Emergency Preparedness for Anaphylaxis in School

Michael Corjulo APRN, CPNP, AE-C
ASNC April 20, 2017

Objectives

- Review a brief overview of anaphylaxis related to the school environment
- Demonstrate the use of epinephrine autoinjectors currently available
- Discuss emergency allergy/anaphylaxis plans
- Discuss the role of Benadryl in the treatment of anaphylaxis
Anaphylaxis

- A serious, generalized allergic or hypersensitivity reaction that is rapid in onset and potentially fatal
- Acute onset (minutes to several hours)
- Significant drop in BP, dizziness, syncope +/- any combination of:

<table>
<thead>
<tr>
<th>Skin or Mucosal Involvement:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Generalize urticaria</td>
</tr>
<tr>
<td>• Itching (anywhere)</td>
</tr>
<tr>
<td>• Flushing</td>
</tr>
<tr>
<td>• Swollen lips, tongue, uvula</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Respiratory compromise:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Dyspnea</td>
</tr>
<tr>
<td>• Stridor or frequent throat clearing</td>
</tr>
<tr>
<td>• Difficulty swallowing saliva</td>
</tr>
<tr>
<td>• Wheezing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Persistent GI symptoms:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Significant cramping</td>
</tr>
<tr>
<td>• Nausea/Vomiting</td>
</tr>
<tr>
<td>• Diarrhea</td>
</tr>
</tbody>
</table>

![Diagram of anaphylaxis with allergen exposure, MHC class II, TCR, Naive T cell, Th2 cell, IgE, IL-4, IL-13, mast cell degranulation, histamine, CysLTs, PGs, cytokines, airway smooth muscle cells, bronchoconstriction, blood vessel, vasodilation, and mucus production.]
Anaphylaxis: Causes & Risk Factors

- Milk, eggs, tree nuts, peanuts, shellfish, and finned fish are by far the most common food causes in pediatrics
- Insect stings and various other allergens are important considerations
- Known allergy with known or suspected ingestion/exposure significantly elevates level of concern – raises the “anaphylaxis red flag”
- Other allergic conditions
  - Allergic threshold

Fatal Anaphylaxis

- Delay in administration of epinephrine
- Concomitant asthma, especially if poorly controlled
- Adolescence

- Lucky anaphylaxis
Epinephrine: Rapid Onset and Short Duration

- Vasoconstrictor that prevents or decreases
  - Upper airway/laryngeal edema
  - Hypotension
  - Shock
- Smooth muscle relaxation
  - Bronchodilator
  - GI and GU
- Cardiac inotropic and chronotropic
- Adverse effects are the similar to endogenous epinephrine (adrenaline) effects
  - Tremor, anxiety, pallor, and palpitations

Anaphylaxis Treatment: Universal Considerations

1. Stay calm
2. Have someone call 911
   - Stay with student, don’t hang up, report allergic reaction and epinephrine being given
3. Administer epinephrine autoinjector
   - Every professional medical organization in the U.S. recognizes epinephrine as the first line treatment for anaphylaxis
   - Developmental and Emotional Considerations
   - Expiration dates
4. Lie down if able, avoid rapid rise to upright position
5. Notify parent/guardian, appropriate school staff, and PCP/Allergist when able
Epinephrine Dosage and Administration

- IM absorbs 10x faster than SC
- Through clothes (empty pocket)
- Autoinjectors
  - 0.3mg > 55 lbs
- Up to 20% need a 2nd dose
  - Inadequate dose
  - Delay in initial dose
  - Suboptimal injection technique
- Biphasic reaction
  - Up to 11%
  - More common with insect venom

Epinephrine Autoinjectors

- Originally developed in the 1970s for the military to treat chemical weapon exposure
- Epipen first approved in 1987
  - Has a 2017 generic equivalent
- Twinject first approved in 2003, updated as Adrenaclick in 2012
  - Has a 2016 generic equivalent
- Auvi-Q first approved in 2013
  - Recalled in 2015
  - Returned February 2017
Epinephrine Autoinjectors: Know your options

Device Comparison

<table>
<thead>
<tr>
<th></th>
<th>0.15mg</th>
<th>0.3mg</th>
<th>Needle guard</th>
<th>Audio instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epipen</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Adrenaclick</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auvi-Q</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>
How to use EpiPen® and EpiPen® Jr (epinephrine) Auto-Injectors.

1. Hold firmly with orange tip pointing downward
   - Remove blue safety release

2. Swing and push orange tip firmly into mid-outer thigh until you hear a ‘click’
   - Hold on thigh for several seconds

After administration, patients should seek medical attention immediately or go to the emergency room. For the next 48 hours, patients must stay within close proximity to a healthcare facility or where they can call 911.
Emergency Anaphylaxis Plans

- Components
  - Demographics
  - Life-threatening allergies
  - Related medical history
    - Asthma
    - Oral allergy syndrome
  - Anaphylaxis symptoms
  - Treatment protocol

- Optional
  - State-specific medication authorization
  - Emergency care plan for lay person
Sample Plans


Sample Plans

FOOD/INSECT EMERGENCY ANAPHYLAXIS CARE PLAN and MEDICATION AUTHORIZATION

Sample Plans

[Image with text]

[Image with text]

[Image with text]

[Image with text]
EPI AUTO-INJECTOR DIRECTIONS:
1. Stay Calm
2. Grip in your dominant hand as shown
3. Pull off blue activation cap.
4. Hold orange tip near outer thigh, OK to inject through clothing, but make sure pocket on that leg is empty.
5. Swing and jab firmly into outer thigh until you hear it click so you know it's injecting the medicine. Hold in place and count to 10; remove and massage 10 sec. (orange tip will automatically slide over needle)
6. Auto-injector should be given to EMS to take to E.R.

EPINEPHRINE ADMINISTRATION PROTOCOL:
1. Administer Epinephrine Auto-Injector: circle one: (0.15mg  0.3mg)
2. Have someone call 911 for ambulance, don't hang up, and stay with student
3. Administer other medication: ________________________________________________
4. Lie down if able; avoid rapid rise to upright position
5. Notify school and parent/guardian as soon as possible

EMERGENCY ALLERGY CARE PLAN FOR STUDENT
NAME: ______________________________________  GRADE/SCHOOL: _______________________
ALLERGIES:
[ ] Give Epinephrine upon exposure to above allergy OR
[ ] Give Epinephrine at the onset of any of the below symptoms if allergen likely eaten (or student stung)

SYMPTOMS OF ANAPHYLAXIS:
- Chest tightness, shortness of breath, cough, wheezing, profuse runny nose
- Itchy, red, swollen, or tender
- Tightness and/or hives in throat, difficulty swallowing, hoarseness, drooling
- Swelling of face, tongue, throat
- Itchy mouth, itchy eyes, hives
- Hives, itching (anywhere), swelling (e.g. face, eyes)
- Nausea, vomiting, diarrhea, crampy pain

EP/EPIN JR. AUTO-INJECTOR DIRECTIONS:
1. Stay Calm
2. Grip in your dominant hand as shown
3. Pull off blue activation cap.
4. Hold orange tip near outer thigh. OK to inject through clothing, but make sure pocket on that leg is empty.
5. Swing and jab firmly into outer thigh until you hear it click so you know it’s injecting the medicine. Hold in place and count to 10; remove and massage 10 sec. (orange tip will automatically slide over needle)
6. Auto-injector should be given to EMS to take to E.R.

EMERGENCY CONTACTS
Name:  Name:
Relation:  Phone:
Phone:  Phone:

The role of Diphenhydramine (Benadryl) in allergy treatment

- **Antihistamine (H1 blocker)**
- Blocks histamine (naturally occurring chemical) released upon exposure to an allergic trigger
  - Histamine release causes: sneezing; itchy, watery eyes; runny nose; hives; and rashes
- **Common Side Effects**
  - sleepiness, fatigue, or dizziness;
  - headache;
  - dry mouth; or
  - difficulty urinating
Diphenhydramine use in the treatment of anaphylaxis

“No one ever died from not getting Benadryl to treat their anaphylaxis, But children and adults have died from using Benadryl and delaying the use of epinephrine during anaphylaxis”

Reasons people die from anaphylaxis

- Inadequate prevention
- Accidental exposure
- Risk-taking
- Lack of access to (enough) epinephrine
- Delay in epinephrine administration
  - Benadryl first
  - Fear of injection
  - Unexpected severity
  - Not using expired epinephrine
Solution (for schools and beyond)

- Use Emergency Allergy Plans just to treat Anaphylaxis
  - Model after the AAAI plan and remove the antihistamine option

- Use separate medication authorizations and care plans to treat other allergic conditions where antihistamine use is safe and appropriate
  - Oral Allergy Syndrome (OAS)
  - Urticaria (chronic or recurring hives)