

Epinephrine Autoinjector

Nor-Cal EMS
2021

Learning Objectives

- 1) Understand the immune response in allergic reactions, signs and symptoms.
- 2) Understand the indicators for epi use
- 3) Understand how epinephrine works
- 4) How to use an Epi-pen
- 5) How to respond to an anaphylactic or asthmatic emergency.
 - Getting help
 - Rescue Breathing
 - Administering epi-pen
 - Documentation

Epi-Pen/Autoinjector Training

- You must have completed the EMT basic scope training to use the Epi-Pen/Autoinjector.
- EMR-Optional Scope: If your agency is an optional scope provider, an EMR may take the training to use Epi-Pen autoinjector.

Introduction

- Allergies are among the most common health problems in the United States.
- As many as 50 million people suffer from allergies.
- Allergic reactions range from mild (slow onset with minor symptoms) to severe (sudden onset with major symptoms affecting the airway, breathing, and circulation).

Immune System

- Substances that the body recognizes as “foreign” are called *antigens*.
- Antigens enter the body through contact with the skin (**absorption**), a bite or sting (**injection**), gastrointestinal tract (**ingestion**), and respiratory system (**inhalation**)
- An antigen that causes an allergic reaction is called an **allergen**.
- Allergens enter the body by being:
 - Inhaled
 - Swallowed
 - Contact with the mucous membranes
 - Contact with the skin

Immune Response

- The body's response to an allergen can be irritating to life- threatening.
- They produce uncomfortable signs and symptoms such as a runny nose, sneezing, itching, coughing, and watery eyes.
- An allergic reaction may be **immediate** or progress more **slowly up to hours**.
- They produce life-threatening signs and symptoms chest pain, severe wheezing, respiratory distress and/or failure, inability to swallow, hypotension, shock, and/or death.

Potential Allergens

- Foods: peanuts, tree nuts, i.e. almonds, walnuts, hazel, brazil, and cashew nuts.
- Shellfish for example: shrimp and lobster
- Dairy Products
- Eggs
- Latex
- Medications
- Exercise
- Envenomation – stings and bites

* Patients may not know of or even suspect an they have an allergy. You may find that the patient began itching after using a new topical lotion or detergent. You may also assist patients who have become hypotensive after a bee sting.

In 1/3 of cases a trigger cannot be established

Primary triggers:

- Foods
 - Egg, peanut, tree nut, milk, fruits, shellfish, shrimp, crustaceans
- Insect stings
 - Hymenoptera venoms, fire ant stings
- Natural rubber latex
- Medications
 - Antibiotics:
 - Penicillin, Cephalosporins, Sulfonamides, Nitrofurantoin, Tetracycline, Streptomycin

Body System Responses

- Skin - Hives
- Eyes – Tears and Redness
- Nose - Runny
- Throat – Swelling of the tongue and inability to swallow.
- Stomach lining – Nausea, Vomiting, Diarrhea
- Lungs – Difficulty breathing and/ wheezing

Signs and Symptoms

- Hay fever is an example of a mild reaction.
- Hives can indicate a moderate reaction.
- Anaphylaxis is a severe reaction characterized by difficulty breathing, swelling of the tongue or any altered level of consciousness are signs of a severe reaction.
 - Severe allergic reaction can include multiple body systems.
 - Can be fatal

Hives/Urticaria



Signs and Symptoms (con't)

- General signs: itchy, watery eyes, headache, runny nose, sneezing
- Skin symptoms: tingling feeling in the face, mouth, chest, feet, hands and itching
- Signs: hives, swelling of face, neck, hands, feet, and/or tongue
- Flushed or red skin
- Cyanosis (in particular, perioral)
- Respiratory symptoms: lump, strange feeling or tickle in the throat, tightness in throat and chest, difficulty breathing and difficulty swallowing.
- Respiratory signs: cough, rapid breathing, labored breathing, noisy breathing, hoarseness, stridor, and wheezing.

Signs and Symptoms (con't)

- Gastrointestinal signs and symptoms: crampy abdominal pain, nausea, vomiting and diarrhea.
- The GI signs and symptoms are often unrecognized.
- Cardiovascular symptoms: pounding or racing heart, feeling light-headed or faint.
- Cardiovascular signs: tachycardia, hypotension, weak or absent pulse.
- Mental status symptoms: not feeling well, anxiety, sense of impending doom.
- Mental status signs: restlessness, disorientation, unresponsiveness.

Anaphylaxis

- Anaphylaxis may appear mild initially, but may worsen rapidly.
- Swelling in the upper airway, which causes obstruction and reduces airflow to the lungs (hypoxia).
- Dilatation and leakage of blood vessels can cause a dangerous drop in blood pressure.
- Have the patient transported rapidly.
- Complete the focused history and physical while en route.

Anaphylaxis actions on the body

Tissue swelling

The tongue and airway passages

Airway constriction

Muscles surrounding the lower airways tighten

Drop in blood pressure

Blood vessels dilate

Immediate injection of epinephrine is the single factor most likely to save a life during anaphylaxis!

Anaphylaxis is treated with epinephrine



Epinephrine Action

The body's stress response causes the normal release of epinephrine to maintain homeostasis during vigorous activity: "fight or flight".

These same actions of epinephrine counteract the bronchoconstriction and low blood pressure of anaphylaxis when administered by medical personnel.

- * Relaxes smooth muscle in the airways
- * Counteracts histamine and other cytokines
- * Raises blood sugar level
- * Raises heart rate, blood pressure, and myocardial oxygen demand

Epinephrine Pharmacology

- Acts directly on alpha and beta adrenergic receptors
- Alpha receptors constrict blood vessels, **vasoconstriction – raises blood pressure**
- Beta receptors dilates/**relaxes the smooth muscle** in airways and easier to breath
- Increases **heart rate, blood pressure**, heart squeezing harder and blood vessels contract
- Increases myocardial oxygen demand – heart needs more oxygen (use caution with “older” patients)

Epinephrine Pharmacokinetics

- Route: Intramuscular (IM) Delivery (Autoinjector or Syringe)
- Onset of effect 3 to 5 minutes.
- Optimal duration 1 to 4 hours.
- Can repeat every 5 to 10 minutes.
- Duration of effect: 1-4 hours

- Epi First! Epi Fast!

Precautions to consider during epinephrine administration

- May precipitate Acute Coronary Disease (ACS) causing chest pain. Be aware and cautious in “older”(55) patients.
- Be certain you are administering the correct concentration.
- Whether the dose being administered is for adult or pediatric patients
- Epinephrine is sensitive to temperature extremes
 - Store away from heat
 - Avoid freezing temperatures
- Epinephrine is light sensitive
- ***Do not use if the liquid is discolored or has particles in the solution***

Epinephrine After Being Exposed To Sunlight for Various Times



Epinephrine Underused in EMS

*There is No Absolute contraindication for
Epinephrine in anaphylaxis or
anaphylactic shock*

*This is the primary medication for allergic reaction &
anaphylaxis in adults & children*

Expected Side Effects

- Palpitations
- Tachycardia & arrhythmias
- Hypertension
- Headache
- Tachypnea
- Pupils dilate
- Tremor, weakness
- Pallor, sweating
- N/V
- Nervousness/anxiety
- Angina
- Increased blood flow to muscles

Indications for the use of epinephrine

- Allergic Reaction or Anaphylaxis
- Known or suspected trigger and:
- One or more of the following must be present:
 - diffuse and progressive hives
 - respiratory distress (or sudden onset of wheezing)
 - hypotension

Protocol

- Scene safety, provider safety.
- Remove cause of the reaction from patient, using appropriate precautions.
- Ensure patent airway and monitor patient's respiratory status.
- Administer oxygen or assist ventilations as indicated.
- Don't hesitate to give supplemental oxygen
- Assess and treat for signs of shock.

Emergency Medical Care

- Working hard to breath, respiratory distress or failure: **administer high-oxygen.**
- Assist respirations if necessary.
- Check for pulses.
- Signs of shock: flushed, cool or moist skin, cyanosis and tachycardia.
- “SAMPLE” history
- History of allergic reactions.
- Rapidly obtain baseline vital signs.
- Does the patient carry their own epinephrine?



Dosing for Epinephrine Administration Autoinjector

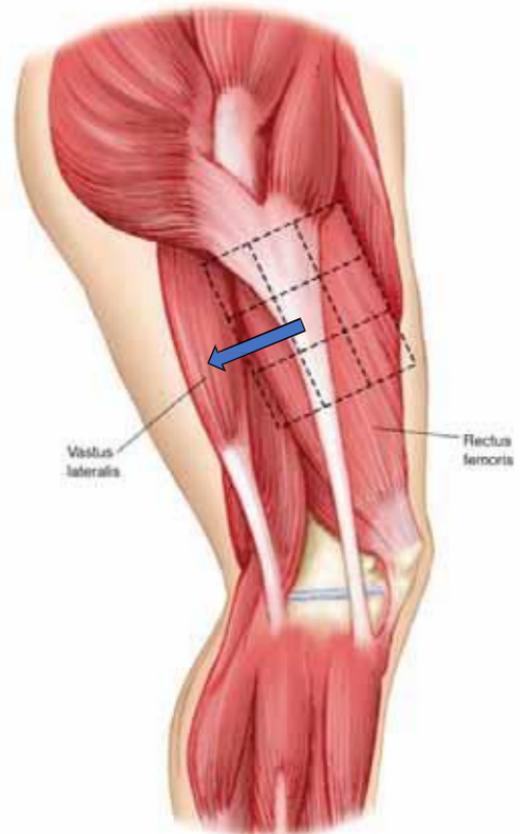
- **Adults** – **0.3 mg** of 1:1,000 concentration via Intramuscular injection
- **Pediatrics** – **0.15 mg** of 1:1,000 concentration via Intramuscular injection
- Adult dosing: equal to or greater than 30 kg or 66 lbs.
- Pediatric dosing: less than 30 kg or 66 lbs.

Using the EpiPen

- Hold the auto-injector with your thumb and two (2) fingers.
- Be careful not to inject yourself.
- Follow selected device manufactures recommendations concerning administration.
- Hold the auto-injector with tip near the outer thigh.
- Firmly push the tip against the outer thigh until it “clicks”.
- Keep the auto-injector firmly pushed against the thigh at a 90°-degree angle (perpendicular) to the thigh.
- Hold firmly against the thigh for approximately ten (10) seconds to deliver the drug.

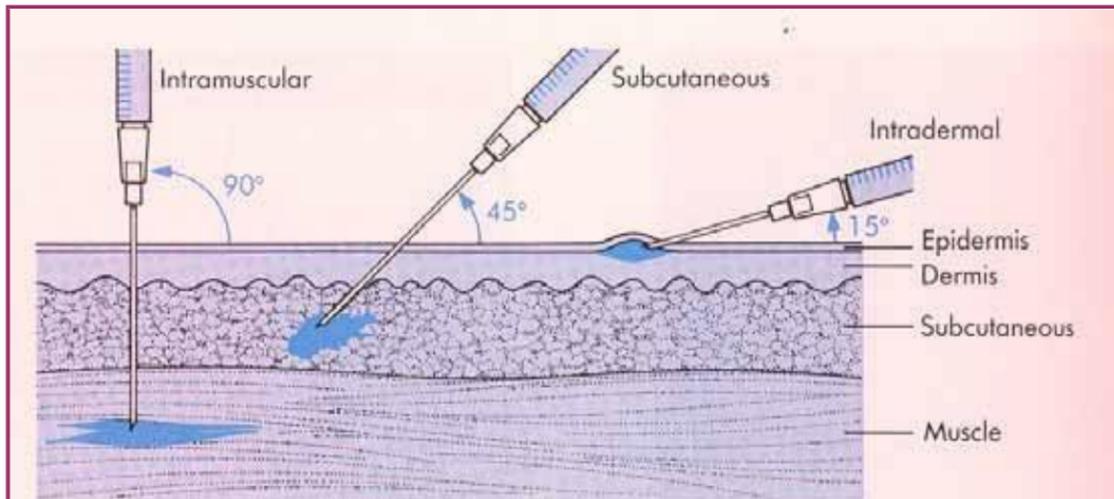
Route of administration

- Intramuscular
- Anterolateral thigh
- Allows drug to be injected into the belly of a muscle
- Blood vessels supplying that muscle distribute the medication into bloodstream.

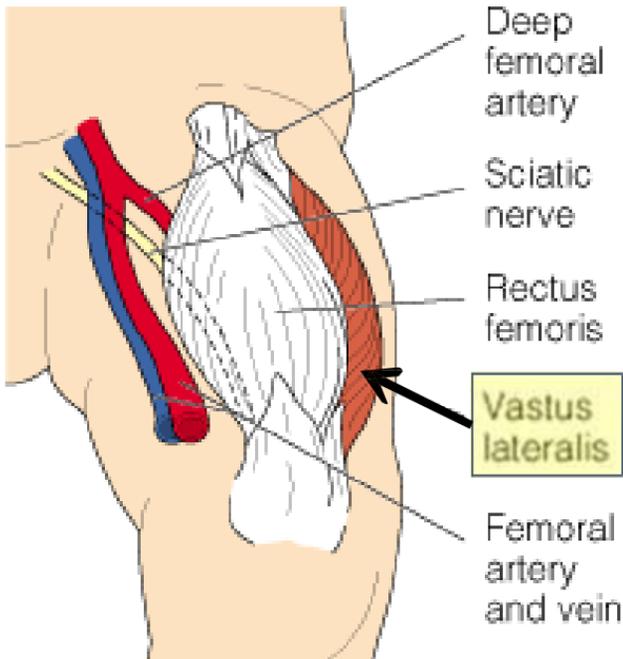


Be sure to inject epinephrine into the muscle

It may take twice as long (up to 10 min) for Epinephrine to have the life- saving effect if not injected into the muscle.



The Anterolateral Thigh is the Best Site for Infants & Toddlers



- Good site for all ages, but especially under 3 years old
- Far from major blood vessels & nerves
- Insert needle at 90° angle

Using the EpiPen

- Remove the auto-injector from the thigh.
- The tip will extend to cover the needle.
- Administer IM injection and discard used pen without recapping.
- Massage the injection site for at least ten (10) seconds.
- Record time of injection
- Reassess patient and vital signs
- May repeat every 5 to 15 minutes, for a total of three doses.
- If patient has self-administered one dose PTA, then may repeat twice for a total of three doses.

*For stability purposes, approximately 1.7 mL remains in the auto-injector after injection.

Reassessment after Epinephrine Administration

- After the administration of epinephrine, transport the patient rapidly.
- Complete any remaining assessments or treatments en route to the hospital.
- Reassess the patient's airway, breathing, and circulatory status continually.
- Recheck the baseline vital signs every five minutes.

Continuation of Care

- Additional care:
 - Calm the patient and provide continual reassurance
 - Maintain warmth
 - Loosen tight clothing
- Look for these signs of deterioration:
 - Decreasing mental status
 - Increasing breathing difficulty
 - Decreasing blood pressure
- Continue to monitor and document the patient's vital signs and condition for the remainder of your transport
- Record the patient's vital signs every 5 minutes

Assessment and Documentation of Patient Response

- Document your findings upon assessment of patient condition after treatment.
- This includes appearance, work of breathing, lung sounds, skin signs, vital signs, and any changes in ability to speak
- Document intervention and patient's response to medication, including vital signs.
- Repeats administration of medication as indicated per protocol.
- Document medication, dose, concentration of medication, time given and site of administration for each intervention.