Anaphylaxis in the Community
Anaphylaxis Community
Expert Faculty

Eric L. Caplan, M.D.
*Board Certified Allergy / Immunology*

Colorado Springs Allergy & Asthma Clinic

www.csallergy.com
Anaphylaxis Community Experts

- National program developed and hosted by Allergy & Asthma Network in partnership with the American College of Allergy Asthma and Immunology, National Association of School Nurses and American School Health Association.
- Sponsored by Mylan Specialty L.P.
Anaphylaxis Community Experts

Disclosure Statement

- Speaker for Mylan
- Not a brand specific talk however so no conflicts
- I receive zero reimbursement for giving this talk
Anaphylaxis Community Experts
Program Objectives

Participants will be able to:

• Identify patients at risk
• Recognize early signs and symptoms
• Discuss anaphylaxis mediators and reasons epinephrine is first line of treatment
• Discuss rationale for prescribing two epinephrine auto-injectors
Patients at Risk

- Prior history of anaphylaxis
- Asthma
- Food allergies
- Pollen/food allergies
- Patients/parents who do not perceive the above as risk factors
Early Signs and Symptoms

• Are not always outwardly obvious in the early stages
• The difference between early and late may be a matter of moments, minutes or hours and may include:
  — Feeling of impending doom
  — Urticaria
  — Shortness of breath, wheezing
  — Oral pharyngeal swelling
  — Vomiting
  — Lightheadedness
Anaphylaxis is likely in any ONE of the following scenarios:

- Acute onset of an illness (minutes to several hours) with involvement of the skin, mucosal tissue, or both
- Respiratory compromise (eg, dyspnea, wheezing-bronchospasm)
- Reduced BP or associated symptoms of end-organ dysfunction

AND AT LEAST ONE OF THE FOLLOWING

- Reduced BP after exposure to known allergen (minutes to several hours):
  - Infants and children: Low SBP (age specific) or >30% decrease in SBP*
  - Adults: SBP of <90 mm Hg or >30% decrease from that person’s baseline

- >2 of the following that occur rapidly after exposure to a likely allergen (minutes to several hours):
  - Involvement of the skin-mucosal tissue (eg, generalized hives, itch-flush, swollen lips-tongue-uvula)
  - Respiratory compromise
  - Reduced BP or associated symptoms
  - Persistent gastrointestinal symptoms (eg, crampy abdominal pain, vomiting)

SBP=systolic blood pressure.

* Low SBP for children is defined as <70 mm Hg from 1 month to 1 year, <(70 mm Hg plus [2 x age]) from 1 to 10 years, and <90 mm Hg from 11 to 17 years.

Case One

A 37 y/o male w/ long history of allergic rhinitis and mild intermittent asthma; develops acute urticaria and shortness of breath 30 minutes after eating pecans.

Patient was treated in the ER w/ an albuterol inhalation and 50 mg of Benadryl® IM. Symptoms resolved within 90 minutes.
Was this patient treated appropriately?

A) Yes
B) No
Anaphylaxis Treatment

Considerations

- Rate of progression or outcome not predictable
- Mediators responsible for the event
- Pharmacokinetics and pharmacodynamics
Median Time to Respiratory or Cardiac Arrest

- **FOODS**: 30 min
- **VENOMS**: 15 min
- **IATROGENIC REACTIONS**: 5 min

Pumphrey RS. *Clin Exp Allergy*. 2000;30(8):1144-50
Many Mediators Cause Anaphylactic Symptoms

- Leukotrienes
- Prostaglandins
- Kinins

- Platelet activating factor
- Interleukins
- Tumor necrosis factor
- Histamine
Actions of Epinephrine: Antagonize Effects of All Mediators

Epinephrine

- $\alpha_1$-adrenergic receptor: ↑ Vasoconstriction, ↑ Peripheral vascular resistance, ↓ Mucosal edema
- $\alpha_2$-adrenergic receptor: ↓ Insulin release
- $\beta_1$-adrenergic receptor: ↑ Inotropy, ↑ Chronotropy
- $\beta_2$-adrenergic receptor: ↑ Bronchodilation, ↑ Glycogenolysis, ↓ Mediator release

Epinephrine IM: Time to Onset

Maximum pharmacodynamic effect occurs before 10 min

Antihistamines: Time to Suppression

Time to 50% suppression

- Fexofenadine: 101.2 min
- IM Diphenhydramine: 51.7 min
- PO Diphenhydramine: 79.2 min

Take Home Messages

• Anaphylaxis can progress rapidly w/ death occurring in minutes.
• Anaphylactic reactions are caused by multiple mediators.
• Epinephrine is rapid-acting and antagonizes the effects of all mediators.
• Antihistamine does not act fast enough and antagonizes only the effects of histamine.
• Epinephrine is the first line of treatment for anaphylaxis.
Case Two

A 16 y/o male was stung by a bee and suffered acute urticaria, shortness of breath and dizziness.

After ER treatment w/ epinephrine, cortisone and oxygen, he was given a prescription for two (two-pack) epinephrine auto-injectors.

Patient’s mom gave one to her son to carry, left one at school, kept one in her purse and one at home thinking if her son was stung, he'd be protected against a fatal anaphylactic reaction.
Was she right?

A) YES

B) NO
Two Doses are Readier than One

- Episode severity, duration is not predictable

- Episode may respond to initial treatment but return minutes or hours later - biphasic

- An episode may be protracted; the patient may need more drug before help arrives
Patterns of Anaphylaxis

- Uniphasic: symptoms resolve within minutes or hours after treatment and do not reoccur

- Biphasic: symptoms reoccur 1-72 hours after resolution of symptoms

- Protracted: symptoms continue for hours or days
Biphasic Anaphylaxis

**Antigen Exposure**

- **Initial Symptoms**
  - **Symptomatic**
  - **Asymptomatic**
  - Treatment

- **Second-Phase Symptoms**
  - **Symptomatic**
  - Treatment

- **Time**
  - 0
  - 1-24 hours
  - 1-8 hours

**Treatment**
Number of Patients Experiencing Anaphylaxis Subtypes

<table>
<thead>
<tr>
<th>Subtype</th>
<th>Number</th>
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<tr>
<td>Protracted</td>
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<tr>
<td>Biphasic</td>
<td>5</td>
</tr>
<tr>
<td>Uniphasic</td>
<td>13</td>
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N=25


Number of Patients
Patients Requiring Additional Doses of Epinephrine

Severity of Anaphylaxis

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percent of Patients</th>
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<tbody>
<tr>
<td>Grade I</td>
<td>11/54</td>
</tr>
<tr>
<td>Grade II</td>
<td>12/29</td>
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<tr>
<td>Grade III</td>
<td>13/18</td>
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Frequency of the Need for Two Injections Regardless of Cause

% of Patients Requiring a 2nd Dose

<table>
<thead>
<tr>
<th>Korenblat</th>
<th>Webb</th>
<th>Varghese, Lieberman</th>
<th>Haymore</th>
<th>Kelso</th>
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<tr>
<td>35</td>
<td>31</td>
<td>33</td>
<td>25</td>
<td>16</td>
</tr>
</tbody>
</table>

% of Patients Requiring > 1 Dose of Epinephrine During Anaphylactic Reaction

Varghese M et al. AAAAI 2006;
Attacks may progress in severity

Take Home Messages

• Patients may require two or more doses because of severity, protracted course, or biphasic reactions
• The need for more than one dose occurs in up to 35% of episodes
• There is no way to predict who will require more than one dose based on the severity of previous events
Case Three

A 15 y/o girl w/ a history of tree pollen allergy develops itching of her mouth, soft palate and ears each time she eats apples, pears and fresh vegetables. The reactions have worsened over the last two years and recently include a dry cough.
Would you prescribe an epinephrine auto-injector for this girl?

A) YES
B) NO
Pollen Food Allergy Syndrome

- **Rosaceae**
  - Apple
  - Peach
  - Plum
  - Pear
  - Cherry
  - Apricot
  - Almond

- **Apiaceae**
  - Carrot
  - Celery
  - Parsley
  - Caraway
  - Fennel
  - Coriander
  - Aniseed

- **Fabaceae**
  - Soybean
  - Peanut
  - Hazelnut

- **Betulaceae**
  - Birch

- **Cucurbitaceae**
  - Cantaloupe
  - Honeydew
  - Watermelon
  - Zucchini
  - Cucumber

- **Musaceae**
  - Banana

- **Anaphylaxis Community Experts**

- **Allergy & Asthma Network**

- **ACAAI**
  - American College of Allergy, Asthma & Immunology
Pollen Food Allergy Syndrome (PFAS) Oral Allergy Syndrome (OAS) + systemic reactions

- PFAS emphasizes that one may have not only oropharyngeal symptoms but systemic symptoms 2-10% of the time
- While usually associated only with raw foods, cooked plant foods may provoke PFAS
- Stable allergens, e.g. peanut, hazelnut, and pea may be best detected with commercial extracts
- Patients suspected of having PFAS or OAS plus systemic reactions should be referred to an allergist for confirmation, education and context.
Components of Pollen Food Allergy Syndrome (PFAS)

- A history of symptoms consistent with PFAS
- Allergic sensitization to pollen
- Allergic sensitization to a plant food
- A known correlation between the plant food and the pollen
Oral Food Challenges

• PFAS patients often have multiple positive prick test to fruits & vegetables
• Positive tests do not always predict clinical symptoms upon ingestion
• Oral challenge is the only definitive method of diagnosing
• Challenge studies can confirm only 33% (e.g. melon) up to 80% (Rosaceous family e.g., peach, plum, almond, apple) as allergen levels can vary in the specific food used and the time of the year when challenged
When to do Oral Food Challenges

- Systemic reaction to mixed foods, with culprit food unknown
- Hx of reaction to specific food with negative specific IgE testing
- Following systemic reaction, to determine tolerance to cross-reactive foods not part of the usual diet
- It is unclear if cooking eliminates the symptoms
- History is unclear and patient wishes to ingest the implicated food
Epinephrine for PFAS: Should one Rx?

- Up to 10% of patients are at risk for a systemic reaction
- Severe reactions can occur upon the first ingestion of a food with cross-reactive allergens
- Systemic reactions to previously tolerated foods can occur
- The natural history of PFAS is unknown
- Peach, peanut, tree nuts, and mustard are high risk foods for PFAS with systemic symptoms
- Rx for reactions of any severity to cooked plant foods
Take Home Messages

• In most instances the course is benign
• A small percent may experience a serious event
• Severity of subsequent reactions is often unpredictable.
• Allergists are divided on management strategy
• NIAID guidelines as broadly interpreted would allow for administration of auto-injector
Key Points

- Prior history of anaphylaxis, asthma or allergies
- Early signs and symptoms may not be outwardly apparent
- Epinephrine antagonizes all mediators, therefore, the first line of treatment
- Up to 35% of patients require more than one epinephrine auto-injector