



Anaphylaxis

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Introduction

Anaphylaxis, an extreme systemic allergic reaction, occurs within minutes or hours of a susceptible person's exposure to his/her "trigger factor(s)", and is a potentially life-threatening medical emergency requiring immediate recognition and treatment. Foods, especially peanuts and foods containing peanut, are by far the commonest trigger factors in children, although the possibility of other triggers such as latex rubber, antibiotics and other medications, insect venoms, exercise, or massive exposure to cold must also be considered. Most episodes of anaphylaxis occur in the community rather than in a hospital.

Diagnosis

Anaphylaxis episodes are characterized by sudden onset and brief (less than 24 hours) duration. The body systems involved, the symptoms and signs, and the severity and duration of the episode may vary not only from child to child, but also in the same child on different occasions. Anaphylaxis usually involves the skin and one or more other systems, as follows:

- Stage I skin symptoms and signs; itching, flushing, urticaria, and angioedema (swelling of the subcutaneous tissue).
- Stage II skin symptoms and signs as above; plus one or more of the following: respiratory symptoms (rhinorrhea, voice change, cough, dyspnea); gastrointestinal symptoms (nausea, cramping); tachycardia.
- Stage III skin symptoms and signs as above; plus one or more of the following: vomiting, diarrhea, defecation; stridor, bronchospasm, cyanosis; and/or hypotension.
- Stage IV skin symptoms and signs as above; GI symptoms as above; respiratory arrest and/or cardiac arrest.

It is important to note that **hypotension is a late sign and patients should be treated in the early stages of anaphylaxis in order to prevent hypotension from developing.** If the diagnosis of anaphylaxis is suspected but not clear, for example, in a child presenting with hives and coughing, treat presumptively.

RESOURCES



Obtaining a serum tryptase level within a few hours of the onset of the episode may provide helpful, confirmatory evidence along with the clinical history and physical examination.

Treatment

As soon as the diagnosis of anaphylaxis is made or suspected, first-aid treatment in the form of an *intramuscular injection of epinephrine* should be given. The correct dose is 0.01 mg/kg of a 1/1000 solution, to a maximum of 0.3 mg (0.3 mL). After this first-aid treatment, the child should be taken to the nearest hospital for further evaluation and treatment.

Children with a history of anaphylaxis are at risk for subsequent episodes and death. *All children who have had one or more episodes of anaphylaxis should have injectable epinephrine with them or with their parent or caregiver at all times, and should wear some form of Medic-Alert identification.* The responsibility for their well-being should be shared with a certified Clinical Immunology and Allergy specialist who will perform the appropriate tests to confirm the trigger factor suggested by the history, provide detailed advice about avoidance of the trigger, and also provide some information about the natural history of anaphylaxis.

Canadian Paediatric Surveillance Program for anaphylaxis

The primary objective of this surveillance program for anaphylaxis is to ascertain the true incidence of the disorder in Canadian infants, children, and adolescents. An important additional objective is to obtain detailed information about anaphylaxis in this population; for example: who is at risk, where the anaphylactic reactions occur, what triggers them, how they are treated, and what long-term follow-up is given.

During the first nine months of surveillance for anaphylaxis in the Canadian Paediatric Surveillance Program, we have received 349 case reports, which are presently being reviewed and validated. Most of the physicians reporting anaphylaxis are based in community offices or in hospital outpatient clinics.

At the end of the surveillance period, the information obtained will be used for the development of educational materials for patients, their families, and their physicians.

References

1. Sly RM. Anaphylaxis. In: Behrman RE, Kliegman RM, Jenson HB, eds. *Nelson's Textbook of Pediatrics*. 16th Ed. Philadelphia, PA: W.B. Saunders Company, 2000:686-8.
2. Simons FER, Roberts JR, Gu X, Simons KJ. Epinephrine absorption in children with a history of anaphylaxis. *J Allergy Clin Immunol* 1998; 101:33-7.



Anaphylaxis (continued)

Frequently asked questions

Choose the one best answer.

1. What physical sign(s) listed below is(are) characteristic of anaphylaxis?
 - a) hives
 - b) wheezing
 - c) stridor
 - d) collapse
 - e) all of the above
2. Which of the following may provoke anaphylaxis in children?
 - a) milk
 - b) latex rubber
 - c) amoxicillin
 - d) all of the above
 - e) none of the above
3. Which of the following food items may contain peanut?
 - a) milk chocolate bar
 - b) vanilla ice cream
 - c) satay sauce
 - d) all of the above
 - e) none of the above
4. Which of the following should be given as first aid by child/parent/caregiver at the first symptoms/signs of anaphylaxis, before transfer to hospital?
 - a) H₁-antihistamine, e.g., diphenhydramine (Benadryl)
 - b) epinephrine
 - c) prednisone
 - d) oxygen
 - e) none of the above
5. What is the preferred route of epinephrine administration in the first-aid treatment of anaphylaxis?
 - a) subcutaneous
 - b) intramuscular
 - c) inhaled (pressurized metered-dose-inhaler)
 - d) inhaled (nebulizer/face mask)
 - e) intravenous

Answers: 1. e); 2. d); 3. d); 4. b); 5. b)

RESOURCES