# Sensitization in early age to food allergens in children with atopic dermatitis

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## ABSTRACT

*Background:* Clinical and laboratory evidence increasingly supports the notion that food allergy plays a role in the pathogenesis of atopic dermatitis (AD). However, the prevalence of clinically significant food hypersensitivity among children with AD remains an unanswered question.

*Objective:* To prospectively determine the prevalence of IgE-mediated food hypersensitivity among patients referred to a dermatology department for evaluation of AD, and to analyze the clinical relevance of these sensitizations in AD.

*Methods:* We studied 44 infants of both sexes, aged less than 12 months old, who attended the dermatology department with symptoms of AD. Compliance with Hanifin-Rajka criteria was confirmed and the severity of AD was evaluated using the SCORAD index. IgE-mediated sensitization to cow's milk, alpha-lactalbumin, beta-lactoglobulin, casein, egg-white, egg-albumin, ovomucoid and foods introduced into the diet was studied using the skin prick test (SPT) and measurement of specific serum IgE (sIgE) by CAP System fluorescein-enzyme immunoassay.

Cow's milk, as well as suspected foods from the clinical history or those with a positive SPT and/or sIgE, were withdrawn from the diet to evaluate improvement in AD, and an open controlled challenge test was carried out.

*Results:* Of the 44 patients studied, sensitization to foods was detected in 27 (61 %). No changes were observed in AD during the elimination diet or when the eliminated foods were subsequently reintroduced into the diet. The results of open controlled food challenges were positive in 12 patients (27 %).

*Conclusions:* A high prevalence of food sensitization was found in infants with AD. The most frequent sensitization observed was to egg, although with little clinical relevance since this food had not been introduced into the diet.

In the sample studied, the clinical relevance of the observed food hypersensitivities was confirmed in relation to AD. Further studies are required to confirm these results.

***Key words:*** Food hypersensitivity. Food allergy. Atopic dermatitis. Cow's milk allergy. Egg allergy. Food challenge.

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## INTRODUCTION

Atopic dermatitis (AD) is a chronic inflammatory skin disorder that affects between 10 % and 12 % of the pediatric population. There is an increasing body of clinical and laboratory evidence suggesting that food hypersensitivity plays a pathogenic role in AD in a subset of patients, primarily infants and children[1].

In the early part of this century, Schloss reported several cases of patients who had improvement in their eczematous skin lesions after avoiding specific foods. That report was followed by many others with conflicting findings and led to controversy about the role of specific food allergens in AD[2]. Some authors demonstrated by double-blind placebo-controlled food challenge (DBPCFC) an acute-onset clinical reactions consisting of urticaria, pruritus, and erythema in a subset of patients with AD, whereas others had delayed-onset eczematous reactions. No relationship has been established between reactivity in skin prick tests (SPT) and delayed-onset clinical reactions[3-5].

The prevalence of clinically relevant food hypersensitivity among children with AD remains an unanswered question. Approximately 40 % of infants and small children with moderate/severe AD have food allergy with a positive DBPCFC[6-8]. Because the real prevalence of food allergy in AD remains unknown, the aim of this study is to determine the prevalence of clinically relevant food hypersensitivity in patients who were referred to a Service of Dermatology. These patients were referred to the dermatologist without selection for any adverse reaction to foods.

## METHODS

### Subjects

We studied 44 infants of both sexes, 27 males (61 %) and 17 females (39 %), less than 12 months old (range from 3 to 12 months, mean 7.5 months and mode 6 months), referred from the Service of Dermatology with the diagnosis of atopic dermatitis (AD) fulfilling the criteria of Hanifin-Rajka[9] and were not selected on the basis of suspected allergy to foods. They were recruited according to consecutive non-probabilistic sampling. The dermatologist evaluated patients at the initial visit, and an AD symptom score was assigned using the SCORAD index[10].

Full past medical history was recorded and a complete physical examination performed. All patients were asked about foods introduced into the diet and their tolerance.

### Procedures

*Skin test technique:* Prick testing was done with a commercially available allergens (LETI Laboratory, Madrid, Spain). A 1 mm-one-peak lancet with shoulder to prevent deeper penetration was used. Histamine dihydrochloride (10 mg/ml) was used as a positive control, and saline solution was used as a negative control. SPT were carried out on the front surface of the forearm with reading after 15 minutes. A wheal diameter 3 mm larger than that produced by the negative control was considered positive. SPT were performed in all patients with whole cow's milk extract (5 mg/ml), with isolated cow's milk proteins (CMP): $\alpha$-lactalbumin (5 mg/ml), $\beta$-lactoglobulin (5 mg/ml), and casein (10 mg/ml) and with other foods: egg-white, egg-albumin, ovomucoid and those introduced into diet.

*In vitro test:* A venous blood sample was obtained from the infant. The patients were screened for food-specific serum IgE to milk, $\alpha$-Lactalbumin, $\beta$-Lactoglobulin and those foods with positive SPT. The levels of total and specific serum IgE were determined using CAP System fluorescein-enzyme immunoassay (CAP) (limit of the assay,0.35 $KU_A/L$) (Pharmacia Diagnostics, Uppsala Sweden). The test was considered positive when a result of 0.35 $KU_A/L$ was obtained.

*Challenge test:* Before the challenge, foods were eliminated from the infants' diet for at least 2weeks. Open controlled food challenges (OCFC) with cow's milk were performed on all patients after one month of elimination from the diet, and the same test were carried out with the foods with positive allergy evaluation (sIgE and/or SPT) after two weeks of elimination from the diet. Elimination diet with cow's milk was extended to one month following the protocol of the study of Isolauri[3]. During this month patients were reviewed in the hospital at the time of any exacerbation of AD.

All of the challenges were performed in the Unit of Allergy at the Hospital, where appropriate medication and resuscitation equipment was directly available. Informed consent was previously obtained from the parents. Each patient remained for 2 hours under observation after the last food dose intake before going back home. Before OCFC infants must fulfil the following conditions: controlled atopic dermatitis, absence of acute rash and not being treated with anti-histamines in the previous 7 days, topical corticoids (48 hours), systemic corticoids (one month) and oral and inhaled beta-adrenergics (12 hours).

The OCFC were made with a ready-to-use infant formula of cow's milk. In the challenge with cow's milk, rising doses (5, 10, 25, 50 and 100 ml) were given at 30-minute intervals until milk intake appropriate for the age was reached. In the case of the other foods, they were prepared under normal eating conditions, the dose was equivalent to a normal intake, and increasing doses with 30-minute intervals were given: 1/8 of the total dose, 1/4 of the total dose and later the rest of the total dose. If there was history of an IgE-mediated type immediate reaction it was