

Significant improvement of eczema with skin care and food elimination in small children

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Abstract

Aim: To evaluate common methods of investigation and treatment in children younger than 2 y of age with eczema, with or without sensitization to food allergens. **Methods:** One hundred and twenty-three children younger than 2 y of age with eczema and suspected food allergy were included in this prospective study. The children underwent skin-prick test with cow's milk, fresh hen's egg white and wheat. Specific IgE to milk and egg white was analysed. The eczema extent and severity was estimated with SCORAD before and after treatment. Children with a positive skin-prick test were instructed to exclude that food item from their diet. All children were treated with emollients and topical steroids when needed. **Results:** Sixty-two of the children were skin-prick positive to at least one of the allergens; 62% had mild, 30% moderate and 8% severe eczema at their first visit. After treatment, 90% had mild, 10% moderate and 0% severe eczema. Forty-six per cent of the children had circulating IgE antibodies to milk or egg white. Ten per cent had specific IgE but negative skin-prick test to the same allergen. This subgroup improved their eczema significantly without elimination diet.

Conclusion: The conventional treatments for children with eczema, i.e. skin care and food elimination, are effective. The beneficial effect of skin care as the first step should not be neglected, and it may not be necessary to eliminate food allergens to relieve skin symptoms in all food-sensitized children with eczema.

Key Words: Eczema, food allergy, food elimination, IgE antibodies, skin-prick test

Introduction

Eczema [1] is a common disease in childhood, affecting at least 10–20% of all children [2]. The atopic eczema type, where classification is based on sensitization, is the most common variety in childhood, seen in approximately 70–80% of the patients in a hospital population [2]. Infants and small children usually display sensitization to food allergens such as egg, milk, wheat, soy and peanut [3–7]. Food allergens induce rash in nearly 40% of children with moderate or severe eczema [8]. Thus, food avoidance is frequently tried and has been shown to be effective in controlled trials [3]. Still, milk and egg are important sources of nutrients in childhood, and the expert help of a dietitian is needed if major food items are eliminated, to guarantee adequate nutrition [9–11]. Children on elimination diets have a significantly

lower intake of nutrients, such as fat and proteins, and a higher risk of malnutrition [9] and impaired growth [10,11]. For the majority of children, the intolerance is transient, i.e. they outgrow their food allergy and develop tolerance with age [7,12,13]. There are, however, no clinical tests that determine the achievement of tolerance of the allergen. Skin-prick test (SPT) results and their change over time have often been used to assess the decrease of sensitivity. Recently, a simplified algorithm using the SPT was suggested to evaluate food hypersensitivity and the persistence/resolution of sensitivity [7]. Caution was suggested, however, as both the allergen involved and previous serious adverse reactions must be taken into consideration [14].

The most common advice for treatment of eczema in children is the use of skin care, with emollients and, when necessary, topical steroids. Such advice

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is given every day at child health clinics. A disturbed skin-barrier function is a dominant feature in eczema, which makes skin care a reasonable remedy [15]. Many parents hope for a more specific and definite cure, and ask for further investigation to rule out the possibility of sensitization. Allergy testing is recommended in eczema with persistent symptoms, and well-organised cooperation between primary care and specialists in allergy has been stressed as crucial [16].

Previous studies of eczema have often described older children, or children with severe symptoms. Most children, however, have mild or moderate symptoms [17,18].

The aim of this study was to evaluate common methods of investigation and treatment of young children with eczema, with and without sensitization to food allergens. In this paper we report the clinical findings at the time of diagnosis, and the effect of skin care and elimination diet for 6 wk. We will continue to monitor these children until they reach 5 y of age and investigate how they manage to reintroduce the eliminated food items to their diet.

Material and methods

Subjects

The study cohort comprises 123 children participating in a prospective study of the clinical and immunological development of small children with eczema and suspected food allergy. Between June 1999 and September 2001, children under 2 y of age, admitted to four Swedish paediatric departments (Linköping, Norrköping, Jönköping and Hudiksvall), were recruited to the study. The children were all referred from primary-care physicians. The group comprised 52 girls and 71 boys, aged between 2 and 24 mo (mean 8.4 mo) at the first visit. Ten of 123 children were above 18 mo of age. All children underwent SPT for cow's milk (0.5% fat), fresh hen's egg white and wheat dissolved in water, as food allergens are the most relevant allergens for this age group [16]. SPT was performed by the prick-prick method [16,19]. A mean wheal diameter at least 3 mm larger than the negative control was defined as a positive reaction [16]. The diagnosis of eczema was established using the criteria defined by Hanifin and Rajka [20]. The extent and severity of eczema were estimated by the Scoring Atopic Dermatitis (SCORAD) method [21] by experienced allergy research nurses. The SCORAD evaluation includes both the objective items extent and intensity, and the subjective items pruritus and sleep loss, assessed by the parents on visual analogue scales. According to the SCORAD classification, children were judged to have mild (SCORAD under 25), moderate (SCORAD between 25 and 50) or severe (SCORAD over 50) eczema.

Before the start of the study, all nurses practised scoring on a child with eczema to evaluate inter-observer variability. Each child was evaluated by the same investigator, before and after treatment, to reduce the inter-observer variability [22].

Children with positive SPT were recommended to exclude the corresponding allergen from the diet (and/or from the mother's diet, if the child was breastfed), and feeding advice was also given by a dietitian.

All parents were instructed in, and practically shown, skin care with emollients and topical steroids, when needed. The nurse contacted the families by phone after 1 wk. The purpose was to encourage the family to follow the suggested treatment, and to be able to answer additional questions. In most cases, the families reported less severe eczema symptoms already after 1 wk of treatment.

The eczema was re-evaluated with SCORAD at a second visit, after a treatment period of about 6 wk.

Specific IgE levels

A blood sample was collected at the first visit. The levels of specific IgE antibodies to milk and egg were analysed with UniCAP[®], a commercial fluoroenzyme immunoassay, according to the recommendations of the manufacturer (Pharmacia Diagnostics AB, Uppsala, Sweden). The test results were considered positive at values >0.35 kUA/l.

Statistics

Since neither antibody levels nor SCORAD indices were normally distributed, non-parametric tests were used. Paired analyses were performed with the Wilcoxon signed-rank test and unpaired analyses with the Mann-Whitney U-test. A probability level of <5% was considered statistically significant. The calculations were performed with the statistical package StatView 5.0 for PC (SAS Institute Inc., Cary, NC, USA).

Ethics

The study was approved by the Human Research Ethics Committee at the Faculty of Health Sciences, University of Linköping.

Results

Skin-prick testing and feeding advice

All 123 children were skin-prick tested at their first visit. Seventy-six children (62%) were positive to at least one of the allergens: cow's milk, hen's egg white and wheat. Fifty-nine had positive SPT to egg, 41 to milk and nine to wheat. Twenty-seven children were

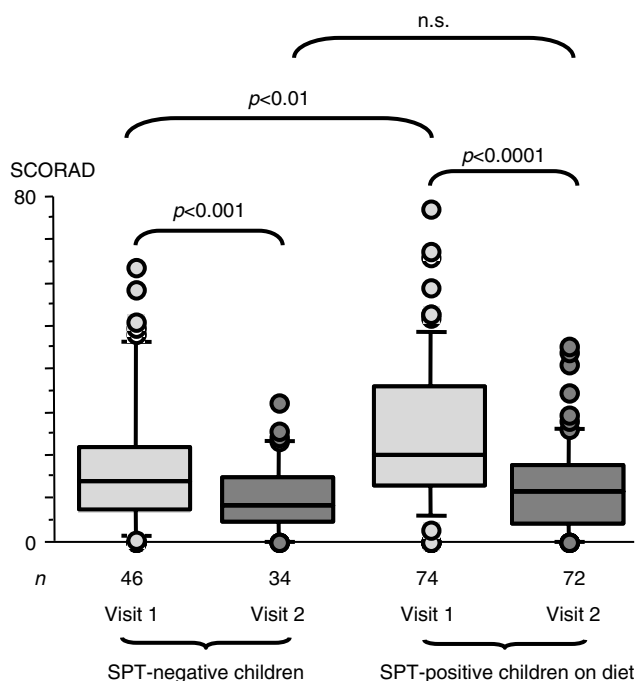


Figure 1. SCORAD values at the first and second visit in SPT-negative and SPT-positive children. All children were treated with skin care, and the SPT-positive children also received an elimination diet.

positive to more than one allergen. Of the nine children positive to wheat, seven were also positive to both egg and milk. There were no differences in age, sex or length of breastfeeding between SPT-positive and SPT-negative children (data not shown).

Severity of eczema and treatment

At the first visit, 74 of the children were classified as having mild eczema, 36 moderate and 10 severe according to their SCORAD index, i.e. 62%, 30% and 8%, respectively. SCORAD values were distributed between 0 and 77 (median 17.1). Eczema evaluation was missing for three children. Eleven children had SCORAD 0 at the first assessment. Twenty (out of 123) children were treated with group II local steroids for a short period on referral.

Children with positive SPT had significantly higher SCORAD than children with negative SPT (median 19.8 and 13.9, respectively; $p < 0.01$) (Figure 1) at the first visit, but there was no difference in SCORAD between SPT-positive and SPT-negative children after treatment (median 11.5 and 8.3, respectively) (Figure 1). The SCORAD indices were significantly lower after treatment, in both SPT-positive and SPT-negative children ($p < 0.0001$ and 0.001, respectively) (Figure 1). At the second visit, SCORAD indices were distributed between 0 and 45.2 (median 10.1), and eczema evaluation was missing for 12 children. After

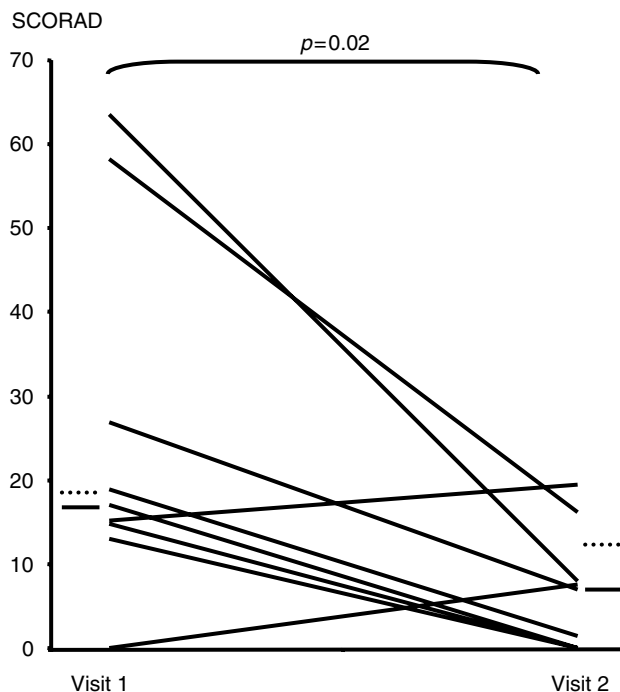


Figure 2. Eczema improvement in nine children sensitized to milk or egg according to circulating IgE antibodies, but with negative SPT to the same allergen, before and after treatment with skin care and no elimination diet. Median SCORAD values are indicated for these nine sensitized children with no elimination diet (black line), and for 76 SPT-positive children recommended an elimination diet (dotted line).

treatment, 100 were classified as having mild eczema, 11 moderate and none of the children was classified as having severe eczema, i.e. 90%, 10% and 0%, respectively. Nineteen children had SCORAD 0 at the second assessment.

Specific serum IgE antibodies

Blood samples were obtained from all children. Of the 123 children, 57 had circulating specific IgE antibodies: 51 to egg, 30 to milk and 24 to both allergens. Twelve children had positive specific IgE but negative SPT to the same allergen. As they had negative SPT at the first visit, no elimination diet was recommended. The levels of specific IgE antibodies and SCORAD at the first visit were similar in this subgroup and in the SPT-positive children (data not shown). At the second visit, the SCORAD in this subgroup with food-specific IgE but negative SPT tended to be lower (median 6.9; range 0–19.5) than in the SPT-positive group (median 11.5; range 0–45.2) ($p = 0.07$). Data on SCORAD were reported in nine of these children from both visits, and in 7/9 of them, eczema improved during the 6 wk of treatment with emollients (median 17.0 before and 6.9 after treatment, respectively; $p = 0.02$) (Figure 2).

Discussion

Advice to use skin care for treatment of eczema in children is given daily at child-health clinics. In this study we have shown that children with eczema improved significantly after a short period of skin care, and in those with positive SPT to food, diet elimination. The effect was noted when skin care was combined with diet elimination in sensitized subjects. A significant improvement was also achieved without diet changes in a subgroup with food-specific IgE but negative SPT, treated with skin care only.

In small children with eczema and suspected sensitization to food, diet elimination is often recommended. However, elimination diet may affect the nutritional value of the food [9–11]. Parents often try elimination diets hoping that this will give a definite cure of the eczema. Careful investigation by a paediatrician and good advice by a dietitian are crucial to avoid unnecessary elimination diets [16].

Improvement of eczema during an elimination period in sensitized children is in line with the major opinion [3,23,24], but the similar degree of improvement in children treated only with skin care in our study is in contrast to earlier findings by Lever et al. [3]. In that study, RAST-positive children who continued to ingest eggs showed non-significant changes of their eczema, whereas eczema improved significantly in the diet group.

The children in our study may have had less serious symptoms. We are unable to evaluate this, because different methods for estimating eczema were used in the two studies. The subgroup of sensitized children with negative SPT in our study showed no difference in SCORAD compared to those with positive SPT. Two children in the subgroup had severe symptoms (Figure 2), i.e. we have no indication that these children had less severe eczema.

There are several similarities between our study and a recent Swedish study, part of the BAMSE study [18]. In that study, 221 children from a community birth cohort were investigated at 2 y of age for the evaluation of eczema. Both studies used the Hanifin and Rajka criteria for diagnosing atopic dermatitis [19], and SCORAD to assess severity [20]. Among the patients, they also reported a predominance of boys, and a minority of cases with severe symptoms: 2% in the BAMSE study and 9% in our study before treatment, and 0% in both after treatment. However, there are also major differences between the two studies. We found significantly higher SCORAD values in children with positive SPT at the first investigation, which is in contrast to the BAMSE report. After treatment, we found no significant difference of the SCORAD values between SPT-positive and SPT-negative children. A plausible explanation for this difference is the fact that their cases were already

treated with topical steroids and emollients, and their children with food allergy were already on an elimination diet. We also found a higher proportion of SPT-positive children: 62% compared to 27%, in spite of the fact that more allergens were tested in that study. Similarly, the proportion of IgE-positive children is higher in our study: 45.7% compared to 15%. These differences are presumably caused by the differences in study design. All our patients were referred from primary care because of eczema symptoms, and the BAMSE study was performed on a population-based cohort, where treatment (skin care and elimination) was started before the eczema evaluation.

In conclusion, the conventional treatments for eczema, i.e. skin care for all children and food elimination for SPT-positive children, were also effective in these children. Improvement was also seen in a subgroup of sensitized children with skin care as the only treatment and continued exposure to the corresponding allergen. The beneficial effect of skin care as the first step should not be neglected, and it may not be necessary to eliminate food allergens to relieve skin symptoms in all food-sensitized children with eczema. Further follow-up of these children will reveal the long-term effect of diet elimination versus skin care only.

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