

Food as an Allergen in the Etiology of Bronchial Asthma of Children in Turkey

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There is evidence that food can act as an antigen to stimulate antibody production in man. The reintroduction of a food can also cause a union between antibodies and antigens which may produce allergic reaction throughout the body. Theoretically almost all foods are capable of provoking an allergic reaction, but obviously those which are most potent antigenically, or are most eaten, are the most frequent offenders. Although food allergy is considered to be synonymous with gastro-intestinal allergy, any tissue of the body may participate in the allergic reaction.

There are a great many factors which play important parts in the etiology of infantile asthma. Pollens, mold spores, animal danders, house dust and bacteria are often common causes, but the role of food differs widely; some authors consider food allergy to be extremely rare, while others believe that food is a significant factor in the etiology of bronchospasms.

Rowe¹ in 1958 claimed that there may be a very high incidence of food allergy in older children, but a recent collaborative study² from the American Academy of Allergy shows that foods are rarely implicated in severe allergic disease, especially in childhood asthma.

The aim of this paper is to analyze the Turkish children with bronchial asthma seen in our allergy department, and to find out whether food is a cause of their asthma attacks.

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Results

All the 105 patients studied proved to be allergic to pollen and other inhalants, and all were already under hyposensitization treatment against these. The results of scratch skin testing with various foods such as meat, sea food, vegetables, fruit, cereals and milk, are listed separately in Tables 1-6. In 42 out of the 105 cases skin tests with these foods were found to be positive.

TABLE I

RESULTS OF SKIN TESTING WITH VEGETABLES ON ASTHMATIC PATIENTS

Vegetables	Number of patients tested	Results of Skin Testing				
		—	+	++	+++	++++
Carrots	105	102	2	1	—	—
Peas	105	97	5	2	1	—
Cabbage	105	95	6	2	2	—
Tomatoes	105	92	7	5	1	—
Spinach	105	98	6	1	—	—
Potato	105	85	9	6	4	1
Pepper	35	30	3	2	—	—
Eggplant	35	29	4	2	—	—
Green Beans	35	25	5	3	2	—
Vegetables (mixed)	105	95	7	2	1	—

TABLE II

RESULTS OF SKIN TESTING WITH SEA FOODS ON ASTHAMATIC PATIENTS

Sea foods	Number of patients tested	Results of skin testing				
		—	+	++	+++	++++
Oyster	105	89	13	3	—	—
Shrimp	105	94	9	2	—	—
Herring	105	81	12	7	5	—
Sardine	105	85	15	3	2	—
Lobster	105	80	20	3	2	—
Crab	105	97	6	2	—	—
Shellfish	70	55	6	4	4	1
Fish (mixed)	70	62	7	1	—	—

TABLE III
RESULTS OF SKIN TESTING WITH MEATS ON ASTHMATIC PATIENTS

Meats	Number of patients tested	Results of Skin testing				
		—	+	++	+++	++++
Lamb	105	104	1	—	—	—
Beef	105	101	2	2	—	—
Chicken	105	102	2	1	—	—
Eggs	105	80	19	3	2	1
Meats (mixed)	70	68	1	1	—	—

TABLE IV
RESULTS OF SKIN TESTING WITH CEREALS ON ASTHMATIC PATIENTS

Cereals	Number of patients tested	Results of skin testing				
		—	+	++	+++	++++
Rice	105	93	8	2	2	—
Beans	105	90	11	2	1	1
Wheat	105	97	5	2	1	—
Corn	105	92	8	4	1	—
Cereals (mixed)	80	62	6	11	1	—

TABLE V
RESULTS OF SKIN TESTING WITH FRUITS ON ASTHMATIC PATIENTS

Fruits	Number of patients tested	Results of skin testing				
		—	+	++	+++	++++
Strawberry	105	93	7	2	2	—
Apple	105	76	15	3	2	1
Banana	105	100	2	2	1	—
Orange	105	101	2	1	1	—
Apricot	35	30	3	2	—	—
Grape	35	33	1	1	—	—
Pear	35	35	—	—	—	—
Fruit (mixed)	70	60	6	2	1	1

TABLE VI
RESULTS OF SKIN TESTING WITH MILK AND MILK PRODUCTS
ON ASTHMATIC PATIENTS

Milk and Milk products	Number of pa- tients tested					
		—	+	++	+++	++++
Milk	105	83	19	2	1	—
Cheese	105	94	5	5	1	—

Sea foods appear to be the most allergenic of the skin tested foods. All the patients who had positive skin reactions had undergone provocation tests, in which we gave them a list including all the foods to which they reacted positively, and asked them to eat as much of these as possible. Table 7 shows their allergic reactions following this provocation.

TABLE VII
TYPE OF ALLERGIC REACTION FOLLOWING PROVOCATION
TEST

Patients	Allergic Symptoms
5	Urticaria
1	Colic + Urticaria
1	Colic + Rhinitis + Cough
2	Wheezing
3	Rhinitis + Cough

There were only two patients whose reactions could definitely be thought to be related to the ingestion of food, and these developed bronchospasms; the offending foods were thought to be egg and fish, however since no histologic studies were made it was difficult to evaluate these patients' rhinitis by clinical adjustment.

The patients who gave positive results on provocation for respiratory allergy symptoms, with their histories, skin testing results, the offending foods and type of allergic rhinitis are summarized in Table 8.

Discussion

There are two general types of allergic reaction to foods. The first is immediate hypersensitivity, in which the reaction appears as soon as the food is ingested. The common reactions are hives, eczema, gastro-

TABLE VIII
SUMMARY OF PATIENTS GIVING POSITIVE RESULTS TO PROVO-
CATION TEST

	History	Skin Testing	Provocation test	Offending foods	Type of allergic reactions
M. B.	+	+	+	Fish	Cough, noisy breathing bronchospasm
T. Ş.	+	+	+	Fish, cereal (corn)	Cough, urticaria
N. U.	—	+	+	Fish	Cough, rhinitis
O. K.	+	+	+	Fish, strawberry	Cough, urticaria, rhinitis
T. A.	+	+	+	Egg	Bronchospasm
F. G.	—	+	+	Potato	Colic, rhinitis, cough

intestinal symptoms, asthma and hay fever, but the majority consist of hives, urticaria or mild angioedema (Table 9). The second type of reaction appears later, and is classified as delayed hypersensitivity. Many hours, days or weeks may pass between the ingestion of the food and the onset of a reaction, and since it is accumulative, it can easily go undetected. Most clinical analyses which attempt to investigate the role of food are directed toward the former type of hypersensitivity.

TABLE IX
ALLERGIC REACTION FROM FOODS, DURING AND AFTER
INFANCY.

Under 2 years of age	Colic, diarrhea, atopic eczema, failure to thrive,
	Circumoral and circumanal contact dermatitis.
	Geographical tongue, asthma, perennial allergic rhinitis celiac syndrome.
	Infantile cortical hyperostosis ⁹
After infancy	Skin manifestations: Atopic eczema, urticaria
	Respiratory tract: Asthma, perennial allergic rhinitis
	Gastro-intestinal tract: Abdominal pain, diarrhea, nausea vomiting, migraine headache

Data provided by case histories and provocation tests are sometimes insufficient, and the results obtained by means of skin tests with food are thought to be inconsistent.

It is widely accepted that skin tests with food do not correlate as well with the symptoms as do skin tests with inhalants, but they may correlate

better in patients who show immediate demonstrable positive results following ingestion. Nevertheless, there are still allergists who believe that the use of skin tests is worthwhile.³ Apparently there is sometimes a smaller concentration of reagins in the skin than in the reaction tissue. It is also possible that sensitivity may result specifically from the digested product of the foods, i.e. the proteose or other split derivatives of protein, and not from undigested foods.

As a rule food sensitivity rarely remains for life, but shows a tendency to wane gradually, though fish and nut sensitivity may be an exception to this. The reason for long-term sensitivity to these is still unknown, though some chemical compound such as iodine or fatty acids may be the offending allergens.

Since food allergy decreases progressively with maturity, the incidence of it is not uniform, and has varied between 0.3 and 55 per cent in the literature.^{4 5} The reasons for this difference are as follows:

1. Inadvertent introduction of antibiotics via their administration to cattle and poultry into foods for human consumption;
2. Unexplained symptoms from food ingestion;
3. Food-colorings⁶ (such as coal-tar dyes, which are said to be the most potentially allergenic);
4. Food-preservatives and pesticides used both on growing plants and in animal feed, transmission of which to the human ingestor is subject to inspection;
5. Non-immunologic intolerance of food;
6. Bacterial and toxic ingestion with the food. In foods in which staphylococcus is propagated toxins are formed in large quantities;
7. Many foods have pharmacologic effects which operate in varying degrees on many people. The laxative effect of prunes or soy bean milks act as a gastric irritant, causing gastro-intestinal allergy-like symptoms;
8. In some cases the improper synthesis of foods may give symptoms similar to gastro-intestinal allergy. Among these galactosemia and other food-induced diseases, easily confused with allergic disorders, are breast-milk intoxication,⁷ goat's milk anemia and favism.

In addition to these, the psychological factor can also play a role in allergic reactions. A reaction of distaste, such as nausea or vomiting from a food, can sometimes be a conditioned reflex resulting from a previous adverse experience with the food.

Summary

In this study the role of food allergy in respiratory allergy in children at the Hacettepe Faculty of Medicine Allergy Clinic is investigated. Compared with pollen, mold spores and other inhalants, food allergens are a minor factor. Of 105 cases studied, only two showed bronchospasms due to foods, and these two also proved to be allergic to many other allergens. Six cases of urticaria, two of colic and four of rhinitis were also considered to be food allergies.

The role of foods as allergens, and the types of allergic reactions in different age groups are summarized. Though foods play little part in the production of bronchospasms, they should be considered in the evaluation of bronchial asthma, especially in patients who present year-round symptoms, and are not given relief from hyposensitization treatment.

As claimed by many allergists, skin tests with antigens were shown to be unreliable in confirming food allergy, and provocation tests seem to be the only feasible methods so far for routine exploration of asthmatic children.

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