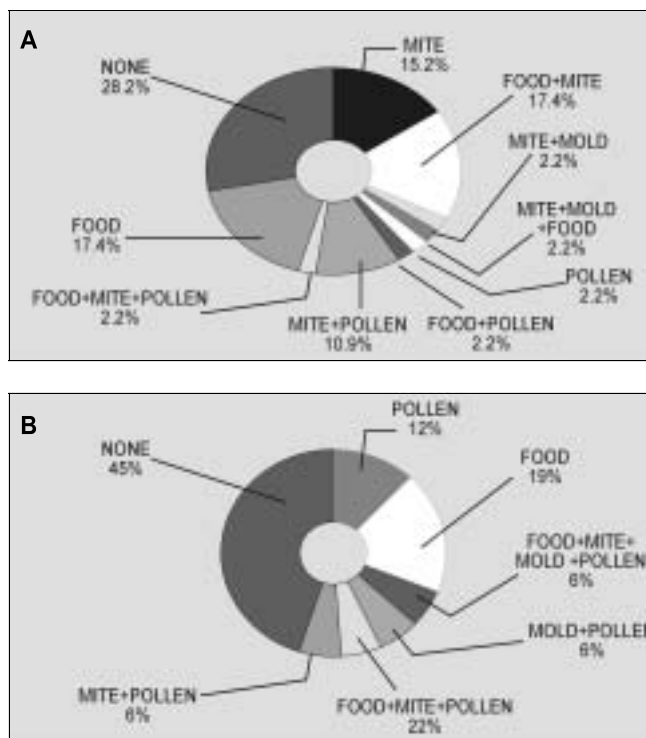


Figure 1. Sensitization at first visit [A] and at follow-up [B]

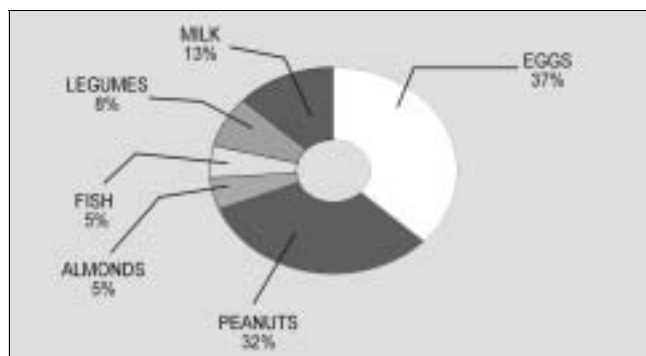


Figure 2. Distribution of food sensitizations at first visit

Table 2. Time in years from onset to recovery

Recovery	Time from onset to recovery	SD	95% confidence level
Complete	3.89	1.71	4.30–2.47
Partial	3.92	1.96	4.87–2.97
Partial and complete	3.68	1.85	4.31–3.04

underwent repeat allergy tests. As can be seen in Figure 1B, 7 patients (45%) had no sensitivity, 3 had food sensitivity, and 2 had aeroallergen sensitivity. House-dust mite allergy was found in three patients who had other concomitant allergies. When compared to their primary allergies, the results reveal that the two patients who had no allergies at the onset of their atopic dermatitis had no allergies at the end of follow-up. Five patients lost their allergies.

One patient with food allergy acquired allergy to house-dust mite and other aeroallergens, while another food-allergic patient lost his allergy but became allergic to house-dust mite, molds and other aeroallergens. Taken together, these results show that while food allergy diminished, some patients acquired other sensitivities, particularly to house-dust mite.

Discussion

This study aimed to investigate the relationship between atopic dermatitis and potential offending allergens in Jewish and Arab atopic infants, and to study the outcome of this condition. Food allergy in Israel was previously studied in the setting of a hospital referral center [7]. The present study approached the role of food allergy in the context of atopic dermatitis in children treated at a community child health center. This is the first such research in Israel, and the first to compare Jewish and Arab children.

The Jewish and Arab population studied reflected the population base served in the region [Table 1]. The relatively lower percentage of atopic dermatitis in the Arab children compared with Jewish children may reflect their numbers in the local population, however one cannot exclude the fact that there are actually fewer atopic dermatitis patients in the Arab population. We also showed that Arab children and boys recovered earlier than Jewish children and girls, respectively. However, due to the small numbers of patients it is not possible to reach any conclusions on such differences. To further investigate these non-significant trends a much larger number of patients is needed.

Total IgE concentrations were elevated above normal concentrations for age in 53.8% of patients, compared to 72% of patients who had allergic sensitivities detected either by skin tests or specific IgE [Figure 1]. These results and the discrepancy between them can be explained as follows: High total IgE concentration supports an existing allergic potential, but the opposite is not true; that is, a normal IgE concentration does not rule out allergy. Furthermore, a normal total IgE concentration for age does not preclude elevated specific IgE concentrations for one or more specific allergens. The latter is specially important and true in infancy or early childhood, when total IgE levels are basically lower than in adults. Taken together, allergy skin tests or the measurement of specific IgE concentrations are important in the evaluation of an infant or child with atopic dermatitis. These tests should of course be directed and limited toward the potential allergens known to exacerbate atopic dermatitis.

Food allergy is often a major contributor to the development of atopic dermatitis [Figures 1 and 2]. While the medical and nutritional history and skin tests or specific IgE concentrations can support the diagnosis of food allergy, the gold standard for the diagnosis of food allergy is a double-blind placebo-controlled food-challenge [3]. Such food challenges were not performed on the patients described in this report because they all had active skin lesions when enrolled, and such a challenge would have been neither possible nor ethical. For this reason, we had to use specific IgE measurements in some children rather than the more readily available, quicker and less expensive skin tests. In this context it is noteworthy that the relationship between food-specific IgE

concentrations and the risk of positive food challenges in children was recently reviewed, and, in fact, many recent studies now support the notion that high concentrations of food-specific IgE antibody are predictive of food-induced clinical symptoms [8]. Furthermore, by measuring the concentrations of food-specific IgE antibodies, it is possible to identify a subset of patients who are highly likely (>95%) to experience clinical reactions to eggs, milk, peanuts, or fish [8]. A recent study of atopic dermatitis patients demonstrated that screening prick tests for a limited number of major food allergens were very accurate, with 99% of patients with food allergy being identified correctly [9]. This could eliminate the need to perform a double-blind placebo-controlled food challenge in a significant number of patients suspected of having IgE-mediated food allergy, as was the case in similar studies [10–12].

The major food allergens detected in our patients were similar to those reported by others, egg protein being the leading cause [11], except for soy allergy which was not detected in our patients. We may thus conclude that soy is a relatively safe nutritional substitute in milk-allergic patients in our population. As soy formulas are readily available and cheap they are important in our rural and relatively low income population. A major contributor to the persistence of the atopic dermatitis found in our study is house-dust mite, in agreement with previous observations in the world and in Israel [1,6,13].

Recently, two important studies showed that sesame is a major food allergen in Israel [14,15]. When sera in our study were tested for specific IgE we did not find elevated specific IgE concentrations toward sesame. There is, however, a difference in the populations studied and therefore any comparison may be misleading. The previous studies were performed in children who reacted to sesame to begin with [14] or were suspected of food allergy in general [15] and not in children with atopic dermatitis. It is also possible that our population of children with atopic dermatitis was too small to draw conclusions on the percentage of sensitization to sesame. Our results are in agreement with previous publications. Peanut sensitization, for example, accounted in our experience for 32% of first-visit sensitizations, which concurs with reports on peanut being a major food allergen in Europe and North America.

Atopic dermatitis generally appears in infancy and early childhood and is more common in families with atopy [1]. Our results, revealing the appearance of atopic dermatitis in 58.7% by 1 year of age and in 76% by 2 years of age with a positive family history of atopy in 41.3% of children, are similar to those from other parts of the world. Atopic dermatitis resolves in time in most cases [Table 2] and is not related to gender or ethnic origin, which is in agreement with reports from other parts of the world [10]. Our work supports the observation that atopic dermatitis in early infancy predicts allergic airway disease and other allergic conditions in childhood [16]. Therefore, infants with very early signs of atopic dermatitis and a positive family history are candidates for early intervention measures against respiratory allergies.

Conclusions

Atopic dermatitis is an allergic condition in the northern region of Israel. The majority of children with atopic dermatitis exhibit

allergic sensitivities. The most common allergies are to food, especially egg, and later in life to house-dust mite and other aeroallergens. In most cases there is a partial or complete recovery within 4 years and up to the age of 8. The clinical presentation, allergies and outcome of atopic dermatitis in the northern and rural area of Israel are similar when compared to those in other parts of the world.

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