

16. EPINEPHRINE 1:10,000/1:1,000

a) Pharmacology

- (1) The administration of epinephrine causes increases in:
 - (a) Systemic vascular resistance
 - (b) Systemic arterial pressure
 - (c) Heart rate (positive chronotropic effect)
 - (d) Contractile state (positive inotropic effect)
 - (e) Myocardial oxygen requirement
 - (f) Cardiac automaticity
 - (g) AV conduction (positive dromotropic effect)
- (2) Causes bronchial dilation by smooth muscle relaxation

b) Pharmacokinetics

- (1) IV administered epinephrine has an extremely rapid onset of action.
- (2) Is rapidly inactivated by the liver
- (3) Subcutaneous administration of epinephrine results in slower absorption due to local vasoconstriction.
- (4) Local massage will hasten absorption.
- (5) Topically applied nebulizer within the respiratory tract, epinephrine has vasoconstrictor properties that result in reduction of mucosal and submucosal edema. It also has bronchodilator properties that reduce airway smooth muscle spasms.

c) Indications

- (1) Medical cardiac arrest and pediatric traumatic arrest (NEW '19)
- (2) Moderate to severe allergic reaction/anaphylaxis
- (3) IV epinephrine should be reserved for cardiac arrest patients and for impending cardiac arrest due to anaphylactic shock.
- (4) Bronchial asthma
- (5) Respiratory stridor (suspected croup)
- (6) Dopamine replacement indications for epinephrine drip (Jurisdiction option only when approved by the State EMS Director) (NEW '19)

d) Contraindications

- (1) Hypertension
- (2) Preexisting tachydysrhythmias with a pulse (ventricular and supraventricular)
- (3) Use with pregnant women should be avoided whenever possible.
- (4) Traumatic cardiac arrest in adult patients (NEW '19)

e) Adverse Effects

- (1) Tachydysrhythmias (supraventricular and ventricular)
- (2) Hypertension
- (3) May induce early labor in pregnant women



- (4) Headache
- (5) Nervousness
- (6) Decreased level of consciousness
- (7) Rebound edema may occur 20–30 minutes after administration to croup patients.

f) Precautions

- (1) Do not mix with sodium bicarbonate as this deactivates epinephrine.
- (2) Epinephrine causes a dramatic increase in myocardial oxygen consumption.
- (3) Its use in the setting of an acute MI should be restricted to cardiac arrest
- (4) IVP epinephrine (1:1,000) should not be administered to any patient with a pulse.

g) Dosage

- (1) Cardiac Arrest
 - (a) Adult:
 - (i) Administer 1 mg (1:10,000) IVP/IO every 3–5 minutes
 - (b) Pediatric:
 - (i) Administer 0.01 mg/kg (0.1 mL/kg) of 1:10,000 IVP/IO; repeat every 3–5 minutes
 - (ii) ET: 0.1 mg/kg of 1:1,000, diluted with 5 mL of LR; repeat every 3–5 minutes
 - (c) Neonate:
 - (i) Administer 0.01 mg/kg (0.1 mL/kg) of 1:10,000 IVP/IO; repeat every 5 minutes
 - (ii) ET: 0.03 mg/kg of 1:10,000, diluted with 1 mL of LR
- (2) Bradycardia
 - (a) Adult: not indicated
 - (b) Pediatric:
 - (i) Administer 0.01 mg/kg (0.1 mL/kg) of the 1:10,000 IVP/IO; repeat every 3–5 minutes
 - (ii) ET: 0.1 mg/kg of 1:1,000, diluted with 5 mL of LR; repeat every 3–5 minutes
 - (c) Neonate:
 - (i) Administer 0.01 mg/kg (0.1 mL/kg) of 1:10,000 IVP/IO; repeat every 3–5 minutes
 - (ii) ET: 0.03 mg/kg of 1:10,000, diluted with 1 mL of LR



- (3) Allergic Reaction/Anaphylaxis/Asthma
 - (a) FOR ANAPHYLAXIS (ADULT ONLY)

For patients who are in extremis with severe hypotension or impending respiratory failure, consider initiating an epinephrine drip after having administered 3 doses of IM epinephrine.

- (i) Mix 1 mg of epinephrine (either 1:1,000 or 1:10,000) in a 1 liter bag of LR IV/IO. Initiate an infusion with a wide open macro drip titrating to a systolic pressure of greater than 90 mmHg. When drip administered, this will be reported as an exceptional call.
- (b) Epinephrine: 1:1,000
 - (i) Less than 5 years of age: administer 0.15 mg in 0.15 mL IM
 - (ii) 5 years and greater: administer 0.5 mg in 0.5 mL IM
- (4) Croup
 - (a) Adult: not indicated
 - (b) Pediatric
 - (i) Administer 2.5 mL of epinephrine 1:1,000 via nebulizer.

If patient does not improve, administer a second dose of 2.5 mL of epinephrine 1:1,000 via nebulizer.



ALL PATIENTS WHO RECEIVE NEBULIZED EPINEPHRINE MUST BE TRANSPORTED BY AN ALS UNIT TO AN APPROPRIATE FACILITY.

- (5) As replacement for dopamine with the following dosing by indication
 - Cardiogenic (post-ROSC or acute heart failure)
 - (i) Adult: 0.05 0.3 mcg/kg/min.
 - (ii) Pediatric: 0.05 0.3 mcg/kg/min.
 - Sepsis
 - (i) Adult: 0.05 0.3 mcg/kg/min.
 - (ii) Pediatric: 0.05 0.3 mcg/kg/min.
 - Hypovolemic shock (after sufficient volume replacement) (c)
 - (i) Adult: 0.05 0.3 mcg/kg/min.
 - (ii) Pediatric: 0.05 0.3 mcg/kg/min.
 - (d) Anaphylaxis
 - (i) Adult: 0.5 mcg/kg/min.
 - (ii) Pediatric: 0.5 mcg/kg/min