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Food Hypersensitivity in Patients Over 14 Years of Age Suffering from Atopic Dermatitis

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Abstract

Background:

Patients suffering from atopic dermatitis often describe food hypersensitivity. Rising prevalence of food hypersensitivity and severe allergic reactions to foods have been reported, but the data are scarce.

Aims and Objectives:

Evaluation of food hypersensitivity reactions in patients suffering from atopic dermatitis.

Materials and Methods:

The dermatological examination was performed in patients of age 14 years and above and the detailed history was taken concerning the food hypersensitivity.

Results:

A total of 228 patients were examined-72 men, 156 women, average age 26.2 (SD 9.5) years. The food hypersensitivity reactions were recorded in 196 patients from 228 (86%), no reactions were recorded in 32 patients (24%). Foods with the most often recorded reactions are: Nuts (in 35% of patients), tomatoes (in 20%), and kiwi (in 17, 5%), apples and spices (in 16%), tangerines and oranges (in 15%), capsicum (in 13%), fishes (in 12%), celery (in 9%), and chocolate (in 7%).

Conclusion:

Food hypersensitivity reactions are recorded in 86% of patients suffering from atopic dermatitis. Nuts, tomatoes, and pollen-associated foods play a role in the majority of patients suffering from atopic dermatitis.

Keywords: *Atopic dermatitis, food allergens, food hypersensitivity*

Introduction

What was known?

1. Food hypersensitivity is commonly suspected, especially, among adults with atopic diseases.

2. Rising prevalence of food hypersensitivity and severe allergic reactions to foods have been reported, but the data are scarce. It is stressed that more data are needed regarding patient groups at risk for food hypersensitivity and symptoms and foods responsible for these reactions.

Atopic dermatitis is a chronic, intermittent, inflammatory, genetically predisposed skin disease characterized by severe pruritus and xerosis. A number of environmental factors have been implicated in its pathogenesis. This disease is one of the earliest manifestations of atopy with the highest incidence during the first 3 months of life,[1] and constitutes, together with allergic rhinitis and asthma bronchiale, the triad of atopic diseases. The prevalence of atopic dermatitis is about 10-20% in children and 1-3% in adults.[2]

The presence of atopic disorders implies an increased risk of food allergy representing only a small percentage of all food hypersensitivity reactions. The term food allergy is used to describe clinical symptoms that are mediated by the immune system while non-allergic food hypersensitivity describes those which are not.[3] The term food hypersensitivity represents the umbrella term for both reaction patterns.

According to some studies, food-induced hypersensitivity symptoms are far more frequently perceived (20-30%) than recognized by the medical profession.[4,5,6]

Materials and Methods

In the period from January 2008 to January 2012, 228 patients suffering from atopic dermatitis in age 14 years or older, were examined - 72 men, 156 women, average age 26.2 (SD 9.5) years, average SCORAD (Scoring Index of Atopic Dermatitis affected skin area, intensity criteria and subjective parameters) 32.9 points (SD 14.1) at the Department of Dermatology and Venereology. The diagnosis of atopic dermatitis was made with the Hanifin-Rajka criteria.[7] The complete dermatological examination was performed and these patients were personally asked to describe all their food hypersensitivity reactions.

The patients answered if they suffered from immediate or late food hypersensitivity including oral allergy syndrome, gastrointestinal problems, the occurrence of skin problems, and respiratory problems. The most frequent food allergens were mentioned and patients answered if they had a suspicion of food hypersensitivity, and other foods they suspected a having potential to cause hypersensitivity.

The answers concerning the possible food hypersensitivity reactions reflect the patient's history and were not based on the results of examinations such as specific IgE, skin prick tests, or challenge tests.

The results of examinations with the patient's answers were collected and processed by the dermatologist.

Results

A total of 228 patients were examined, 76 men, and 156 women with the average age 26.2 years (SD 9.5 years) and with the average SCORAD 32.9 SD 14.1 points.

A total of 196 patients (86%) from 228 described the food hypersensitivity reactions, no reactions were recorded in 32 patients (14%). The characteristic of patients is shown in [Table 1](#).

The food hypersensitivity reactions are recorded after the ingestion of nuts in 79 patients (35%), tomatoes in 47 patients (20%), kiwi in 40 patients (17%), apples in 38 patients (16%), spices in 38 patients (16%), tangerines in 35 patients (15%), oranges in 35 patients (15%), capsidum in 30 patients (13%), fish in 27 patients (12%), celery in 20 patients (9%), chocolate in 15 patients (7%), carrots in 13 patients (6%), Sesame seeds in 10 patients (4%), milk in nine patients, almond in nine patients and cherry in nine patients (3.9%), of honey in eight patients and strawberry in eight patients (3,5%), after ingestion of potatoes in seven and wine in seven patients (6%), after ingestion of apricots in six patients, garlic in six patients, poppy-seeds in six patients, cacao in six patients, pine-apple in six patients, banana in six patients and egg in six patients (2.6%), after ingestion of gherkin in three patients, cucumber in three patients, flavored soda water in three patients, pear in three patients, pulses in three patients and beer in three patients (1.3%), after ingestion of chees in two patients, beef in two patients, gooseberry in two patients, currants in two patients, melon in two patients, spinach in two patients, plum in two patients, rice in two patients, kohlrabi in two patients, ketchup in two patients, mustard in two patients (1%) and after ingestion of parsley, chamomile,

cauliflower, cafe, chicken, sausages, rye flour in one patient each (0.4%) for every one of the aforementioned items (0.4%).

Most subjects reported reactions to a single food (47 patients, 20%), to two foods by 40 patients (17.5%), to three foods by 44 patients (19%), to four foods by 19 patients (8%), to five foods by 16 patients (7%), to six foods by 19 patients (8%), and to seven foods by 11 patients (5%).

These symptoms of food hypersensitivity were mentioned: Oral allergy syndrome in 142 patients (62%), pruritus in 98 patients (42%), worsening of atopic dermatitis in 65 patients (28%), urticaria in 20 patients (9%), gastrointestinal symptoms in 25 patients (11%), rhinitis in 21 patients (9%), respiratory problems in 10 patients (4%), and contact allergic reaction in 10 patients (4%) – [Table 2](#).

Discussion

The study group represents patients suffering from atopic dermatitis older than 14 years of age. The food hypersensitivity reactions were recorded in 86% of patients, the majority of them as the early reactions and these reactions have a high diagnostic importance because the early symptoms after ingestion have a clear diagnostic connection with the ingested foods. The majority of these patients eliminated these foods but they recorded that after a casual ingestion the reactions were reproducible.

Most frequent food hypersensitivity reactions were described after the ingestion of nuts and especially after peanuts with the symptom of oral allergy syndrome.[8] Peanut allergy represents an increasing problem, involving approximately one in 150-200 subjects. The mean age at detection is decreasing and even 2-3-year-old children are being affected. A typical at-risk subject is an atopic individual with heightened risk for atopic dermatitis and/or other food allergies.[9] Tomatoes were mentioned as a cause of oral allergy syndrome and pruritus in 47 patients (20%). There is an increasing consumption of tomatoes worldwide: Fresh in salads, cooked in household sauces, or industrially processed. Although, many tomato allergens have been identified, there is no information in the literature on the allergenic components found in commercial tomato products. In fresh tomato, different lipid transfer proteins (LTP) isoforms are present and allergenic. Industrial tomato derivatives still contain LTP, thus presenting a problem for lipid transfer protein allergic patients.[10] Fruits (in particular acidic fruits such as kiwi, oranges, or lemons) were frequently mentioned as causing symptoms of oral allergy syndrome, pruritus, worsening of eczema or gastrointestinal reaction. In patients allergic to fruit, multiple sensitizations to other vegetable products, whether from the same family or taxonomically unrelated, are frequent, although they do not always share the same clinical expression. Furthermore, more than 75% of these patients are allergic to pollen, the type of pollen varying in relation to the aerobiology of the area. The basis of these associations among vegetable foods and with pollens lies in the existence of IgE antibodies against “panallergens,” which determines cross-reactivity. Panallergens are proteins that are spread throughout the vegetable kingdom and are implicated in important biological functions (generally defense) and consequently their sequences and structures are highly conserved. The three best-known groups are allergens homologous to Bet v 1, profilins, and LTP. Allergens homologous to Bet v 1 (major birch pollen allergen) constitute a group of defense proteins (PR-10), with a molecular weight of 17 kDa, which behave as major allergens in patients from northern and central Europe with allergy to vegetables associated with birch pollen allergy. In these patients, the primary sensitization seems to be produced through the inhalation route on exposure to birch pollen. The symptomatology characteristically associated with sensitization to this family of allergens is oral allergy syndrome. Profilins are highly conserved proteins in eukaryotic organisms and are present in pollen and a wide variety of vegetable foods. They have a molecular weight of 14 kDa and present a high degree of structural homology as well as marked cross-reactivity among one another. The presence of anti-profilin IgE broadens the spectrum of sensitizations to vegetable foods detected through skin tests and/or *in vitro* tests but it is unclear whether it is connected with the clinical expression of food allergy.[11] The reactions (anaphylaxis) after poppy seeds were described as the most severe.

Food hypersensitivity reactions are generally divided on a basis of the underlying pathophysiologic changes that produce the reaction as (1) food allergy, (2) food intolerance, (3) pharmacologic reactions, (4) food poisoning, and (5) toxic reactions. Although, food hypersensitivity reactions are common, food allergy represents only a small percentage of all these reactions; only 2-4% of these reactions can be attributed to

reproducible, immunoglobulin E-mediated food allergy.[12,13] According to Sicherer,[14] food allergy, defined as an adverse immune response to food proteins, affects as many as 6% of young children and 3-4% of adults in westernized countries and the prevalence appears to be rising. The importance of food allergy in children with atopic dermatitis was confirmed by extensive studies.[15,16] The role of food allergy remains controversial and underestimated in older children and adult patients suffering from atopic dermatitis.[2] Results similar to those in our study were found in the Patel's study.[17] This study was carried out on all patients with food related symptoms attending a cutaneous allergy clinic. It was shown that while the reported prevalence of food allergy in adult patients with atopic dermatitis is low (10%), more than half of these will show immunological evidence of a food allergy which support the clinical history. Immediate symptoms were usual with nuts and tomatoes as the major allergens. According to Mattila[18] food hypersensitivity is commonly suspected, especially among adults with atopic diseases. In the study of Mattila,[18] 286 Finnish University students were examined; 87 of them without clinically confirmed atopic disease, the rest suffered with atopic dermatitis/or other atopic diseases. A thorough clinical examination was performed with a questionnaire specifying adverse events to foods. In the study by Mattila[18] food hypersensitivity were recorded in 172 subjects (60%), most frequently among subjects with atopic dermatitis and other atopic diseases. The authors[18] stressed that, more data are needed regarding patient groups at risk for food hypersensitivity and symptoms and foods responsible for the reactions. The Roehr's study[12] presents the data of the pediatric group (0-17 years) of a representative, randomly sampled, cross-sectional population – based survey studying 13,300 inhabitants of Berlin regarding food-related symptoms. They concluded that the perception of food related-symptoms is common among children and adolescents from the general population. Self-report could be confirmed in around 1 of 10 individuals, still resulting in 4.2% of proven clinical symptoms. However, most reactions were mild and mainly because of pollen-associated food allergy while non-allergic food hypersensitivity reactions were less common. Severe IgE-mediated food allergy was observed in individuals with pre-existing atopic disease. According to the results of Osterballe[19] rising prevalence of food hypersensitivity and severe allergic reactions to foods have been reported. This study estimated the prevalence of food hypersensitivity to the most common allergenic foods in an unselected population of young adults. They investigated a cohort of 1272 young adults 22 years of age by a questionnaire, skin prick test, and histamine release followed by oral challenge to the most common allergenic foods. Food hypersensitivity was divided into primary and secondary, primary food hypersensitivity was defined as being independent of pollen sensitization whereas the secondary one was defined as a reaction to pollen related fruits and vegetables in pollen allergic patients. The primary food hypersensitivity was reported by 19.6% and the secondary one by 16.7% of the participants. Confirmed primary food hypersensitivity by oral challenge was 1.7%. In primary food hypersensitivity, the most common allergenic food was peanuts (0.6%) followed by additives (0.5%), shrimps (0.2%), codfish (0.1%), cow's milk (0.1%), octopus (0.1%), and soy (0.1%). In secondary food hypersensitivity, kiwi allergy was reported by 7.8% of the participants followed by hazelnut (6.6%), pineapple (4.4%), apple (4.3%), orange (4.2%), tomato (3.8%), peach (3.0%), and nuts (2.7%). The aim of another Osterballe study[20] was to estimate the prevalence of food hypersensitivity to the most common allergenic foods in an unselected population of children and adults. In total, 698 cases of possible food hypersensitivity were recorded in 304 (16.6%) participants. The prevalence of food hypersensitivity confirmed by oral challenge was 2.3% in children at 3 years of age, 1% in children older than 3 years, and 3.2% in adults. The most common allergenic foods were hen's egg affecting 1.6% of the children 3 years old of age and peanuts in 0.4% of the adults. Of the adults, 0.2% was allergic to codfish, and 0.3% to shrimp whereas no challenges with codfish and shrimp were positive in children. The prevalence of clinical reactions to pollen-related foods in pollen-sensitized adults was estimated to be 32%. According to the Kanny's study,[21] food hypersensitivity is an important health problem for which epidemiologic studies are needed. They performed an epidemiologic survey in France to determine the prevalence, clinical pictures, allergens, and risk factors of food allergy. This study was conducted on 33,110 persons who answered a questionnaire addressed to a representative sample of the French population. The reported prevalence of food allergy is 3.5%. A total of 57% presented with atopic diseases. The most frequent allergens were 9% vegetables, 8% milk, 8% crustaceans, 5% fruit cross-reacting with latex, 4% egg, 3% tree nuts, and 1% peanut. Sensitization to pollen was significantly correlated with angioedema, asthma, rhinitis, and fruit allergy. The main manifestations of food allergy

were atopic dermatitis in subjects under 6 years of age, asthma in subjects between 4 years and 6 years of age, and anaphylactic shock in adults over 30 years of age. According to Roehre,[12] it is well known, that objective clinical symptoms can be reproduced in only a small proportion of subjective reports, probably because of a strong tendency of individuals to casually relate situations of the daily life with ingested foods. On the other hand, these recorded early symptoms at our study were reproducible and clearly described (oral allergy syndrome, urticaria, breathlessness, anaphylaxis, some gastrointestinal symptoms such as cramps). According to Godse and col[22] acute urticaria is more common in young adults and children and most often is caused by allergic reactions to foods. Sometimes patients seek confirmatory testing from a physician about a suspected food or drug trigger. Symptoms such as pruritus and worsening of atopic dermatitis do not always have a connection to ingested foods but patients may relate them to foods. Retrospective analyses by Niggeman and Breuer have shown that the patient's history of food related atopic dermatitis does not have a high diagnostic importance.[23] However, according to the Indian study,[24] 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, sea fish and prawns, brinjal and soyabean for a period of 3 weeks. Instead of these avoided items, the food items were dal and dal products, rohu fish, chicken, and fruits. There was a statistically significant reduction in severity scores after dietary elimination alone.

According to our results, food hypersensitivity reactions are common in patients suffering from atopic dermatitis and should not be underestimated. Patients with these reactions should be examined for evaluations, if they suffer from food allergy, food intolerance or from other kind of food hypersensitivity reactions.

Conclusion

Food hypersensitivity reactions are recorded in 86% of patients suffering from atopic dermatitis. These patients describe food hypersensitivity mostly after ingestion of nuts (35% of patients), with the oral allergy syndrome. The other foods with most often recorded reactions are tomatoes, kiwi and citrus.

What is new?

Suspected rising prevalence of food hypersensitivity in patients suffering from atopic dermatitis was confirmed in our study; the food hypersensitivity reactions were recorded in 86% of these patients. Foods with the most often recorded reactions are nuts, kiwi, tomatoes, and citrus.

Footnotes

Source of Support: This study was supported by financial support from Charles University

Conflict of Interest: Nil.

References

1. Bonifazi E, Meneghini CL. Atopic dermatitis in the first six months of life. *Acta Derm Venereol Suppl* (Stockh) 1989;144:20–2. [PubMed: 2529727]
2. Schultz-Larsen F, Hanifin J. Epidemiology of atopic dermatitis. *Immunol Allergy Clin North Am*. 2002;22:1–24.
3. Johansson SG, Hourihane JO, Bousquet J, Bruijnzeel-Koomen C, Dreborg S, Haahtela T, et al. A revised nomenclature for allergy. An EAACI position statement from the EAACI nomenclature task force. *Allergy*. 2001;56:813–24. [PubMed: 11551246]
4. Young E, Stoneham MD, Petruckevitch A, Barton J, Rona R. A population study of food intolerance. *Lancet*. 1994;343:1127–30. [PubMed: 7910231]
5. Høst A. Adverse reactions to foods: Epidemiology and risk factors. *Pediatr Allergy Immunol*. 1995;6:20–8. [PubMed: 9064061]

6. Sloan AE, Powers ME. A perspective on popular perceptions of adverse reactions to foods. *J Allergy Clin Immunol.* 1986;78:127–33. [PubMed: 3722639]
7. Hanifin J, Rajka G. Diagnostic features of atopic dermatitis. *Acta Derm Venereol.* 1980;(Suppl 92):44–7.
8. Moher D, Hopewell S, Schulz KF, Montori V, Gøtzsche PC, Devereaux PJ, et al. CONSORT 2010 explanation and elaboration: Updated guidelines for reporting parallel group randomised trials. *BMJ.* 2010;340:c869. [PMCID: PMC2844943] [PubMed: 20332511]
9. Sicherer SH. Clinical update on peanut allergy. *Ann Allergy Asthma Immunol.* 2002;88:350–61. [PubMed: 11991552]
10. Pravettoni V, Primavesi L, Farioli L, Brenna OV, Pompei C, Conti A, et al. Tomato allergy: Detection of IgE-binding lipid transfer proteins in tomato derivatives and in fresh tomato peel, pulp, and seeds. *J Agric Food Chem.* 2009;57:10749–54. [PubMed: 19919119]
11. Fernández Rivas M. Cross-reactivity between fruit and vegetables. *Allergol Immunopathol.* 2003;31:141–6.
12. Roehr CC, Edenharter G, Reimann S, Ehlers I, Worm M, Zuberbier T, et al. Food allergy and non-allergic food hypersensitivity in children and adolescents. *Clin Exp Allergy.* 2004;34:1534–41. [PubMed: 15479267]
13. Zuberbier T, Edenharter G, Worm M, Ehlers I, Reimann S, Hantke T, et al. Prevalence of adverse reactions to food in Germany-a population study. *Allergy.* 2004;59:338–45. [PubMed: 14982518]
14. Sicherer SH, Sampson HA. Food allergy: Recent advances in pathophysiology and treatment. *Annu Rev Med.* 2009;60:261–77. [PubMed: 18729729]
15. Sampson HA, Scanlon SM. Natural history of food hypersensitivity in children with atopic dermatitis. *J Pediatr.* 1989;115:23–7. [PubMed: 2738792]
16. Sampson HA. Jerome Glaser lectureship. The role of food allergy and mediator release in atopic dermatitis. *J Allergy Clin Immunol.* 1988;81:635–45. [PubMed: 3356844]
17. Patel T, Gawkrödger DJ. Food allergy in patients with eczema: Immediate symptoms are usual, with nuts and tomatoes the major allergens. *J Eur Acad Dermatol Venereol.* 2011;25:865–7. [PubMed: 21668512]
18. Mattila L, Kilpeläinen M, Terho EO, Koskenvuo M, Helenius H, Kalimo K. Food hypersensitivity among Finnish university students: Association with atopic diseases. *Clin Exp Allergy.* 2003;33:600–6. [PubMed: 12752588]
19. Osterballe M, Mortz CG, Hansen TK, Andersen KE, Bindslev-Jensen C. The prevalence of food hypersensitivity in young adults. *Pediatr Allergy Immunol.* 2009;20:686–92. [PubMed: 19594854]
20. Osterballe M, Hansen TK, Mortz CG, Høst A, Bindslev-Jensen C. The prevalence of food hypersensitivity in an unselected population of children and adults. *Pediatr Allergy Immunol.* 2005;16:567–73. [PubMed: 16238581]
21. Kanny G, Moneret-Vautrin DA, Flabbee J, Beaudouin E, Morisset M, Thevenin F. Population study of food allergy in France. *J Allergy Clin Immunol.* 2001;108:133–40. [PubMed: 11447395]
22. Godse KV, Zavar V, Krupashankar D, Girdhar M, Kandhari S, Dhar S, et al. Consensus statement on the management of urticaria. *Indian J Dermatol.* 2011;56:485–9. [PMCID: PMC3221204] [PubMed: 22121259]
23. Breuer K, Heratizadeh A, Wulf A, Baumann U, Constien A, Tetau D, et al. Late eczematous reactions to food in children with atopic dermatitis. *Clin Exp Allergy.* 2004;34:817–24. [PubMed: 15144477]
24. Dhar S, Malakar R, Banerjee R, Chakraborty S, Chakraborty J, Mukherjee S. An uncontrolled open pilot study to assess the role of dietary eliminations in reducing the severity of atopic dermatitis in infants

and children. Indian J Dermatol. 2009;54:183–5. [PMCID: PMC2807161] [PubMed: 20101317]

Figures and Tables

Table 1

Number of patients	228
Men	72
Women	156
Average age	26.2 (SD 9.5) years
Number of patients suffering from food hypersensitivity	196
Number of patients without food hypersensitivity	32

Characteristic of patients

Table 2

Symptoms	Number of patients from 228 (%)
Oral allergy syndrome	142 (62)
Pruritus	98 (43)
Worsening of atopic dermatitis	65 (28)
Gastrointestinal problems	25 (11)
Urticaria	20 (9)
Rhinitis	21 (9)
Breathlessness	10 (4)
Contact allergic reaction	10 (4)

The recorded symptoms of food hypersensitivity

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