budesonide (byoo-des-oh-nide)

Pulmicort Respules, Pulmicort Flexhaler

Classification
Therapeutic: anti-inflammatories (steroidal)
Pharmacologic: corticosteroids

Pregnancy Category B

Indications
Nebulization—Maintenance treatment and prophylactic therapy of asthma. Oral inhalation—Maintenance treatment and prophylactic therapy of asthma.

Action
Potent, locally acting anti-inflammatory and immune modifier.

Therapeutic Effects:
Decreases frequency/severity of asthma attacks. Improves asthma symptoms.

Pharmacokinetics

Absorption:
Flexhaler—39%; Respules—6%. Action is primarily local following inhalation.

Distribution:
Crosses placenta; enters breast milk in small amounts.

Protein Binding:
85–90%.

Metabolism and Excretion:
Metabolized by the liver (primarily by CYP3A4) following absorption from lungs; 60% excreted in urine, 40% in feces.

Half-life:
Adults—2–3.6 hr; Children 10–14 yrs—1.5 hr; Children 4–6 yrs—2.3 hr (after nebulization).

TIME/ACTION PROFILE (improvement in symptoms)

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation</td>
<td>within 24 hr</td>
<td>1–4 wk†</td>
<td>unknown</td>
</tr>
<tr>
<td>Nebulization</td>
<td>2–8 days</td>
<td>4–6 wk</td>
<td>unknown</td>
</tr>
</tbody>
</table>

†Improvement in pulmonary function; decreased airway responsiveness may take longer

Contraindications/Precautions
Contraindicated in: Hypersensitivity to budesonide; Active untreated infections; Underlying immunosuppression (from disease or concurrent therapy); Systemic corticosteroids required during stress or trauma; OB: Has been used safely, use only if clearly needed.

Use Cautiously in: Active untreated infections; Diabetes or glaucoma; Underlying immunosuppression (from disease or concurrent therapy). C instituting systemic corticosteroids (should not be abruptly discontinued when budesonide is initiated, additional corticosteroids needed during stress or trauma).

Adverse Reactions/Side Effects

CNS: Headache.

Derm: Rash.

EENT: Otitis media, dysphonia, epistaxis, oropharyngeal fungal infections, pharyngitis, rhinitis, sinusitis.

Resp: Bronchospasm, cough.

GI: Abdominal pain, diarrhea, dyspepsia.

Endo: Adrenal suppression (dose-dependent).

Misc: ANAPHYLAXIS, Flu-like syndrome.

Interactions

Drug-Drug: Strong CYP3A4 inhibitors, including ritonavir, atazanavir, clarithromycin, indinavir, itraconazole, ketoconazole, nefazodone, nilfemycin, saquinavir, azithromycin, imatinib, and voriconazole, may increase levels of budesonide.

Route/Dosage

Flexhaler

Inhalation (Adults): 180–360 mcg twice daily (not to exceed 720 mcg twice daily).

Respules

Inhalation (Children 6 yr): Previously on bronchodilators alone—0.5 mg once daily (not to exceed 1 mg twice daily); previously on other inhaled corticosteroids—0.5 mg once daily (not to exceed 1 mg twice daily).

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Assess patients changing from systemic corticosteroids to inhalation corticosteroids for signs of adrenal insufficiency (anorexia, nausea, weakness, fatigue, hypotension, hypoglycemia) during initial therapy and periods of stress. If these signs appear, notify health care professional immediately; condition may be life-threatening.

Monitor for withdrawal symptoms (fatigue, weakness, nausea, vomiting, hypotension, joint or muscular pain, lassitude, depression) during withdrawal from oral corticosteroids.

Monitor growth rates in children receiving chronic therapy; lowest possible dose should be used.

Lab Test Considerations: Periodic adrenal function tests may be ordered to assess degree of hypothalamic-pituitary-adrenal (HPA) axis suppression in chronic therapy. Children and patients using higher than recommended doses are at highest risk for HPA suppression.

May cause serum and urine glucose concentrations if significant absorption occurs.

Potential Nursing Diagnoses
Ineffective airway clearance (Indications)
Risk for infection (Side Effects)

Implementation
After the desired clinical effect has been obtained, attempts should be made to decrease dose to lowest amount required to control symptoms. Gradually decrease dose every 2–4 wk as long as desired effect is maintained. If symptoms return, dose may require return to starting dose.

Inhaln:
Allow at least 1 min between inhalations of Flexhaler. Do not shake inhaler or use with spacer.

Intranasal:
Clear nasal passage by blowing nose prior to use, shake canister gently before use.

PO:
May administer without regard to meals, do not chew, crush or break open capsule, swallow whole. Do not administer with grapefruit juice.

Patient/Family Teaching
Advise patient to take medication as directed. Take missed doses as soon as remembered unless almost time for next dose. Advise patient not to discontinue medication without consulting health care professional; gradual decrease is required. Instruct patient to read the Patient Information and Instructions for Use before using and with each refill, in case of new information.

Advise patients using inhalation corticosteroids and bronchodilator to use bronchodilator first and to allow 5–10 min to elapse before administering the corticosteroid, unless otherwise directed by health care professional.

Advise patient that inhalation corticosteroids should not be used to treat an acute asthma attack, but should be continued even if other inhalation agents are used.

Advise patients using inhalation corticosteroids to control asthma may require systemic corticosteroids for acute attacks. Advise patient to use peak flow monitoring to determine respiratory status.

Advise patient to rinse mouth with water after treatment to decrease risk of development of local candidiasis.

Instruct patient whose systemic corticosteroids have been recently reduced or withdrawn to carry a warning card indicating the need for supplemental systemic corticosteroids in the event of stress or severe asthma attack unresponsive to bronchodilators.

Advise female patients to notify health care professional if pregnancy is planned or suspected or if breast feeding.

Pulmicort Flexhaler: Advise patient to follow instructions supplied. Before first-time use, prime unit by turning cover and lifting off, hold unit upright with mouthpiece up and press brown grip fully to right, then fully to left until it clicks. To administer dose, hold unit upright, press brown grip fully to right, then fully to left, until it clicks. Turn handle away from outlet and inhale (do not blow into outlet). Do not shake inhaler. Place mouthpiece between lips and inhale deeply and forcefully. Remove satisfiers from mouth and inhale. Do not inhale into mouthpiece. Repeat procedure if 2nd dose required. Replace cover.

Pulmocort Respules: Administer with jet nebulizer connected to adequate air flow, equipped with a mouthpiece or face mask. Adhere face mask to avoid exposure of eyes to medicated mist. Wash face after use of face mask. Ultrasonic nebulizers are not adequate for administration and not recommended.

Instruct parent to read and follow the Patients Instructions for Use included in each package. Do not mix with other medications in the nebulizer.
CONTINUED

budesonide

- Store resuples upright, away from heat and protected from light. Do not refrigerate or freeze. Resuples are stable for 2 wks at room temperature after opening aluminum foil envelope. Unused resuples should be returned to aluminum foil envelope.

Evaluation/Desired Outcomes

- Improvement in asthma symptoms.

Why was this drug prescribed for your patient?