High Alert

EPINEPHrine (ep-i-nef-rin)
Adrenalin, Allerject, Anapen, AsthmaNefrin, EpiPen, racepinephrine
Classification
Therapeutic: antiasthmatics, bronchodilators, vasopressors
Pharmacologic: adrenergics

Pregnancy Category C

Indications

Action
Results in the accumulation of cyclic adenosine monophosphate (cAMP) at beta-adrenergic receptors. Affects both beta1 (cardiac)-adrenergic receptors and beta2 (pulmonary)-adrenergic receptor sites. Produces bronchodilation. Also has alpha-adrenergic agonist properties, which result in vasoconstriction. Inhibits the release of mediators of immediate hypersensitivity reactions from mast cells. Therapeutic Effects: Bronchodilation. Maintenance of heart rate and BP. Localizations’ prolongation of local/spinal anesthetic.

Pharmacokinetics
Absorption: Well absorbed following subcut administration; some absorption may occur following repeated inhalation of large doses.
Distribution: Does not cross the blood-brain barrier; crosses the placenta and enters breast milk.
Metabolism and Excretion: Action is rapidly terminated by metabolism and uptake by nerve endings.
Half-life: Unknown.

Contraindications/Precautions
Contraindicated in: Hypersensitivity to adrenergic amines; Some products may contain bisulfites or fluorocarbons (in some inhalers) and should be avoided in patients with known hypersensitivity or intolerance.
Use Cautiously in: Cardiac disease (angina, tachycardia, MI); Hypertension; Hyperthyroidism; Diabetes; Cerebral arteriosclerosis; Glaucoma (except for ophthalmic use); Excessive use may lead to tolerance and paradoxical bronchospasm (inhaled). OB: Use only if potential maternal benefit outweighs potential risks to fetus. Lactation: High intravenous doses of epinephrine might interfere with milk production or let-down. Low-dose epidural, topical, ophthalmic or epinephrine are unlikely to interfere with breast feeding (NIH). Elderly: More susceptible to adverse reactions; may require a dose.

Adverse Reactions/Side Effects

Interactions
Drug-Drug: Concurrent use with other adrenergic agents will have additive adrenergic side effects. Beta blockers may negate therapeutic effect. Tricyclic antidepressants enhance pressor response to epinephrine.
Monitor pulmonary function tests before and periodically during therapy.

**Bronchodilator**

- **Assessment**
  - Assess lung sounds, respiratory pattern, pulse, and BP before administration and during peaks of medication. Note amount, color, and character of sputum produced, and notify health care professional of abnormal findings.

**Implementation**

- Monitor pulmonary function tests before and periodically during therapy.
- Observe for paradoxical bronchospasm (wheezing). If condition occurs, withhold medication and notify health care professional immediately.
- Observe patient for drug tolerance and rebound bronchospasm. Patients requiring more than 3 inhalation treatments in 24 h should be under close supervision. If minimal or no relief is seen after 3–5 inhalation treatments within 2–12 h, further treatment with aerosol alone is not recommended.
- Assess for signs of increased respiratory rate (tachypnea), swelling of the face, lips, or eyelids. If condition occurs, withhold medication and notify health care professional immediately.
- **Vasopressor** Monitor BP, pulse, ECG, and respiratory rate frequently during IV administration. Continue ECG, hemodynamic parameters, and urine output should be monitored continuously during IV administration.
- Monitor for chest pain, arrhythmias, heart rate (110 bpm), and hypotension. Consult physician for parameters of pulse, BP, and ECG changes for adjusting dose or discontinuing medication.
- **Shock** Assess volume status. Correct hypovolemia prior to administering epinephrine.

**Topical**

- **Adults (Adults and Children aged 6 yr):** Nasal decongestant—Apply 1% solution as drops, spray, or with a neti pot.
- **Topical (Adults and Children aged 6 yr):** Nasal decongestant—Apply 1% solution in doses of 0.25–0.5 mL of 2.25% racemic epinephrine solution diluted to the desired normal saline.

**Local Anesthetic**

- **Topical (Adults and Children aged 6 yr):** 0.2–0.4 mL of 2.25% solution with local anesthetic.
- **Topical (Adults):** Use 1:200,000 solution with local anesthetic.

**Lab Test Considerations:** May cause transient increases in serum potassium concentrations with expected electrolyte abnormalities. Serum potassium concentration should be monitored closely.

**Patient and Overdose:** Symptoms of overdose include persistent agitation, chest pain or discomfort, decreased BP, diaphoresis, tachyarrhythmias, delirium, convulsions, and vomiting.

**Treatment:** includes discontinuing all adrenergic bronchodilators and other beta-adrenergic agonists and symptomatic, supportive therapy. Cardiopulmonary beta blockers are used cautiously because they may induce bronchodilatation.

Potential Nursing Diagnoses

- Ineffective airway clearance (Indications)
- Indirect tissue perfusion (Indications)

**Implementation**

- **Do not confuse epinephrine with ephedrine.**
### EPINEPHrine

**Contd.** (Continued)

- **For anaphylactic shock,** volume replacement should be administered concurrently with epinephrine.
- **Continuous Infusion:**
  - IM: For anaphylactic shock, volume replacement should be administered concurrently with epinephrine.
  - IV: Dose calculations, concentration, route of administration, and infusion pump settings.
- **Do not use solutions that are pinkish or brownish or that contain a precipitate.**
- **Tolerance may develop with prolonged or excessive use. Effectiveness may be reduced by discontinuing for a few days and then readministering.**
- **Do not use solutions that are opalescent or hazy or that contain a precipitate.**
- **For anaphylactic shock, volume replacement should be administered concurrently with epinephrine.**
- **Continuous Infusion:**
  - IM: For anaphylactic shock, volume replacement should be administered concurrently with epinephrine.
  - IV: Dose calculations, concentration, route of administration, and infusion pump settings.
- **Use a tuberculin syringe with a 26-gauge 1/2 in. needle for subcut injection.**
- **Medication should be administered promptly at the onset of bronchospasm.**
- **EPINEPHrine continued.**
- **Continuous Infusion: Different:**
  - IM: A 1:10,000 solution can be administered undiluted. Dilute 1 mg (1 mL) of a 1:1000 solution in 9 mL of 0.9% NaCl to prepare a 1:10,000 solution.
  - IV: The 1:10,000 solution can be administered undiluted. Dilute 1 mg (1 mL) of a 1:1000 solution in 250 mL of DSW or 0.9% NaCl. Protect from light. Infusion stable for 24 hr.
- **Continuous Infusion: Different:**
  - IM: See Intravenous Route section. Titrate to response (HR, BP, respiratory rate).
  - IV: See Intravenous Route section. Titrate to response (HR, BP, respiratory rate).
- **Y-Site Incompatibility:**
  - IV: See Intravenous Route section. Titrate to response (HR, BP, respiratory rate).
  - IM: See Intravenous Route section. Titrate to response (HR, BP, respiratory rate).

**Genetic Implication.** CAPI TALS indicate life-threatening, underlines indicate most frequent. Strikethrough indicates discontinued.


- Allow 1–2 min to elapse between inhalations of epinephrine inhalation solution to make certain the second inhalation is necessary.
- When epinephrine is used concurrently with corticosteroid or ipratropium inhalations, administer bronchodilator first and other medications 5 min apart to prevent toxicity from inhaled fluorocarbon propellants.
- Endotracheal: Epinephrine can be injected directly into the bronchial tree via the endotracheal tube if the patient has been intubated. Perform 5 rapid inflations; forcibly administer 10 mL containing 2–2.5 mg epinephrine (1 mg/mL) directly into tube; follow with 5 quick inflations.

**Patient/Family Teaching**

- Instruct patient to take medication exactly as directed. If on a scheduled dosing regimen, take a missed dose as soon as possible; space remaining doses at regular intervals. Do not double doses. Caution patient not to exceed recommended dose; may cause adverse effects, paradoxical bronchospasm, or loss of effectiveness of medications.
- Instruct patient to contact health care professional immediately if shortness of breath is not relieved by medication or is accompanied by diaphoresis, dizziness, palpitations, or chest pain.
- Advise patient to use bronchodilator first if using other inhalation medications, and allow 5 min to elapse before administering other inhalant medications, unless otherwise directed.
- Advise patient to rinse mouth with water after each inhalation dose to minimize dry mouth.
- Advise patient to maintain adequate fluid intake (2000–3000 mL/day) to help liquefy tenacious secretions.
- Advise patient to consult health care professional if respiratory symptoms are not relieved or worsen after treatment or if chest pain, headache, severe dizziness, palpitations, nervousness, or weakness occurs.

**Evaluation/Desired Outcomes**

- Prevention or relief of bronchospasm.
- Increase in ease of breathing.
- Prevention of bronchospasm or reduction in frequency of acute asthma attacks in patients with chronic asthma.
- Prevention of exercise-induced asthma.
- Reversal of signs and symptoms of anaphylaxis.
- Increase in cardiac rate and output, when used in cardiac resuscitation.
- Increase in BP, when used as a vasopressor.
- Localization of local anesthetic.
- Decrease in sinus and nasal congestion.

**Why was this drug prescribed for your patient?**