Levalbuterol (leev-al-byoo-ter-ole)
Xopenex, Xopenex HFA

Classification
Therapeutic: bronchodilators
Pharmacologic: adrenergics

Pregnancy Category: C

Indications
Bronchospasm due to reversible airway disease (short-term control agent).

Action
R-enantiomer of racemic albuterol. Binds to beta-2 adrenergic receptors in airway smooth muscle leading to activation of adenyl cyclase and increased levels of cyclic-3', 5'-adenosine monophosphate (cAMP). Increases in cAMP activate kinases, which inhibit the phosphorylation of myosin and decrease intracellular calcium. Decreased intracellular calcium relaxes bronchial smooth muscle. Therapeutic Effects: Relaxation of airway smooth muscle with subsequent bronchodilation. Relatively selective for beta-2 (pulmonary) receptors.

Pharmacokinetics
Absorption: Some absorption occurs following inhalation.
Distribution: Unknown.
Metabolism and Excretion: Metabolized in the liver to an inactive sulfate and 3–6% excreted unchanged in the urine.
Half-life: 3.3–4 hr.

TIME/ACTION PROFILE (bronchodilation)

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
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<tbody>
<tr>
<td>Inhaln</td>
<td>10–17 min</td>
<td>90 min</td>
<td>5–6 hr</td>
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Contraindications/Precautions
Contraindicated in: Hypersensitivity to levalbuterol or albuterol. Use cautiously in: Cardiovascular disorders (including coronary insufficiency, hypertension, and arrhythmias); History of seizures; Hypokalemia; Hyperthyroidism; Diabetes mellitus; Unusual sensitivity to adrenergic amines; OB, Lactation, Pedi: Pregnancy, lactation, or children ≤12 yr (for nebulized solution) or ≤4 yr (for metered-dose inhaler) (safety not established).

Exercise Extreme Caution in: Concurrent use or use within 2 weeks of tricyclic antidepressants or MAO inhibitors (may ↑ risk of adverse cardiovascular reactions).

Adverse Reactions/Side Effects
CNS: anxiety, dizziness, headache, nervousness.
Resp: PARADOXICAL BRONCHOSPASM (excessive use of inhalers), increased cough, turbinate edema.
CV: tachycardia.
GI: dyspepsia, vomiting.
Endo: hyperglycemia.
F and E: hypokalemia.
Neuro: tremor.

Interactions
Drug-Drug: Concurrent use or use within 2 weeks of tricyclic antidepressants or MAO inhibitors may ↑ risk of adverse cardiovascular reactions (use with extreme caution). Beta blockers block the beneficial pulmonary effects of adrenergic bronchodilators (choose cardioselective beta blockers if necessary and with caution). May ↑ risk of hyperkalemia from potassium-sparing diuretics. May ↓ serum digoxin levels. May ↑ risk of arrhythmias with hydrocarbon inhalation anesthetics or cocaine.

Drug-Natural Products: Use with caffeine-containing herbs (guarana, tea, coffee) may ↑ stimulant effect.

Route/Dosage
Inhaln (Adults and Children ≥4 yr): 2 inhalations q 4–6 hr; some patients may respond to 1 inhalation q 4 hr.
Inhaln (Adults and Children ≥12 yr): 0.63 mg via nebulization 3 times daily (every 6–8 hr) may ↑ to 1.25 mg 3 times daily (every 6–8 hr).
Inhaln (Children 6–11 yr): 0.31 mg via nebulization 3 times daily (not to exceed 0.63 mg 3 times daily).

NURSING IMPLICATIONS
Assessment
● Assess long sounds, pulse, and BP before administration and during peak of medication. Note amount, color, and character of sputum produced. Closely monitor patients on higher dose for adverse effects.

Levalbuterol
Monitor pulmonary function tests before initiating therapy and periodically during course to determine effectiveness of medication.

Observe for paradoxical bronchospasm (wheezing, dyspnea, tightness in chest). If condition occurs, withhold medication and notify health care provider immediately.

Lab Test Considerations: May cause ↑ serum glucose and ↓ serum potassium.

Potential Nursing Diagnoses
Ineffective airway clearance (Indications)

Implementation

Inhaln: Allow at least 1 min between inhalations of aerosol medication.

For nebulization, levalbuterol solution does not require dilution prior to administration. Once the foil pouch is opened, vials must be used within 2 weeks; open vials may be stored for 1 week. Discard unopened solution not clear or cloudy.

Patient/Family Teaching

Instruct patient in the proper use of metered-dose inhaler and spacer and to take levalbuterol as directed. Caution patient not to exceed recommended dose; may cause adverse effects, paradoxical bronchospasm, or loss of effectiveness of medication.

Instruct patient to notify health care professional of all Rx or OTC medications, vitamins, or herbal products being taken and to consult health care professional before taking any OTC medications or alcoholic beverages concurrently with this therapy. Caution patient also to avoid smoking and other respiratory irritants.

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 levalbuterol 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.

Instruct patient to notify health care professional if no response to the usual dose of levalbuterol.

Evaluation/Desired Outcomes

Prevention or relief of bronchospasm.

Why was this drug prescribed for your patient?