pentostatin (pen-toe-sta-tin)

**Classifications**
- Therapeutic: antineoplastics
- Pharmacologic: enzyme inhibitors

**Pregnancy Category** D

**Indications**
Treatment of hairy cell leukemia in patients with active disease.

**Action**
Inhibits adenine deaminase (ADA), an enzyme that blocks the synthesis of DNA, especially in T cells of the lymphoid system. **Therapeutic Effects:** Decreased signs and symptoms of hairy cell leukemia (recovery of hematologic parameters, organomegaly, and lymphadenopathy).

**Pharmacokinetics**
- **Absorption:** IV administration results in complete bioavailability.
- **Distribution:** Highest in the kidneys; minimal penetration into the CNS.
- **Metabolism and Excretion:** 90% renally excreted.
- **Half-life:** 6 hr (increased in renal impairment).

**TIME/ACTION PROFILE (clinical response)**

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<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
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<tbody>
<tr>
<td>IV</td>
<td>4.7 mo</td>
<td></td>
<td>unknown</td>
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<td></td>
<td></td>
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<td>7.7 mo (range 1.4–35.1 mo)†</td>
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†Inhibition of adenine deaminase lasts for 1 wk after administration.

**Contraindications/Precautions**
- **Contraindicated in:** Hypersensitivity to pentostatin or mannitol; Concurrent use of fludarabine (risk of potentially fatal pulmonary toxicity).
- **Use Cautiously in:** Cardiovascular disease, seizures, or pre-existing renal, hepatic, or pulmonary disease or other chronic debilitating illness; Patients with child-bearing potential; OB, Lactation, Pedi:
  - Pregnancy, lactation, or children (safety not established).

**Adverse Reactions/Side Effects**
- **CNS:** CNS toxicity, fatigue, headache.
- **EENT:** Epistaxis, keratoconjunctivitis, pharyngitis, rhinitis, sinusitis, vision changes.
- **Resp:** Pulmonary toxicity, bronchitis, dyspnea, pneumonia.
- **CV:** MI, angina pectoris.
- **GI:** Anorexia, diarrhea, nausea, vomiting, constipation, flatulence, abdominal pain, stomatitis.
- **GU:** Renal toxicity.
- **Derm:** Itching, skin rash.
- **Hemat:** Anemia, leukopenia, thrombocytopenia.

**Interactions**
- **Drug-Drug:** Risk of fatal pulmonary toxicity by concurrent use of fludarabine. Effects of vidarabine by pentostatin, which may result in increased toxicity of both agents.

**Route/Dosage**
- **IV (Adults):** 4 mg/m² every other week.

**NURSING IMPLICATIONS**

**Assessment**
- Monitor patient for CNS toxicity, which initially manifests as lethargy and may progress to anxiety, nervousness, confusion, mental depression, numbness, or tingling in hands or feet, sleepiness, and trouble sleeping. With high doses, CNS toxicity may lead to seizures, coma, and death. Dose should be withheld in patients manifesting CNS toxicity.
- Monitor intake and output and renal function; provide adequate hydration. Administer 500–1000 mL of D5/0.45% NaCl before administration and 500 mL of D5W or a similar solution after administration of pentostatin. Antihypertensives should be administered for 8–12 hr after therapy.
- Monitor patient for allergic reactions, including anaphylactic reactions, rash, and itching. Therapy should be discontinued if severe rash or anaphylaxis develops. Epinephrine, an antihistamine, and resuscitation equipment should be available during therapy.
- Monitor for bone marrow depression, fever, bleeding (petechiae, gum bleeding, purpura), and infection. Avoid immunizations and increased temperature if platelet count is low. Apply pressure to injection sites for 15 min. Avoid IM or subcutaneous injections if platelets are low.
- Monitor for increased fatigue, dyspnea, and orthostatic hypotension.

**Nursing Considerations**
- Familiarize patient and family with potential symptoms of HIV infection and assess frequently for signs of infection during neutropenia. Antiretrovirals may be needed if neutropenia occurs due to immunosuppression and neutrophil toxicity.
- Provide support and education to all patients receiving pentostatin.

**Patient/Family Teaching**
- Instruct patient to take medication as directed. Missed doses should be taken as soon as remembered. If a dose is missed by 12 hr, the next dose should be taken at the regular time (not doubled).
- Instruct patient to notify health care professional of all Rx or OTC medications, vitamins, or herbal products being taken and to avoid concurrent use of fludarabine.
- Instruct patient to use a latex rubber condom during sexual contact to prevent transmission of HIV. Inform patient to use a condom during sexual contact with a pregnant female and avoid semen-stained clothing.
- Advise patient to notify health care professional of medication regimen before treatment or surgery.

**Evaluation**
- Treatment outcome is decreased signs and symptoms of hairy cell leukemia (recovery of hematologic parameters, organomegaly, and lymphadenopathy).
Lab Test Considerations: Before initiating therapy, assess renal function by measuring serum creatinine or CrCl. Measure serum creatinine before each dose. Dose may be withheld if serum creatinine is ≥ 2-fold the upper limit of normal. Monitor CBC with differential and platelet count before each dose and periodically during therapy. Temporarily withhold pentostatin if absolute neutrophil count (ANC) is < 500 cells/mm³ during treatment in a patient whose initial neutrophil count was ≥ 500 cells/mm³. Resume treatment when ANC returns to pretreatment levels. May cause transiently increased serum alkaline phosphatase, AST, ALT, and LDH in most patients. Monitor peripheral blood for hairy cells periodically throughout therapy to determine response to treatment. Monitor serum creatinine and concentrations before and periodically throughout therapy. May cause transiently increased serum uric acid concentrations. Monitor peripheral blood for hairy cells periodically throughout therapy to determine response to treatment. Monitor serum uric acid concentrations before and periodically throughout therapy. May cause transiently increased serum alkaline phosphatase, AST, ALT, and LDH in most patients.

Potential Nursing Diagnoses
Risk for infection (Side Effects)
Deficient knowledge, related to medication regimen (Patient/Family Teaching)

Implementation
High Alert: Fatalities have occurred with incorrect administration of chemotherapeutic agents. Before administering, clarify all ambiguous orders; double check single, daily, and course-of-therapy dose limits; have second practitioner independently double check original order, calculations and infusion pump settings. Clarify orders that do not include generic and brand names.

Pentostatin should be administered under the supervision of a physician experienced in the use of antineoplastic agents.

Administration of live vaccines to immunocompromised patients should be avoided.

Solution should be prepared in a biologic cabinet. Wear gloves, gown, and mask while handling medication. Discard equipment in specially designated containers. Syringes and vials should be treated with 5% sodium hypochlorite solution before disposal.

IV Administration
Direct IV (Diluent): Reconstitute by adding 5 mL of sterile water for injection to each 10-mg vial. Shake thoroughly to ensure complete dissolution of the drug. May be administered without further dilution. Concentration: Concentration will be 2 mg/mL. Rate: Administer as a bolus injection over 5 min.

Intermittent Infusion (Diluent): Dilute in 25–50 mL of D5W or 0.9% NaCl for concentrations of 0.33 or 0.18 mg/mL, respectively. Solutions are stable for 8 hr at room temperature. Discard unused solution. Rate: Administer over 20–30 min.

Y-Site Compatibility: fludarabine, melphalan, ondansetron, paclitaxel, sargramostim.

Solution Compatibility: 0.9% NaCl, lactated Ringer’s injection.

Patient/Family Teaching
Instruct patient to notify health care professional immediately if rash or signs of anaphylaxis develop.

Instruct patient to notify health care professional promptly if fever; chills; cough; hoarseness; sore throat; signs of infection; lower back or side pain; painful or difficult urination; bleeding gums; bruising; blood in stools, urine, or emesis; increased fatigue; dyspnea; or orthostatic hypotension occurs. Caution patient to avoid crowded places and people with known infections. Instruct patient to use soft toothbrush and electric razor and to avoid fell. Caution patient not to drink alcoholic beverages or take medication containing aspirin or NSAIDs; may precipitate gastric bleeding.

Advise patient to use sunscreen and protective clothing to prevent photosensitivity reactions.

Instruct patient not to receive any vaccinations without advice of health care professional.

Emphasize need for periodic lab tests to monitor for side effects.

Evaluation/Desired Outcomes
Decrease in number of hairy cells in the peripheral blood and bone marrow.

Decreased organomegaly.

Decreased lymphadenopathy.

Pentostatin is usually continued for 2 doses after a complete response is achieved. If a partial response is achieved, pentostatin is continued for 12 mos. If neither a complete nor partial response is achieved in 6 mos, pentostatin therapy is discontinued.

Why was this drug prescribed for your patient?