



Resuscitation Council (UK)

Emergency treatment of anaphylactic reactions

Guidelines for healthcare providers

Working Group of the Resuscitation Council (UK)

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Executive summary

- The UK incidence of anaphylactic reactions is increasing.
- Patients who have an anaphylactic reaction have life-threatening airway and/or breathing and/or circulation problems usually associated with skin and mucosal changes.
- Patients having an anaphylactic reaction should be recognised and treated using the Airway, Breathing, Circulation, Disability, Exposure (ABCDE) approach.
- Anaphylactic reactions are not easy to study with randomised controlled trials. There are, however, systematic reviews of the available evidence and a wealth of clinical experience to help formulate guidelines.
- The exact treatment will depend on the patient's location, the equipment and drugs available, and the skills of those treating the anaphylactic reaction.
- Early treatment with intramuscular adrenaline is the treatment of choice for patients having an anaphylactic reaction.
- Despite previous guidelines, there is still confusion about the indications, dose and route of adrenaline.
- Intravenous adrenaline must only be used in certain specialist settings and only by those skilled and experienced in its use.
- All those who are suspected of having had an anaphylactic reaction should be referred to a specialist in allergy.
- Individuals who are at high risk of an anaphylactic reaction should carry an adrenaline auto-injector and receive training and support in its use.
- There is a need for further research about the diagnosis, treatment and prevention of anaphylactic reactions.

Summary of changes from previous guideline

This guideline replaces the previous guideline from the Resuscitation Council (UK): *The emergency medical treatment of anaphylactic reactions for first medical responders and for community nurses (originally published July 1999, revised January 2002, May 2005).*¹

- The recognition and treatment of an anaphylactic reaction has been simplified.
- The use of an Airway, Breathing, Circulation, Disability, Exposure (ABCDE)* approach to recognise and treat an anaphylactic reaction has been introduced.
- The early use of intramuscular adrenaline by most rescuers to treat an anaphylactic reaction is emphasized.
- The use of intravenous adrenaline to treat an anaphylactic reaction is clarified. It must only be used by those skilled and experienced in its use in certain specialist settings.
- The age ranges and doses for adrenaline, hydrocortisone and chlorphenamine have been simplified.

*See Appendix 1 for more information about the ABCDE approach.

1. Introduction

1.1 Purpose of this guideline

The UK incidence of anaphylactic reactions is rising.² Despite previous guidelines, there is confusion about the diagnosis, treatment, investigation and follow-up of patients who have an anaphylactic reaction.³⁻⁵

This guideline replaces the previous guidance from the Resuscitation Council UK: *The emergency medical treatment of anaphylactic reactions for first medical responders and for community nurses (originally published July 1999, revised January 2002, May 2005).*¹

This guideline gives:

- An updated consensus about the recognition and treatment of anaphylactic reactions.
- A greater focus on the treatments that a patient having an anaphylactic reaction should receive. There is less emphasis on specifying treatments according to which specific groups of healthcare providers should give them.
- Recommendations for treatment that are simple to learn and easy to implement, and that will be appropriate for most anaphylactic reactions.

There are no randomised controlled clinical trials in humans providing unequivocal evidence for the treatment of anaphylactic reactions; moreover, such evidence is unlikely to be forthcoming in the near future. Nonetheless, there is a wealth of experience and systematic reviews of the limited evidence that can be used as a resource.⁶

This guideline will not cover every possible scenario involving an anaphylactic reaction; the guidance has been written to be as simple as possible to enable improved teaching, learning and implementation. Improved implementation should benefit more patients who have an anaphylactic reaction.

1.2 Scope of this guideline

This guideline is for healthcare providers who are expected to deal with an anaphylactic reaction during their usual clinical role (e.g., doctors, nurses, paramedics) working in the hospital or out-of-hospital setting. There is considerable variation and overlap between the skills and knowledge of different healthcare providers who are expected to treat an anaphylactic reaction. We have therefore deliberately not developed guidelines for specific groups of healthcare provider.

Individuals who are involved in resuscitation regularly are more likely to have advanced resuscitation skills than those who are not. This guideline does not expect individuals to obtain intravenous access in an emergency if this is not part of their usual role. Rather, individuals should use skills that they know and use regularly. This will make it more likely that these skills are used effectively on the rare occasions when they are needed to treat an anaphylactic reaction. Any extra skills specifically for the treatment of a patient with an anaphylactic reaction should be reasonably easy to learn, remember and implement (e.g., intramuscular (IM) injection of adrenaline).

The Association of Anaesthetists of Great Britain & Ireland and the British Society for Allergy and Clinical Immunology have published specific guidance for the treatment of anaphylactic reactions associated with anaesthesia (www.aagbi.org and www.bsaci.org).

There is also specific guidance for managing medicines in schools, nurseries and similar settings (www.allergyinschools.org.uk and www.medicalconditionsatschool.org.uk).^{7 8}

The treatment of a patient having an anaphylactic reaction in any setting is the same for children and adults.⁹ Any differences will be highlighted.

1.3 Key points

Treatment of an anaphylactic reaction should be based on general life support principles:

- Use the Airway, Breathing, Circulation, Disability, Exposure (ABCDE*) approach to recognise and treat problems.
- Call for help early.
- Treat the greatest threat to life first.
- Initial treatments should not be delayed by the lack of a complete history or definite diagnosis.

Patients having an anaphylactic reaction in any setting should expect the following as a minimum:

- Recognition that they are seriously unwell.
- An early call for help.
- Initial assessment and treatments based on an ABCDE* approach.
- Adrenaline therapy if indicated.
- Investigation and follow-up by an allergy specialist.

*See Appendix 1 for more information about the ABCDE approach.

1.4 Methods

Organisations involved in the previous guidelines nominated individuals for the Working Group. The co-chairs (appointed by the Executive Committee of the Resuscitation Council UK) identified the key issues that needed to be addressed based on review of the previous guidelines and a database of frequently asked questions and comments.¹⁰ The group met in January and November 2007. Draft versions of the document were discussed within the group by email. Experts from outside the group were consulted for specific issues.

A draft version of the guideline was made available for comment on the Resuscitation Council (UK) website (www.resus.org.uk) between 25th September and 4th November 2007. The document was accessed 15,432 times in this period. The feedback was reviewed at the November working group meeting and the document updated. This guideline was made available on the Resuscitation Council (UK) website in January 2008.

2. Anaphylaxis

2.1 Definition of anaphylaxis

A precise definition of anaphylaxis is not important for the emergency treatment of an anaphylactic reaction. There is no universally agreed definition. The European Academy of Allergology and Clinical Immunology Nomenclature Committee proposed the following broad definition:¹¹

Anaphylaxis is a severe, life-threatening, generalised or systemic hypersensitivity reaction.

This is characterised by rapidly developing life-threatening airway and/or breathing and/or circulation problems usually associated with skin and mucosal changes.

2.2 Epidemiology

One of the problems is that anaphylaxis is not always recognised, so certain UK studies may underestimate the incidence. Also, as the criteria for inclusion vary in different studies and countries, a picture has to be built up from different sources.

Incidence rate

The American College of Allergy, Asthma and Immunology Epidemiology of Anaphylaxis Working group summarised the findings from a number of important international epidemiological studies and concluded that the overall frequency of episodes of anaphylaxis using current data lies between 30 and 950 cases per 100,000 persons per year.¹²

Lifetime prevalence

The same group provided data indicating a lifetime prevalence of between 50 and 2000 episodes per 100,000 persons or 0.05-2.0%.¹² More recent UK primary care data concur, indicating a lifetime age-standardised prevalence of a recorded diagnosis of anaphylaxis of 75.5 per 100,000 in 2005.¹³ Calculations based on these data indicate that approximately 1 in 1,333 of the English population have experienced anaphylaxis at some point in their lives.

Other data

A retrospective study of Emergency department attendances, identifying only the most severe cases, and relating this number to the population served, estimated that approximately 1 in 3,500 patients had an episode of anaphylaxis during the study period 1993-4.¹⁴ Taking specific causes of anaphylaxis where prevalence and

severity data are available, there are 1 million cases of venom anaphylaxis and 0.4 million cases of nut anaphylaxis up to age 44 years worldwide.

Triggers

Anaphylaxis can be triggered by any of a very broad range of triggers, but those most commonly identified include food, drugs and venom.¹⁵ The relative importance of these varies very considerably with age, with food being particularly important in children and medicinal products being much more common triggers in older people.¹⁶ Virtually any food or class of drug can be implicated, although the classes of foods and drugs responsible for the majority of reactions are well described.¹⁷ Of foods, nuts are the most common cause; muscle relaxants, antibiotics, NSAIDs and aspirin are the most commonly implicated drugs (Table 1). It is important to note that, in many cases, no cause can be identified. A significant number of cases of anaphylaxis are idiopathic (non-IgE mediated).

Stings	47	29 wasp, 4 bee, 14 unknown
Nuts	32	10 peanut, 6 walnut, 2 almond, 2 brazil, 1 hazel, 11 mixed or unknown
Food	13	5 milk, 2 fish, 2 chickpea, 2 crustacean, 1 banana, 1 snail
Food possible cause	17	5 during meal, 3 milk, 3 nut, 1 each - fish, yeast, sherbet, nectarine, grape, strawberry
Antibiotics	27	11 penicillin, 12 cephalosporin, 2 amphotericin, 1 ciprofloxacin, 1 vancomycin
Anaesthetic drugs	39	19 suxamethonium, 7 vecuronium, 6 atracurium, 7 at induction
Other drugs	24	6 NSAID, 3 ACEI, 5 gelatins, 2 protamine, 2 vitamin K, 1 each - etoposide, acetazolamide, pethidine, local anaesthetic, diamorphine, streptokinase
Contrast media	11	9 iodinated, 1 technetium, 1 fluorescein
Other	3	1 latex, 1 hair dye, 1 hydatid

Table 1. Suspected triggers for fatal anaphylactic reactions in the UK between 1992-2001¹⁵

NSAID – Non steroidal anti-inflammatory drug

ACEI – Angiotensin Converting Enzyme Inhibitor

