

**Review Article****A BRIEF REVIEW ON: FOOD ALLERGY****Pankaj Usha,\*Sharma Ranu, Viswas Amit, Khinchi M.P., Parveen Shama.**

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**ABSTRACT-**

Food allergy is used to describe an adverse immunologic response to a food protein. It is important to distinguish food allergy from other non-immune mediated adverse reactions to foods, particularly since more than 20% of adults and children alter their diets due to perceived food allergy. Any substance that triggers allergic reactions called an allergen. Allergens “invade” the body by being inhaled, swallowed or injected, or they may be absorbed through the skin. Common allergens include pollen, dust and mold. Allergies are among the nations most common and costly health problems. Clinical involvement of three to ten food allergens may be observed. Sometimes over 20 foods are involved. Having only one or two foods as allergens is rare. Often, large amounts of food in multiple findings may be necessary to produce allergic symptoms. Due to multiple foods and delayed onset of symptoms, the offending foods are rarely self diagnosed.

**Keywords:** Food Allergy, Types, Mechanism, Diagnosis, Treatment, Awareness,**INTRODUCTION-**

The term food allergy is used to describe an adverse immunologic response to a food protein. It is important to distinguish food allergy from other non-immune mediated adverse reactions to foods, particularly since more than 20% of adults and children alter their diets due to perceived food allergy. Adverse reactions that are not classified as food allergy include food intolerances secondary to metabolic disorders (e.g., lactose intolerance), reactions to toxic contaminants (e.g. histamine produced by scombroid fish contaminated by Salmonella organisms) or pharmacologically active food components (e.g. caffeine in coffee causing jitteriness, tyramine in aged cheeses triggering migraine). Other conditions which are associated with symptoms similar to food allergy include auriculotemporal syndrome (a disorder characterized by facial flushing and salivation that may follow trauma to the parotid gland), and gustatory rhinitis.<sup>[2]</sup>

Any substance that triggers an allergic reaction is called an allergen. Allergens “invade” the body by being inhaled, swallowed or injected, or they may be absorbed through the skin. Common allergens include pollen, dust and mold. Allergies are among the nation’s most common and costly health problems. A study of 969 children on the Isle of Wight found 34% of parents reported food allergies in their children but only 5% were found to have an allergy<sup>[6]</sup>. There is also over diagnosis caused by doctors relying on or misinterpreting limited tests<sup>7</sup>. This all means that many people get worried about something unnecessarily, take the wrong treatments or avoid the wrong thing. Fears about food allergies are leading parents to cut major food groups from their children’s menus and causing people to follow<sup>18</sup>

Management of acute allergic reactions to food, There are no recommended medications for the prevention of immunoglobulin E (IgE)-mediated, non-IgE-mediated or mixed food-induced allergic reactions. Medication may, however, be used to treat both severe and non-severe allergic reactions. While

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treating mild-to-moderate food allergic reactions, the patient should be closely monitored for any signs or symptoms of an anaphylactic reaction.<sup>[22]</sup>

Anaphylaxis may be fatal if not recognized and managed appropriately with rapid treatment. The drug of choice for the treatment of an anaphylactic reaction is intramuscular adrenaline, with other drugs given as adjunctive therapy. In cases of suboptimal response to the initial dose of adrenaline, or with progression of symptoms, a repeat dose should be given. Basic cardiopulmonary resuscitation should be initiated and maintained to support the airway, oxygenation and circulation. The following steps should be instituted in the initial management of anaphylaxis: eliminate additional exposure to the allergen administer intramuscular injection(s) of adrenaline call for help place the patient in a recumbent position, with lower limbs elevated, and do not allow the patient to stand up quickly give supplemental oxygen administer intravenous fluid in cases of hypotension or incomplete response to intramuscular adrenaline administer adjunctive therapy (antihistamines and corticosteroids) admit the patient for close observation for biphasic reactions.<sup>[15]</sup>

#### **TYPES OF FOOD ALLERGY:**

People can be allergic to almost any food, but most food allergy reactions are caused by 8 foods:<sup>[18]</sup>

Peanuts  
Tree Nuts  
Eggs  
Milk  
Wheat  
Fish  
Soy  
Shellfish (crab, lobster)

If your child has symptoms after eating certain foods, he or she may have a food allergy.

A food allergy occurs when the body's immune system sees a certain food as harmful and reacts by causing symptoms. This is an allergic reaction. Foods that cause allergic reactions are allergens.<sup>[87]</sup>

#### **Two Categories of Food Allergies**

be suffering from IgG-mediated, delayed-onset food allergies.<sup>[11]</sup>

#### **Immunoglobulin E (IgE) mediated:-**

Symptoms result from the body's immune system making antibodies called Immunoglobulin E (IgE) antibodies. These IgE antibodies react with a certain food.

**Non-IgE mediated:-**Other parts of the body's immune system react to a certain food. This reaction causes symptoms, but does not involve an IgE antibody. Someone can have both IgE mediated and non-IgE mediated food allergies.

#### **Types of Food Allergy Testing**

Several types of food or metal allergies have been observed in patients. The major ones include

Type I, Type II, Type III, and Type IV. Type I testing is done mainly on the skin and detects IgE-antibody food allergies. The IgE antibodies attach to mucous membranes, which release histamine. Allergic reactions may occur within one to 60 minutes. These reactions affect the skin, airway, and digestive tract, causing classical allergies such as rhinitis, urticaria, angioedema, eczema, vomiting, diarrhea, and anaphylaxis. These are more dangerous symptoms, and they can be life-threatening.

**Type I** is common in children, but rare in adults. Only one or two foods are usually involved in causing allergic symptoms, which occur two hours or less after consumption of offending foods. Usually, the allergic food is eaten infrequently; however, small, even trace, amounts of food can trigger an intense allergic reaction, including anaphylaxis, in which a fatal reaction can occur within minutes.

**Type II** food allergy involves lectin allergens, which bind to ABA markers on cells that include red blood cells, mucous membranes, intestinal lining, and most other cells. This attracts IgG antibodies and killer cells, which will destroy red blood cells, thereby causing anemia.

**Type III** immune reactions are more frequently involved in food allergy than Type I reactions. About 45-60% of the population has been reported as having Type III food allergies. Up to 70-80% of Americans who do not respond well to medical treatment may

### Mechanism of Food Allergy

The immunologic mechanisms responsible for the development of allergic sensitization rather than tolerance to foods are not well understood, although there have been a number of recent advances in our understanding of why some foods are inherently allergenic. In addition, the involvement of alternative routes of exposure that are not inherently tolerogenic may play a role in sensitization to foods. Although there are no currently accepted therapeutic approaches to food.<sup>[5]</sup>

### Mechanisms of allergic sensitization:

In order to generate allergic sensitization to foods experimentally, adjuvants are commonly used to break oral tolerance. Emerging data suggest that allergic sensitization may occur if the naturally tolerogenic oral route is not the primary route of exposure. Household exposure to peanut has been shown to be associated with allergic sensitization to peanut in children, independent of maternal ingestion. One important route of sensitization may be the skin.

### Adjuvant activity of food allergens

The majority of food allergic reactions are induced by a limited number of food allergens. Accumulating data suggest that activation of the innate immune system is a property of common food allergens. Confirming earlier findings with human DCs, peanut was shown to alter the phenotype of mouse DCs independent of TLR signaling.

### Host factors promoting sensitization to foods

Gastrointestinal epithelial cells at the

interface between the gastrointestinal contents and the mucosal immune system are host factors that likely determine the immune response to foods. Epithelial cells from food allergic subjects express higher levels of galectin-9 that can act on DCs to promote allergic sensitization.<sup>[11][16]</sup> The epithelial cytokine thymic stromal lymphopoietin (TSLP) is critical for gastrointestinal but not systemic manifestations of food allergy in mice. Mutations resulting in enhanced expression of TSLP are associated with eosinophilic esophagitis, but the relationship to IgE-mediated food allergy has not yet been addressed in humans. Central to the pathophysiology of food allergy is the generation of food-specific IgE. Class-switching to IgE is supported by T cell production of IL-4 and IL-13. Short-term (six hours) stimulation of human peripheral blood mononuclear cells (PBMCs) with peanut or tetramer staining of freshly isolated human PBMCs has been used to phenotype the allergen-specific T cell response.

### Mechanisms of food-induced anaphylaxis

IgE-mediated food allergy is believed to result from triggering of mast cells to release histamine that acts on target cells including endothelial cells, epithelial cells, and smooth muscle. Studies in mouse models have identified mast cell-derived platelet activating factor as another important mediator of anaphylaxis. Alternative pathways of anaphylaxis, involving IgG and macrophages, can also participate in peanut-induced anaphylaxis in mice. Immunoglobulin free light-chains have also been shown to participate in casein-triggered hypersensitivity reactions in the skin, by an as-yet-unidentified effect or mechanism.

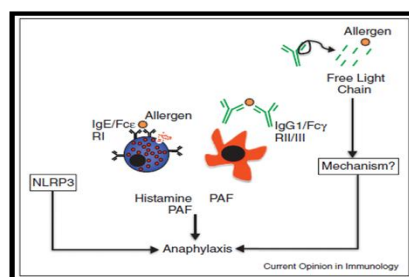


Fig.1- Food induce Anaphylaxis



## DIAGNOSIS OF FOOD ALLERGY

### Physical Examination

The physical examination is used to evaluate cutaneous, gastrointestinal, and respiratory systems. For suspected food allergic patients, the skin should be examined carefully, with special attention to intensely pruritic, erythematous papulovesicles associated with excoriation, serous exudate, xerosis, lichenification, papules, and keratosis pilaris. Distribution and skin reaction pattern of the rash are important, with the pattern in infants and young children generally involving the face, neck, and extensor skin surfaces. In contrast, in older children with longstanding skin disease.

### Diagnostic Testing Methods

The 2 methods of measuring specific IgE to food are the immediate hypersensitivity skin prick test and the in vitro serum-specific IgE test, which is also called an Immuno CAP FEIA test. RAST testing is a method not currently used, but the term is sometimes still used to describe serum-specific IgE testing in general. The tests are highly sensitive.

### Symptoms

Symptoms of an allergic reaction may involve the skin, the gastrointestinal tract, the cardiovascular system and the respiratory tract. They can surface in one or more of the following ways:<sup>[21]</sup>

- Vomiting and/or stomach cramps
- Hives
- Shortness of breath
- Wheezing
- Repetitive cough
- Shock or circulatory collapse
- Tight, hoarse throat; trouble swallowing
- Swelling of the tongue, affecting the ability to talk or breathe
- Weak pulse
- Pale or blue coloring of skin
- Dizziness or feeling faint
- Anaphylaxis, a potentially life-threatening reaction that can impair breathing and send the body into shock; reactions may simultaneously affect different parts of the body (for example, a stomach-ache accompanied by a rash)

## TREATMENT OF FOOD ALLERGY

### Self-Care at Home

- For localized hives or other mild skin reactions
- Take cool showers or apply cool compresses.
- Wear light clothing that doesn't irritate your skin.
- Take it easy. Keep your activity level low.
- To relieve the itching, apply calamine lotion or take over-the-counter antihistamines, such as diphenhydramine (Benadryl) or the non sedating antihistamine, loratadine (Claritin).
- For all other reactions, especially severe reactions, self-treatment is not recommended. Have a companion drive you to the hospital emergency department. Here's what you can do while waiting for the ambulance:

### Medical Treatment

In a severe reaction, the first priority is to protect your airway (breathing) and your blood pressure.

Your health care provider will make sure that your airway is open and that you are getting enough oxygen.<sup>[27]</sup>

- Oxygen may be given through a tube into the nose or by face mask.
- In severe respiratory distress, mechanical ventilation may be required. A tube is placed in the mouth to keep the airway open.
- In rare cases, a simple surgery is performed to open an airway.

Your blood pressure will be checked frequently.

- An intravenous line may be started.
- This is used to give saline solution to help boost blood pressure.
- It also may be used to give medication.

## PREVENTION OF FOOD ALLERGY

### No bingeing.

We feel that it is prudent to avoid bingeing on any food in the second half of the pregnancy and during breastfeeding.

**Egg avoidance.**

Since eggs fell off the favoured food list when the nutrition watchers regarded high cholesterol foods poorly, most women don't find it too hard to avoid eggs. It is hard to avoid all egg and even if there are only small amounts in the diet egg protein fragments can be found in breast milk.

**Complete peanut and nut avoidance in the household.**

Since peanut and nut allergies can last forever abstinence for a while is worth the effort. Complete avoidance of peanut butter, peanuts and nuts in the household is strongly recommended.

**Seed avoidance**

Sesame seed paste (tahini) seems to be quite allergenic in highly atopic infants and can cause anaphylactic reactions in infancy. In all but the most allergic children, the allergy fades later in childhood.

**Milk and dairy foods precautions**

In most instances the mothers of children with a dairy allergy have had a lot of milk, cheese and chocolate. On many days their intake has exceeded ordinary requirements. Dairy allergy tends to be less of a problem than peanut, nut and egg allergy and it usually fades by school age.

**Fish and sea foods precautions**

Fish allergies can be a lifelong problem and just the smell of fish can cause severe reactions in affected individuals. Fish allergies tend to be due to the large fish like cod, ling (a type of cod), perch, barramundi etc and generally occur in families with a history of fish allergies or in households where fish is cooked on a regular basis.<sup>[21]</sup>

**CONCLUSION**

Food allergy is an important clinical problem of increasing prevalence. Assessment by an allergist is very important for appropriate diagnosis and treatment. Diagnosis currently relies on a careful history and diagnostic tests, such as SPT, serum-specific IgE testing (where appropriate) and, if indicated, oral food challenges. The main stay of treatment

is avoidance of the responsible food(s) and appropriate, prompt response to allergic reactions with epinephrine. Further insights into the pathophysiology of food allergy will lead to the development of improved methods for prevention, diagnosis, and management of the disorder.

Food allergy is an important and frequently overlooked cause of (or triggering factor for) a wide range of chronic physical and mental disorders. Routine use of elimination diets in clinical practice can greatly increase the response rate in many difficult-to-treat medical conditions.

Food allergy remains an important health concern due to increasing prevalence worldwide, potentially fatal reactions and current lack of curative therapy. Importance must be placed on proper diagnosis which may at times be difficult given the limitations of current available testing. Avoidance of the offending allergen and prompt treatment of acute reactions are the current mainstays of food allergy management. Present data indicate that there is no benefit in delaying the introduction of allergenic foods to the diet of children. However, much still must be elucidated to understand the optimal timing of allergenic food introduction. While little headway has been made in the prevention of food allergy, multiple therapeutic options including both allergen specific and non-specific therapies are in human efficacy trials. Though the initial results are promising, no single therapy is considered ready for common use until further data on optimal dosing and long-term safety are available.

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