

# Management of Anaphylaxis



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## KEYWORDS

- Anaphylaxis • Epinephrine • Subcutaneous immunotherapy • Allergic rhinitis
- Asthma

## KEY POINTS

- Cutaneous manifestations including urticaria, angioedema, and flushing are the most common physical examination findings in anaphylaxis.
- Intramuscular epinephrine should be administered in any patient suspected of having an anaphylactic episode with 0.2 to 0.5 mL at a concentration of 1:1000 for adults and 0.01 mg/kg in pediatric patients.
- Serum tryptase is currently the most helpful laboratory test to evaluate for anaphylaxis, although other tests are investigated that may increase the sensitivity of testing.
- Patients receiving subcutaneous immunotherapy should be observed for at least 30 minutes after injection. Screening for asthma and dose reduction during pollen season may decrease the risk of anaphylaxis.

## INTRODUCTION

### *Definition and Epidemiology*

Although first described in 1901, a meaningful and accurate definition of anaphylaxis is still being refined. Anaphylaxis is defined as a severe systemic reaction that is potentially fatal and caused by exposure to an allergy-causing substance.<sup>1</sup> The lifetime risk of anaphylaxis in the US population is approximately 1.6% and the frequency of hospital admissions are reportedly increasing, likely owing to the increase seen in food allergy, although mortality has slightly decreased.<sup>2,3</sup>

The causes of anaphylaxis are complex and diverse, including foods, medications, insect stings, and systemic mast cell degranulating disorders. Food triggers are the most common cause of anaphylaxis, followed by medications, and hospital admissions for food-related anaphylaxis in children more than doubled from 2000 to 2009.<sup>4</sup> The most common foods that cause anaphylaxis are peanuts, tree nuts, shellfish, fish, egg, and cow's milk.<sup>5</sup> Risk factors for fatal food-related anaphylaxis include

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adolescent age, history of allergy to peanuts or tree nuts, asthma, and patients without obvious cutaneous symptoms.

The 2 most common medications causing anaphylaxis are antibiotics (beta-lactam) and nonsteroidal antiinflammatory drugs.<sup>2,5</sup> Testing for medication-induced anaphylaxis remains lacking and history continues to be important in determining the etiology. The most common etiology for anaphylaxis in the allergy office is the administration of subcutaneous immunotherapy (SCIT), which warrants appropriate training and continued education of staff, as well as preparedness to treat this potentially fatal reaction.

## **DIAGNOSIS OF ANAPHYLAXIS**

### ***Signs and Symptoms of Anaphylaxis***

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Cutaneous manifestations are the most common, with urticaria and angioedema occurring in up to 90% of patients and flushing of the skin in more than one-half of patients.<sup>6</sup> It is uncommon for patients to have pruritus without urticaria. Respiratory symptoms include dyspnea or wheezing is seen in approximately 50% of patients and upper airway angioedema in more than one-half of all patients. Gastrointestinal symptoms such as nausea, vomiting, diarrhea, and discomfort can also occur, and have been reported in approximately one-third of patients. Hypotension and shock occur in severe episodes.

Elements of the history that are important to obtain in patients suspected of experiencing anaphylaxis include foods and medications ingested within 6 hours of the episode, activity during the episode, duration, time of day, location, stings or bites, heat or cold exposure, associated symptoms, recurrence of symptoms, and treatment provided.<sup>5</sup>

### ***Differential Diagnosis of Anaphylaxis***

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Several other conditions can present with symptoms similar to anaphylaxis, including vasovagal reactions and disorders that cause flushing of the skin, angioedema, and/or vocal cord dysfunction. Vasovagal reactions are quite common and should be differentiated from anaphylaxis. Pallor, diaphoresis, bradycardia, hypotension, and a lack of cutaneous manifestations such as urticaria, pruritus, angioedema, and flushing characterize vasovagal reactions. Bradycardia can also occur during anaphylaxis, but tachycardia is often a precursor to bradycardia in an anaphylactic episode.<sup>5</sup>

Flushing of the skin can be caused by medications such as niacin, angiotensin-converting enzyme inhibitors, vancomycin, and ingestants such as alcohol, monosodium glutamate, and scombroid fish. Scombroidosis occurs after consuming spoiled fish containing increased levels of histamine. In these cases the tryptase levels would be normal.<sup>7</sup> Other syndromes such as mastocytosis, carcinoid, vasointestinal polypeptide tumors, and medullary carcinoma of the thyroid can cause flushing of the skin that may be confused with anaphylaxis.

Tests that can help to establish a diagnosis of anaphylaxis during or in the immediate subsequent period include serum tryptase, histamine, 24-hour urinary histamine metabolites, and urinary prostaglandin D<sub>2</sub>. Typically, serum tryptase is considered the most helpful test to establish a diagnosis of anaphylaxis, although studies have shown that plasma histamine levels, cysteinyl leukotrienes, and prostaglandins may be more sensitive and remain under further investigation.<sup>8</sup> Tryptase peaks up to an hour and a half after the initial onset of anaphylaxis and can remain elevated several hours afterward.

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