etidronate (eh-tih-droe-nate)

**Indications**

- Treatment of Paget’s disease of bone.
- Treatment and prophylaxis of heterotopic calcification associated with total hip replacement or spinal cord injury.

**Action**

Blocks the growth of calcium hydroxyapatite crystals by binding to calcium phosphate.

**Therapeutic Effects:**

- Decreased bone resorption and turnover.

**Pharmacokinetics**

- **Absorption:** Absorption is generally poor (1–6%) after oral administration.
- **Distribution:** Half of the absorbed dose is bound to hydroxyapatite crystals in areas of increased osteogenesis.
- **Metabolism and Excretion:** Unabsorbed drug is eliminated in the feces; 50% of the absorbed dose is excreted unchanged by the kidneys.
- **Half-life:** 5–7 hr.

**TIME/ACTION PROFILE**

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO (Paget’s disease)</td>
<td>1 mo†</td>
<td>unknown</td>
<td>1 yr</td>
</tr>
<tr>
<td>PO (heterotopic calcification)</td>
<td>unknown</td>
<td>unknown</td>
<td>several months</td>
</tr>
</tbody>
</table>

†As measured by decreased urinary hydroxyproline.

**Contraindications/Precautions**

- **Contraindicated in:**
  - Hypersensitivity.
  - Overt osteomalacia.
  - Abnormalities of the esophagus which delay esophageal emptying (i.e., strictures, achalasia).

- **Use Cautiously in:**
  - History of upper GI disorders.
  - Hypocalcemia.
  - Hypovitaminosis D.
  - Renal impairment (dosage reduction may be needed).
  - Invasive dental procedures, cancer, receiving chemotherapy or radiation therapy, poor oral hygiene, post- surgical disease, dental disease, or poorly-fitting dentures (due to risk of jaw osteonecrosis).

**Adverse Reactions/Side Effects**

- **GI:** Diarrhea, nausea, esophagitis, esophageal cancer, esophageal ulcer.
- **MS:** Musculoskeletal pain, microfractures, osteonecrosis (primarily of jaw).

**Interactions**

- **Drug-Drug:**
  - Antacids, mineral supplements, or buffers (as in didanosine) containing calcium, aluminum, iron, or magnesium may impair absorption of etidronate.
  - Hypocalcemic effect may be additive with calcitonin.

- **Drug-Food:**
  - Foods containing large amounts of calcium, aluminum, iron, or magnesium may impair absorption of etidronate.

**Route/Dosage**

- **Paget’s Disease**
  - PO (Adults): 5–10 mg/kg/day single dose for up to 6 mo or 11–20 mg/kg/day for not more than 3 mo.

- **Heterotopic Ossification (Hip Replacement)**
  - PO (Adults): 20 mg/kg/day for 1 mo before and 3 mo after surgery.

- **Heterotopic Ossification (Spinal Cord Injury)**
  - PO (Adults): 20 mg/kg/day for 2 wk, then decreased to 10 mg/kg/day for 10 wk.

**NURSING IMPLICATIONS**

- **Assessment:**
  - Assess patient for bone pain, weakness, or loss of function before and throughout therapy. Bone pain may persist or increase in patients with Paget’s disease; usually subsides days to months after therapy is discontinued. Confer with health care professional regarding analgesics to control pain.
  - Heterotopic Ossification: Monitor for inflammation and pain at the site and loss of function of ossification occurs near joint.
  - Lab Test Considerations: Etidronate interferes with bone uptake of technetium-99m in diagnostic scans.

- **Contraindicated in:** Hypersensitivity.

- **Genetic Implication:**
  - CATT indicates life-threatening, underline indicates most frequent. Strikethrough indicates discontinued.

- **Drug-Laboratory Test Interactions:**
  - May increase levels of calcium, aluminum, iron, or magnesium.

- **Overdosage:**
  - May cause bone pain, weakness, or loss of function.

- **CNS:**
  - May cause increased bone resorption.

- **Excretory:**
  - May cause increased bone resorption.

- **Musculoskeletal:**
  - May cause increased bone resorption.

- **Gastrointestinal:**
  - May cause increased bone resorption.
Paget's disease: urinary excretions of hydroxyproline and serum alkaline phosphatase are often the first clinical signs of effectiveness; monitor every 3 mo. Treatment is maintained when levels return to 75% of pretreatment values. Monitor serum phosphate levels before and 4 wk after beginning therapy. Dose may be increased if serum phosphate is 7.5 without corresponding increase in urinary excretion of hydroxyproline or serum alkaline phosphatase.

Potential Nursing Diagnoses

Acute pain (Indications) (Side Effects)

Implementation

PO: Administer on empty stomach, because food decreases absorption. Swallow tablet whole; do not break, crush, or chew.

Patient/Family Teaching

- Advise patient to take as directed. Take missed doses as soon as remembered unless almost time for next dose. Do not double up on doses. Dose should not be taken within 2 hr of eating (especially products high in calcium) or taking antacids or antacids, because absorption will be impaired.
- Instruct patient to notify health care professional if swallowing difficulties, chest pain, new or worsening heartburn, or intolerance or pain when swallowing occurs; may be signs of problems of the esophagus.
- Instruct patient to notify health care professional if diarrhea occurs. Health care professional may divide the dose throughout the day to control diarrhea.
- Emphasize need for keeping follow-up appointments to monitor progress, even after medication is discontinued, to detect relapse.
- Advise patient to inform health care professional of corticosteroid therapy prior to dental surgery.

Evaluation/Desired Outcomes

- Decreased bone pain and fractures in Paget’s disease.
- Prevention or treatment of heterotopic ossification. Normal serum calcium levels are usually attained in 2–8 days in hypercalcemia associated with bone metastasis. Therapy may be repeated once after 1 wk.

Why was this drug prescribed for your patient?