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Hypoallergenic diet can influence the severity of atopic dermatitis

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Abstract

Aim: To evaluate with SCORAD system the contribution of the diagnostic hypoallergenic diet on the severity of atopic dermatitis and especially on the the intensity criteria and subjective parametersin patients over 14 years of age.

Materials and Methods: The diagnostichypoallergenic diet was recommended for the period of 3 weeks. Severity of eczema was scored in agreement with SCORAD score, and especially the intensity criteria (erythema, edema, crusting, excoriations, lichenifications, dryness) and subjective parameters (pruritus, sleeplessness) were evaluated at the beginning and at the end of this diet.

Results: One hundred and forty-eight patients suffering from atopic dermatitis were included in the study: 107 women and 41 men with the average age of 26.03 (s.d. 9.6 years), min. 14 max. 63 years. In the end of 3 weeks diagnostic hypoallergenic diet there was a statistically significant reduction in severity of sleepless and pruritus and in all of the intensity criteria except of lichenification.

Conclusion: The diagnostic hypoallergenic diet can improve the intensity criteria and subjective parameters of atopic dermatitis evaluated in SCORAD, but not the lichenification. We recommend to introduce this diet before a challenge tests and as a temporary medical arrangement in patients suffering from moderate or severe form of atopic dermatitis.

Keywords: Atopic dermatitis, crusting, diagnostic hypoallergenic diet, dryness, erythema, excoriations, lichenifications, edema, SCORAD, sleeplessness, pruritus

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What was known? Food is closely associated with the pathogenesis of atopic dermatitis. The importance of food allergy in children was confirmed by extensive studies. The role of food allergy as an triggering factor in older children and adult patients suffering from atopic dermatitis remains controversial.

► Introduction



The role of food allergy in atopic dermatitis has been the biggest controversy in dermatology. However, many food reactions in people with atopic dermatitis may not necessarily be mediated through immune reactions. [1] Adverse food reactions are generally divided on a basis of the underlying pathophysiological changes that produced the reaction as food allergy, food intolerance, pharmacological reactions, food poisoning and toxic reactions. Although adverse reactions to foods are common, only 2-4% of these food adverse reactions can be attributed to reproducible, immunoglobulin E-mediated food allergy. [2],[3] There is a vast amount of literature claiming that dietary elimination causes improvement of atopic dermatitis in some cases. However, much of the evidence fails to withstand close scrutiny. [1] According to the EACI Position paper, the introduction of a diagnostic hypoallergenic diet over a period of at least 3 weeks can be helpful in severe atopic dermatitis. [4] The European Task Force on Atopic Dermatitis has developed the SCORAD (SCORing AD) index to create a consensus on assessment methods for atopic dermatitis, so that study results of different trials can be compared. [5]

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► The Aim



To evaluate with SCORAD system the contribution of the diagnostic hypoallergenic diet on the intensity criteria and subjective parameters in patients over 14 years of age.

► Materials and Methods



Patients

Patients over 14 years of age with atopic dermatitis 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 Hanifin-Rajka criteria. [6]

All included patients signed the informed consent with the study and agreement of local Ethics committee was given to this study.

Examinations

Complete dermatological and allergological examination was performed in all included patients.

The detailed personal history of possible food allergy was taken in all included patients.

Only patients with the suspicion of food allergy or of food intolerance (according to their history) were included in the study.

Scoring of atopic dermatitis

The diagnosis of atopic dermatitis was made with the Hanifin-Rajka criteria [6] at the Department of Dermatology and Venereology, Faculty Hospital and Medical Faculty of Charles University, Hradec Králové, Czech Republic.

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substantial, because this difference is 7.7 points ($P = 0.00001$)

The evaluation of the intensity items

Erythema

The severity of erythema is recorded in [Table 2]. At the beginning of the diet 126 patients suffered from mild erythema and 22 from moderate or strong erythema. At the end of the diet, 138 suffered from mild and 10 from moderate or strong erythema.

Table 2: Erythema

Severity	Number of patients before diet (n)	Number of patients after diet (n)	P value
None or mild erythema	126 (99)	138 (99)	0.00001
Moderate or strong erythema	22 (17)	10 (7)	

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There was a statistically significant reduction in severity of erythema ($P = 0.0027$).

Edema

The severity of edema is recorded in [Table 3]. Altogether, at the beginning of the diet 75 patients suffered from no-edema and 73 from moderate or strong edema. At the end of the diet, 98 suffered from no-edema and 50 from moderate or strong edema.

Table 3: Edema

Severity	Number of patients before diet (n)	Number of patients after diet (n)	P value
No-edema	75 (60)	98 (73)	0.00001
Moderate or strong edema	73 (59)	50 (37)	

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There was a statistically significant reduction in severity of edema ($P = 0.00001$).

Crusting

The severity of crusting is recorded in [Table 4]. Altogether, at the beginning of the diet 82 patients suffered from no-crusting, 55 from mild crusting and 11 from moderate crusting. At the end of the diet, 103 suffered from none crusting, 37 from mild and 8 from moderate crusting.

Table 4: Crusting

Severity	Number of patients before diet (n)	Number of patients after diet (n)	P value
None	82 (64)	103 (77)	0.000275
Mild	55 (43)	37 (28)	
Moderate crusting	11 (9)	8 (6)	

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There was a statistically significant reduction in severity of crusting ($P = 0.000275$).

Excoriations

The severity of lichenification is recorded in [Table 5]. At the beginning of the diet 41 patients suffered from no-excoriations, 64 from mild, 35 from moderate and 8 from strong excoriations. At the end of the diet, 64 suffered from no-excoriations, 63 from mild, 21 from moderate excoriations and no patient suffered from strong excoriations.

Table 5: Excoriations

Severity	Number of patients before diet (n)	Number of patients after diet (n)	P value
None	41 (32)	64 (48)	0.00001
Mild	64 (50)	63 (47)	
Moderate or strong	35 (27)	21 (16)	

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There was a statistically significant reduction in severity of crusting ($P = 0.0000001$).

Lichenification

The severity of lichenification is recorded in [Table 6]. Altogether, at the beginning of the diet 13 patients suffered from none lichenification, 73 from mild and 62 from moderate or strong lichenification. At the end of the diet, 11 suffered from no-lichenification, 74 from mild and 63 from moderate or strong lichenification.

Table 6: Lichenification

Severity	Number of patients before diet (n)	Number of patients after diet (n)	P value
None	13 (10)	11 (8)	0.112
Mild	73 (57)	74 (55)	
Moderate or strong	62 (48)	63 (47)	

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There was not any statistically significant reduction in severity of lichenification ($P = 0.843$).

Dryness

The severity of dryness is recorded in [Table 7]. At the beginning of the diet four patients suffered from none dryness, 39 from mild and 105 from moderate or strong dryness. At the end of the diet, five patients suffered from no-dryness, 66 from mild and 78 from moderate or strong dryness.

Table 7: Dryness

Severity (points)	Number of patients before diet (n)	Number of patients after diet (n)	P value
0	4 (3.7)	5 (3.7)	0.0001
1	39 (36.0)	66 (48.0)	
2-10	105 (96.3)	78 (56.3)	

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There was a statistically significant reduction in severity of dryness ($P = 0.00001$).

The evaluation of the subjective parameters

Sleeplessness

The sleeplessness is recorded in [Table 8].

Table 8: Sleeplessness

Severity (points)	Number of patients before diet (n)	Number of patients after diet (n)	P value
0	61 (55.5)	80 (57.8)	0.02
1	46 (41.8)	40 (28.8)	
2-8	26 (23.7)	20 (14.4)	

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At the beginning of the diet 61 patients evaluated sleeplessness with 0 point, 46 with 1 point, 26 with 2 points and 15 with 3-8 points. At the end of the diet, 80 patients evaluated sleeplessness with 0 point, 40 with 1 point, 19 with 2 points, 9 with 3-8 points.

There was a statistically significant improvement in sleeplessness ($P = 0.02$).

Pruritus

The severity of pruritus is recorded in [Table 9]. At the beginning of the diet 11 patients evaluated the severity of pruritus with 0 or 1 point, 45 patients with 2 points and 92 patients with 3-10 points. At the end of the diet 75 patients evaluated the severity of pruritus with 0 or 1 point, 38 with 2 points and 34 with 3-10 points. There was a statistically significant improvement in pruritus ($P = 0.00001$).

Table 9: Pruritus

Severity (points)	Number of patients before diet (n)	Number of patients after diet (n)	P value
0-1	56 (50.9)	75 (53.9)	0.0001
2	45 (40.9)	38 (27.1)	
3-10	92 (83.2)	34 (24.0)	

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Statistics



We used transition tables. The same classifications were used for both columns and rows. Each patient falls in a row according to the classification at the beginning of the diet. A patient falls in a column depending on the classification at the end of the diet. It follows the entries on the diagonal contain the numbers of patients with unchanged classifications. The row sums are the subtotals of patients at the beginning of the diet, the column sums would mean the subtotals of patients at the end of the diet. The frequencies at the beginning and at the end may not be effected by the diet. This is the null hypothesis for the Stuart test as a generalization of the better known McNemar test.

In some cases some entries of tables would be too small and the use of the Stuart test would not be legitimate. To correct this problem we used collapsing whenever the entries were small, such as zeroes or ones. We present the P value of the Stuart test. If the $P < 0.05$, we reject the null hypothesis there is no change caused by the diet.

Discussion



At our study the diagnostic hypoallergenic diet was recommended to the patients with atopic dermatitis before the food challenge tests in the diagnostic work-up of food allergy. Patients included in this study suffered from severe and moderate form of atopic dermatitis; patients with mild form were included only in suspicion to have food

adverse reactions or food allergy. Although the diet was strict, the amount of recommended food was not limited and patients did not suffer from food insufficiency. We hypothesized that food allergens may act as one of triggers and maintaining the clinical manifestations of atopic dermatitis and hypoallergenic diet can significantly reduce the disease activity. By its design, the present study is an open and uncontrolled one and other triggers had not been taken into consideration.

To the evaluation of the diagnostic hypoallergenic diet we used SCORAD at the beginning of this diet and at then at the end of this diet in all included 148 patients. This diet was recommended for the time of 3 weeks.

Nevertheless this diet was personally discussed with each patient included in the study at the beginning of the diet and during this diet. Patients recorded the symptoms of atopic dermatitis (the extent of involved skin, itching, sleep disorder) and potential other health problems in special tables and were checked by dermatologist at the beginning of the diet and at the end of the diet.

In 148 patients diagnosed with atopic dermatitis by following specific dietary eleminations for 3 weeks statistically significant lowering of erythema, edema, crusting and excoriations was recorded. No statistically significant reduction was recorded in lichenification. In evaluation of subjective parameters, the statistically significant improvement was seen in pruritus and sleeplessness at our study. This diet was recommended as additive-free diet and with low content of biogenic amines. Patients eliminated fresh fruit, vegetables, soy and nuts, which may act as cross allergens. At the end of the diet, all patients were individually informed about introducing of suspected food in their meal and about performing of challenge tests with suspected food allergen. In controlled group of 43 patients suffering from atopic dermatitis, who were not on this diet in the period of 3 weeks, the mild increase of SCORAD score was recorded.

In one study about 45% of adult patients with atopic dermatitis syndrome and birch pollen allergy were found to have worsening of their eczema within 48 hours of ingesting Bet v1-containing foods, even in the absence of noticeable immediate oral symptoms. [\[7\]](#)

Regarding basic foods as wheat and cow milk, studies dealing with this allergy in adult patients suffering from atopic dermatitis are rare and the significance of food allergy regarding the course of atopic dermatitis in adolescents and adult patients may be underestimated. [\[8\]](#)

In another study, [\[9\]](#) specific dietary elimination for 3 weeks was recommended in patients diagnosed with atopic dermatitis. The study group comprised of 100 children and their severity of itching, surface area of involvement, and SCORAD index were measured. Selected patients were advised to strictly adhere to a diet excluding milk and milk products, all kinds of nuts and nut-containing foods, egg and egg-containing foods, seafish and prawns, brinjal and soyabean for a period of 3 weeks. Instead of these avoided items, the food items to be included freely to maintain proper nutrition were dal and dal products, rohu fish, chicken, and fruits. All the preintervention parameters were measured again after 3 weeks. There was a statistically significant reduction in severity scores after dietary elimination alone. Authors concluded this study with the recommendation, that dietary elimination can help to alleviate symptoms and signs in a subset of infants and children with atopic dermatitis. [\[9\]](#)

It is important to realise, that other numerous trigger factors for atopic dermatitis have been identified, including inhalable respiratory allergens, irritative substances and infectious micro-organism such as *Staphylococcus aureus*. Psychogenic and climatic factors may also cause the exacerbation of atopic dermatitis.

Our results show, that food may have an influence on the severity of atopic dermatitis, especially on the intensity items, pruritus and sleeplessness. This short-term diagnostic diet should serve only as a temporary arrangements before challenge tests in patients with severe and moderate form of atopic dermatitis. If the condition of atopic dermatitis remains stable or decreases during diagnostic elimination diet within 3-4 weeks, it is unlikely that food allergy is a relevant trigger factor of atopic dermatitis and open food challenges are not necessary. On the other hand, long-term diet in patients suffering from atopic dermatitis may have serious consequences and may lead to deficient in calories, protein or minerals such as calcium. [\[10\],\[11\]](#) Avoidance of multiple foods is potentially hazardous and requires continued pediatric and dietary supervision. [\[10\]](#)

➤ Conclusions



On the basis of our results we recommend to introduce this diagnostic hypoallergenic diet as a temporary medical arrangement in patients suffering from moderate or severe form of atopic dermatitis before food challenge tests.

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What is new? The aim of our work is the evaluation, if the diagnostic hypoallergenic diet can influence the severity of atopic dermatitis. According to our results, this diet can temper the severity of atopic dermatitis, especially the intensity items, pruritus and sleeplessness.

Tables

[\[Table 1\]](#), [\[Table 2\]](#), [\[Table 3\]](#), [\[Table 4\]](#), [\[Table 5\]](#), [\[Table 6\]](#), [\[Table 7\]](#), [\[Table 8\]](#), [\[Table 9\]](#)

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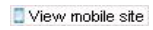
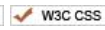
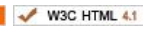
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