Food allergy is essentially a ‘developed world’ disease, with incidence increasing by up to five per cent per year in the UK. Although several theories have been proposed as to why we are seeing such increases, particularly in children, the cause remains unclear. Josephine Garvey describes the common food allergens and outlines the diagnostic tests used to investigate food allergies.

**KEY WORDS**
Food intolerance
Food allergy
Paediatrics

**REFERENCES**


needed. If the reaction is immediate indicating that it is IgE-mediated, the diagnosis is usually made using the skin prick test (SPT) and/or the radioallergosorbent test (RAST). Alternative tests claim to diagnose food allergy, for example sweat tests and hair analysis, although none have a scientific basis and are therefore not recommended.

Skin prick test The SPT will indicate the presence or absence of allergen-specific IgE in the skin, after exposure by pricking the epidermis with a specified allergen, for example, peanut extract. A reaction results in a bump or weal – known as a flare – which is often red. This is measured to determine severity. Antihistamine medications should not be taken 12–24 hours prior to the SPT to prevent false interpretations.

Because false positives occur, guidelines have been drawn up to ensure the results of an SPT are interpreted correctly (Sampson and Ho, 1997; Eigenmann and Sampson, 1998; Sampson, 2001). It requires an experienced analyst, who has undertaken a recognised training course, to interpret the results correctly.

The negative predictive accuracy of the SPT test, is 99 per cent and is its most useful attribute. If negative, you can be 99 per cent confident that the patient will not have an IgE-mediated reaction to that food (Sampson and Albergo, 1984). This makes it a useful test for screening prior to further tests. It is also relatively non-invasive, simple to use and fast, and is, therefore, the method of choice in most allergy clinics.

Radioallergosorbent test The RAST is also based on IgE. A sample of blood is used and the IgE response is tested against the specific allergens. Like the SPT it has its limitations, but in this case both the positive and negative predictive accuracy are generally poor. However, it has been considered useful in diagnosing allergy with foods including peanuts and sesame (Sampson and Ho, 1997). The RAST occasionally replaces the SPT when the skin is too sensitive or too damaged to test, for example in cases of severe eczema.

Both the SPT and RAST methods produce false positives, and conducting tests with several foods, without a clinical history, is contraindicated.

Diagnostic food exclusions Food exclusion is the only valid method available to diagnose non-IgE-mediated reactions, in which different immunoglobulins – often IgG and other sub-classes – are involved. Reactions may be delayed or present only after the consumption of a large dose of the allergen. Exclusions range from simple, such as a change of baby milk formula, to more complex restrictions such as the few foods diet – a strict, low-allergen diet, which lasts for 3–6 weeks, depending on response and compliance. It should be supervised by a dietitian or nutritionist to avoid nutritional deficits.

Maintenance exclusions are more long term, for example, infants who are intolerant to milk may avoid dairy products for up to two to three years. Children should be supervised appropriately to prevent nutritional deficiencies and monitored regularly to determine whether they have outgrown the reaction.

Food challenge This involves testing quantities of the suspected food allergen orally, either supervised in a hospital or clinic, or in the home. Its purpose is to objectively test whether the patient is truly allergic to the food (Box 1).

When there is a risk of a psychosomatic reaction, the test should be blind. The food should be increased in incremental doses and the final dose should be sufficient to reproduce the severity of the original reaction. In the clinical setting the single-blind challenge is used most commonly. Where the challenge is carried out will depend on the original symptoms, the current allergic status, as well as the psychosomatic risk. A home challenge should only be recommended by an allergy specialist after a thorough risk assessment.

Common food allergens Often called the big eight, these include dairy products, peanuts, tree nuts, fish and shellfish, eggs, wheat, soya, and seeds – particularly sesame.

Dairy products These are the most common allergen for children in this country and are the most common cause of IgE-mediated reactions in children under two years of age (Crespo, 1995). However, 77 per cent outgrow their allergy by two years, and 95 per cent by five years (Hill et al, 1995). Young infants with a dairy allergy are usually given an alternative milk formula.
Calcium-supplemented drinks are available for older children.

A dairy-free diet should exclude dairy foods and dairy product ingredients (Box 2). Many manufacturers add milk powder and dairy proteins to breads, cakes, biscuits and even some processed meats, and advice on reading the label as well as a provision for alternatives is therefore recommended.

When the protein in cow’s milk is the indicated allergen, all mammalian milk should be avoided, including goat’s milk and sheep’s milk. Breast milk, which has many other potentially protective factors should not be excluded. Products such as lactose (a milk sugar) and possibly fats (such as butter or ghee) are often tolerated depending on the severity of the reaction, which again should be established before restricting the diet.

Eggs Allergy to eggs is usually outgrown in early childhood. The egg protein involved is easily denatured by heat and processing, so children can often tolerate egg in food such as cakes and biscuits. It is important that the type of reaction is established before putting too many restrictions on the diet.

Peanuts Peanuts form part of the legume family, so botanically are not nuts. Although other legumes contain egg in food such as cakes and biscuits. It is important that they are reviewed by an allergy specialist before exclusion advice is given. Nuts such as pine nuts, chestnuts and coconuts are not cross-reactive and should not be excluded from the diet unless specific reactions are reported. However, sesame often cross-reacts with peanut and should be tested routinely.

Peanut and vegetable oils are often excluded unnecessarily. Highly processed, heat-extracted, refined oils are considered safe, while cold-extracted or cold-pressed oils are not (Hourihane et al, 1998). Lupine, a flower seed, is also highly reactive with peanuts and is often used in bakery products, especially in continental Europe.

Although the percentage of the population affected by peanut allergy is relatively small, it is considered the leading cause of fatal and near-anaphylactic reactions. However, Macdougal et al (2002) reported more fatal reactions, including death, from cow’s milk in younger children, with no deaths from a peanut allergy in children under 13 years.

Patients with a peanut allergy are at risk of accidental exposure and people with severe reactions should be given a written emergency plan.

Fish Reactions to fish, more commonly white fish such as cod and plaice, vary in severity. Shellfish allergy tends to be lifelong.

Wheat This allergy is commonly confused with gluten intolerance, which is an enzyme deficiency. Gluten is a protein found in wheat and to a lesser extent in oats, barley and rye. A person may be gluten intolerant, for example if they have coeliac disease, but be able to tolerate gluten-free wheat-based products. People with wheat allergy can tolerate oats, barley or rye, but not gluten-free wheat products.

Prevention There is little published evidence to support dietary intervention during pregnancy in the genetically susceptible child. Kramer (2002) proposed that a diet that avoids allergens during pregnancy is unlikely to reduce the risk of women at high risk giving birth to a child who has atopic allergies. Moreover, such a diet may have an adverse effect on maternal and/or foetal nutrition.

Breastfeeding is considered the ideal way to feed babies who are at risk of allergies. It has a number of nutritional, physiological and immunological advantages and is currently recommended for infants at risk of developing food allergy (Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment, 2000). The European recommendation is exclusive breastfeeding for the first four to six months of life in infants at risk of atopic allergies.

It is thought that the early introduction of solids before four months may increase the risk in potentially allergic infants. In Europe it is recommended that weaning is delayed by up to six months, while in the UK the recommendation is four to six months. Foods least likely to cause allergic reactions should be introduced first, and those presenting greater risk, such as wheat (found in one-third of weaning foods), dairy products, eggs, fish, nuts and seeds should be delayed. It is suggested that peanuts are avoided until three years of age.

Conclusion Food allergy remains a poorly understood problem, with many conflicting opinions and unscientific sources of information and a high rate of misdiagnosis. Consequently many patients with true allergies are not adequately informed and are, therefore, unprepared to deal with a severe reaction, which can be fatal. At the other extreme there is overdiagnosis. In order to deal with this dual problem, health care professionals need to improve their knowledge and diagnostic techniques so that they are better able to deal with the problem. In addition, clinicians involved in food allergy need to improve their communication network, particularly between specialists as well as with organisations involved with food allergies.

REFERENCES


USEFUL CONTACTS

Allergy UK
Tel: 020 8303 8583; www.allergyuk.org

The Anaphylaxis Campaign,
Tel: 01252 542029; www.anaphylaxis.org.uk

Coeliac UK
Tel: 01494 437278; www.coeliac.co.uk

National Asthma Campaign
Tel: 0207 7226 2260; www.asthma.org.uk

National Respiratory Training Centre
Tel: 01926 493313; www.nrtc.org.uk