

E09: Anaphylaxis

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Introduction

Allergic reactions range from localized urticaria to life-threatening anaphylaxis. Anaphylaxis is the most severe form of an immediate hypersensitivity reaction and encompasses both IgE-mediated reactions and anaphylactoid reactions; the latter do not require previous sensitizing exposures. Paramedic and EMR/FR management of anaphylaxis includes maintenance of the airway, breathing, and circulation with epinephrine the primary therapeutic intervention.

Essentials

- Intramuscular administration of EPINEPHrine is indicated for initial care of a patient with systemic signs of anaphylaxis. The anterolateral mid-thigh is the preferred site due to improved absorption.
- Intravenous EPINEPHrine should be reserved for the patient who is extremely hypoperfused or facing impending cardiac arrest.
- Intravenous EPINEPHrine should only be considered after intramuscular EPINEPHrine.
- A patient's own EPINEPHrine auto-injector is an appropriate treatment for anaphylaxis and EMRs can administer a patient's EPINEPHrine autoinjector when associated with signs and symptoms of anaphylaxis.
- Death from anaphylaxis is far more likely to be associated with a delay in management rather than an inadvertent administration of EPINEPHrine.

Additional Treatment Information

- Diphenhydramine is not effective in life-threatening anaphylaxis. It must not be administered instead of EPINEPHrine. Antihistamine use is intended for controlling urticarial symptoms to improve patient comfort.
- Some patients will present with predominant respiratory symptoms of dyspnea and wheezing. Treating with salbutamol for bronchodilation is acceptable if EPINEPHrine has been ineffective. It should only be used after EPINEPHrine administration and not as a first line treatment.
- Patients who are persistently hypoxic and whose condition does not improve following repeated epinephrine doses may require assisted ventilation and advanced airway management. These procedures may be extremely difficult due to distortion of the airway, primarily due to angioedema. Slow, low pressure bag-valve mask ventilation, with sufficient time for exhalation (similar to ventilation in asthma) will improve air flow through bronchioles. Ventilation rates and tidal volumes typically used in patients with respiratory failure can cause serious complications in anaphylaxis: gastric distension; vomiting; pneumothorax; and worsening hypotension can result from high pulmonary pressures.
- Nebulized EPINEPHrine has been used in cases where there is significant airway edema compromising management in addition to IM EPINEPHrine, but there is little data to support its routine use. Nebulized EPINEPHrine must never delay, or substitute for, IM EPINEPHrine.
- The benefit of corticosteroids in anaphylaxis is unproven. Nonetheless, it is common practice to prescribe a 2-day course of oral steroids (e.g., oral prednisolone 1 mg/kg, maximum 50 mg daily) to hopefully reduce the risk of symptom recurrence after a severe reaction or a reaction with marked or persistent wheeze.
- **Cardiac arrest considerations:**
 - Cardiac arrest may result from angioedema with upper and lower airway obstruction. Immediate cricothyrotomy may be necessary.
 - → [PR22: Surgical Airways](#)
 - Severe anaphylaxis may produce profound vasodilation requiring significant volume replacement.

Referral Information

All patients with suspected anaphylaxis must be advised that they should be conveyed to hospital regardless of the severity of their presentation or response to management. International guidelines recommend at least 4 hours of

observation following treatment.

General Information


- The patient's history can include exposure to an allergen such as food, bites/stings, medications, or the allergen may be unknown.
- Exposure to an allergen results in the release of inflammatory mediators from mast cells and basophils which cause the signs and symptoms of anaphylaxis. While there are a number of mediators, histamine is the most widely recognized.
- Anaphylaxis is a rapid onset, multiple-organ, generalized hypersensitivity (allergic) syndrome. It is usually characterized by exposure to a known or suspected allergen with a sudden onset of symptoms and at least 1 of the following R.A.S.H. signs/symptoms:
 - Respiratory distress (dyspnea, wheeze, cough, stridor)
 - Abdominal symptoms (nausea, vomiting, diarrhea, abdominal pain/cramps)
 - Skin/mucosal symptoms (hives, welts, itch, flushing, angioedema, swollen lips/tongue)
 - Hypotension (or hypoperfusion or altered conscious state)
- In rare circumstances, anaphylaxis can occur with symptoms in an isolated body system. If a patient has hypotension following exposure to a known allergen, consider treating as anaphylaxis.
- Allergic reactions may range in severity from mild, with only a rash, to life threatening. The degree of severity depends on the body's response to the allergen. The tendency is for reactions to increase in severity over time as the body becomes increasingly sensitive and primed to the allergen.

Interventions

First Responder

- Position supine to improve blood pressure and do not walk the patient
- Remove allergen (e.g., scrape off any stinger(s) / stop drug administration)
- Prevent or reverse progression to life-threatening manifestations:
 - [EPINEPHrine](#) via autoinjector (EpiPen)
- Provide supplemental oxygen and airway management as required
 - → [A07: Oxygen Administration](#)
 - → [B01: Airway Management](#)

Emergency Medical Responder – All FR interventions, plus:

- Convey early
- Consider intercept with additional resources
-  **Requires completion of EMR scope expansion education:**
 - Prevent or reverse progression to life-threatening manifestations
 - [EPINEPHrine](#)
 - **Note:** EMRs must complete EMR-specific scope of practice expansion education prior to EPINEPHrine use (FR scope expansion material is insufficient for BCEHS practice)

Primary Care Paramedic – All FR and EMR interventions, plus:

- Prevent progression to life-threatening manifestations
 - [EPINEPHrine](#)
- Treat bronchospasm **after** EPINEPHrine has been administered
 - [Salbutamol](#)
- Consider vascular access and fluid administration if patient remains hypotensive or hypoperfused
 - → [D03: Vascular Access](#)

Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

- [EPINEPHrine](#) IV/IO if refractory to other routes of EPINEPHrine

- Consider [diphenhydRAMINE](#) to mitigate medium-term effects and limit histamine response
- Intubation or FONA if unable to oxygenate and ventilate; [ketAMINE](#) is the preferred induction agent in anaphylaxis
 - → [PR18: Anesthesia Induction](#)
 - → [PR22: Surgical Airways](#)

Critical Care Paramedic – All FR, EMR, PCP, and ACP interventions, plus:

- Mechanical ventilation strategies
- An H₂ antihistamine given with an H₁ antihistamine may provide some additional relief of urticaria

Evidence Based Practice

Anaphylaxis

Supportive

- [H2 Blocker with Diphenhydramine](#)
- [Diphenhydramine](#)
- [Epinephrine](#)
- [Crystalloid Infusion](#)

Neutral

Against

References

1. Alberta Health Services. AHS Medical Control Protocols. 2020. [\[Link\]](#)
2. Ambulance Victoria. Clinical Practice Guidelines: Ambulance and MICA Paramedics. 2018. [\[Link\]](#)
3. Australasian Society of Clinical Immunology and Allergy. ASCIA Guidelines - Acute management of anaphylaxis. 2020. [\[Link\]](#)
4. Choo KJL et al. Glucocorticoids for the treatment of anaphylaxis: Cochrane systematic review. 2010. [\[Link\]](#)
5. Tintinalli JE, et al. Tintinalli's emergency medicine: A comprehensive study guide. 9th edition. 2019.

Practice Updates

- 2023-09-29: added autoinjector epinephrine to FR interventions; added epinephrine to EMR interventions

