Isoproterenol (eye-soe-proe-ter-e-nole)

Stimul, Medihaler-Iso

Classification
Therapeutic: antiarrhythmics, bronchodilators
Pharmacologic: adrenergics

Pregnancy Category C

Indications
Management of bronchospasm during anesthesia. Treatment of asthma or COPD. Management of bradycardia (IV only).

Action
Results in the accumulation of cyclic adenosine monophosphate (cAMP) at beta-adrenergic receptors. Produces bronchodilation. Inhibits the release of mediators of immediate hypersensitivity reactions from mast cells. Has additional significant beta (cardiac)-adrenergic action, which results in positive inotropic and chronotropic effects. Therapeutic Effects: Bronchodilation. Increased heart rate.

Pharmacokinetics
Absorption: Well absorbed following IM or subcut administration. IV administration results in complete bioavailability.

Distribution: Unknown.

Metabolism and Excretion: Metabolism occurs in the lung, liver, and other tissues; 50% excreted unchanged by the kidneys after IV administration. Half-life: 2.5–5 min.

TIME/ACTION PROFILE (bronchodilation)

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>2–5 min</td>
<td>unknown</td>
<td>0.5–2 hr</td>
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<tr>
<td></td>
<td>immediate</td>
<td>unknown</td>
<td>1 hr</td>
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</tbody>
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Contraindications/Precautions
Contraindicated in: Hypersensitivity to adrenergic amines or bisulfites.

Use Cautiously in: Cardiovascular disease (including hypertension and coronary artery disease); Hyperthyroidism; Diabetes; Glaucoma; Geri: Geriatric patients are more susceptible to adverse reactions; may require dosage reduction; Pregnancy (near term) and lactation; Pedi: Safety not established in children; pediatric use has been associated with serious adverse reactions.

Adverse Reactions/Side Effects
CNS: nervousness, restlessness, tremor, headache, insomnia. CV: arrhythmias, angina, hypertension, tachycardia, extrasystoles, hypotension, flushing, MI, TIA, MIPE (pulmonary edema with small infarcts).

Interactions
Drug-Drug: Concurrent use with other adrenergic agents (sympathomimetics) will have additive adrenergic side effects. Use with MAO inhibitors may lead to hypertensive crisis. May increase theophylline elimination. Beta blockers may negate therapeutic effect.

Route/Dosage
IV (Adults): Heart block, Adams-Stokes attacks and cardiac arrest—0.02–0.06 mg may be followed by additional doses of 0.01–0.02 mg or 5 mcg/min infusion; bronchospasm during anesthesia—0.01–0.02 mg, repeated as needed.

IV (Neonates, Infants, and Children): 0.05–2 mcg/kg/min via continuous infusion.

IM (Adults): Heart block, Adams-Stokes attacks and cardiac arrest—0.2 mg; subsequent range 0.02–1 mg.

Subcut (Adults): Heart block, Adams-Stokes attacks and cardiac arrest—0.2 mg; subsequent range 0.15 mg–0.2 mg.

Intracardiac (Adults): Heart block, Adams-Stokes attacks and cardiac arrest—0.02 mg.

NURSING IMPLICATIONS

Assessment
• Bronchodilator: Assess lung sounds, respiratory pattern, pulse, and BP before administration and during peaks of medication. Note amount, color, and character of sputum produced.
• Monitor pulmonary function tests before initiating therapy and periodically during therapy to determine effectiveness.
• Pedi: Continuous assessment of vital signs, frequent electrocardiography, and daily measurements of cardiac enzymes, including CPK-MB, are required if IV isoproterenol therapy is administered to pediatric pa-

High Alert
- **Toxicity and Overdose:** Symptoms of overdose include persistent agitation, chest pain or discomfort, decreased BP, dizziness, hyperglycemia, hypokalemia, seizures, tachyarrhythmias, persistent trembling, and vomiting.

- **Treatment:** Includes discontinuing beta-adrenergic agonists and symptomatic, supportive therapy. Cardioselective beta blockers are used cautiously, as they may reduce bronchodilation.

**Potential Nursing Diagnoses**

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

**Implementation**

- **High Alert:** IV vasoactive medications are inherently dangerous. Prior to administration, have second practitioner independently check original order, dose calculations, concentration, route of administration, and infusion pump settings.

**IV Administration**

- **Direct IV:** May administer 20 mcg (1 mL) solution undiluted. Do not use if solution is pinkish to brownish or contains a precipitate.
  - **Rate:** Administer 0.5–1 mL (10–20 mcg) over 1 min.

- **Continuous Infusion:**
  - **Diluent:** Prepare by adding 4 mg (20 mL of 0.2 mg/mL solution) of isoproterenol to 500 mL of D5W, D10W, 0.9% NaCl, 0.45% NaCl, dextrose/saline combinations, dextrose/Ringer’s or lactated Ringer’s.
  - **Concentration:** 8 mcg/mL.
  - **Rate:** Administer at a rate of 2–10 mcg/min (15–75 mL/hr), adjusting according to patient response and parameters for heart rate and hemodynamic values. Administer via infusion pump to deliver of precise amounts of medication. Infusion must be gradually tapered over a 24–48 hr period to prevent rebound bronchospasm.

- **Y-Site Compatibility:**
Evaluation/Desired Outcomes

- Prevention or relief of bronchospasm.
- Increase in ease of breathing.
- Increase in cardiac rate and output when used intravenously.

Why was this drug prescribed for your patient?