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 and symptoms of anaphylaxis.
    1. Anaphylaxis – More severe and is characterized by an acute onset involving:
        a. The skin (urticaria) and/or mucosa with either respiratory compromise or decreased BP or signs of end-organ dysfunction. **OR**
        b. Hypotension for that patient after exposure to a known allergen. **OR**
            i. Adults: Systolic BP less than 90
            ii. Pediatrics: Age Specific Hypotension
        c. Two or more of the following occurring rapidly after exposure to a likely allergen:
            i. Skin and/or mucosal involvement (urticaria, itchy, swollen tongue/lips)
                a. Skin involvement may be ABSENT in up to 40% of cases of anaphylaxis
            ii. Respiratory compromise (dyspnea, wheezing, stridor, hypoxemia)
            iii. Persistent gastrointestinal symptoms (vomiting, abdominal pain, diarrhea)
            iv. Hypotension or associated symptoms (syncope, hypotonia, chest tightness, incontinence)
    2. 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

1. If signs of anaphylaxis, administer **Epinephrine IM**
    a. Adult: 0.3mg IM, or 0.3mg Auto-Injector
    b. Pediatric: 0.01mg/kg Max 0.3mg or 0.15mg Auto-Injector
2. For urticaria or pruritus, in addition to Epinephrine IM, also administer **Diphenhydramine *[PARA]***.
    a. Adult: 25-50mg IV/IO/IM
    b. Pediatric: 1mg/kg IV/IO/IM

        a. The IV route is preferred for the patient in severe shock.
    c. Additonal antihistamine: **Famotidine [PARA] Adult: 20mg IV/IO/IM**; Pediatric: **0.25mg/kg IV/IO/IM**
3. Normal Saline/Lactated Ringer's ***[AEMT]***) IV/IO fluid bolus 20 ml/kg rapidly (over 15 minutes) and repeat as needed for ongoing hypoperfusion.
4. If respiratory distress, in addition to Epinephrine IM, consider administering
    a. **Albuterol 2.5mg Neb**-preferred, **DuoNeb 2.5mg/0.5mg Neb,**-acceptable
    AND/OR
    b. **Racemic Epinephrine** 0.5ml of 2.25% solution nebulized ***[EMT-O].***
5. If signs of anaphylaxis persist following the first dose of Epinephrine, additional IM Epinephrine can be repeated every 5-15 minutes.
6. Ongoing symptoms consider Steroids **[PARA]**
    a. **Methylprednisolone 2mg/kg** IV/IO/IM (max 125mg)
7. Consider an **Epinephrine infusion *[PARA]*** if cardiovascular collapse (hypotension with altered mental status, pallor, diaphoresis and/or delayed capillary refill) is present despite repeated epinephrine IM and isotonic fluid boluses,
    a. Adult: 0.05-2 mcg/kg/min IV OR 2-10mcg/min
    b. Pediatric: 0.05-2 mcg/kg/min IV
8. Transport as soon as possible, and perform ongoing assessment as indicated.

Patient Safety Considerations

- Time to Epinephrine delivery
- Concentration of epinephrine in relation to route
- Weight-based dosing of medications

Notes and 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 or 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 or 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

- Presence or absence of angioedema
- Presence or absence of respiratory compromise
- Presence or absence of circulatory compromise
- Localized or generalized urticaria
- Response to therapy

Quality Improvement

Associated NEMSIS 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****) PEDS-03: Documentation of estimated weight in kilograms.* Frequency that weight or length-based estimate are documented in kilograms

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