EMT-B Epinephrine Training Module

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Objectives

- Review of Allergic Reactions
- Review Protocols and Procedure
  - Respiratory Distress/Bronchospasm
  - Allergic Reaction/Anaphylaxis
- Demonstration
- Test
History of Epinephrine in Wilderness Medicine

- Literature review
  - Annals of Emergency Medicine, June 1995, Shalit et al.
  - Case series of 8 pts who received epi from an EMT-B for anaphylaxis for a hymenoptera sting from June 1992 to September 1993
  - Results showed all patients clinically improved within 25 minutes with no adverse effects
Causes of Allergic Reactions

- Insect bites and stings
  - 3% of population has allergy to insect stings
  - From the order Hymenoptera, which includes bees, wasps, hornets, yellow jackets and fire ants
- Food examples
  - Eggs, fruits and nuts
- Drug examples
  - Penicillin, aspirin, ibuprofen, opiates
Allergic Reactions

- Range from mild to life threatening
- Early symptoms may be vague
- Classic skin signs are urticaria, (hives)
  - Red, itchy raised welts anywhere on the body
- Swelling of face, lips, eyes
- Symptoms can occur seconds after exposure or up to 30 minutes
Mild Allergic Reactions

- Itching
- Hives
- Redness

Treatment is close observation and watching for progression of symptoms
Severe Allergic Reactions
Signs and Symptoms

- Respiratory Tract
- Skin
- Cardiovascular
Respiratory Tract

- Wheezing
- Upper airway noisy breathing (stridor)
- Chest and throat tightness
- Shortness of Breath
- Nasal congestion*

*alone does not indicate a severe reaction
Skin

- Facial Swelling
  - Involving lips, tongue, mouth (airway involvement)
- Redness*
- Hives*
- Itching*

*alone does not indicate a severe reaction
Cardiovascular

- Decreased Blood Pressure (<90)
- Increased Heart Rate (>120)
- Severe Dizziness
- Fainting
- Decreased Mental Status
  - confusion, lethargy, coma
Treatment

- Ensure an open airway
- Administer oxygen
- History and Physical
- Vital signs
- Epinephrine
Epinephrine

- A catecholamine, sympathomimetic
- Acts on cardiovascular system
  - Increases the strength of heart muscle contraction
  - Increases heart rate
  - Increases systolic blood pressure
- Acts on respiratory system
  - Bronchodilatation
Epinephrine

- DO NOT give epi to patients with
  - ONLY hives, flushing or itching
  - Ongoing chest pain
- Use caution (base contact if possible) when giving epi to patients with
  - History of heart attack, angina, or stroke
Epinephrine

- Give epi with a clear history of insect bite or sting, or history of other allergy
- AND, must have at least one of the below signs and symptoms of severe allergic reaction
  - Respiratory Tract
    - Wheezing, stridor, shortness of breath
  - Skin
    - Facial swelling involving lips, tongue, mouth (airway involvement)
  - Cardiovascular
    - Dizziness, HR>120, BP <90, AMS
Epinephrine Onset

- IM/SC, 5-15 minutes
- **Danger:**
  - IV onset immediate, however at the 1:1000 concentration can cause arrhythmia and death
  - This is the reason for drawing back on syringe prior to injection to ensure you are not in a vessel
Epinephrine Dosage

- **First Responder - Autoinjector**
  - 0.3ml IM, of 1:1000 concentration (1ml=1mg)

- **EMT - B Ampule draw up**
  - 0.3ml IM, of 1:1000 concentration (1ml=1mg)
Protocols that include Epinephrine

- Allergic Reaction/Anaphylaxis
- Respiratory Distress/Bronchospasm
EMT - Allergic Reaction/Anaphylaxis Protocol

EMT Standing Orders

1. ABCs

2. Assessment
   Airway edema, vital signs, mental status, wheezes/stridor, rash, history

3. Classify
   Mild reaction: local swelling and/or hives. **Skip to Base contact (#9)**
   Severe reaction (ANY of the following): hypotension, wheezing, respiratory distress, oral swelling, altered mental status, chest tightness. **Follow steps 4 to 9.**

4. Epinephrine
   If certified. (1 ml = 1 mg)
   Auto-injector 0.3 ml (mg) IM
   OR epinephrine ampule (1 mg/ml) 0.3 ml (mg) IM x 1

5. Oxygen
   High flow (Oxygen)

6. Remove allergen
   If possible. Example bee stinger. (Bites and Stings)

7. Transport/backup

8. Treat for shock
   If present. (Shock)

9. Base Contact
   For further orders, AMA or Treat and Release

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EMT Base Hospital/Radio Failure Orders

Severe reactions only

1. Epinephrine
   Recontact base for repeat doses
   Auto-injector/Ampule
   Repeat dose every 10 minutes until severe symptoms resolve
   Increase frequency to every 5 minutes if symptoms worsening
EMT-B - Respiratory Distress/Bronchospasm Protocol

**EMT Standing Orders**

1. **ABC’s**
   - Protect airway with position, basic airway maneuvers, pharyngeal airway, assist respirations as needed, suction as needed.

2. **Oxygen**
   - Per protocol *(Oxygen)*
   - High flow (moderate to severe distress, altered mental status).

3. **Assessment**
   - Vitals, including temperature if possible, mental status, lung sounds.

4. **Epinephrine**
   - **Auto-injector**
     - Indications: *(Epinephrine Auto-injector)*
     - Severe distress (unable to speak, cyanotic, severe retractions, accessory muscle use)
     - No history of angina or MI
     - Dose: 0.3 ml IM *(1 ml = 1 mg)*
   - **OR epinephrine ampule**
     - Dose: 0.3 ml IM *(1 ml = 1 mg)*

5. **Transport/ALS backup**
   - Consider air transport for patients in severe distress or unstable vitals.

6. **Base Contact**
   - No TAR without base contact.

**EMT Base Hospital/Radio Failure Orders**

1. **Epinephrine**
   - Repeat dose every 10 minutes until severe symptoms resolve
   - **Auto-injector/Ampule**
   - Increase frequency to every 5 minutes if symptoms worsening

2. **Inhaler**
   - If patient has an albuterol or other inhaler, allow and encourage patient to use it, as they have been directed by their physician. *(Examples: Ventolin, Proventil, Bronkosol, Alupent)*
Epi Ampule
Prepare the equipment.
Check the medication, confirm medication allergies.
Wearing gloves, hold the ampule upright and tap its top to dislodge any trapped solution.
Place gauze around the thin neck...
...and snap it off with your thumb.
Draw up the medication, holding syringe with needle up, expel any air from syringe.
Intramuscular Injection Sites

- **Primary sites**
  - Deltoid (shoulder)
  - Vastus lateralis (outer thigh)

- **Secondary sites**
  - Dorsal gluteal (buttocks), *primary site for thin kids*
  - Rectus femoris (top of thigh)
Intramuscular Injection
Intramuscular Injection Sites

**upper-outer quadrant when using buttock site**
After drawing up the medication....
Prepare the site with alcohol swab.
Insert the needle at a 90° angle, aspirate for blood, if none, then inject 0.3 ml.
Remove the needle and cover the puncture site.
EMT-B Epinephrine Anaphylaxis Kit

Scope: EMT and Parkmedic
Indications: Anaphylaxis (allergic reaction with respiratory distress)
Equipment: Epinephrine kit containing: 1, 1 ml ampule of epinephrine 1:1000, 1 tuberculin syringe with needle, alcohol prep

Procedure:
1. Refer to Allergic Reactions and Respiratory Distress Protocols for detailed assessment.
2. Ask patient if they have any drug allergies.
3. Confirm medication, concentration, dose and clarity of liquid in vial
4. Tap ampule to get medicine down from top, break top off ampule with gauze 2x2, place top in sharps container.
5. Draw up 0.3 ml of epinephrine 1mg/ml 1:1000, syringe approximately 1/3 full.
6. Pointing syringe up, expel all air.
7. Inform patient they are going to receive an injection, side effects may include feeling shaky or heart racing.
8. Select and cleanse area for subcutaneous injection, primary sites upper arm or thigh.
9. Using one hand to tent skin, insert needle at 90 degrees into administration site and draw back checking for blood return. If there is blood return, select a different site, and insert needle, again check for blood return.
10. If no blood, administer 0.3 ml of epinephrine (1/3 of syringe) for any patient.
11. Remove needle and carefully re-cap using one-handed technique. Discard needle properly in sharps container if additional needles are available. If not, retain needle with syringe and remaining epinephrine as additional doses may be required.
12. Observe patient for improvement or deterioration of condition. Repeat exam and vitals after each dose.
15. If indicated by protocol, begin again from step 5.
Skills Session/Test

- Demonstrate skill with medication
- Practice session:
  - Have multiple practice sessions with EMT-B’s injecting epinephrine into oranges.
- Test: 25 multiple choice questions
Epinephrine Training Module Test
Please circle the best answer

1. A 16 year-old boy who says he is very allergic to bee stings and was stung on the hand 5 minutes ago, approaches you for help. He is anxious and has swelling and redness of the hand, you should:
   a. Treat as severe allergic reaction with epinephrine now.
   b. Remove the stinger and reassure the patient that he is not having an anaphylactic reaction.
   c. Transport him to a medical facility while observing for other symptoms.
   d. Release him now as it is obvious he is not having an allergic reaction.

2. 1:1000 Epinephrine should be used in which of the following patient situations?
   a. Blood pressure of 190/100 and throat swelling after bee sting.
   b. Blood pressure of 75 by palpation after accidentally eating known allergic food.
   c. History of asthma with current cyanosis and dyspnea.
   d. All of the above.

3. Epinephrine dose in a 6 year-old child is?
   a. 0.03 ml
   b. 0.3 ml
   c. 3.0 ml
   d. 3 tablespoons

4. You have given epinephrine 1:1000 and after 10 minutes the patient is getting worse, you should:
   a. Transport faster because the epinephrine is ineffective.
   b. Give a repeated dose.
   c. Assume the patient is allergic to the epinephrine and ask for base hospital assistance.
   d. Call the base hospital prior to further action.

5. Pulling back on the plunger of the syringe after insertion through the skin, but prior to injection of epinephrine should be done to:
   a. Clear air from the syringe.
   b. Make sure you are not in a blood vessel.
   c. Make sure you are not in the bone.
   d. Aspirate fat.

6. A 60 year-old man with no past medical history or history of allergen exposure presents with dyspnea and severe wheezing, he should receive a dose of epinephrine?
   a. True
   b. False
7. The onset of most life threatening allergic reactions is within:
   a. A few seconds to 30 minutes.
   b. 45-60 minutes.
   c. 2-4 hours following exposure.
   d. 12-24 hours following exposure.

8. A person experiencing itching and swelling around their mouth, tongue and throat 25 minutes after receiving and insect bite should:
   a. Administer epinephrine 1:1000 to prevent further deterioration.
   b. Carefully observe for further symptoms.
   c. Transport to the nearest medical facility.
   d. All of the above.

9. Which of the following is the most significant reason for administering epinephrine after an allergic exposure:
   a. Nausea and vomiting
   b. Dizziness
   c. Respiratory distress
   d. Welts on back (hives)

10. Severe anaphylactic reactions include urticaria, wheals, hives, wheezing and dyspnea:
    a. True
    b. False

11. Patients with no memory of a previous bee sting may have an allergic reaction to a bee sting:
    a. True
    b. False

12. A patient with red welts over their back, chest and arms following a bee sting requires immediate epinephrine:
    a. True
    b. False

13. All patients who receive epinephrine from an EMT require transport to a medical facility:
    a. True
    b. False

14. In a patient that meets requirements for epinephrine, base hospital contact must be established before administration:
    a. True
    b. False
15. During a severe allergic reaction the chemicals released by the body may cause all the following except:
   a. Blood vessel dilation causing a decreased blood pressure
   b. Blood vessel leakage resulting in swelling
   c. Severe muscle pain
   d. Narrowing of the air passages causing shortness of breath

16. You may AMA/TAR a patient if:
   a. Patient has a mild local reaction
   b. Patient was observed at least 30 minutes from onset of exposure and has normal vital signs
   c. Patient has no history of severe allergic reactions
   d. Patient was given no medication
   e. All of the above must be met in order to AMA/TAR

17. If a patient has an epinephrine autoinjector, you should use that instead of your anaphylaxis kit:
   a. True
   b. False
   c. According to the NPS EMS field manual, you may use the epinephrine autoinjector or your anaphylaxis kit

18. Which of the following patients have a low risk of complications when receiving epinephrine for an anaphylactic reaction:
   a. 70 year old patient
   b. 65 year old patient on a beta blocker (ex metoprolol)
   c. 55 year old patient with a history of heart attack (MI)
   d. All of the above patients are at risk of having complications with epinephrine

19. When assessing a patient’s history which past medical history is not concerning regarding the administration of epinephrine:
   a. Heart attack (MI)
   b. Stroke (cerebral vascular accident)
   c. Recent finger amputation
   d. High blood pressure (Hypertension)

20. What is the concentration of the epinephrine ampule:
   a. 1 ml = 3 mg
   b. 1 ml = 1 mg
   c. 2 ml = 1 mg
   d. 3 ml = 1 mg
21. Should you give epinephrine to this 2 year-old patient who ate strawberries for the first time and is talking and laughing
   a. Yes
   b. No

22. When breaking the ampule, the ampule is considered a sharp:
   a. True
   b. False

23. According to the standing orders in the NPS EMS field manual, how often can you repeat the epinephrine dose:
   a. Every ten minutes
   b. Every 5 minutes if symptoms worsen
   c. Both a and b

24. Which protocols allow EMT-B’s to give epinephrine:
   a. Respiratory distress
   b. Chest pain
   c. Cardiac arrest
   d. Childbirth

25. All of the following are considered severe symptoms in the setting of allergic reaction, except:
   a. Itching
   b. Low blood pressure (Hypotension)
   c. Respiratory distress
   d. Altered mental status
Epinephrine Training Module Test Key
1. B
2. D
3. B
4. B
5. B
6. B
7. A
8. D
9. C
10. A
11. A
12. B
13. A
14. B
15. C
16. E
17. C
18. D
19. C
20. B
21. A
22. A
23. C
24. A
25. A