Anaphylaxis

Gabriel Ortiz, MPAS, PA-C, DFAAPA
Pediatric Pulmonary Services- El Paso Texas

Co-founder, Past-Pres. AAPA-Allergy Asthma Immunology
AAPA Liaison to American Academy of Allergy Asthma Immunology (AAAAAI)
AAAAAI Liaison to AAPA
Faculty Disclosure for
Gabriel Ortiz, MPAS, PA-C

Consultant- Merck, Mylan, Sunovion, TEVA

Speakers Bureau- Aerocrine, Genentech, Merck, Mylan, Sunovion, TEVA
Thermo Fisher Scientific,
Learning Objectives

• 1. Implement guideline-based strategies for the accurate diagnosis of anaphylaxis

• 2. Explain the rationale for the appropriate use of injectable epinephrine as first-line therapy for the treatment of anaphylaxis

• 3. Discuss the use of an emergency action plan that includes education on risk factors
Classification, Risk Factors, and Signs and Symptoms of Anaphylaxis
Classification of Human Anaphylaxis

Human Anaphylaxis

Immunologic

- IgE, FcεRI
  - Foods, venoms, latex, drugs

- Non-IgE, FcεRI
  - Dextran, OSCS (contaminant in heparin)

Nonimmunologic

Idiopathic

- Other
  - Drugs such as NSAIDs, opioids, neuromuscular blocking agents, radiocontrast media

- Physical
  - Exercise, cold

ANAPHYLACTOID

IgE = immunoglobulin E; FcεRI = high-affinity IgE receptor; OSCS = over-sulfated chondroitin sulfate.

Factors That Increase Risk of an Event or Potentiate Its Severity

Infants
Cannot describe their symptoms

Adolescents and young adults
Increased risk-taking behaviors

Surgery, labor and delivery
Risk from medications (eg, antibiotic to prevent neonatal group B strep infection)

Elderly
Increased risk of fatality from medication or venom-triggered anaphylaxis

Factors That Increase Risk of an Event or Potentiate Its Severity (cont’d)

Comorbid Diseases

- Asthma and other respiratory diseases
- Cardiovascular diseases
- Allergic rhinitis and eczema
- Psychiatric illness (e.g., depression)

Concurrent Medications/Ethanol/Recreational Drug

- β-adrenergic blockers and ACE inhibitors (may result in more severe reaction, may reduce effectiveness of epinephrine)
- Ethanol/sedatives/hypnotics/antidepressants/recreational drugs (potentially affect recognition of anaphylaxis triggers and symptoms)

aAtopic diseases are a risk factor for anaphylaxis triggered by food, exercise, and latex, but not for insect stings, β-lactam antibiotics, or insulin. ACE = angiotensin converting enzyme.

### Frequency and Occurrence of Signs and Symptoms of Anaphylaxis

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>Percent(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cutaneous</strong></td>
<td></td>
</tr>
<tr>
<td>Urticaria or angioedema</td>
<td>85-90</td>
</tr>
<tr>
<td>Flushing</td>
<td>45-55</td>
</tr>
<tr>
<td>Pruritus without rash</td>
<td>2-5</td>
</tr>
<tr>
<td><strong>Respiratory</strong></td>
<td></td>
</tr>
<tr>
<td>Dyspnea, wheeze</td>
<td>45-50</td>
</tr>
<tr>
<td>Upper airway angioedema</td>
<td>50-60</td>
</tr>
<tr>
<td>Rhinitis</td>
<td>15-20</td>
</tr>
<tr>
<td><strong>Hypotension, dizziness, or syncope</strong></td>
<td>30-35</td>
</tr>
<tr>
<td><strong>Abdominal</strong></td>
<td></td>
</tr>
<tr>
<td>Nausea, vomiting, diarrhea, or cramping pain</td>
<td>25-30</td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td></td>
</tr>
<tr>
<td>Headache</td>
<td></td>
</tr>
<tr>
<td>Substernal pain</td>
<td></td>
</tr>
<tr>
<td>Seizure</td>
<td></td>
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<tr>
<td>Sense of impending doom</td>
<td></td>
</tr>
</tbody>
</table>

:\(^a\) Percentages are approximations.

**ACTION ITEM:**

Recognize that cutaneous symptoms are present in as many as 90% of anaphylaxis cases, and in the absence of a known allergen, involvement of ≥2 systems is indicative of anaphylaxis.

Anaphylaxis Is Likely When 1 of the Following Criteria Is Met

1. Sudden onset of an illness, with involvement of the skin, mucosal tissue, or both (minutes to several hours):
   
   **AND at least 1 of these:**
   
   1. Sudden respiratory symptoms
   2. Sudden reduced BP or symptoms of end-organ dysfunction

   **OR**

2. 2 or more of the following that occur suddenly after exposure to a likely allergen or other trigger for that patient (minutes to several hours):

   1. Sudden skin or mucosal symptoms
   2. Sudden respiratory symptoms
   3. Sudden reduced BP or symptoms of end-organ dysfunction
   4. Sudden gastrointestinal symptoms

   **OR**

3. Reduced BP after exposure to a known allergen for that patient (minutes to several hours)

BP = blood pressure; GI = gastrointestinal.

Which of the following is the ideal route of delivery for epinephrine?

1. Inhaled
2. Intravenous
3. Intramuscular
4. Subcutaneous

Use your keypad to vote now!
A second dose of epinephrine can be administered after the first dose in as little as:

1. 5 minutes  
2. 10 minutes  
3. 20 minutes  
4. 40 minutes

Use your keypad to vote now!
Case Study:
John, 7-Year-Old Boy
Case Study: John, 7-Year-Old Boy (cont’d)

• Review of allergic history:
  – No history of anaphylaxis before recent event
  – Developed localized hives on neck after drinking milk at 1 year of age
Pharmacologic Management of Anaphylaxis
Acute Management When Anaphylaxis Is Suspected

• Administer IM epinephrine\textsuperscript{a} quickly
  – Repeat every 5 to 10 minutes if necessary

• Place patient in supine position with legs elevated

• Consider oxygen for patients who:
  – Have prolonged reactions
  – Have pre-existing hypoxemia or myocardial dysfunction

\textbf{ACTION ITEM:}
Intramuscular epinephrine can be administered every 5 to 10 minutes if necessary for the treatment of patients with anaphylaxis

\textsuperscript{a} IM epinephrine (to lateral aspect of thigh) from 1:1,000 dilution (1 mg/mL) injected as 0.2 to 0.5 mL (0.01 mg/kg in children, maximum dose 0.3 mg) to control symptoms and increase blood pressure

Additional Measures When Anaphylaxis Is Suspected

• Evaluate hypotension and need for IV fluids

<table>
<thead>
<tr>
<th>In general</th>
<th>Persistent hypotension &lt;90/60 mm Hg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children &gt;1 to 10 years</td>
<td>Systolic &lt;70 mm Hg + (2x age in years)</td>
</tr>
<tr>
<td>&gt;10 years</td>
<td>Systolic &lt;90 mm Hg</td>
</tr>
</tbody>
</table>

• Individualize observation

IV = intravenous.
Other Factors to Consider When Treating an Anaphylactic Episode

• Types of supportive treatments
  – IV fluids for hypotension
  – Antihistamines, corticosteroids, vasopressors, or glucagon

• Severity and rate of progression of the episode

• Onset of action and method of administration of the drug(s) administered