SEVERE FOOD ALLERGIES

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ABSTRACT

Severe food allergies can either be life-threatening shortly after exposure to the offending food (IgE-mediated) or cause nutritional, growth or circulatory compromise after repeated ingestion of the allergen (non-IgE-mediated). Such allergies can have a major impact on the quality of life of patients and their families. Severe food allergies appear to be increasing worldwide and peak in preschool years, though fatal food allergies peak in adolescence and early adulthood. Fatal food allergic reactions are most commonly described with nuts and seafood, and in many cases the patient had been diagnosed with a food allergy but had not previously had a severe reaction to the food. Asthmatics and adolescents are at particular risk of fatal or near-fatal food allergic reactions and should be offered specialist care. Effective management of the patient with severe food allergy requires a multidisciplinary approach involving allergists, emergency care physicians, dieticians, caregivers and school personnel. A comprehensive emergency plan is central. Early recognition and treatment of food allergy reactions can be life-saving.

INTRODUCTION AND CLASSIFICATION

The food allergy epidemic, which has surfaced in the last 10-15 years, has brought with it an increase in severity and complexity of food allergies. Current data indicate that food allergy is most prevalent in young infants (5-10%) but continues to affect 1-2% of the general adult population.

Multiple or severe food allergies are associated with a significant reduction in quality of life, the potential towards nutritional compromise and anxiety associated with potentially life-threatening reactions. Food allergies permeate a person’s entire world from home to school to leisure activities.

Traditionally we have thought of ‘severe food allergies’ as IgE-mediated food allergies associated with anaphylaxis. I would advocate for extension of the term ‘severe food allergies’ to include: those allergies associated with nutritional compromise (e.g. severe food protein enteropathy with malabsorption, or multiple food allergy syndrome); those with potential long-term consequences (e.g. coeliac disease); as well as non-IgE-mediated reactions with circulatory or respiratory compromise (e.g. food protein-induced enterocolitis syndrome (FPIES), Heiner’s syndrome). A suggested classification of severe food allergy is demonstrated in Figure 1.

While this article focuses on severe IgE-mediated food allergy, which is the most common manifestation of severe food allergy, the severe non-IgE-mediated allergies are summarised in brief towards the end of the article.

SEVERE IgE-MEDIATED FOOD ALLERGIES

Anaphylaxis is a potentially life-threatening reaction, typically involving two or more systems, including respiratory and/or cardiovascular. Anaphylaxis involves release of significant amounts of mediators from mast cells and basophils, which can lead to rapid progression of signs and clinical lability. Prompt recognition and treatment of anaphylaxis is vital to prevent morbidity and even mortality.

While anaphylaxis can be caused by foods, drugs or venom, food allergy is the leading cause of anaphylaxis worldwide.

Epidemiology of food-induced anaphylaxis

The incidence of anaphylaxis is unclear and probably under-reported, ranging from 1 to 20 per 100 000 person years. Data on anaphylaxis from South Africa are severely restricted; most epidemiological data are from European, North American and Australian studies. Allergy-related emergencies may represent up to 1% of attendances in accident and emergency departments in Australia, France and the UK.

International studies report a 2-5-fold increase in hospital admissions and emergency presentations for severe food allergic reactions over the past 10-15 years. UK hospital admission data suggest that there has been a 250% increase in severe anaphylaxis between 1995 and 1999. Studies in Australia have shown a 7-fold increase in food-associated anaphylaxis in children in the decade from 1995 to 2006. Another study reviewing Australian hospital data on admissions and deaths from anaphylaxis between 1993 and 2005 showed an increase in anaphylaxis hospitalisations from 4.1 to 19.7/100 000 in the 0-4-year age group. This increase was attributed to the increase in food allergy.

Foods are the commonest cause of anaphylaxis in children, and in one series accounted for 94% of cases of anaphylaxis in the under-18 age group. Allergic reactions including anaphylaxis to foods are most common in preschool children, though fatalities in children are rare. In a British series of 58 cases of anaphylaxis, males under the age of 5 were most commonly affected; 31 cases occurred at home, and interestingly, 5 during food challenges in hospital. An Australian survey of over 4 000 children indicated that >90% of anaphylactic reactions occurred in preschool-aged children, the main foods implicated being peanut, milk and egg. Less than 10% of fatal reactions to foods have occurred in children under the age of 5.

In children, rates of food allergy are lower in girls than boys, though in adolescence and adulthood there seems to be a slight (60:40) female predominance for severe reactions.

Foods implicated in anaphylaxis

While any food protein can theoretically trigger anaphylaxis, by far the commonest foods involved are peanut, tree nut, milk, egg and seafood. In the British
A series of 58 children with severe anaphylaxis, milk and egg were most commonly implicated under the age of 1, between 1 and 3 years peanut, and over 4 years tree nuts. There are, however, geographical differences in patterns of IgE-mediated food allergies depending on consumption patterns; for example severe sesame seed allergy is more commonly observed in Israel than anywhere else.

In a review of adrenaline autoinjector prescription in patients at Red Cross Children’s Hospital in Cape Town in 2011, 39/41 autoinjectors were issued for food allergy; foods implicated were peanut in 64% of cases, tree nut in 13%, cow’s milk, egg and fish in 7% each, shellfish in 5% and soya in 2%. Multiple food allergies were present in 59%, and 38% had previously received adrenaline for severe food reactions.

The documented increase in peanut allergy is a particular concern, because of the potential for anaphylaxis and the propensity for lifelong sensitivity. Up to 30% of children with nut allergy may experience severe reactions. Anaphylaxis can also occur as a result of novel allergens and cross-reactivity syndromes. Novel allergens, such as lupin flour which can have allergenic cross-reactivity with peanut, are causing increasing numbers of severe food reactions in certain parts of the world, and in France the risk of peanut-allergic patients being allergic to lupin flour is now in the region of 30%. An increasing number of cases of anaphylaxis to soya are being described in patients with birch pollen sensitivity, because of cross-reactivity of the birch allergen Bet v 1 and the Gly m 4 protein in soya.

In young children, up to two-thirds with severe food reactions will experience their first severe reaction before the allergen is known to them. Despite vigilant attempts to avoid foods known to cause the allergy, allergens such as peanut, milk and egg are relatively ubiquitous, and masked allergens (such as in sauces) or even cross-contaminants during food preparation cause many cases of anaphylaxis.

**Risk factors for food-induced anaphylaxis**

The risk of anaphylaxis in an individual case depends on a number of factors including age, food involved, amount of food ingested, the presence of asthma and precipitating factors such as exercise.

- **Age:** Sub-lethal and lethal food allergy occurs most commonly in adolescents and young adults, partially as a result of an increase in risk-taking behaviour and a reduction in supervision.
- **Food involved:** Although anaphylaxis can occur to any food protein, severe anaphylaxis is most commonly described for peanut, tree nut and seafood. In nut allergy, no group can confidently be classified as being at low risk of systemic reactions, as even in those with previously mild symptoms, the risk of subsequent severe reaction is still 1-5%/year/subject.
- **Amount of food ingested:** The amount of allergen contact can affect the severity of the reaction. Patients with mild or moderate reactions to trace amounts of food or to food contact may have a severe reaction upon ingestion of a more substantial amount. Cases have been reported of anaphylaxis after cutaneous exposure to the food allergen, such as milk. In some patients, minute amounts of allergen ingested (as little as 1.5 mg) may be fatal.
- **Presence of asthma:** Asthma has been recognised as a frequent comorbidity in fatal food allergy, and the underlying severity of asthma is important in predicting the severity of allergic food reactions.

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**Fig 1. Classification of severe food allergy.**

<table>
<thead>
<tr>
<th>Severe Food Allergy</th>
<th>Severe IgE-Mediated Food Allergy</th>
<th>Severe Non-IgE or Mixed IgE/NON-IgE Food Allergy</th>
<th>Resulting in Long-Term Consequences, e.g. Cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaphylaxis</td>
<td>Resulting in Malnutrition/Growth Impairment</td>
<td>Resulting in Dehydration/Anaemia</td>
<td>e.g. FPIES/Heiner’s syndrome</td>
</tr>
<tr>
<td>e.g. severe food protein-induced enteropathy/eosinophilic oesophagitis/multiple food allergy of infancy</td>
<td></td>
<td></td>
<td>e.g. Coeliac Disease</td>
</tr>
</tbody>
</table>

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This is a representation of the classification of severe food allergy, showing the various outcomes and factors involved.
Life-threatening bronchospasm during a food allergy reaction is more likely to occur in patients with severe asthma (relative risk 6.8) than in those with mild asthma (relative risk 2.7). The prevalence of asthma in children with anaphylaxis is 30-40%.\textsuperscript{31} Though asthma has a much stronger link in more severe and fatal reactions.\textsuperscript{9,29} Awareness of the risks of those food allergic patients with asthma dictates that there should be a particularly rigorous approach to the diagnosis and management of coexistent food allergy and asthma.

**Exercise:** Food-associated exercise-induced anaphylaxis is a condition that is characterised by anaphylaxis to a specific allergenic food (and rarely to a non-specific meal) when exercise is performed close to the time of ingestion of the food. It usually occurs when the patient exercises within 4 hours of a meal, rare cases with exercise preceding the meal have been described.\textsuperscript{1} There are no symptoms with ingestion alone or with exercise alone. Causation is speculative; theories have included blood supply shunting away from the splanchnic vasculature during exercise, thus reducing allergen tolerance, or a lowered mast cell releasibility threshold induced by exercise.

**Fatal food reactions**

Deaths and near-fatal reactions are rare and may occur even when appropriate medical care is given immediately. In some cases, deterioration may be iatrogenic, e.g. excess intravenous adrenaline.\textsuperscript{39} Lethal anaphylaxis occurs in up to 2% of cases of severe anaphylaxis.\textsuperscript{40,41} Anaphylaxis causes 100-200 deaths per year in the USA.\textsuperscript{6,42}

In nearly all published food allergy mortality cases, the patients had a known history of allergy to the food to which they had a fatal reaction, but were unaware that the food they consumed actually contained the ingredient.\textsuperscript{43} The UK fatal anaphylaxis register demonstrates that over two-thirds of those dying from sting reactions and over four-fifths dying from drug anaphylaxis had no previous indication of their allergy, whereas those dying from food allergy had usually had previous reactions but these were typically not severe.\textsuperscript{44}

In nearly all cases adrenaline was not given in a timely fashion before the onset of respiratory arrest. Peanut, tree nut and seafood are the foods most commonly associated with near-fatal or fatal anaphylaxis.\textsuperscript{45} In 108 cases of food-related mortality in the UK, 75 were due to peanut and tree nut. Teenagers and young adults are at particular risk. Children, however, are not exempt, and in an American series of 32 food allergy deaths, 10 were in children under the age of 16 years, of which 8 were caused by nuts, the youngest in a 2-year-old child.\textsuperscript{20}

Patients with near-fatal or fatal anaphylaxis almost always have asthma.\textsuperscript{9,46} In 96% of the above-mentioned American series of 32 food allergy deaths the patient had a past history of asthma.\textsuperscript{29} In another UK study of 48 anaphylactic deaths between 1999 and 2006, 43/48 took daily asthma treatment, and in 10 cases the patients had an intercurrent exacerbation of asthma leading up to the severe food reaction.\textsuperscript{47} A greater number of anaphylatoxin receptors C3aR and C5aR have been found in the lungs of those with fatal asthma, suggesting those patients may have been more sensitive to anaphylaxis.\textsuperscript{48}

The mortality-prone patient may not have experienced a previous life-threatening reaction. In the last-mentioned UK series of 48 anaphylactic deaths, over 50% of deaths occurred in patients whose previous reaction to food was considered mild.\textsuperscript{47} It has been postulated that repeated accidental exposures may increase sensitisation and subsequently amplify the allergic response in the susceptible individual.\textsuperscript{40,50}

**Clinical features of food-induced anaphylaxis**

Anaphylaxis is typically rapidly progressive involving multiple organ systems. Timing of onset of anaphylactic symptoms varies widely, from seconds to a few hours after exposure. Common symptoms and signs associated with anaphylaxis are shown in Table I.

Cutaneous manifestations are present in 80-90% of cases of anaphylaxis.\textsuperscript{51} Skin signs, however, may be less prominent in near-fatal/fatal anaphylaxis. Sampson et al. reported 6 fatal and 7 non-fatal food-related anaphylactic reactions and noted that all children and adolescents with non-fatal reactions but only one child in the fatal group showed cutaneous signs during the anaphylactic event.\textsuperscript{46}

Respiratory compromise is the key problem in severe food reactions. Respiratory features vary from mild wheeze/stridor to severe dyspnoea, cyanosis or respiratory arrest. In a study of fatal food reactions in the UK, 42/47 cases suffered from respiratory arrest involving upper and/or lower airways at a median time of less than 30 minutes after ingestion.\textsuperscript{44,52}

Hypotensive shock is a less common and usually late feature; fluid extravasation and vasodilatation can cause an upper to 35% decrease in circulatory blood volume within 10 minutes.\textsuperscript{53}

**Table I. Common symptoms and signs associated with anaphylaxis**

<table>
<thead>
<tr>
<th><strong>Cutaneous</strong></th>
<th><strong>Respiratory</strong></th>
<th><strong>Cardiovascular</strong></th>
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<tbody>
<tr>
<td>Urticaria</td>
<td>Rhinoconjunctivitis</td>
<td>Collapse*</td>
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<tr>
<td>Angio-oedema</td>
<td>Throat tightness*</td>
<td>Hypotension*</td>
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<tr>
<td>Pruritus (including oral)</td>
<td>Change in voice*</td>
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<tr>
<td></td>
<td>Stridor*</td>
<td></td>
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<td></td>
<td>Wheeze*</td>
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<td></td>
<td>Difficulty in breathing/signs of respiratory distress*</td>
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</table>

*Symptoms or signs particularly associated with life-threatening reactions.

**Diagnosis of food-induced anaphylaxis**

**History:** A careful history is crucial, but a single adverse reaction to a food has an only 50% positive predictive value (PPV) for identifying the allergen.\textsuperscript{54} A history of 3 similar reactions to a food has a nearly 100% PPV.

**Allergy tests:** Skin-prick tests (with resuscitation medication and equipment) as well as specific IgE tests are useful to confirm the diagnosis and identify other previously unidentified allergens. It should be noted that the traditionally quoted 95% PPV for reactions may be population-specific. Component-resolved diagnostics can further refine the diagnostic process to assess for allergens associated with clinical severity and persistence (e.g. Ara h 2 in peanut allergy).

**Food challenges:** Even in severe allergy, allergy tests may be negative. In some cases, carefully

<table>
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*Symptoms or signs particularly associated with life-threatening reactions.*
controlled food challenges may be considered to try to identify the causative allergen if there is diagnostic uncertainty or to rule out those allergens which did not contribute towards a reaction. Such challenges are high risk requiring 1:1 nursing and IV access.

**Treatment of acute severe IgE-mediated reactions**

Effective recognition and treatment of acute severe food reactions requires close co-operation between emergency care physicians and allergists. In anaphylaxis, adrenaline is the preferred treatment and should be administered rapidly before symptoms progress to a point where outcome may be fatal. Early treatment of food-induced respiratory and cardiovascular symptoms can lead to resolution. For respiratory symptoms, prompt intramuscular adrenaline, followed by an adrenaline nebuliser (upper airways) or salbutamol nebuliser (lower airways), is needed. For hypotension, adrenaline, supine positioning and fluid resuscitation are vital.

Adrenaline is a powerful drug which is much safer by the intramuscular than intravenous (IV) route. IV adrenaline should be reserved for refractory cases in a resuscitation area; overzealous IV adrenaline can lead to arrhythmia and pulmonary oedema, which can even cause further clinical deterioration. A basic protocol for treatment of food-induced anaphylaxis is shown in the Resuscitation Council of South Africa Guidelines on p.122.

**Long-term management of severe IgE-mediated food allergy**

Patients with severe food allergy, as well as patients with food allergy and asthma, should ideally be managed in a specialised allergy clinic.

Food allergy has a dramatic impact on the patient’s and family’s quality of life. Serious food allergies make everyday aspects a complicated and exhausting process, including attending birthday parties and play dates, and using public transport. There is a fine balance between being overly involved and protective, thus potentially jeopardising a person’s emotional growth, and being slightly too ‘relaxed’, and taking unnecessary risks for the sake of normalcy. Optimal management of a person with allergy requires multidisciplinary support, and vast amounts of education of and cooperation from caregivers and schools. The aim is to make the environment as safe as possible for food allergy sufferers while keeping them as physically and emotionally healthy as possible.

The basic principles of long-term food allergy management are as follows:

**Dietary avoidance**

The preferred approach for food allergies is prevention, which entails complete elimination of the food from the patient’s environment and a consistent high level of alertness. Involvement of an experienced allergy-trained dietician is crucial.

In reality food elimination is extremely difficult, and there is always a degree of risk for a food allergic person to have a severe reaction. Improved education of parents, school and patients, as well as stringent food labelling, may help reduce the recurrence and severity of food-induced anaphylaxis.

**Written individualised allergy management plan and MedicAlert bracelet**

An allergy action plan should be in place outlining symptoms of allergic reactions and step-by-step treatment according to the severity of the reaction. Copies of the action plan should be at home, at school and with any regular caregivers. The action plan should be revised regularly.

The patient with severe food allergy should be encouraged to wear a MedicAlert bracelet/necklace.

The Food Allergy and Anaphylaxis Network have established a comprehensive set of criteria for emergency allergy action plans (Table II).

**Adrenaline autoinjector**

Prescription of an adrenaline autoinjector depends on the risk of future life-threatening anaphylaxis, and the benefits, risks and affordability of the intervention. The clinician should remember that an adrenaline autoinjector can create anxiety and social stigma. Careful selection of patients who should carry an adrenaline autoinjector should highlight the child at risk. Unselected provision of adrenaline pens to all food allergic children means the treatment modality can be ‘diluted’ and these really at risk are less easily identified.

Any patient with a previous severe IgE-mediated food reaction requires an adrenaline autoinjector, as do patients with food allergy and coexistent asthma. Nut allergy, remoteness from care, reactions to trace amounts of the allergen, and adolescents deserve further consideration.

The patient should receive frequent re-education on correct delivery of the adrenaline autoinjector and the expiry date should be checked regularly.

**Focus on high-risk groups**

Adolescents and young adults need special focus as they are the group at highest risk of life-threatening anaphylaxis. For adolescents with severe food allergy to be safe, they should be confident in managing their food avoidance plans, be competent and willing to communicate their plans to others and be competent to administer emergency treatment.

Asthmatics with food allergy are a particularly high-risk group, hence excellent asthma control should be rigorously maintained.

**Frequent review**

The pervasive effect of a severe food allergy means the support team should ‘walk and talk’ frequently with the family, re-educating and retraining at every opportunity. The patient/family should have a clear vision of the management plan, chances of developing tolerance, medication doses, etc.

**Food allergy and schools**

As food allergies increase in prevalence, a significant proportion of schools will have at least one child with a severe food allergy, and educators will need to know how to safely accommodate children with food allergy without discriminating against them. It is the right of the allergic child to be educated in a safe and healthy environment, not to be stigmatised as a result of their condition, and to be able to participate in all educational and recreational school activities to the same extent as their peers.

Severe food-allergic reactions may present for the first time at school and overall 20-30% of food reactions occur at school. Up to a third of those with reactions will have signs of a severe reaction. Every effort should be made to recognise and treat food-allergic reactions in the school environment.
Prevention of food anaphylactic reactions in children at risk at schools and preschools entails a multistep process:  

1. Obtaining medical information about the child at risk by school personnel. This includes a detailed allergy action plan and photo identification of the child.

2. Education of those involved in the care of the child concerning the avoidance of the allergen, risk and signs of anaphylaxis and administration of emergency medication. This includes the school head, the class teacher, the school nurse and cafeteria staff. Ideally a dietician should also provide a list of which foods to avoid. School staff should be indemnified against prosecution for the consequences of administering emergency or relieving medication.

3. Age-appropriate education of children about severe food allergies.

4. Implementation of practical strategies to avoid exposure to known triggers, for example:
   - The child's food should ideally be prepared at home and labelled clearly.
   - If the food is produced in a cafeteria, it should be prepared separately for the highly allergic child.
   - The child should not share food with other children.
   - Strict hand washing and bench-top washing before and after meals should be implemented.
   - Ideally the child should not be completely isolated during mealtimes, but precautions taken, e.g. a highly allergic child should ideally not be seated at the same table where the food allergen is being served.
   - In some cases, the child's specialist may provide a written request for removal of a certain food from a certain class/school.

**Novel treatment strategies**

Current management strategies in focus are dietary elimination, and treatment of accidental exposure to the food in question, without altering the natural course of the allergy. Several new treatment strategies focus on increasing the threshold of reactivity, so in effect offering a partial cure of the disease by making accidental exposures safer. Such strategies are still confined to the research realm and are not yet ready to be translated into everyday practice. The most promising of these strategies is oral immunotherapy (SOTI) and treatment with anti-IgE antibody. Further discussion of such strategies is beyond the scope of this article, and the reader is referred to an excellent recent review article.

**SEVERE NON-IgE-MEDIATED FOOD ALLERGIES**

Several non-IgE-mediated (and some mixed IgE/non-IgE) food allergy types deserve classification as a severe or potentially severe food allergy. Non-IgE-mediated food allergies may be triggered by a wide range of food allergens and are a chronic condition with long-term effects on nutrition, gastrointestinal function, feeding behaviours and overall development. Currently

<table>
<thead>
<tr>
<th>Table II. Food Allergy and Anaphylaxis Network (FAAN) list of suggested points to be included for food allergy action plans</th>
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</thead>
<tbody>
<tr>
<td>1. Title includes ‘food allergy’</td>
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<tr>
<td>2. Child’s picture</td>
</tr>
<tr>
<td>3. Birthday</td>
</tr>
<tr>
<td>4. Teacher’s name</td>
</tr>
<tr>
<td>5. Listed food allergen</td>
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<tr>
<td>6. Does the child have asthma?</td>
</tr>
<tr>
<td>7. Indicate that children with asthma are at higher risk for severe reaction</td>
</tr>
<tr>
<td>8. List of physical symptoms of a reaction</td>
</tr>
<tr>
<td>9. If allergen ingested, but no symptoms, what to do next?</td>
</tr>
<tr>
<td>10. Identify what medication to give, adrenaline or antihistamine for particular symptoms</td>
</tr>
<tr>
<td>11. Indicate that throat symptoms are life-threatening</td>
</tr>
<tr>
<td>12. Indicate that lung symptoms are life-threatening</td>
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<tr>
<td>13. Indicate that heart symptoms are life-threatening</td>
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<tr>
<td>14. Statement saying that if the reactions progress, give adrenaline or antihistamine</td>
</tr>
<tr>
<td>15. Name adrenaline autoinjector and dose</td>
</tr>
<tr>
<td>16. Blank line for medications/dose/route</td>
</tr>
<tr>
<td>17. Asthma inhalers and/or antihistamines cannot be depended on to replace adrenaline in anaphylaxis</td>
</tr>
<tr>
<td>18. Call emergency services (provide telephone number) and state to operator that an allergic reaction has been treated and additional adrenaline may be needed</td>
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<tr>
<td>19. Blank line for provider (doctor’s) name</td>
</tr>
<tr>
<td>20. Blank line for provider phone (doctor’s) number</td>
</tr>
<tr>
<td>21. Parent’s name</td>
</tr>
<tr>
<td>22. Parent’s phone number</td>
</tr>
<tr>
<td>23. Emergency contact’s name and phone numbers</td>
</tr>
<tr>
<td>24. If parent/guardian cannot be reached, do not hesitate to medicate or take child to medical facility</td>
</tr>
<tr>
<td>25. Parent’s signature</td>
</tr>
<tr>
<td>26. Provider’s (doctor’s) signature</td>
</tr>
<tr>
<td>27. Name of trained staff members to administer epinephrine</td>
</tr>
<tr>
<td>28. Detailed EpiPen instructions with illustration</td>
</tr>
<tr>
<td>29. Take used adrenaline to emergency department</td>
</tr>
<tr>
<td>30. Plan to stay in emergency department for at least 4 hours</td>
</tr>
</tbody>
</table>

Adapted from Powers et al.
there is a lack of clear diagnostic markers for non-IgE-mediated food allergy and complex dietary treatments are often required. Severe non-IgE-mediated food allergies include the following:

**Food allergies leading to nutritional compromise**

Food-allergy-associated pathology causing malabsorption (e.g., severe food protein enteropathy) or reduced intake (e.g., eosinophilic oesophagitis) may lead to nutritional compromise and failure to thrive. Patients with this form of allergy may have protein-energy malnutrition and significant feeding difficulties. Patients at risk of nutritional compromise need frequent review to assess possible development of tolerance, regular growth assessment, assessment of micronutrient status and specialist dietetic input.

With increasing food allergy complexity, ‘multiple food allergy of infancy’ syndrome (MFAI) is also becoming a more prevalent entity. 66 MFAI is characterised by intolerance to breast milk, cows’ milk, soy and extensively hydrolysed formula, as well as other common early weaning foods in infancy. The child usually presents within the first few weeks of life with symptoms which may include irritability and feeding refusal, persistent vomiting or reflux, chronic diarrhoea and failure to thrive. Infants with untreated MFAI may have severe growth impairment and may take 2-3 years to recover.

**Food allergy leading to dehydration or severe anaemia**

Food protein-induced enterocolitis syndrome (FPIES) is an infantile form of cell-mediated food hypersensitivity caused typically by cow’s milk and soya, also described in response to a variety of solids such as rice. 66 It is characterised by profuse vomiting and diarrhoea typically 1-2 hours after ingestion of the offending food. Twenty per cent of infants with FPIES progress to dehydration and shock, and are often misdiagnosed and overinvestigated until the pattern of return of symptoms with subsequent food exposure becomes evident. FPIES is thought to be related to T-cell secretion of tumour necrosis factor (TNF) alpha.

Heiner’s syndrome is a food hypersensitivity pulmonary disease that affects primarily infants, and is mainly caused by cow’s milk. 67 It can cause a chronic cough, wheeze, and pulmonary haemosiderosis and haemoptysis with resulting episodes of severe anaemia. High titres of precipitating antibodies to cow’s milk are diagnostic, and in pulmonary haemosiderosis, iron-laden macrophages are evident on the bronchoalveolar lavage.

**Food allergy causing long term consequences**

Coeliac disease (gluten-sensitive enteropathy) is an infantile form of cell-mediated food hypersensitivity and is associated with intestinal lymphoma and other forms of cancer, especially adenocarcinoma of the small intestine, pharynx and oesophagus. 68 Although these cancers are rare and classically only manifest after 15-20 years or more of disease, they have a poor prognosis. Strict adherence to a gluten-free diet, especially if started in the first few years of life, is the only preventative strategy.

**CLOSING REMARKS**

As food allergies continue to increase worldwide, severe and complex food allergies will increase too. Severe food allergies permeate several aspects of a patient’s life and should be approached in a multidisciplinary manner involving specialised medical and dietetic personnel, as well as parents and schools. All too often the condition is approached purely from a medical/clinical perspective.

We need the buy-in of an extended support team for effective management of acute food allergy reactions, as well as long-term management which enables the food allergic person to thrive and function normally in as safe an environment as possible.

**Declaration of conflict of interest**

The author declares no conflict of interest.

**REFERENCES**


35. Bahna SL. Adverse reactions by skin contact. Allergy 2003;59:566-70.


Eczema, stomach pain, diarrhoea, constipation or colicky...

Many allergic diseases develop in early childhood and may appear as symptoms you don’t automatically relate to allergy. Being unable to reduce your child’s dis-comfort and pain can cause a feeling of helplessness. But there’s an easy step you can take to help your child: Ask your doctor for an allergy blood test.

An allergy blood test is a quick and reliable way to help find out if your child is allergic and to what exactly. The result can be the first step towards a healthier and less worrisome childhood.

Can allergy be the cause?

Allergy blood test - be sure, be safe. Learn more at www.isitallergy.com