

Managing Anaphylaxis

Anaphylaxis is an acute, potentially life-threatening, systemic allergic reaction.¹ Anaphylaxis can present with a wide range of symptoms, from hives to loss of consciousness. Common causes of anaphylaxis include food allergies, medications, and stinging insects.^{1,6} The chart below answers common questions about managing anaphylaxis, including the role of epinephrine, antihistamines, and steroids.

Clinical Question	Answer/Pertinent Information		
How is anaphylaxis diagnosed?	<ul style="list-style-type: none"> • Diagnostic criteria for anaphylaxis are difficult to outline, due to the wide range of signs and symptoms and a lack of reliable or timely laboratory testing.^{1,4} • Diagnosis of anaphylaxis during the acute episode is typically based on clinical signs and symptoms.⁷ • Anaphylaxis may be likely if a patient has sudden onset (minutes to hours) of:¹ <ul style="list-style-type: none"> ○ skin and/or mucosal symptoms (e.g., hives, itching, flushing, angioedema) AND at least one of the following: <ul style="list-style-type: none"> ▪ respiratory symptoms (e.g., shortness of breath, wheezing, cough, hypoxemia) ▪ low blood pressure ▪ symptoms of end organ damage (collapse, syncope) <p>OR</p> <ul style="list-style-type: none"> ○ Two or more of the following after exposure to a SUSPECTED allergen/trigger: <ul style="list-style-type: none"> ▪ skin and/or mucosal symptoms (e.g., hives, itching, flushing, angioedema) ▪ respiratory symptoms (e.g., shortness of breath, wheezing, cough, hypoxemia) ▪ low blood pressure or end organ damage (collapse, syncope) ▪ gastrointestinal symptoms (e.g., abdominal pain and cramping, vomiting) <p>OR</p> <ul style="list-style-type: none"> ○ low systolic blood pressure (<90 mmHg [adults]) or >30% drop in BP (adults or children) after a KNOWN allergen exposure 		
How are anaphylaxis symptoms classified?	Mild ¹⁰	Moderate ¹⁰	Severe ^{10,*}
	<ul style="list-style-type: none"> • erythema • hives • angioedema 	<ul style="list-style-type: none"> • chest or throat tightness • dyspnea, wheezing, stridor (high pitched wheezing; more common in children than adults) • nausea, vomiting, abdominal pain • dizziness • diaphoresis 	<ul style="list-style-type: none"> • cyanosis, oxygen saturation \leq92% • hypotension • confusion, loss of consciousness • incontinence <p>*Risk factors for severe and/or fatal anaphylaxis include cardiovascular disease, asthma, older age, and coexisting comorbid conditions.¹</p>

Clinical Question	Answer/Pertinent Information
What is the role of epinephrine?	<ul style="list-style-type: none">• Use intramuscular (IM) epinephrine first-line to treat anaphylaxis, injecting into the anterolateral thigh (upper front of thigh, toward the side, away from the middle) [Evidence Level C]. Dose is 0.01 mg/kg up to a max of 0.5 mg (adults) or 0.3 mg (children).^{1,7}<ul style="list-style-type: none">○ Epinephrine auto-injectors (e.g., <i>EpiPen</i>) are the preferred delivery method due to faster time to administration and reduced rate of errors.¹¹ See our chart, Emergency Epinephrine Injection Devices, for details on availability, dosing, and administration.○ IM administration achieves faster and higher concentrations compared to the subcutaneous administration.^{4,12}○ During anaphylaxis, feel comfortable using IM epinephrine, even in patients with a history of cardiovascular disease. Adverse cardiovascular events are rare and usually associated with improper dosage or administration.⁴• Repeat doses as needed every five to 15 minutes for continuing symptoms.^{1,7,12}
What is important to know about biphasic anaphylaxis?	<ul style="list-style-type: none">• Biphasic anaphylaxis is a recurrence of anaphylaxis symptoms (with no further exposure to causative trigger) beginning an hour or more after an asymptomatic period.^{1,12}• Up to about 20% of patients who experience anaphylaxis may experience a repeat episode within about 72 hours.^{1,4,6} Most occur within six to twelve hours.¹²• There are not good predictors of which patients have these recurrent episodes of anaphylaxis. Consider the following as possible indicators of an increased risk for these recurrent episodes of anaphylaxis:^{1,6}<ul style="list-style-type: none">○ history of recurrent anaphylaxis within about 72 hours of an initial anaphylactic reaction.○ severity of anaphylactic reaction (more severe reactions may be more likely to recur).○ more than one dose of epinephrine needed to treat the initial anaphylactic reaction.○ history of asthma or wheezing.○ delayed onset of symptoms of anaphylaxis (e.g., more than one hour after exposure).• Consider longer observation periods for patients with severe anaphylaxis or those who require more than one dose of epinephrine to monitor for recurrent episodes of anaphylaxis.^{1,6}
What is the role of antihistamines?	<ul style="list-style-type: none">• Do NOT rely on antihistamines to prevent biphasic anaphylaxis.^{1,11}• Do NOT use antihistamines as a substitute for epinephrine.^{1,6,12} Antihistamines:^{1,6}<ul style="list-style-type: none">○ have slow onset of action (~30 minutes or more after oral administration).○ are NOT able to stabilize mast cells or target other mediators of anaphylaxis.○ do NOT treat respiratory (e.g., bronchospasm) or cardiovascular symptoms (e.g., hypotension) of anaphylaxis.• It is NOT necessary to use antihistamines WITH epinephrine. When treating anaphylaxis, consider ADDING an antihistamine AFTER epinephrine to ease cutaneous symptoms (i.e., itching associated with urticaria, flushing).^{1,6,12}<ul style="list-style-type: none">○ Any antihistamine can be used. Newer antihistamines (e.g., cetirizine) have a longer duration of action and less sedation compared to older antihistamines (e.g., diphenhydramine), while maintaining a similar onset of action.¹○ Though there are not data demonstrating efficacy, some protocols may add an H2-blocker (e.g., ranitidine).^{1,2}

Clinical Question	Answer/Pertinent Information
What is the role of steroids?	<ul style="list-style-type: none">• Do NOT rely on steroids to prevent biphasic anaphylaxis.^{1,6,11}• Do NOT use steroids as a substitute for epinephrine.¹² Steroids:^{1,6}<ul style="list-style-type: none">○ have a slow onset of action (up to four to six hours regardless of route of administration).○ are unable to reverse acute symptoms of anaphylaxis.• When treating anaphylaxis, the addition of steroids AFTER epinephrine may be considered as optional or adjunctive therapy in patients with asthma or recent steroid use (due to potentially suppressed HPA axis).^{6,11,12}• Dexamethasone (orally) or methylprednisolone (intravenously) are examples of steroids used in anaphylaxis protocols.²
What is the role of antihistamines/steroids as premedication?	<ul style="list-style-type: none">• Follow your institution’s protocols when considering premedicating patients with antihistamines and/or steroids to prevent hypersensitivity reactions with:¹<ul style="list-style-type: none">○ chemotherapy.¹○ immunotherapy; to reduce systemic reactions, especially in patients with a higher risk of anaphylaxis fatality (e.g., underlying cardiovascular disease, concurrent use of beta-blockers).¹○ some patients receiving IV radiocontrast media. See our chart, Safe Use of IV Contrast, for details.
What is the role of beta-agonist therapy during anaphylaxis?	<ul style="list-style-type: none">• For patients who experience bronchospasm during anaphylaxis, inhaled beta-agonist therapy can be added on (e.g., albuterol [US]; salbutamol [Canada]).^{7,8,12}<ul style="list-style-type: none">○ For example, albuterol 8 puffs OR 2.5 to 5 mg via nebulizer given every 20 minutes as needed.^{2,8}• Some protocols also add ipratropium 0.5 mg inhaled by nebulizer.^{5,9}
What follow-up is appropriate for patients who experience anaphylaxis?	<ul style="list-style-type: none">• Ensure patients are prescribed epinephrine auto-injectors.^{4,6} Some data indicate only 63% of kids diagnosed with anaphylaxis in the emergency department are prescribed epinephrine at discharge.⁴• Educate all patients who experience anaphylaxis about:^{1,6}<ul style="list-style-type: none">○ avoidance of anaphylaxis triggers.○ possible signs and symptoms.○ recurrent episodes of anaphylaxis within about 72 hours of an initial anaphylactic reaction.○ treatment with epinephrine.• Refer patients to an allergist.¹• Talk to patients about thresholds for care.¹ For example:^{1,4}<ul style="list-style-type: none">○ Watchful waiting/monitoring may be appropriate for an itchy nose, sneezing, or mild stomach discomfort.○ Epinephrine should always be given immediately for severe symptoms (e.g., shortness of breath, wheezing, trouble swallowing, low blood pressure).• Ensure patients have an allergy and anaphylaxis plan.³ These can be personalized for patients:<ul style="list-style-type: none">○ US: AAAAI’s Anaphylaxis Emergency Action Plan (http://www.aaaai.org/Aaaai/media/MediaLibrary/PDF%20Documents/Libraries/Anaphylaxis-Emergency-Action-Plan.pdf).○ Canada: Food Allergy Canada (https://foodallergycanada.ca/tools-and-downloads/downloads/emergency-plan-forms/).

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Levels of Evidence

In accordance with our goal of providing Evidence-Based information, we are citing the **LEVEL OF EVIDENCE** for the clinical recommendations we publish.

Level	Definition	Study Quality
A	Good-quality patient-oriented evidence.*	<ol style="list-style-type: none"> 1. High-quality randomized controlled trial (RCT) 2. Systematic review (SR)/Meta-analysis of RCTs with consistent findings 3. All-or-none study
B	Inconsistent or limited-quality patient-oriented evidence.*	<ol style="list-style-type: none"> 1. Lower-quality RCT 2. SR/Meta-analysis with low-quality clinical trials or of studies with inconsistent findings 3. Cohort study 4. Case control study
C	Consensus; usual practice; expert opinion; disease-oriented evidence (e.g., physiologic or surrogate endpoints); case series for studies of diagnosis, treatment, prevention, or screening.	

***Outcomes that matter to patients** (e.g., morbidity, mortality, symptom improvement, quality of life).

[Adapted from Ebell MH, Siwek J, Weiss BD, et al. Strength of Recommendation Taxonomy (SORT): a patient-centered approach to grading evidence in the medical literature. *Am Fam Physician* 2004;69:548-56. <https://www.aafp.org/pubs/afp/issues/2004/0201/p548.html>.]

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