



REVIEW ARTICLE

A REVIEW OF FOOD ALLERGY

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Abstract:

A food allergy is an immunologic response to a food protein and caused by allergens in the food that are a kind of protein in the food. Food allergy is recognized as a common worldwide problem. Anaphylaxis, Angioedema, Skin rashes, Eczema etc. is the symptom of food allergy. Drug interaction risk isn't limited to herbal supplements. Certain foods can interact with medications. People taking digoxin should avoid Black licorice (which contains the ingredient glycyrrhizin). Together, they can produce irregular heart rhythms and cardiac arrest; licorice and diuretics will produce dangerously low potassium levels, putting a patient at risk for numbing weakness, muscle pain and even paralysis. Licorice can also interact with blood pressure medication or any calcium channel blockers some food product like milk, peanut, fish, eggs etc. produce allergy like diarrhoea, vomiting and these are treated using substituents and medicines. Diagnosis of food allergy is based on clinical history, skin prick tests, and laboratory tests to detect serum-food specific IgE, elimination diets and challenges.

Keywords: Food allergy, skin rashes, immunologic response, hypersensitivity reaction, vomiting, diarrhoea.

REVIEW ARTICLE**INTRODUCTION**

Food allergy is recognized as a common worldwide problem, and, like other atopic disorders, its incidence seems to increase. In the past years, investigations of allergic food proteins and related immunological responses have moved to the molecular level, and the newly-found knowledge might provide novel experimental strategies for the laboratory diagnosis and the immunomodulatory control of food-induced allergic reactions.⁽¹⁾ Approximately 20% of the population alters their diet for a perceived adverse reaction to food, but the application of double-blind placebo-controlled oral food challenge, the “gold standard” for diagnosis of food allergy.^(2, 3)

OVERVIEW:

A food allergy is an immunologic response to a food protein and caused by allergens in the food that are a kind of protein in the food.⁽⁴⁾ These proteins resist the cooking process, the acid in the stomach and the enzymes in the stomach and intestines and enter the blood stream and they cause the allergy reaction after they enter the blood stream.⁽⁵⁾

SIGNS & SYMPTOMS:

1. Anaphylaxis: - a severe, whole-body allergic reaction that can result in death.
2. Rapid swelling (edema) of the skin, mucosa and submucosal tissues, especially of the eyelids, face, lips, and tongue.
3. Eczema is a form of dermatitis, or inflammation of the upper layers of the skin.
4. Skin rashes, such as nettle rash (also called urticaria or hives). Some of these longer lasting rashes are called atopic dermatitis.⁽⁶⁾
5. Itching of the mouth, throat, eyes, skin, or any area
6. Nausea, vomiting, diarrhoea, stomach cramps, or abdominal pain
7. Runny nose or nasal congestion
8. Wheezing, scratchy throat, shortness of breath, or difficulty swallowing

TYPES OF ALLERGIC FOOD

1. **Milk allergy:-**

The major allergens in milk are the caseins and the protein b-lactoglobulin. People are usually allergic to more than one kind of milk protein. The proteins from cow's milk are very similar to those from goats and sheep. Thus goat's or sheep's milk cannot be used as a cow's milk substitute in allergic individuals. ⁽⁶⁾ Symptoms are frequently vomiting and diarrhoea in children.

2. Eggs:-

Allergy to eggs is usually observed in young children rather than adults. The main allergens are the egg white proteins ovomucoid, ovalbumin and ovotransferrin.

3. Peanut allergy:-

Peanuts are one of most allergenic foods and frequently cause very severe reactions, including anaphylaxis. The main allergens in peanuts and Soya are the proteins used by the seed as a food store for it to grow into a seedling.

4. Tree nut allergy:-

This group includes true tree nuts, such as Brazil nuts, hazelnuts, walnut and pecan. Children who become sensitised to tree nuts tend to remain allergic throughout life. Hazelnut and almond allergies are more like those people get to fruit, and are linked to pollen allergies.

5. Fish and shellfish allergy:-

The major allergens in fish are flesh proteins called parvalbumins which are very similar in all kinds of fish. Shellfish allergens are usually found in the flesh and are part of the muscle protein system, whilst in foods such as shrimps, allergens have also been found in the shells. ⁽⁶⁾

6. Fruits allergy:-

In general allergic reactions to fruits and vegetables are mild, and are often limited to the mouth, and are called the oral-allergy syndrome (OAS). Around four out of ten people having OAS are also allergic to tree and weed pollens.

Tomato Allergy:-

Reported on 4 cases (2 adults with throat constriction, 1 child with gastro esophageal reflux disease (GERD), 1 child with atopic dermatitis) with IgE-mediated reactions to tomatoes.

7. Cereals allergy:-

Suffered by children and adults alike, wheat allergy appears to be particularly associated with exercise-induced anaphylaxis. The more of a cereal (wheat, rye, barley, oats, maize or rice) we eat the more likely we are to suffer an allergy.

8. Penicilline's allergy reaction :-

Frequently manifestations are – rash, itching, urticaria and fever. Wheezing, angioneuritis, edema, serum sickness and exfoliative dermatitis are less common. Anaphylaxis is rare but may be fatal. All form of penicilline (natural or semisynthetic) can cause allergy but it is more commonly seen after paranteral administration. Penicilline produce hypersensitivity urticaria, angioedema, bronchospasm, anaphylaxis or seum sickness. ^(7, 8)

CLASSIFICATION OF FOOD ALLERGY:

1. Immediate reaction type (Skin sensitive or wheal type)Antibody: Skin sensitizing:-

A. Hereditary: spontaneous, abrupt, obvious, often severe symptoms Involving all major systems of body

- a) Alimentary mucosa causes: food by ingestion
- b) Respiratory mucosa causes: Inhaled dusty airborne food dusts and volatile food odours by inhalation (rare)
- c) Skin causes: food by percutaneous absorption (rare)
- d) By parentral injection causes: Therapeutic agent containing food excitants

B. Nonhereditary: Induced, anaphylactic, often severe symptoms involving all major system of

Portal of entry by parenteral injection causes: sensitizers such as organ extracts, virus vaccines (egg media)

2. Delayed reaction types (Skin negative or non wheal type)

Antibody: unknown:-

A. Hereditary: Deliberate, obscure symptoms involving all major systems of body

Portal of entry: Alimentary mucosa causes: Foods by ingestion

B. Nonhereditary:- Induced (contact dermatitis), rare, involving respiratory and cutaneous systems

Portal of entry: Intact oral and buccal mucosa, and skin causes: Foods, essential oils of foods and spices. ^(9, 10)

Pathophysiology

A food allergy is an immunologic response to a food protein Food allergy is type 1 hypersensitivity reaction. Type I Hypersensitivity is characterised by excessive activation of

mast cells and basophils by IgE, resulting in a systemic inflammatory response that can result in symptoms as benign as a runny nose, to life-threatening anaphylactic shock and death. Exposure to an allergen activates B cells to form IgE secreting plasma cells. The secreted IgE Molecules bind to IgE specific Fc Receptor on mast cells. Second Exposure to allergen leads to cross linking of the bound IgE triggering release of pharmacologically active mediators vasoactive amines.

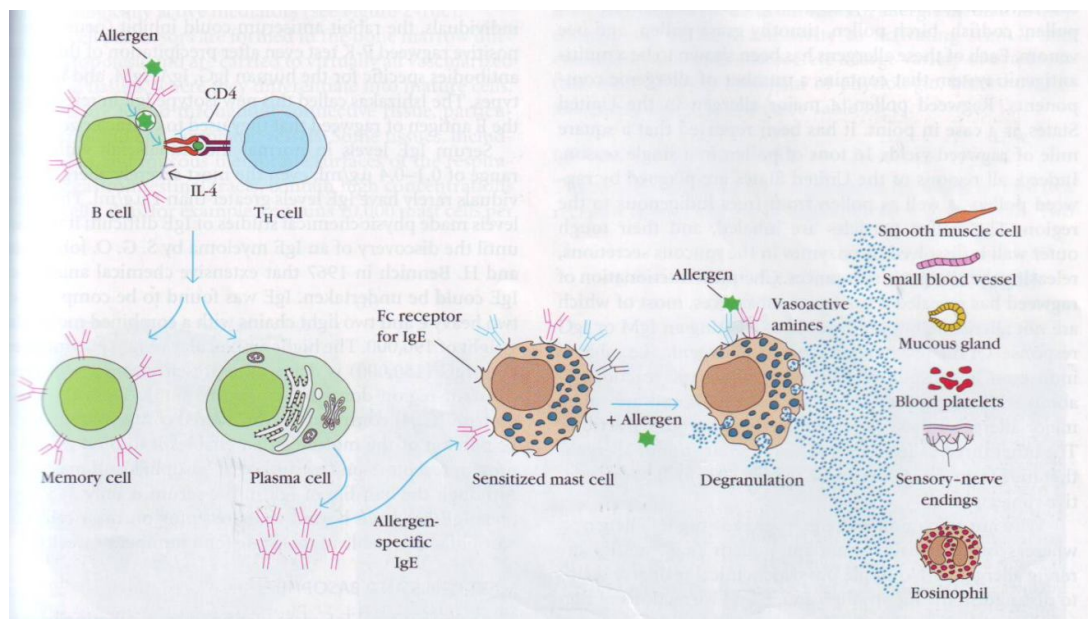


Fig: Event during allergy

DIAGNOSIS OF FOOD ALLERGY

Diagnosis of food allergy is based on clinical history, skin prick tests, and laboratory tests to detect serum-food specific IgE, elimination diets and challenges.⁽¹¹⁾

- 1. History:-**The physician interviews the patient to determine if the facts are consistent with a food allergy. The doctor asks such questions as: What was the timing of the reaction? Did the reaction come on quickly, usually within an hour after eating the food? Was treatment for allergy successful.
- 2. Dietary Diary:-**To keep a record of the contents of each meal and whether reactions occurred that are consistent with allergy.

3. **Elimination Diet:-** The next step is an elimination diet. The patient does not eat a food suspected of causing the allergy, for example, eggs, and substitutes another food, in this instance, another source of protein.
4. **Skin Prick Tests:-**The skin prick is easy to do and results are available in minutes. Different allergists may use different devices for skin prick testing. Some use a "bifurcated needle", which looks like a fork with 2 prongs. Others use a "multi-test", which may look like a small board with several pins sticking out of it. ^(4, 11)
5. **Blood Tests:-**Blood tests such as the RAST (radioallergosorbent test) and the ELISA (enzyme-linked immunosorbent assay). These tests measure the presence of food specific IgE antibodies in the blood of patients.

A. Oral desensitization & topical treatment:-

- 1) **Treatment for Milk Allergies:-** It is total avoidance of milk proteins. Initially if the infants are breastfed, the lactating mothers are given an elimination diet. Milk substitutes include hypoallergenic formulas based on hydrolyzed protein (such as nutramigen, alimentum, and pregestemil) or free amino acids.
- 2) **Treatment for Nut allergy:-** It is usually treated with an exclusion diet and vigilant avoidance of foods that may be contaminated with tree nuts or nut particles and/or oils. It is also treated with Epinephrine. ^(13, 14)
- 3) **Treatment for fruits allergy:-** Peeling or cooking the foods have shown to reduce the effects of the allergy in the throat and mouth, but may not relieve reactions in the gastrointestinal tract.
- 4) **Antihistamines:-** Antihistamines may also relieve the symptoms of the allergy. The older sedating type antihistamine tablets or syrup such as Piriton will reduce itching especially at night.
- 5) **Emollients:-** These skin moisturising creams and ointments, the mainstay of eczema treatment, are completely safe and should be applied liberally at least three or more times per day to hydrate and protect the skin.
- 6) **Sublingual Immunotherapy - the procedure:-** Grazax oral tablet desensitisation immunotherapy is now available for adults as a treatment for grass pollen induced hayfever and allergic rhino-conjunctivitis.
- 7) **Wet Wraps:-** These are applied at night to keep moisture in the skin, aid absorption of creams and to protect against scratching.

B. **Vaccines, immunotherapy & injection:-** It is for the treatment of patients affected by peanut allergy, showed a long-term increase in the average amount of peanut tolerated. Another anti-IgE preparation (Omalizumab) has been approved for the treatment of persistent allergic asthma in patients who are poorly controlled with inhaled corticosteroids. ^(6, 15)

Table: Potential immunotherapeutic strategies for the treatment of food allergy

THERAPY	TYPES OF ALLERGY	ROUTES (s)	IMMUNOLOGIC MECHANISM	RISK(s)
Traditional injection immunotherapy	Oral allergy syndrome	Subcutaneous	Increased IgE-blocking antibodies, decrease specific IgE	Safe when performed properly
Peptide immunotherapy	IgE-mediated food allergy	Subcutaneous	Immune deviation from Th2 to Th1	Appear safe
Traditional Chinese medicine	IgE-mediated food allergy (asthma)	Subcutaneous	Immune deviation from Th2 to Th1	Appear safe
Fusion proteins	IgE-mediated (all type)	Subcutaneous	Blocks IgE-mediated	Unknown
Mutated protein immunotherapy	IgE-mediated food allergy	Subcutaneous & oral	Immune deviation from Th2 to Th1(3)	Appear safe
DNA immunization	IgE-mediated food allergy	Subcutaneous & oral	Immune deviation from Th2 to Th1(oral) increase levels of allergen specific secretory IgA in the gut & systemic IgG	Unknown long-term
Immuno stimulating sequences (ISSs)	IgE-mediated food allergy	Subcutaneous	Immune deviation from Th2 to Th1	Appear safe
Anti-IgE Therapy	IgE-mediated food allergy	Subcutaneous	Deplete IgE, blocks IgE from binding to high affinity IgE-receptor(FCεRI):down-regulation IgE	Appear safe

			receptors productions	
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Complementary treatments of food allergy:-

1. Enzyme Potentiated Desensitization:- It has been used to treat hay fever and alleged food allergies.
2. Ionization:- These machines have been claimed to help hay fever and asthma sufferers by decreasing the allergen load on the nasal mucosa and lungs.
3. Ozone Therapy:- In treating allergy is a new addition to complementary medical treatment. The allergic patient's blood be exposed to ozone gas and then re-injected or ozone is directly insufflated rectally or vaginally.
4. Acupuncture:- Acupuncture is an ancient Chinese form of treatment that involves inserting tiny needles into specific meridians or areas of the body.
5. Herbal medicine:- An herbal remedy such as the Ma Huang plant (*Ephedra sinica*) which contains ephedrine has been used to treat asthma for 5000 years.

Medicine/herb/food interactions:

Herbs and foods may interact with medications you normally take that result in serious side reactions. The medication that is taken by mouth travels through the digestive system in much the same way as food and herbs taken orally do. So, when a drug is mixed with food or another herb, each can alter the way the body metabolizes the other. Some drugs interfere with the body's ability to absorb nutrients. Similarly, some herbs and foods can lessen or increase the impact of a drug. Alcohol is a drug that interacts with almost every medication, especially antidepressants and other drugs that affect the brain and nervous system. Some dietary components increase the risk of side effects. Theophylline, a medication administered to treat asthma, contains xanthines, which are also found in tea, coffee, chocolate, and other sources of caffeine. Consuming large amounts of these substances while taking theophylline increases the risk of drug toxicity. Certain vitamins and minerals impact on medications too. Large amounts of broccoli, spinach, and other green leafy vegetables high in vitamin K, which promotes the formation of blood clots, can counteract the effects of heparin, warfarin, and other drugs given to prevent clotting.

Drug Interaction and Food: Drug interaction risk isn't limited to herbal supplements. Certain foods can interact with medications. People taking digoxin should avoid **Black licorice** (which contains the ingredient glycyrrhizin). Together, they can produce irregular heart rhythms and cardiac arrest; licorice and diuretics will produce dangerously low potassium levels, putting a

patient at risk for numbing weakness, muscle pain and even paralysis. Licorice can also interact with blood pressure medication or any calcium channel blockers.

Tomato:- It contains small quantities of a toxic substance known as solanine that may trigger headaches in susceptible people. They are also a relatively common cause of allergies. An unidentified substance in tomatoes and tomato-based products can cause acid reflux, leading to indigestion and heartburn.

Turnips:- It contain two goitrogenic substances, progoitrin and gluconasturtin, which can interfere with the thyroid gland's ability to make its hormones. Although moderate consumption of goitrogens is not a hazard for healthy people, they can promote development of a goiter (an enlarged thyroid) in persons with thyroid disease.^(16, 17)

SUMMARY & CONCLUSION:

Food allergy is caused by immunological reactions to foods, sometimes in individuals or families predisposed to allergies. A number of foods, especially shellfish, milk, eggs, peanuts, and fruit can cause allergic reactions (notably hives, asthma, abdominal symptoms, lightheadedness, and anaphylaxis) in adults or children. Once the diagnosis of food allergy is made (primarily by the medical history) and the allergen is identified (usually by skin tests), the treatment basically is to avoid the offending food.

In conclusion, an individual suffering from food allergies needs to avoid that particular food, always carry some emergency anti allergy measures on his person and carry the information regarding a particular food allergy on his person. Information is the key to living a healthy and food allergy free life.^(5, 13)

Food Allergy at a Glance

- Food allergy is not common, but can be serious.
- Food allergy differs from food intolerance, which is far more common.
- The more frequent types of food allergies in adults differ from those in children.
- Children can outgrow their food allergies, but adults usually do not.
- The diagnosis of food allergy is made with the help of the patient's detailed history, the patient's diet diary, or an elimination diet.^(7,16)

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