pamidronate (pa-mid-rone-a)

**Classification**
Therapeutic: Bone resorption inhibitors
Pharmacologic: Bisphosphonates, hypocalcemics

**Pregnancy Category D**

**Indications**
Moderate to severe hypercalcemia associated with malignancy. Osteolytic bone lesions associated with multiple myeloma or breast cancer. Moderate to severe Paget’s disease.

**Action**

**Pharmacokinetics**

**Absorption:** IV administration results in complete bioavailability.

**Distribution:** Rapidly absorbed by bone. Reaches high concentrations in bone, liver, spleen, teeth, and tracheal cartilage. Approximately 50% of a dose is retained by bone and slowly released.

**Metabolism and Excretion:** 50% is excreted unchanged in the urine.

**Half-life:** Elimination half-life from plasma is biphasic—1st phase 1.6 hr, 2nd phase 27.2 hr. Elimination half-life from bone is 300 days.

**TIME/ACTION PROFILE (effect on serum calcium)**

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>24 hr</td>
<td>7 days</td>
<td>unknown</td>
</tr>
</tbody>
</table>

**Contraindications/Precautions**
Contraindicated in: Hypersensitivity to pamidronate, other bisphosphonates, or mannitol; OB, Lactation: Pregnancy or lactation.

**Use Cautiously in:** Underlying cardiovascular disease, especially HF (initiate saline hydration cautiously); Invasive dental procedures, cancer, receiving chemotherapy, poor oral hygiene, periodontal disease, anemia, coagulopathy, infection, or poorly-fitting dentures (may ↑ risk of jaw osteonecrosis); History of thyroid surgery (may be at ↑ risk for hypocalcemia). Renal impairment (dose ↓ recommended); Pedi: Safety not established.

**Adverse Reactions/Side Effects**

**CNS:** Fatigue.

**EENT:** Conjunctivitis, blurred vision, eye pain/inflammation, rhinitis.

**Resp:** Rales.

**CV:** Arrhythmias, hypertension, syncope, tachycardia.

**GI:** Nausea, abdominal pain, anorexia, constipation, vomiting. Fluid overload.

**F and E:** Hypocalcemia, hypokalemia, hypomagnesemia, hypophosphatemia.

**GU:** Nephrotoxicity.

**Hemat:** Leukopenia, anemia.

**Local:** Phlebitis at injection site.

**Metab:** Hypothyroidism.

**MS:** Muscle stiffness, musculoskeletal pain, femur fractures, osteonecrosis (primarily of jaw).

**Misc:** Fever, generalized pain.

**Interactions**

**Drug-Drug:** Hypokalemia and hypomagnesemia may ↑ risk of digoxin toxicity. Calcium and vitamin D will antagonize the beneficial effects of pamidronate. Concomitant use of thalidomide may ↑ risk of renal dysfunction.

**Route/Dosage**

**Hypercalcemia of Malignancy**

**IV (Adults):**
- Moderate hypercalcemia—30–90 mg; may be repeated after 7 days.

**Osteolytic Lesions from Multiple Myeloma**

**IV (Adults):** 90 mg monthly.

**Osteolytic Lesions from Metastatic Breast Cancer**

**IV (Adults):** 90–180 mg/treatment; may be given as 30 mg daily for 3 days up to 90 mg q 3–4 wk. Single doses of 60–90 mg may also be effective.

**Paget’s Disease**

**IV (Adults):** 90–180 mg/treatment, may be given as 90 mg daily for 3 days up to 90 mg q 3–4 wk. Single doses of 60–90 mg may also be effective.

**NURSING IMPLICATIONS**

**Assessment**

- Monitor intake/output ratios and BP. Frequent during therapy. Assess for signs of fluid overload (edema, rales/crackles).

**Potential Nursing Diagnoses**

- Knowledge deficit related to medication regimen 

**Patient/Family Teaching**

- Instruct patient to avoid use of over-the-counter medications (e.g., aspirin, antacids) that may accentuate bleeding or perforation from Paget’s disease.

- Advise patient to report any bone fracture or infection to health care provider immediately.

- As appropriate, review all other significant adverse reactions and interactions with patient and family.
● Monitor symptoms of hypercalcemia (nausea, vomiting, anorexia, weakness, constipation, thirst, and cardiac arrhythmias).

● Observe for evidence of hypocalcemia (paresthesia, muscle twitching, laryngospasm, and Chvostek’s or Trousseau’s sign). Protect symptomatic patients by elevating and padding side rails, keeping bed low position.

● Monitor IV site for phlebitis (pain, redness, swelling). Symptomatic treatment should be used if this occurs.

● Assess for bone pain. Treatment with nonopioid or opioid analgesics may be necessary.

● Lab Test Considerations: Assess serum creatinine prior to each treatment. Withhold dose if renal function has deteriorated in patients treated for bone metastases.

● Monitor serum electrolytes (including calcium, phosphate, potassium, and magnesium), hemoglobin, and creatinine closely. May cause hyperkalemia or hypokalemia, hypernatremia, and hematuria.

● Monitor renal function periodically during therapy.

Potential Nursing Diagnoses

Acute pain (Indications) (Side Effects)

Risk for injury (Indications)

Implementation

● Initiate a rigorous saline hydration, maintaining a urine output of 2000 mL/24 hr, concurrently with pamidronate therapy. Patients should be adequately hydrated, but avoid overhydration. Use caution in patients with underlying cardiovascular disease, especially HF. Do not use diuretics prior to treatment of hypovolemia.

● Patients with severe hypercalcemia should be started at the 90-mg dose.

● IV: Reconstitute by adding 10 mL of sterile water for injection to each vial. Concentration: 30 mg/10 mL or 90 mg/10 mL. Allow drug to dissolve before withdrawing. Solution is stable for 24 hr if refrigerated.

● Hypercalcemia: Diluent: Dilute further in 1000 mL of 0.45% NaCl, 0.9% NaCl, or D5W. Rate: Administer over 4 hr to 24 hr.

● Multiple Myeloma: Diluent: Dilute reconstituted solution in 500 mL of 0.45% NaCl, 0.9% NaCl, or D5W. Rate: Administer over 4 hr.

● Paget’s Disease: Dilute recombinant solution in 500 mL of 0.45% NaCl, 0.9% NaCl, or D5W. Rate: Administer over 4 hr.

Y-Site Compatibility: amygdalin, allopurinol, albumin, alprostadil, ampicillin, cephalixin, cefazolin, clindamycin, doxycycline, erythromycin, ticarcillin, ticarcillin/clavulanate, trimethoprim/sulfamethoxazole, vancomycin, voriconazole, zidovudine.

Y-Site Incompatibility: amphotericin B colloidal, captopril, Danazol, diclofenac, di- }

Continued
CONTINUED

pamidronate

● Additive Incompatibility: Calcium-containing solutions, such as Ringer’s solu-
tion.

Patient/Family Teaching

● Advise patient to report signs of hypercalcemic relapse (bone pain, anorexia, nau-
sea, vomiting, thirst, lightheadedness) to health care professional promptly.

● Advise patient to report mild to moderate pain at the infusion site.

● Encourage patient to comply with dietary recommendations. Diet should contain
adequate amounts of calcium and vitamin D.

● Advise patient to maintain good oral hygiene and have regular dental examina-
tions. Instruct patient to inform health care professional of pamidronate therapy
prior to dental surgery.

● Emphasize the need for regular follow-up exams to monitor progress, even after
medication is discontinued, to detect relapse.

Evaluation/Desired Outcomes

● Lowered serum calcium levels.

● Decreased pain from lytic lesions.

Why was this drug prescribed for your patient?