

## Anaphylaxis and Allergic Reaction

(Adapted from an evidence-based guideline created using the National Prehospital Evidence-Based Guideline Model Process)

### Aliases

Anaphylactic Shock

### Patient Care Goals

1. Provide timely therapy for potentially life-threatening reactions to known or suspected allergens to prevent cardiorespiratory collapse and shock
2. Provide symptomatic relief for symptoms due to known or suspected allergens

### Patient Presentation

#### Inclusion Criteria

Patients of all ages with suspected allergic reaction and/or anaphylaxis

#### Exclusion Criteria

No recommendations

### Patient Management

#### Assessment

1. Evaluate for patent airway and presence of oropharyngeal edema
2. Auscultate for wheezing and assess level of respiratory effort
3. Assess for adequacy of perfusion
4. Assess for presence of signs of anaphylaxis
  - a. Anaphylaxis – More severe and is characterized by an acute onset involving:
    - i. The skin (urticaria) and/or mucosa with either respiratory compromise or decreased BP or signs of end-organ dysfunction

**OR**

  - ii. Hypotension for that patient after exposure to a known allergen
    1. Adults: Systolic BP *less than* 90
    2. Pediatrics: see **Appendix VIII – Abnormal Vital Signs**

**OR**

  - iii. Two or more of the following occurring rapidly after exposure to a likely allergen:
    1. Skin and/or mucosal involvement (urticaria, itchy, swollen tongue/lips)
      - a. Skin involvement may be ABSENT in up to 40% of cases of anaphylaxis
    2. Respiratory compromise (dyspnea, wheeze, stridor, hypoxemia)
    3. Persistent gastrointestinal symptoms (vomiting, abdominal pain, diarrhea)
    4. Hypotension or associated symptoms (syncope, hypotonia, incontinence)
- b. Non-anaphylactic Allergic Reaction
  - i. Signs involving only **one** organ system (e.g. localized angioedema that does not compromise the airway, or not associated with vomiting; hives alone)

## Treatment and Interventions

### Basic Life Support

1. Begin "Initial Medical Care".
2. Follow "Airway Management" protocol if applicable.
3. Follow "Oxygen Administration" protocol if applicable.
4. Call for an ALS unit if patient has wheezing, stridor, or shows other signs of respiratory distress or nausea/vomiting.
5. If patient has a prescribed Epi auto-injector and is experiencing stridor and/or hypotension, assist patient with or administer one dose of the patient's own Epi auto-injector.
6. If patient does not have a prescribed Epi-auto injector and displays signs of anaphylaxis, administer epinephrine 1mg/mL at the following dose and route:
  - a. Adult (25kg or more) 0.3 mg IM in the anterolateral thigh
  - b. Pediatric (less than 25kg) 0.15 mg in the anterolateral thigh
7. If signs of anaphylaxis and hypoperfusion persist following the first dose of epinephrine, additional IM epinephrine can be repeated every 5-15 minutes at above noted doses.

### Advanced Life Support

1. If signs of allergic reaction without signs of anaphylaxis, go to **Step 4**
2. If signs of anaphylaxis, administer epinephrine 1mg/mL at the following dose and route:
  - a. Adult (25kg or more) 0.3 mg IM in the anterolateral thigh
  - b. Pediatric (less than 25kg) 0.15 mg in the anterolateral thigh
  - c. Epinephrine 1mg/mL may be administered from a vial or via auto-injector, if available
3. For urticaria or pruritus, administer a diphenhydramine 1 mg/kg, up to maximum dose of 50 mg IM, IV, or PO)
  - a. The IV route is preferred for the patient in severe shock
  - b. As a supplement to diphenhydramine given for urticaria, any H2-blocking antihistamine (e.g. famotidine, cimetidine) can be given IV or PO in conjunction with diphenhydramine
4. If respiratory distress with wheezing is present, consider administering
  - a. Albuterol 2.5-5 mg nebulized

**AND/OR**

  - b. Epinephrine 1mg/mL, 5mL nebulized
5. If stridor is present, consider administering epinephrine 1mg/mL, 5mL nebulized
6. If signs of anaphylaxis and hypoperfusion persist following the first dose of epinephrine, additional IM epinephrine can be repeated every 5-15 minutes at above noted doses
7. For signs of hypoperfusion, also administer 20 mL/kg isotonic fluid (normal saline or lactated Ringer's) rapidly (over 15 minutes) via IV or IO, and repeat as needed for ongoing hypoperfusion
8. Consider an epinephrine IV drip (0.5 mcg/kg/minute) when cardiovascular collapse (hypotension with altered mental status, pallor, diaphoresis and/or delayed capillary refill) is present despite repeated IM doses of epinephrine in conjunction with at least 60 mL/kg isotonic fluid boluses

9. Transport as soon as possible, and perform ongoing assessment as indicated. Cardiac monitoring is not required, but should be considered for those with known heart problems or who received multiple doses of epinephrine

### **Patient Safety Considerations**

1. Time to epinephrine delivery
2. Concentration of epinephrine in relation to route
3. Weight-based dosing of medications

### **Notes/Educational Pearls**

#### **Key Considerations**

1. Allergic reactions and anaphylaxis are serious and potentially life-threatening medical emergencies. It is the body's adverse reaction to a foreign protein (e.g. food, medicine, pollen, insect sting or any ingested, inhaled, or injected substance). A localized allergic reaction (e.g. urticaria or angioedema that does not compromise the airway) may be treated with antihistamine therapy. When anaphylaxis is suspected, EMS personnel should always consider epinephrine as first-line treatment. Cardiovascular collapse may occur abruptly, without the prior development of skin or respiratory symptoms. Constant monitoring of the patient's airway and breathing is essential.
2. Contrary to common belief that all cases of anaphylaxis present with cutaneous manifestations, such as urticaria or mucocutaneous swelling, a significant portion of anaphylactic episodes may not involve these signs and symptoms on initial presentation. Moreover, most fatal reactions to food-induced anaphylaxis in children were not associated with cutaneous manifestations.
3. A thorough assessment and a high index of suspicion are required for all potential allergic reaction patients – consider:
  - a. History of Present Illness
    - i. Onset and location
    - ii. Insect sting or bite
    - iii. Food allergy/exposure
    - iv. New clothing, soap, detergent
    - v. Past history of reactions
    - vi. Medication history
  - b. Signs and Symptoms
    - i. Itching or urticaria
    - ii. Coughing, wheezing, or respiratory distress
    - iii. Chest tightness or throat constriction
    - iv. Hypotension or shock
    - v. Persistent gastrointestinal symptoms (nausea, vomiting, and diarrhea)
    - vi. Altered mental status
  - c. Other Considerations
    - i. Angioedema (drug-induced)
    - ii. Aspiration/airway obstruction
    - iii. Vasovagal event
    - iv. Asthma or COPD
    - v. Heart failure

4. Gastrointestinal symptoms occur most commonly in food-induced anaphylaxis, but can occur with other causes
  - a. Oral pruritus is often the first symptom observed in patients experiencing food-induced anaphylaxis
  - b. Abdominal cramping is also common, but nausea, vomiting, and diarrhea are frequently observed as well
5. Patients with asthma are at high risk for a severe allergic reaction
6. There is no proven benefit to using steroids in the management of allergic reactions and/or anaphylaxis
7. There is controversy among experts with very low quality evidence to guide management for the use of empiric IM epinephrine after exposure to a known allergen in asymptomatic patients with a history of prior anaphylaxis

#### **Pertinent Assessment Findings**

1. Presence or absence of angioedema
2. Presence or absence of respiratory compromise
3. Presence or absence of circulatory compromise
4. Localized or generalized urticaria
5. Response to therapy

#### **Quality Improvement**

##### **Associated NEMESIS Protocol(s) (eProtocol.01)**

- 9914111 – Medical-Allergic Reaction/Anaphylaxis

##### **Key Documentation Elements**

- Medications given
- Dose and concentration of epinephrine given
- Route of epinephrine administration
- Time of epinephrine administration
- Signs and symptoms of the patient

##### **Performance Measures**

- Percentage of patients with anaphylaxis that receive epinephrine for anaphylaxis:
  - Via the IM route (vs. other routes)
  - Via the IM route in the anterolateral thigh (vs. other locations)
- Percentage of patients with anaphylaxis who receive:
  - Epinephrine within 10 minutes of arrival
  - The appropriate weight-based dose of epinephrine
- Percentage of patients that require airway management in the prehospital setting (and/or the emergency department)
- **EMS Compass® Measure** (for additional information, see [www.emscompass.org](http://www.emscompass.org))
  - *PEDS-03: Documentation of estimated weight in kilograms.* Frequency that weight or length-based estimate are documented in kilograms

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