

Anaphylaxis & Epinephrine Administration by the EMT

Adapted with permission from the Pilot Project for the Administration of Epinephrine by Washington EMTs



Learning Objectives:

With successful completion of this training module, the EMT will be able to describe and/or correctly demonstrate ...

- Signs and symptoms of anaphylaxis
- Epinephrine identification as a medication,
- steps in aseptic technique,
- preparation of Epinephrine for administration,
- intramuscular administration of Epinephrine, &
- the mechanism of action and effects of Epinephrine

During this presentation, check your answer to study questions by clicking on this icon:



Key Terms

Anaphylaxis - a life-threatening, hypersensitivity reaction of the immune system

Aseptic technique - a procedure performed under sterile conditions

Asphyxia - suffocation as a result of blockage of the airway

Dyspnea - labored or difficult breathing

Epinephrine - a hormone released from the adrenal glands that activates several tissues in the "fight-or-flight" response

Histamine - one of several chemical messages released from immune cells that promote inflammation as a defense mechanism

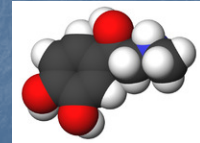
Intramuscular - a medication route by injection into the belly of a muscle which encourages rapid transport in the bloodstream

Shock - a severe reduction in blood pressure (by any cause) that results in inadequate blood flow (oxygen & glucose) to tissues

What is Epinephrine?

- A synthetic form of the naturally occurring hormone **Epinephrine**
- Released during "fight or flight" responses
 - reflex stimulation of the adrenal gland
 - sympathetic division of the autonomic nervous system

During "fight or flight" reactions, the airways _____ (dilate or constrict)



Examples of the Medication



- Name of medication
- Concentration (1:1,000 or 1mg/1ml)
- Expiration date

Indications for Use

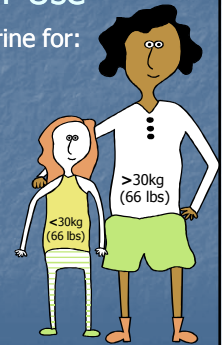
EMTs may administer Epinephrine for:

- Anaphylaxis
- Anaphylactic shock

Is this a different dose than when using the Epi-pen?

Dosage:

- **Adults** - 0.30 mg of 1:1,000
- **Pediatrics** - 0.15 mg of 1:1,000



Anaphylaxis is an over-reaction of the Immune System

- Sudden, severe allergic reaction involving the whole body (*more than a local reaction*)
- Most common allergens= insect stings, food, medication, latex
- Widespread immune system responses cause itching, hives & swelling
- May also cause tachycardia, hypotension, and hypoperfusion
- Tracheal and bronchial swelling may result in asphyxia

What respiratory signs would be typical of anaphylaxis?



Action of Epinephrine

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



For Intramuscular injection of Epinephrine...

Onset of effect: 3-5 min

Duration of effect: 1-4 hours



Some Side Effects of Epinephrine will occur:

- Palpitations
- Tachycardia & dysrhythmias
- Hypertension
- Headache
- Tremor, weakness
- Skin signs: pallor, sweating
- Nausea & vomiting
- Nervousness & anxiety
- Pain, redness at the injection site

Which vital signs are important to document before and after administering epinephrine?



Six Rights of Drug Administration

1. Right person
2. Right drug
3. Right dose
4. Right time
5. Right route
6. Right documentation



Site Selection and Preparation

Intramuscular sites allow a drug to be injected into the belly of a muscle so that the blood vessels supplying that muscle distribute the medication to its site of action via the bloodstream.

What PPE should be worn when preparing the medication and injection site?

First steps:

1. Prep the site with approved antiseptic by scrubbing vigorously and allowing to dry. **DO NOT TOUCH, BLOW ON OR FAN THE INJECTION SITE!**
2. Align the syringe and needle above the injection site at a 90 degree angle (to help insure IM administration of drug).



Prepare the site



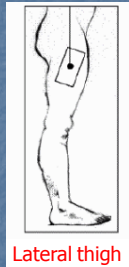
- Scrub the skin vigorously with an alcohol wipe
- Allow to air dry (do not touch, blow on, or fan the injection site)

Isopropyl alcohol aids the removal of bacteria from the skin surface, it does not kill bacteria.

Intramuscular Injection Sites



Deltoid

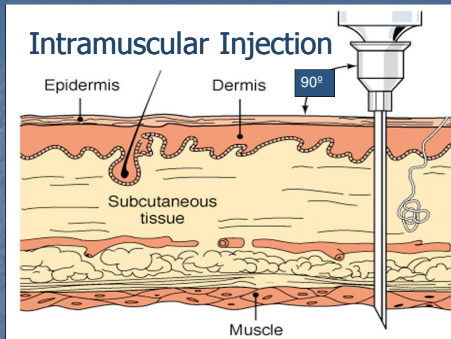


Lateral thigh

Where is the best IM injection site for infants and toddlers?



Intramuscular Injection



How much longer will it take to treat anaphylaxis if epinephrine is administered too shallow (in the subcutaneous layer), rather than in the muscle?



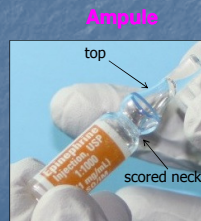
Needle Handling Precautions

- Minimize the tasks performed in a moving ambulance.
- Immediately dispose of used sharps in a sharps container.
- **NEVER** recap needles



Ampules and Vials

Store epinephrine AWAY from light; leave it in its carton until ready to use. Also keep away from extreme heat and danger of freezing.



Treat & Document all information concerning the patient and medication, including:

1. **ABC's; high-flow oxygen therapy via NRB**
2. **Indication for drug administration**
 - vital signs, work of breathing, lung sounds, skin signs, and ability to speak
3. **Drug, dosage, and delivery site**
4. **Patient response to the medication**
 - vital signs, work of breathing, lung sounds, skin signs, and changes in ability to speak
 - both positive and negative responses

Skills Section:
Obtaining Medication from a Glass Ampule

Confirm the Medication

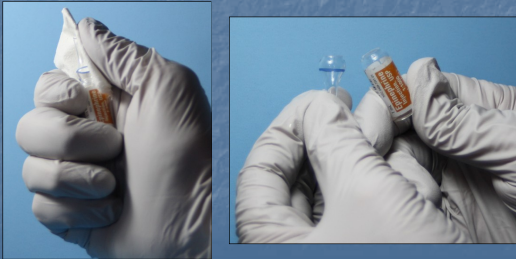
- Medication name
- Dosage (1:1,000 or 1mg/1ml)
- Expiration date
- Not cloudy; no color or precipitate



Hold the ampule upright and tap its top to dislodge any trapped solution.



Use thumb to break along scored edge of neck.
You may place gauze around the neck.



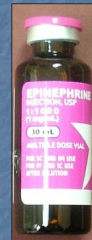
Draw up the medication



Using a syringe, insert the needle into the ampule and draw the plunger back until you reach the correct dosage (PEDI = 0.15 cc or ADULT = 0.30cc)

Skills Section: Obtaining Medication from a Vial

- Medication name
- Dosage (1:1,000 or 1mg/1ml)
- Expiration date
- Not cloudy; no color or precipitate



Prepare the syringe



With the needle cap on, pull back the plunger to the appropriate dosage. You will inject the same volume of air into a multi-use vial as you will withdraw medicine.

Clean the vial's rubber top



1. Insert the needle into the rubber top and inject the air from the syringe into the vial.



2. Withdraw the appropriate volume of medication. **Do not** fill with more than the correct dosage.

Skills Section: Intramuscular Injection

Insert the needle at a 90-degree angle



- Broadly hold the muscle
- Do not pinch the skin
- Hold the syringe like a dart
- Insert the needle with a quick stab at a 90° angle to the skin surface

Deliver the medication

Depress the plunger with a slow, steady motion until the syringe is empty and the needle automatically retracts




The VanishPoint © needle retracts when the plunger is depressed completely.

Cover the puncture site.

Reassess your patient.

Prepare for transport by ALS.





Assessment of Patient Response

Document the patient's response to treatment:

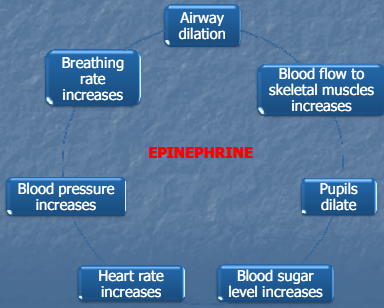
- LOC, behavior, breathing effort, lung sounds, skin signs, vital signs, and changes in ability to speak
- Document adverse effects, if any

How long does it take for the drug to take effect, and what do I do if the patient does not improve?

Any questions?


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.



PUPHINE

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Epi-Pen dosages



Pediatrics - 0.15 mg of 1:1,000
 Adults - 0.30 mg of 1:1,000

The same dosage schedule is used in anaphylaxis, no matter the method of IM administration.

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Respiratory Signs & Symptoms

- Shortness of breath
- Hoarseness, wheezing, or other abnormal sounds of breathing
- Hives, itching, swelling and/or spasm
- Rapid and/or labored breathing, use of accessory muscles, prolonged expirations, hypoventilation, decreased lung sounds
- Changes in the ability to speak

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Document Vital Signs before and after treatment with Epinephrine

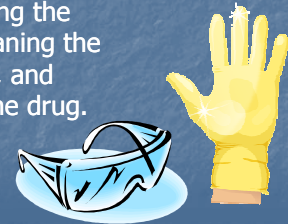
Because epinephrine is expected to cause widespread changes in function, it is important to frequently monitor and document vital signs:

- HR, RR, BP
- include general appearance, work of breathing, lung sounds, skin signs, and ability to speak

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Always wear PPE when treating patients

- Wear gloves and goggles when assessing the patient, preparing the medication, cleaning the site of injection, and administering the drug.

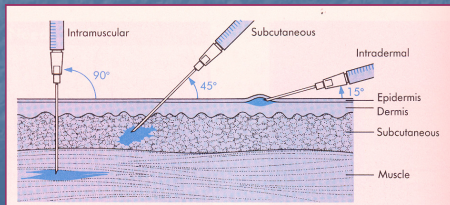


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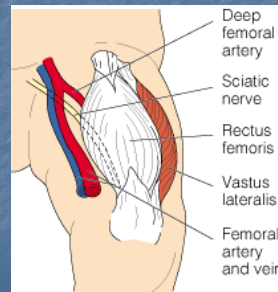
Be sure to inject Epinephrine into the muscle

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

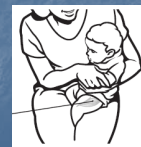
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The anterolateral thigh is the best site for infants & toddlers



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



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Ongoing Assessment

If no significant improvement within 10 minutes, consider second dose

- Second dose requires consultation with online medical control
- If unable to contact medical control or ALS unit, EMT may administer a second dose if patient's condition warrants
- Thorough documentation is essential

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