ethambutol (e-tham-byoo-tole)

**Classification**
Therapeutic: antituberculars

**Pregnancy Category C**

**Indications**
Active tuberculosis or other mycobacterial diseases (with at least one other drug).

**Action**
Inhibits the growth of mycobacteria. Therapeutic Effects: Tuberculostatic effect against susceptible organisms.

**Pharmacokinetics**
Absorption: Rapidly and well absorbed (80%) from the GI tract.

Distribution: Widely distributed; crosses blood-brain barrier in small amounts; crosses placenta and enters breast milk.

Protein Binding: 20–30%.

Metabolism and Excretion: 50% metabolized by the liver, 50% eliminated unchanged by the kidneys.

**Half-life:** 3.3 hr (increased in renal or hepatic impairment).

**TIME/ACTION PROFILE (blood levels)**

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO</td>
<td>rapid</td>
<td>2–4 hr</td>
<td>24 hr</td>
</tr>
</tbody>
</table>

**Contraindications/Precautions**
Contraindicated in: Hypersensitivity; Optic neuritis.

Use Cautiously in: Renal and severe hepatic impairment (dosage reduction required); OB: Although safety not established, ethambutol has been used with isoniazid in pregnant women without fetal adverse effects; Lactation: Usually compatible with breast feeding (AAP).

**Adverse Reactions/Side Effects**

- CNS: confusion, dizziness, hallucinations, headache, malaise.
- EENT: optic neuritis.
- GI: hepatitis, abdominal pain, anorexia, nausea, vomiting.
- Metab: hyperuricemia.
- MS: joint pain, peripheral neuropathy.
- Resp: pulmonary infiltrates.
- Misc: anaphylactoid reactions, fever.

**Interactions**

- **Drug-Drug:** Neutropenia may be increased with other neuropathic agents. Aluminum hydroxide may decrease absorption (space doses 4 hr apart).

**Route/Dosage**

- PO (Adults and Children ≥13 yr): 15–25 mg/kg/day (maximum 2.5 g/day) or 50 mg/kg (up to 2.5 g) twice weekly for 29–30 days (up to 2.5 g) 3 times weekly.

- PO (Children 1 mo —13 yr): HIV negative—15-20 mg/kg/day once daily (maximum: 1 g/day) or 50 mg/kg/dose twice weekly (maximum: 2.5 g/dose) HIV-exposed/-infected—15-25 mg/kg/day once daily (maximum: 2.5 g/day) with clarithromycin (or azithromycin) with or without rifabutin. Nontuberculous mycobacterial infection—15-25 mg/kg/day once daily (maximum: 2.5 g/day).

**NURSING IMPLICATIONS**

**Assessment**
- Microbiological studies and susceptibility tests should be performed before and periodically during therapy to detect possible resistance.
- Assess lung sounds and character and amount of sputum periodically during therapy.
- Assessments of visual function should be made frequently during therapy. Advise patient to report blurring of vision, constriction of visual fields, or changes in color perception immediately. Visual impairment, if not identified early, may lead to permanent sight impairment.

**Implementation**
- Ethambutol is given as a single daily dose and should be taken at the same time each day. Some regimens require dosing 2–3 times/week. Usually administered withisoniazid.

**Nursing Considerations**

- Discontinued.
concurrently with other antitubercular medications to prevent development of bacterial resistance.

- **PO:** Administer with food or milk to minimize GI irritation.

- **PO:** Tablets may be crushed and mixed with apple juice or apple sauce.

**Patient/Family Teaching**

- Instruct patient to take medication as directed. Take missed doses as soon as possible unless almost time for next dose; do not double up on missed doses. A full course of therapy may take months to yr. Do not discontinue without consulting health care professional, even though symptoms may disappear.

- Advise patient to contact health care professional if no improvement is seen in 2–3 wk. Health care professional should also be notified if unexpected weight gain or decreased urine output occurs.

- Emphasize the importance of routine exams to evaluate progress and ophthalmic examinations if signs of optic neuritis occur.

**Evaluation/Desired Outcomes**

- Resolution of clinical symptoms of tuberculosis.

- Decrease in acid-fast bacteria in sputum samples.

- Improvement seen in chest x-rays. Therapy for tuberculosis is usually continued for at least 1–2 yr.

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