



Indian J Dermatol. 2012 Nov-Dec; 57(6): 428–433.
doi: [10.4103/0019-5154.103065](https://doi.org/10.4103/0019-5154.103065)

PMCID: PMC3519248

The Effect of Hypoallergenic Diagnostic Diet in Adolescents and Adult Patients Suffering from Atopic Dermatitis

Jarmila Čelakovská, ¹ K Ettlerová, ¹ K Ettler, J Bukač, ² and M Bělobrádek

From the Department of Dermatology and Venereology, Faculty Hospital and Medical Faculty of Charles University, Hradec Králové, Czech Republic

¹Department of Allergy and Clinical Immunology, Outpatient Clinic, Hradec Králové, Czech Republic

²Department of Medical Biophysics, Medical Faculty of Charles University in Hradec Králové, Czech Republic

Address for correspondence: Mrs. Jarmila Čelakovská, Department of Dermatology and Venereology, Faculty Hospital and Medical Faculty of Charles University, Hradec Králové, Czech Republic. E-mail: jarmila.celakovska@seznam.cz

Received October 2011; Accepted December 2011.

Copyright : © Indian Journal of Dermatology

This is an open-access article distributed under the terms of the Creative Commons Attribution-Noncommercial-Share Alike 3.0 Unported, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

Aim:

To evaluate the effect of a diagnostic hypoallergenic diet on the severity of atopic dermatitis in patients over 14 years of age.

Materials and Methods:

The diagnostic hypoallergenic diet was recommended to patients suffering from atopic dermatitis for a period of 3 weeks. The severity of atopic dermatitis was evaluated at the beginning and at the end of this diet (SCORAD I, SCORAD II) and the difference in the SCORAD over this period was statistically evaluated.

Results:

One hundred and forty-nine patients suffering from atopic dermatitis were included in the study: 108 women and 41 men. The average age of the subjects was 26.03 (SD: 9.6 years), with the ages ranging from a minimum of 14 years to a maximum of 63 years. The mean SCORAD at the beginning of the study (SCORAD I) was 32.9 points (SD: 14.1) and the mean SCORAD at the end of the diet (SCORAD II) was 25.2 points (SD: 9.99). The difference between SCORAD I and SCORAD II was evaluated with the Wilcoxon signed-rank test. The average decrease of SCORAD was 7.7 points, which was statistically significant ($P=0.00000$).

Conclusion:

Introduction of the diagnostic hypoallergenic diet may serve as a temporary medical solution” in patients suffering from moderate or severe forms of atopic dermatitis. It is recommended that this diet be used in the diagnostic workup of food allergy.

Keywords: Atopic dermatitis, diagnostic hypoallergenic diet, SCORAD system

Introduction

What was known?

The role of food allergy remains controversial in older children and adult patients suffering from atopic dermatitis, few studies concerning the food allergy in this group of patients are available.

Atopic dermatitis is a chronic, intermittent, inflammatory, genetically predisposed skin disease that is characterized by severe pruritus and xerosis. A number of environmental factors have been implicated in its pathogenesis.

The role of food allergy in atopic dermatitis has been a subject of controversy in dermatology, but today there is definite evidence that food allergy has a role in the pathogenesis of the disease. The importance of food allergy in children with atopic dermatitis has been confirmed by extensive studies,^[1] but the role of food allergy remains controversial in older children and in adults suffering from this disease.

Many food reactions in people with atopic dermatitis may not necessarily be mediated through immune reactions.^[2] As sensitization to food early in life may be a predisposing factor,^[3] it is important to investigate whether the elimination of dietary triggers can help alleviate the symptoms of atopic dermatitis. The role of dietary factors in atopic dermatitis—either as a causative factor or as a treatment measure through the use of exclusion diets—remains unclear.^[4] Many researchers advocate double-blind placebo-controlled food challenges to establish whether a child has a true food allergy.^[5]

There is a vast amount of literature claiming that dietary elimination of specific foodstuffs causes improvement of atopic dermatitis in some cases. However, much of the evidence fails to withstand close scrutiny.^[2] The advantage of dietary interventions is that they may address one of the primary causes, as opposed to treatments that merely suppress the symptoms. However, there can be serious consequences to any dietary manipulation that leaves the individual deficient in calories, protein, or minerals such as calcium.^[6,7] Avoidance of multiple foods is potentially hazardous and requires continuing dietary supervision in the pediatric age-group.^[6]

According to the European Academy of Allergy and Clinical Immunology (EAACI) position paper, in case of suspected food allergy (by history and/or specific sensitization), a diagnostic elimination diet is recommended over a period of up to 4–6 weeks, with the exclusion of the suspected food items. If the role of food in persistent moderate-to-severe atopic dermatitis is unclear, the patient should maintain a daily record of symptoms (including the status of atopic dermatitis, intensity of itch, and sleep loss) and the intake of specific foods. These protocols will give an overview of the patient's diet and may point to a possible relation between the worsening of eczema and specific food intake. If there is no such association and the diagnostic procedures outlined above do not provide helpful information, the introduction of a diagnostic hypoallergenic diet over a period of at least 3 weeks can be helpful in severe atopic dermatitis.^[8] If the condition of atopic dermatitis remains stable or increases within 4 weeks during the diagnostic elimination diet, it is unlikely that food allergy is a relevant trigger factor for the atopic dermatitis, and open food challenges are then not necessary. It has to be taken into account that in rare cases a food that was 'allowed' during the elimination diet may be responsible for persistent symptoms.

The European Task Force on Atopic Dermatitis (ETFAD) has developed the SCORAD (SCORing AD) index to create a consensus on assessment methods for atopic dermatitis so that the results of different trials can be compared.^[9]

The Aim

The aim of our study was to evaluate, using the SCORAD system, the effect of a diagnostic hypoallergenic diet taken for a period of at least 3 weeks. This diet was recommended to patients suffering from atopic dermatitis in the diagnostic workup of food allergy before open exposure tests with suspected food allergens.

Materials and Methods

Patients

Patients over 14 years of age with atopic dermatitis who were examined at the Department of Dermatology and Venereology, Faculty Hospital and Medical Faculty of Charles University, Hradec Králové, Czech Republic, from January 2005 to April 2008 were included in the study. The diagnosis of atopic dermatitis was made according to the the Hanifin-Rajka criteria.[10]

All patients signed informed consent forms prior to inclusion in the study, and the permission of the local ethics committee was obtained for conducting this study.

Examinations

Complete dermatological and allergological examination was performed in all included patients at the allergological outpatient department, with evaluation of the occurrence of bronchial asthma and of the occurrence of perennial or seasonal rhinoconjunctivitis.

Personal history

A detailed personal history of possible food allergy was taken in all included patients. The patients were asked if they suffered from immediate or late food adverse reactions affecting the skin (itching, rush, urticaria, worsening of atopic dermatitis), gastrointestinal tract, or respiratory tract. History of food-dependent exercise-induced anaphylaxis (FDEIA), occupational asthma and rhinitis, and contact urticaria was also elicited.

Examinations

The diagnostic workup of food allergy (including skin prick tests, atopy patch tests, and measurement of specific serum IgE) to wheat, cow's milk, peanut, soy, and egg was performed before the diagnostic hypoallergenic diet was started. This was done during intervals when the patient had mild symptoms of atopic dermatitis (as evaluated with SCORAD).

Open exposure test and double-blind placebo-controlled food challenge tests with suspected food allergens were performed after the diagnostic hypoallergenic diet during intervals when the patient had mild symptoms of atopic dermatitis.

[Figure 1](#) shows the diagnostic algorithm for the identification of food allergy in atopic dermatitis patients and the inclusion of the diagnostic hypoallergenic diet in the diagnostic workup of food allergy in patients suffering from atopic dermatitis.[8]

Scoring of atopic dermatitis

The diagnosis of atopic dermatitis was made using the Hanifin-Rajka criteria[10] at the Department of Dermatology and Venereology, Faculty Hospital and Medical Faculty of Charles University, Hradec Králové, Czech Republic.

Severity of eczema was scored using the SCORAD index,[9] which includes assessment of topography items (affected skin area), intensity criteria, and subjective parameters. To measure the extent of atopic dermatitis, the rule of nines was applied on a front/back drawing of the patient's body. The extent can be graded on a scale of 0 to 100. The intensity part of the SCORAD index consists of six items: Erythema, edema/papulation, excoriations, lichenification, crusts, and dryness. Each of these items can be graded on a scale of 0 to 3. The subjective items include daily pruritus and sleeplessness. Both subjective items can be graded on a 10-cm visual analog scale. The maximum subjective score is 20. All items were entered in the SCORAD evaluation form. The SCORAD index was calculated using the formula: $A/5 + 7B/2 + C$. In this formula, A represents the extent (0-100), B represents the intensity (0-18), and C represents the subjective symptoms (0-20).

The severity of atopic dermatitis as evaluated with SCORAD was graded as mild (≤ 20 points), moderate (20- 50 points), or severe (> 50 points). The severity of atopic dermatitis was evaluated with the SCORAD system at the beginning of the diagnostic hypoallergenic diet and at the end of this diet (before the exposure tests).

The diagnostic hypoallergenic diet

This diet was designed to be free of any additives and allergens and was suggested to the patient during the diagnostic workup of food allergy; it was introduced after obtaining the patient's informed consent.

Over the period of 3 weeks we recommended the following foods:

- Gluten-free foods
- Potatoes, rice
- Beef, pork, and chicken meat
- Vegetable and fruits only after thermal modification; but parsley, celery, and seasoning were not allowed
- The patient was allowed to drink only plain drinking water, mineral water, or black tea.
- No other foods and drinks were allowed during this period of 3 weeks.

During this diet the patient was allowed to treat himself with a low-potency topical corticosteroid. Other anti-inflammatory substances and ultraviolet (UV) therapy were not permitted.

Results

Patients

One hundred and forty-nine persons—108 women and 41 men—entered the study. The average age was 26.03 years (SD: 9.6 years), with the minimum age being 14 years and the maximum 63 years. The mean SCORAD was 32.9 points (SD: 14.11) (maximum 79.5 points; minimum 12.5 points) at the beginning of the study. The mean SCORAD at the end of the diet was 25.2 (SD: 9.99). These data and the clinical characteristics of patients are presented in [Table 1](#).

In all patients a complete allergological examination was performed. The data about the occurrence of bronchial asthma, occurrence of seasonal or perennial rhinoconjunctivitis, the onset of atopic dermatitis, and family history of atopy were recorded [[Table 1](#)].

[Table 2](#) demonstrates the categorization of the 149 patients according the severity of their atopic eczma at the beginning of the diet and at the end of the diet. At the beginning of the diet 32 (22%) patients suffered from the mild form, 97 (65%) from the moderate form, and 20 (13%) from the severe form of atopic dermatitis. The mean SCORAD at the start of the study was 32.9 (SD: 14.1). The mild form of atopic dermatitis was recorded at the end of the diet in 50 (33%) patients, the moderate form in 92 (62%) patients, and the severe form in 7 (5%) patients. The mean SCORAD at the end of this diet was 25.2 (SD: 9.99).

[Table 3](#) demonstrates the number of patients with increase and decrease in SCORAD at the end of the diet. Decrease of SCORAD was recorded in 119 patients (80%). A decrease of SCORAD by only about 1 point was recorded in 6 of the 119 patients, while in 113 patients (76%) the decrease of SCORAD was by more than 1 point. The mean decrease in the SCORAD was 7.7 points.

Increase of SCORAD was recorded in three patients and in all of them the increase was by 3 points. No changes during this diet were recorded in another 27 patients (18%), i.e. the level of SCORAD at the beginning of the diet and at the end of the diet were the same.

Statistical evaluation of SCORAD

SCORAD at the beginning and at the end of diagnostic hypoallergenic diet was evaluated with the Wilcoxon signed-rank test. We rejected the null hypothesis about the conformity in SCORAD I and SCORAD II because the average difference of 7.7 points was substantial and statistically significant ($P = 0.00001$).

Discussion

Atopic dermatitis is a chronic, intermittent, inflammatory skin disease that may be associated in some cases with food allergies. Numerous other trigger factors for atopic dermatitis have been identified, including inhalable respiratory allergens, irritative substances, and infectious microorganisms such as *Staphylococcus aureus*. Psychogenic and climatic factors may also cause exacerbations of atopic

dermatitis.

The epidermal barrier plays a crucial role in protecting the body against infection and other exogenous insults by minimizing transepidermal water loss and by conferring immunological protection.^[11] Filaggrin gene defects substantially increase the risk of atopic dermatitis. The increased skin permeability in those with such defects may increase the risk of sensitization to food and other allergens, indicating the importance of cutaneous allergen avoidance in early life to prevent the onset of atopic dermatitis and food allergy.^[11]

Food allergy appears to be an important factor in the exacerbation of atopic dermatitis in only a subset of children (and a much smaller subset of adults). Non- IgE- mediated mechanisms are sometimes implicated in the atopic dermatitis flare-ups associated with ingestion of the foods in question, and food allergy appears to have little or no role in children with nonatopic dermatitis.^[12–14] In a questionnaire survey of schoolchildrens' perceptions regarding the factors influencing their atopic dermatitis,^[15] an extremely small proportion (8%) of respondents believed that certain foods or drinks had an effect on their eczema. A survey of adults in High Wycombe showed that 20% perceived exacerbations of their atopic dermatitis as adverse reactions to specific foods, but only 1% had confirmed food allergies.^[16] According to Sicherer, both atopic dermatitis and food allergy are, in the majority of individuals, transitory conditions that improve with increasing age.^[17]

It is important to determine the severity of atopic dermatitis for evaluation of disease improvement after and during therapy. Scoring of the severity of atopic dermatitis is demanded in clinical trials. The ETFAD has developed the SCORAD index to create a consensus on assessment methods for atopic dermatitis so that study results of different trials can be compared.^[18]

To evaluate the effect of the diagnostic hypoallergenic diet we calculated the SCORAD index at the beginning and at the end of this diet in all included 149 patients. This diet was recommended for 3 weeks and was clearly explained to the patient at the beginning of the study.

Patients were asked to record the symptoms of atopic dermatitis (the extent of involved skin, itching, sleep disorder, etc.) and any other health problems in special forms. In 119 (79.8%) patients there was improvement of atopic dermatitis, as indicated by the decrease of SCORAD. In 6 of these patients, the decrease of SCORAD was only by 1 point, while in 113 patients (75%) the decrease of SCORAD was by more than 1 point. The average level of the SCORAD decrease was 7.7 points. Worsening of atopic dermatitis was recorded during this diet in three patients, with increase of SCORAD by 3 points in all three cases. No changes in the severity of atopic dermatitis during this diet were recorded in another 27 patients, with the level of SCORAD at the beginning and at the end of this diet being the same.

Before the beginning of the diet the majority of patients in our study suffered from the moderate form of atopic dermatitis (97 patients), 32 from the mild form, and 20 from the severe form of the disease. At the end of the diet, improvement was recorded in the 20 patients with the severe form of atopic dermatitis, with only 7 of these 20 patients continuing to have severe disease; the SCORAD index was about 45 points in these patients at the end of 3 weeks, indicating a moderate form of atopic dermatitis. Although the average decrease in SCORAD (by 7.7 points) was not very marked from the clinical point of view, most of the patients evaluated this diet as having a favorable effect. The majority of the patients indicated that pruritus of the skin was diminished and that they could sleep better.

On the basis of our results we can conclude that introduction of the diagnostic hypoallergenic diet can serve as a temporary medical solution in adolescents and adult patients suffering from moderate and severe forms of atopic dermatitis.

After 3 weeks of the diagnostic hypoallergenic diet the patients were allowed to introduce the suspected food in their meals and educated about the performance of challenge tests with the probable food allergen. They were informed about the possibility of cross-allergy with pollen and about the risk associated with consuming meals containing aromatic additives and histaminoliberators. All patients were recommended an additive-free diet, with a low content of biogenic amines. Patients with chronic urticaria or atopic dermatitis may suffer from intolerance to histamine. A diet with a low content of biogenic amines may improve the condition of these patients. All patients included in this study

evaluated this diet as having a positive effect on their symptoms.

Because of the uncertainties regarding the benefits and harms of dietary exclusion in people with atopic dermatitis, Bath-Hextall *et al.*[19] conducted a systematic review of all relevant randomized controlled trials. They found some evidence to support the use of an egg-free diet in infants with suspected egg allergy and positive specific IgE to eggs in their blood. Only two of the 11 included studies tested for food allergy,[20,21] but those studies dealt with comparisons of two different forms of exclusion diets rather than a comparison of an exclusion diet vs a normal diet and therefore have not contributed to the question of whether any form of exclusion diet is helpful in such people. The other studies included unselected people with atopic dermatitis did not find any evidence of benefit for exclusion diets. Elimination diets can be difficult to follow. The studies reported in the Bath-Hextal *et al.* review[19] were performed in different populations, with only one study presenting data on the severity of atopic dermatitis. The clinical importance of the small changes in severity scores obtained in many studies is unknown. Although diets excluding foods such as cow's milk are commonly advised, there is little evidence in favor of their benefit in unselected people with atopic dermatitis.[19]

Future studies should be large enough to answer the questions posed, and should be reported according to Consolidated Standards of Reporting Trials (CONSORT) guidelines.[22] Commonsense suggests that food exclusion studies should be done on people with history suggestive of food allergy, and positive results should be confirmed by appropriate allergy testing or challenge tests. A distinction should be made between young children and adolescents and adults because food allergy in children tends to improve over time. Disease severity should be measured using valid instruments and should include quality-of-life assessments and patient-centered outcomes that are easy to interpret clinically. Wherever possible, long-term (>6 months) outcomes should also be recorded in such studies.

Conclusion

On the basis of our results we recommend the introduction of this diagnostic hypoallergenic diet as a temporary medical solution in patients suffering from moderate or severe atopic dermatitis. This diet can serve as an important diagnostic test in the workup of food allergy.

What is new?

The diagnostic hypoallergenic diet can serve as a temporary medical solution in patients suffering from moderate or severe atopic dermatitis.

Footnotes

Source of Support: Nil

Conflict of Interest: Nil.

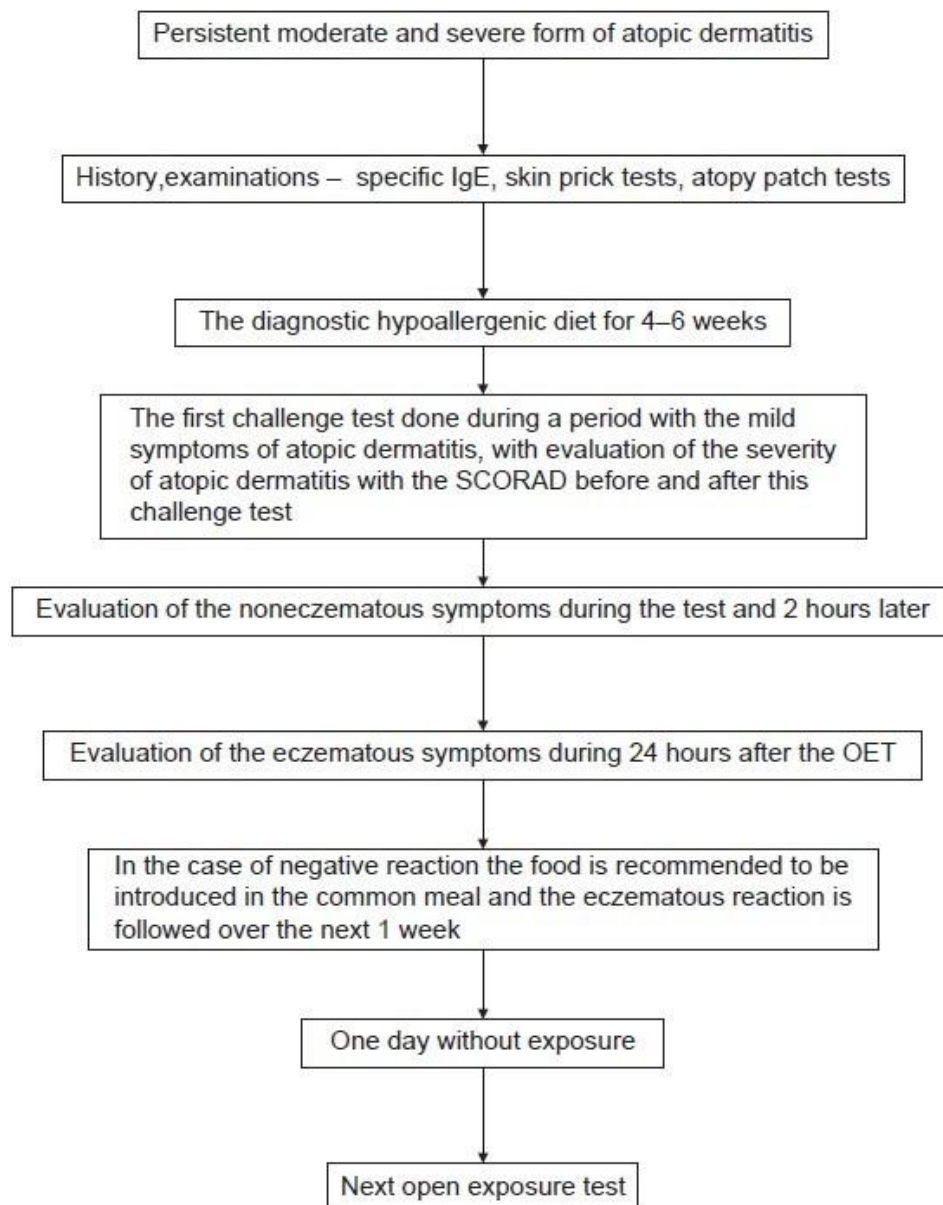
References

1. Sampson HA. Update on food allergy. *J Allergy Clin Immunol.* 2004;113:805–19. [PubMed: 15131561]
2. Oranje A, De Waard-van der Spek F. Atopic dermatitis and diet. *J Eur Acad Dermatol Venereol.* 2000;14:437–8. [PubMed: 11444260]
3. David TJ, Patel L, Ewing CI, Stanton RH. Dietary factors in established atopic dermatitis. In: Williams H, editor. *The epidemiology, causes and prevention of atopic dermatitis.* Cambridge: Cambridge University Press; 2000. pp. 193–201.
4. Baena-Cagnani C, Teijeiro A. Role of food allergy in asthma in childhood. *Curr Opin Allergy Clin Immunol.* 2001;1:145–9. [PubMed: 11964682]
5. Sampson H. The immunopathogenic role of food hypersensitivity in atopic dermatitis. *Acta Derm Venereol.* 1992;176:34–7.
6. David TJ, Waddington E, Stanton R. Nutritional hazards of elimination diets in children with atopic

- dermatitis. *Arch Dis Child*. 1984;59:323–5. [PMCID: PMC1628678] [PubMed: 6721557]
7. Devlin J, Stanton RHJ, David TJ. Calcium intake and cows' milk free diets. *Arch Dis Child*. 1989;64:1183–4. [PMCID: PMC1792518] [PubMed: 2782934]
8. Turjanmaa K. The role of atopy patch tests in the diagnosis of food allergy in atopic dermatitis. *Curr Opin Allergy Clin Immunol*. 2005;5:425–8. [PubMed: 16131918]
9. Kunz B, Oranje AP, Labréze L, Stalder JF, Ring J, Taieb A. Clinical validation and guidelines for the SCORAD index: consensus report of the European task Force on Atopic Dermatitis. *Dermatology*. 1997;195:10–9. [PubMed: 9267730]
10. Hanifin J, Rajka G. Diagnostic features of atopic dermatitis. *Acta Derm Venereol*. 1980;60:44–7.
11. Worth A, Shaikh A. Food allergy and atopic dermatitis. *Curr Opin Allergy and Clin Immunol*. 2010;10:226–30. [PubMed: 20375880]
12. Rancé F, Boguniewicz M, Lau S. New visions for atopic dermatitis: An iPAC summary and future trends. *Pediatr Allergy Immunol*. 2008;19(Suppl 19):17–25. [PubMed: 18665960]
13. Rancé F. Food allergy in children suffering from atopic dermatitis. *Pediatr Allergy Immunol*. 2008;19:279–84. [PubMed: 18397414]
14. Werfel T, Ballmer-Weber B, Eigenmann PA, Niggemann B, Rancé F, Turjanmaa K, et al. Eczematous reactions to food in atopic dermatitis: Position paper of the EAACI and GA2LEN. *Allergy*. 2007;62:723–8. [PubMed: 17573718]
15. Williams JR, Burr ML, Williams HC. Factors influencing atopic dermatitis - A questionnaire survey of schoolchildren's perceptions. *Br J Dermatol*. 2004;150:1154–61. [PubMed: 15214903]
16. Young E, Stoneham MD, Peetruckevitch A, Barton J, Rona R. A population study of food intolerance. *Lancet*. 1994;343:1127–40. [PubMed: 7910231]
17. Sicherer SH, Sampson HA. Food hypersensitivity and atopic dermatitis: Pathophysiology, epidemiology, diagnosis and management. *J Allergy Clin Immunol*. 1999;104:114–22.
18. Oranje AP, Glazenburg EJ, Wolkerstorfer A, De Waard -van der Spek FB. Practical issues on interpretation of scoring atopic dermatitis: the SCORAD index, objective SCORAD and three-item severity score. *Br J Dermatol*. 2007;157:645–8. [PubMed: 17714568]
19. Bath-Hextall F, Delamere FM, Williams HC. Dietary exclusions for improving established atopic dermatitis in adults and children: systemic review. *Allergy*. 2009;64:258–64. [PubMed: 19178405]
20. Niggemann B, Binder C, Dupont C, Hadji S, Arvola T, Isolauri E. Prospective, controlled, multi-center study on the effect of an amino-acid-based formula in infants with cow's milk allergy/intolerance and atopic dermatitis. *Pediatr Allergy Immunol*. 2001;12:78–82. [PubMed: 11338290]
21. Isolauri E, Sutas Y, Makinen-Kiljunen S, Oja S, Isosomppi R, Turjanmaa K. Efficacy and safety of hydrolyzed cow milk and amino acid-derived formulas in infants with cow milk allergy. *J Pediatr*. 1995;127:550–7. [PubMed: 7562275]
22. Moher D, Schulz KF, Altman DG, Lepage L. The CONSORT statement: Revised recommendations for improving the quality of reports of parallel group randomised trials. *Lancet*. 2001;357:1191–4. [PubMed: 11323066]

Figures and Tables

Figure 1



Diagnostic algorithm for the identification of food allergy in atopic dermatitis

Table 1

Total no. of patients	149
Average age	26.2 (SD: 9.5 years); minimum age 14, maximum age 63 years
Sex	
Male	41
Female	108
SCORAD I	32.9 (SD: 14.11)
SCORAD II	25.2 (SD: 9.99)
No. of patients suffering from asthma	57
No. of patients suffering from perennial rhinitis	52
No. of patients suffering from seasonal rhinitis	57
No. of patients with positive family history	50
No. of patients with the onset of atopic dermatitis before 5 years of age	114

Patient older than 14 years of age suffering from atopic dermatitis - characteristics

Table 2

The severity of AE	Number of patients at the beginning of the diet (%)	The mean value (SD) of SCORAD at the beginning of the diet	Number of patients at the end of the diet (%)	The mean value (SD) of SCORAD at the end of the diet
Mild	32	32.9 (SD: 14.11)	50 (33)	25.2 (SD: 9.99)
Moderate	97 (65)		92 (62)	
Severe	20 (13)		7 (5)	
	149		149	

Patients categorized according the severity of atopic dermatitis at the beginning of the diet and at the end of the diet (with the mean SCORAD)

Table 3

Number of patients (%)	Change in SCORAD	
6 (4)	Decrease by about 1 point	The average decrease of SCORAD is 7.7 points in 119 patients (80%)
113 (76)	Decrease by more than 1 point	
3 (2)	Increase by 3 points	
27 (18)	No changes	
149	Average decrease: 7.7 points	

SCORAD at the end of the diet

Articles from Indian Journal of Dermatology are provided here courtesy of **Medknow Publications**