Anaphylaxis

Definition

Anaphylaxis is defined as:[1, 2, 3]

1) The acute onset of a reaction (minutes to hours) with involvement of the skin, mucosal tissue or both and at least one of the following: a) respiratory compromise or b) reduced systemic blood pressure or signs/symptoms of end-organ dysfunction.
2) Two or more of the following that occur rapidly after exposure to a particular allergen for that patient: involvement of the skin/mucosal tissue, respiratory compromise, reduced blood pressure or associated symptoms, and/or persistent gastrointestinal symptoms.
3) Reduced blood pressure after exposure to a known allergen.

Clinical Presentation

Anaphylaxis has many different signs and symptoms and can present differently among patients. The most common manifestation of anaphylaxis is cutaneous, including urticarial and angioedema, and can occur up to 90% of the time. However, the absence of cutaneous signs does not rule out anaphylaxis.[4] The respiratory system is the second most common system affected, including dyspnea, bronchospasm, and wheezing. The gastrointestinal and cardiovascular systems can be affected as well, including nausea, vomiting, diarrhea, abdominal pain, and hypotension.[5] Other less common manifestations can occur such as headache.

Signs and symptoms of anaphylaxis can appear within minutes of exposure to an allergen. Be aware that some reactions can appear greater than 30 minutes after exposure. Anaphylaxis can be biphasic, meaning that symptoms can recur hours after resolution of the initial phase. When this occurs, most of the time it is within 10 hours. Patients should be monitored for at least a few hours after initial resolution of symptoms with consideration of overnight observation after more severe episodes (the optimal duration of the observation period has not been established in the literature).[7]

When discharged, patients must be counseled of these facts and strong consideration should be made to provide auto-injectable epinephrine along with instructions for use.[2, 3]

Management of Anaphylaxis–Immediate Intervention[3]

Clinicians must be aware that initial mild symptoms may progress rapidly into a life-threatening situation unless identified and treated promptly. Epinephrine is the only first-line treatment, and delay in administration can lead to serious consequences. Treatment recommendations and decisions to transfer patients to a different care setting are made on an individual basis by the physician. Please note that the following recommendations do not have to be followed in the stepwise order presented and many of these interventions should happen simultaneously.

1. Assess airway, breathing, and circulation. Monitor vital signs.
2. Administer epinephrine:
   Aqueous epinephrine 1:1000 dilution (1 mg/ml): 0.2-0.5 ml IM in lateral thigh or subcutaneously every 5 min as necessary to control symptoms. In children, 0.01 mg/kg, MAXIMUM SINGLE DOSE is 0.3mg.
3. Call 911.
4. Place patient in supine position with lower extremities elevated.
5. Administer oxygen.
6. Obtain IV access and administer rapid IV fluid replacement.
7. Place tourniquet above injection site.
8. Consider diphenhydramine 1-2 mg/kg or 25-50 mg/dose parenterally. NOTE: H1 antihistamines are second-line and should not be administered instead of epinephrine in the treatment of anaphylaxis.
9. Consider ranitidine for children and adults and cimetidine for adults only. For ranitidine, use 50mg in adults and 12.5-50mg (1 mg/kg) in children. For cimetidine, use 4 mg/kg IV in adults. There is no pediatric dose for cimetidine.

   NOTE: H2 blockers are considered second-line and should not be administered instead of epinephrine.

www.aaoaf.org | aaoa@aaoaf.org | 202.955.5010 | 11130 Sunrise Valley Drive, Suite 100, Reston, VA 20191

10. Consider inhaled beta-agonist (MDI or nebulized) for bronchospasm.
11. Consider IV steroids. NOTE: steroids do not work acutely and should not be used in place of epinephrine.
12. Consider advanced cardiac life support measures for cardiopulmonary arrest during anaphylaxis.
13. Endotracheal intubation or a surgical airway may be needed if respiratory distress persists or worsens after initial treatment.
14. Consider glucagon in patients taking beta-blockers with refractory symptoms. The recommended dose is 1-5 mg administered IV over 5 minutes followed by a 5 to 15 mcg/min infusion; titrate infusion rate to achieve an adequate clinical response.

    In children, the dose is 20–30 mcg/kg (maximum: 1 mg), followed by an infusion of 5 to 15 mcg/minute; titrate the infusion rate to achieve an adequate clinical response.

Please note that epinephrine is the only medication that is required to be available in the office where allergy skin testing and immunotherapy are performed. Keeping some of the above medications on hand can be considered by individual physicians and practices based on their location and proximity to pharmacy services.

Prevention

Clinicians should recognize that there are certain factors that could potentially put patients at increased risk of anaphylaxis. These include active asthma, immuno–therapy escalation, vial prepared in another office, errors in dosing, injection of wrong patient serum, immuno–therapy injections during peak allergy season, first injection from a new vial, and history of anaphylaxis.[6]

It remains controversial if preceding large local reactions predict systemic reactions.[7] Underlying medical conditions must be taken into consideration if treatment of anaphylaxis may pose a significant health risk (e.g., administration of epinephrine in patient with cardiovascular disease).

Medications prescribed for common medical conditions can also place patients at increased risk. Beta-blocker therapy may render a patient more refractory to management with epinephrine. ACE inhibitors have been shown to increase risk of anaphylaxis in those undergoing venom immunotherapy.[8]

Patient Education

Patients undergoing immunotherapy and those with a history of anaphylaxis should be instructed on how to recognize signs and symptoms of anaphylaxis. They should also be instructed on how to properly administer auto-injectable epinephrine. Family members of children should be educated on recognition and initial treatment of anaphylaxis with epinephrine.

Preparation

Offices and facilities administering immunotherapy should be prepared to treat anaphylaxis. Physicians and office staff should have an established protocol in place, which can be reinforced with rehearsal drills.[6] Anaphylaxis treatment medications, in particular epinephrine, should be immediately available and replaced if used or expired. Health providers administering injections should be trained in the recognition and management of anaphylaxis. It is recommended to continually review medications patients take prior to administration of immunotherapy to avoid placing patients at higher risk of a systemic reaction.

1 Sampson HA, Munoz-Furlong A, et al. *Second symposium on the definition and management of anaphylaxis: Summary report–second National Institute of Allergy and Infectious Disease/Food Allergy and Anaphylaxis network symposium* J Allergy Clin Immunol 2006; 117:391-7.

2 Tang A. *A Practical Guide to Anaphylaxis.* Am Fam Physician 2003; 68:1325-32.

3 Lieberman P, Nicklas R, et al. *The diagnosis and management of anaphylaxis practice parameter: 2010 Update.* J Allergy Clin Immunol 2010; 126:477-80.

4 Lieberman P. *The risk and management of anaphylaxis in the setting of immunotherapy.* Am J Rhinol Allergy 26, 469-474, 2012.

5 Hurst DS, Gordon BR, et al. *Safety of Home Based and Office Allergy Immunotherapy: a multicenter prospective study.* Otolaryngol Head and Neck Surg 1999; 121:553-561.

6 Simons FE, Ardusso LR, et al. *World Allergy Organization Anaphylaxis Guidelines: 2013 Update on the Evidence Base.* Int Arch Allergy Immunol. 2013;162(3):193-204.

7 Lieberman P. *Recognition and First-line Treatment of Anaphylaxis.* Am J Med. 2014 Jan;127(1 Suppl):S6-11.

8 Simons FE, Ardusso LR, et al. *World Allergy Organization Anaphylaxis Guidelines: 2013 Update on the Evidence Base.* Int Arch Allergy Immunol. 2013; 162(3):193-204.

11130 Sunrise Valley Drive, Suite 100, Reston, VA 20191 | 202.955.5010 | aaoa@aaoaf.org | www.aaoaf.org