

Review Article

Food Allergies in Clinical Practice

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Food allergies constitute an important component of the disease burden encountered in the community and their incidence is steadily on the rise. Food anaphylaxis is a particularly serious condition warranting prompt action. This article presents a review of the literature exploring various facets including the modern management of this largely neglected but potentially serious clinical problem. Attention has been drawn to the common food items which may contain food allergens and to a stepwise approach to a correct diagnosis. Management strategies including emergency measures (which may even require self administration of epinephrine), immunomodulation, immunotherapy and nutritional safeguarding have been discussed.

[J Indian Med Assoc 2020; 118(3): 28-30]

Key words : Food allergy, immunomodulation, immunotherapy, eosinophilic esophagitis, omalizumab.

Food allergies have profound clinical implications and may present either as the primary disease or as an association with another disease presentation.

A variety of immune-mediated adverse reactions to certain foods may present as allergies, the underlying mechanism being Immunoglobulin E (IgE)-mediated, cell-mediated or mixed¹. Various organ systems may be involved and the presentation may range from itching and a slight skin rash to severe life threatening anaphylaxis. A clear distinction must, however, be made from non-immunological adverse reactions such as food intolerance and food poisoning.

Pathophysiology and Epidemiology :

Development of food allergy depends on heredity, intestinal permeability, immune responsiveness and, of course, exposure to the particular food². Food allergen exposure, though usually by ingestion, may occur by inhalation also. The reaction can develop within seconds to several hours and the symptoms can last for days or even weeks. In some cases the symptoms of food anaphylaxis are not seen unless the patient exercises within a few hours of food ingestion³. Foods known to be associated with allergic reactions are crustaceans (such as shrimps, crabs and lobsters), eggs, fish, shellfish, peanuts, tree nuts (such as walnuts and cashew nuts), soybeans, milk and cereals containing gluten (such as wheat and barley).

The incidence is higher in children and decreases to about 1-3% in adults². More than 90% of acute systemic reactions to food in children are from eggs, milk, soy, wheat

Editor's Comment :

- Allergies to various food items are frequently encountered and may sometimes be dangerous.
- If there is a known allergy, one must be cautious about offending agent.
- Immediate medical attention must be sought when an allergy occurs.

or peanuts and in adults from crustaceans, tree nuts, peanuts or fish⁴. Hidden allergens may be present not only in the food item but also in additives, preservatives and contaminants.

Food allergens have certain biochemical and physicochemical properties which include thermal stability and resistance to proteolysis⁵. Human studies strongly suggest that microbial inhabitants of the human body may play either a pathogenic or protective role in allergies⁶.

Allergies to milk, wheat and eggs tend to abate in late childhood but those to peanuts, tree nuts and seafood are most likely to continue lifelong. Allergies to fruits and vegetables are most commonly encountered in adults and may develop because of homologous proteins shared with airborne allergens. In coeliac disease, extensive enteropathy secondary to immunologic reaction to gliadin (a component of gluten) causing a severe form of malabsorption is seen⁷. There also seems to be a definite relationship between food allergy and both allergic rhinitis and bronchial asthma.

Non IgE mediated food allergy may be acute e.g. Food Protein Induced Enterocolitis Syndrome or chronic e.g. coeliac disease and Eosinophilic Esophagitis⁸.

Clinical Presentation :

The clinical picture may include skin features (urticaria, angioedema or atopic dermatitis), respiratory features (allergic rhinitis, asthma or laryngeal oedema), gastrointestinal features (itching and swelling of oral cavity, nausea, vomiting, abdominal pain or diarrhoea), eye

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Received on : 15/03/2014

Accepted on : 04/10/2016

features (itching and swelling) or cardiovascular features (chest pain or severe hypotension and unconsciousness).

Non-IgE mediated food reactions may present as enterocolitis, coeliac disease and allergic contact dermatitis.

Anaphylactic shock is a life threatening condition encountered in certain food allergies and may present with laryngeal oedema, bronchospasm and hypotension.

Diagnosis :

A proper history should enquire about suspected food items, the quantity of the particular food which may bring about a reaction, whether the reaction is reproducible with the same food and whether avoiding the food brings relief.

On clinical examination, the concomitant presence of atopic disorders such as asthma and atopic dermatitis increases the likelihood of a food allergy. Conversely, a thorough physical examination may rule out the possibility of a food allergy. Skin prick tests are often useful. A positive test shows up as a wheal. Intradermal testing may be potentially dangerous and also has an unacceptably high false positive rate. Skin prick and radio allergosorbent tests which involve testing for IgE antibodies in the blood for particular foods have about 85% sensitivity and 30 – 60% specificity⁴. Dietary manipulations are also used for food allergy testing. An elimination diet beginning with items not likely to cause a reaction and progressing with stepwise addition of other food items over a period of time may incriminate a specific food item. An Oral Food Challenge remains the diagnostic standard for food allergy¹ but should always be carried out under close medical supervision and should be conducted in a double-blind placebo-controlled fashion.

Awareness and Prevention :

The only certain way to avoid food allergies is to avoid exposure to the specific food allergen. This requires awareness on the part of the individual and also the family, caregivers, health care providers and catering services in restaurants, schools, hospitals, airlines, railways and public gatherings. Education regarding strict avoidance of food allergens, the early recognition of anaphylactic symptoms and the early use of self injectable epinephrine remains the mainstay of therapy⁹. It should be ensured that food labels clearly declare ingredients known to be important food allergens.

The role of breast feeding in the prevention of allergic diseases needs to be examined. It has been reported that, in general, studies reveal that infants fed formulae of intact cow's milk or soy protein compared with breast milk have a higher incidence of atopic dermatitis and wheezing illnesses in early childhood¹⁰. Breast feeding mothers should avoid highly allergenic foods if a family history of allergies is present.

Management :

Management focuses on three broad areas namely, avoidance of the offending food, nutritional support to guard against nutritional deficiencies and prompt

recognition and treatment of acute food anaphylaxis. Assessing the nutritional status of the food allergic person and assuring nutritional adequacy during treatment and maintenance highlights the importance of the dietician's expertise². Probiotics improve the intestinal immunological barrier function and reduce the generation of proinflammatory cytokines and therefore appear to be useful in the treatment of food allergy¹¹. An elimination diet may be beneficial in patients with chronic symptoms where the offending food remains unidentified⁷.

For acute food anaphylaxis management must be prompt and correct. This includes life saving measures like epinephrine (adrenaline) injection, securing the airway, cardiopulmonary resuscitation and assisted respiration if necessary, oxygen administration and intravenous fluids. Epinephrine reverses laryngeal oedema, bronchospasm and hypotension and should be given intramuscularly (preferably in the anterolateral thigh), the dose being 500 micrograms (0.5 ml of 1 in 1000 solution) in the adult. Repeated doses may be required at 5 minute intervals according to response. The onset of action is more rapid with the intramuscular route as compared to the subcutaneous route. Epinephrine in the form of properly labelled pre-assembled syringes fitted with a needle (auto-injectors) should be carried by patients with severe allergy at all times. A dose of 300 micrograms in the adult may be appropriate for self administration intramuscularly. In severe circulatory collapse, a dilute (1 in 10000) solution of epinephrine may be given by slow intravenous injection (under close medical supervision) in the dose of 0.5 ml (50 micrograms) in the adult, repeated as per response. Additionally, antihistamines like chlorpheniramine and corticosteroids like hydrocortisone sodium succinate may be given and continued for 24 to 48 hours in accordance with clinical response. Anaphylactic reactions may be prolonged or biphasic. Therefore, medical supervision should continue for an appropriate period.

Drug therapy in the form of steroids and proton pump inhibitors may be required in Eosinophilic Esophagitis⁸. Omalizumab, a humanised monoclonal antibody against IgE used in allergic asthma has been shown to reduce concomitant IgE mediated food allergy symptoms¹².

Newer Frontiers :

Recent advances in the field of immunology have opened up newer frontiers in the management of food allergies. Many food allergens have been characterized at the molecular level leading to novel diagnostic and immunotherapeutic approaches¹³. Novel diagnostic methods including ones that focus on immune responses to specific proteins or epitopes of specific proteins are under study¹⁴. More recently, specific IgE to particular protein components have provided additional diagnostic value¹⁵. A study on the treatment of peanut allergy with rush immunotherapy (a method of rapid desensitisation) provided preliminary data demonstrating the efficacy of

injection therapy with peanut extract¹⁶. Immunomodulation via diet (with special emphasis on pro- and prebiotics, beta-glucans and fungal immunomodulatory proteins) appears to have advantages for managing allergies¹⁷.

The transfer of food allergy following solid organ transplantation is now well documented. Transfer of peanut IgE sensitisation after combined pancreas-kidney transplant has been reported¹⁸.

Discussion :

The clinical challenge posed by food allergies lies in the wide range of their presentation. Chronic long standing allergies may cause minor symptoms but may severely impair the nutritional status and (in children) the growth of the individual. On the other hand, acute anaphylactic reactions may have dramatic presentations and may prove fatal. The magnitude of the problem is substantial and is on the rise. However, many studies indicate that the prevalence of actual food allergies is much lower than the number of suspected food allergies⁵. In the absence of a reasonably correct diagnosis, unnecessary food restrictions should, therefore, not be imposed on an individual.

It should also be realised that complete avoidance of the offending food may not always be possible particularly if it is widely present as an ingredient in many food items and is a part of safe and healthy diet for the population in general. With increasing awareness on all fronts, it should be possible to harness knowledge and effort towards mitigating food allergies in an effective way.

Funding : None

Conflict of Interest : None

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Relevance of Allergy Test

- In clinical practice, a proper history pertaining to the suspected food item is very important with particular reference to whether the reaction is reproducible with the same food item and whether avoiding the item brings relief.
- A thorough clinical examination looking for concomitant presence of atopic disorders is also very crucial.
- Skin prick tests and radio allergosorbent tests are available for Allergy Testing .. They have high sensitivity but low specificity and must be interpreted judiciously.
- Intradermal testing may be potentially dangerous and has an unacceptably high false positive rate.
- The detection of specific IgE to particular protein components is of additional diagnostic importance but this is not universally available.
- Clinically, an elimination diet with stepwise addition of food items over a period of time may incriminate a specific food item.
- An oral food challenge test may clinch the diagnosis but must be carried out under close medical supervision.