Food allergy

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Summary

In young children food allergy is a common cause of morbidity due to its association with atopic eczema and gastrointestinal disorders. Although most children grow out of food allergies before puberty, highly sensitized individuals can have life-threatening reactions. Recognition is important since successful avoidance can prevent the occurrence of morbidity and mortality. However, the presence of hidden food allergens in commercially prepared and packaged foods can make this difficult, and mounting evidence of morbidity and mortality from accidental ingestion is a cause for concern. It is also important to distinguish clinically between true allergic reactions and non-immunological intolerances, the latter being more common causes of adverse reactions in the community. Better understanding of this distinction by the public as well as health professionals should help to clear up much of the confusion surrounding food allergy, and should also help to eradicate many of the misguided testing and treatment methods which have plagued this area for over half a century.

Introduction

Food allergy has been a confused area of clinical medicine for several decades. One reason for this is that the word 'allergy' is frequently misused to describe any kind of idiosyncratic adverse reaction. Strictly speaking, the term food allergy should only be used to describe an over-reaction of the immune system to particular protein foods, most usually egg, milk and peanut. These reactions result in the formation of potentially harmful IgE antibodies in the bloodstream and body tissues. Adverse food reactions are relatively common in the community at large, but in most cases these do not have an immunological basis; to avoid confusion the latter should be referred to as 'intolerances' in order to distinguish them from true allergic reactions.

In 1949, Ingelfinger enunciated three criteria which remain the cornerstone of our clinical definition of true food allergy to the present day: (i) consistent reproduction of symptoms by blind provocation; (ii) functional changes or lesions in the target organs; (iii) demonstration of an immune mechanism in pathogenesis (1). In the overwhelming majority of cases, true food allergy is IgE-mediated (2). Other mechanisms of hypersensitivity have been postulated, for example formation of immune complexes with activation of the complement cascade, or T-cell-mediated reactions, but evidence for their existence is weak (3). Gluten sensitivity in patients with coeliac disease is the only well-recognised exception.

Clinically significant food allergy usually occurs in infants and small children who have eczema, though the rash may be quite mild and parents may not recognise that it is related to food. Most clinically sensitive individuals have a personal or family history of allergic diseases (such as asthma, hayfever and eczema).

The true prevalence of food allergy in the community is difficult to estimate accurately, but there is general agreement that it is highest in infancy (4-6%), falling to 1-2% during early childhood, and less than 1% in adults. These figures reflect the well-known observation that most children 'grow out' of their food allergies before puberty.

The natural history of food allergy varies with age at presentation, degree of sensitisation, and type of food involved (4). Food allergy rapidly declines after the age of 3, so that presentation as discussed above in adult life is uncommon. Nevertheless, food allergy does sometimes persist and under these circumstances symptoms tend to be more severe. Food allergy is more likely to

persist into adult life where symptoms begin after the age of 3, when the initial symptoms are severe, and in those who are sensitive to peanut or fish.

Symptoms of food allergy

The most common symptoms which occur are gastrointestinal and/or cutaneous. Acute reactions often occur within 1-2 hours of ingestion of the offending food protein and begin with swelling, burning or itch around the mouth and throat, followed by vomiting, abdominal cramps and diarrhoea, generalised urticaria, bronchoconstriction, and rarely, fatal anaphylaxis. In asthmatics, acute attacks can occasionally be precipitated by foods, but in most cases this is due to the non-specific irritant effect of sulphite preservatives rather than to a food allergy. Chronic eczema or recurrent abdominal symptoms can sometimes be triggered by unrecognised allergy to a frequently ingested food, particularly in children. Systematic anaphylaxis is well recognised in food allergic individuals, and can occur at any age, but there is little information on the mortality and morbidity of such reactions (5, 6). Certainly, the frequency of allergic reactions from accidental ingestion is a cause for concern. For example, in a recently published longitudinal study, 16 of 32 peanut-sensitive individuals had inadvertently ingested peanut within the preceding 12 months (7). Anecdotal evidence suggests that this is becoming a more frequent problem with the increasing use of undeclared peanut products in packaged and convenience foods (8). Similarly, contamination of 'non-dairy' foods with milk proteins can pose a significant hazard for milk-allergic individuals.

Sensitisation usually occurs in babies in the first few months of life, either from protein fragments absorbed from the mother's diet and transmitted in the breast milk, or by giving the infant cow's milk. Occasionally a mother may notice reactions in her baby while she is breast feeding, but mostly the first reaction occurs between six and nine months of age when solid foods or other liquids are introduced into the infant's diet. Sensitised babies often 'fuss' and reject the offending food(s).

Common food allergens

Although allergic individuals can make IgE antibodies to almost any food, as indicated earlier the three main offending foods are egg, milk and peanut. In 80-90% of children with food allergy egg, peanut, milk, fish, soy and wheat account for around 90% of reactions confirmed by double blind placebo food challenge, and in most cases only one or two foods are involved (9). In infants and young children, allergic reactions to egg occur twice as commonly as to cow's milk or peanuts. Most infants sensitive to cow's milk can tolerate reintroduction by 2 years, but children diagnosed as having a food allergy after the age of 3 years are less likely to outgrow the problem. Children are most likely to grow out of milk, egg, soy and wheat allergies, particularly if the reactions are relatively mild, whereas peanut and fish allergies are more often severe and persistent.

Soy allergy is not commonly seen in Australian children probably because consumption of soy products is low, but the figure may be higher in Asian countries where soy forms a larger part of the daily diet. Five percent of children with infantile eczema may have a soy allergy. Children with soy allergy tend to be highly allergic and usually have allergies to other foods as well. A history of exquisite sensitivity, severe reaction on first exposure, and/or repeated life-threatening anaphylactic episodes suggests that the clinical sensitivity is likely to continue into adult life. Older children and adults may have an allergy to a single food such as prawns without a history of eczema or other allergic disorders, but this is unusual. In adults peanut, fish and shell fish are more prevalent as offending foods, since allergies to egg, milk and wheat tend to be outgrown.

To some extent the prevalence of a specific food allergy also depends on the eating habits of the population in each society. For example, peanut allergy is much more common in the United States than in Sweden, where peanuts and peanut butter are rarely eaten, on the other hand, fish allergy is more common in areas with a high fish consumption such as Scandinavia; similarly rice

allergy is not uncommon in Japan but is rare in western countries. Peanut is probably the most potent of all common allergens (10).

Diagnosis of food allergy

Diagnosis is usually straightforward and rests on the combination of a consistent clinical history, presence of specific IgE antibodies to the clinically implicated food(s) and carefully supervised oral challenges. Generally, only one or two foods are involved, and when symptoms occur immediately after ingestion the problem is readily identified from the history. Properly performed skin prick tests or radioallergosorbent tests (RAST) are sensitive and reliable methods for detecting specific IgE antibodies to suspected allergens, but it must be borne in mind that many allergic patients have such antibodies to one or more foods without experiencing any adverse effects. A positive result is therefore of no clinical significance in the absence of relevant symptoms; by contrast, negative results have high predictive value in excluding food allergy as a cause of symptoms. Thus, as a rule, negative predictive value is high whilst a positive result is poorly predictive, except in those with the strongest positive results. The most definitive test, useful in equivocal cases, is double-blind placebo-controlled oral challenge carried out under careful supervision (9).

Management of food allergy

Management of food allergy consists of strict avoidance of the offending food(s) and prompt self administered treatment when there has been inadvertent exposure. Skin prick tests should be repeated every 12 months in food-allergic children to monitor their food allergies and to determine if the child has outgrown the food allergy.

Controversial issues with food allergy

There remain several areas of uncertainty and controversy in this subject of food allergy. These include the role of food allergy in conditions such as migraine, hyperactivity, rheumatoid arthritis, irritable bowel syndrome and Crohn's disease; the validity of classifying foods into botanical families; and the value of various unorthodox testing and treatment methods. At a fundamental level, we need to know by what mechanisms most children 'grow out' of their clinical food reactivity, even though IgE antibodies may persist; what determines the variability of individual target organ sensitivity; and what it is that renders some food antigens more highly allergenic than others.

Food intolerance

Non-immunological reactions are more common than true food allergies, especially in adults, but are more difficult to diagnose. In most cases they are attributable to pharmacological idiosyncrasies to a variety of natural dietary chemicals and/or food additives (11), and probably act via neurogenic rather than immunological pathways. In susceptible individuals, intolerances to xenobiotics of this kind exhibit clinical behaviour which is suggestive of receptor-mediated actions: dose-dependence (which may be cumulative); withdrawal effects, super-sensitivity and tachyphylaxis, depending on the circumstances of exposure; and cross-sensitivities with pharmacologically related substances. Many foods in the daily diet can contribute, and since reactions are often delayed by several hours, recognition of the connection between symptoms and specific foods can be difficult.

Clinical manifestations of food intolerances are generally more comparable to drug side-effects of idiosyncrasies than to allergies. They can be gastrointestinal, cutaneous, and/or neuropsychiatric, and may include non-specific constitutional symptoms such as headache, malaise, lethargy and myalgia. However, certain reactions, though not immunologically mediated, are clinically indistinguishable from true allergic reactions. Intolerances of this kind are sometimes referred to

rather ambiguously as 'pseudo-allergic reactions' and have been an important source of continuing confusion. The best examples are urticaria and angioedema. Although acute urticaria is a classical manifestation of IgE-mediated allergic reactions, the more common 'hives' of childhood and chronic 'idiopathic' urticaria in adults are non-immunological reactions, often triggered by substances in food. Diagnosis in such cases rests on the use of a carefully controlled elimination diet and systematic oral challenge testing with the relevant substances (11).

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