etoposide (e-toe-poe-side)
VePesid, VP-16

Classification:
Therapeutic: antineoplastics
Pharmacologic: podophyllotoxin derivatives

Pregnancy Category D

Indications:
Refractory testicular neoplasms (IV only) (used in combination with other chemotherapeutic agents in patients who have already received chemotherapy, surgery, or radiation). Small cell lung carcinoma (PO and IV) (first-line therapy; used in combination with other chemotherapeutic agents). Unlabeled Use: lymphomas and some leukemias. Uterine cancer. Brain tumors.

Action:
Interferes with DNA before mitosis (cycle-dependent and phase-specific). Therapeutic Effects: death of rapidly replicating cells, particularly malignant ones.

Pharmacokinetics:
Absorption: variably absorbed after oral administration (bioavailability 50%). IV administration results in complete bioavailability.
Distribution: rapidly distributed; poorly enters the CSF; probably crosses placenta; enters breast milk.
Protein Binding: 97%.
Metabolism and Excretion: some metabolism by the liver with biliary excretion, 44% excreted in feces; 45% excreted unchanged by the kidneys.
Half-life: 4–11 hr.

TIME/ACTION PROFILE (noted as effects on blood counts)

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
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<tbody>
<tr>
<td>PO</td>
<td>unknown</td>
<td>7–14 days (granulocytes)</td>
<td>9–16 days (platelets)</td>
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<tr>
<td>IV</td>
<td>unknown</td>
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<td>9–16 days (platelets)</td>
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Contraindications/Precautions:
Contraindicated in: Hypersensitivity. Pregnancy. Lactation. Known intolerance to etil alcohol or polyethylene glycol. Use cautiously in: Patients with childbearing potential; Active infections; Decreased bone marrow reserve; Renal/hepatic impairment (dosage modification may be necessary). Hypoproteinemia. Elderly (may be at increased risk of adverse effects). Children (safety and effectiveness not established). Other chronic debilitating illnesses.

Adverse Reactions/Side Effects:
Monitor for hypersensitivity reaction (fever, chills, dyspnea, pruritus, urticaria, bronchospasm, tachycardia, hypotension). If these occur, stop infusion and notify physician. Keep epinephrine, an antihistamine, corticosteroids, volume expanders, and resuscitative equipment close by in the event of anaphylactic reaction.

- Assess for signs of infection (fever, chills, cough, hoarseness, lower back or side pain, sore throat, difficult or painful swallowing). Notify physician if these symptoms occur.
- Assess for bleeding (bleeding gums, bruising, petechiae; guaiac test stools, urine, and emesis). Avoid IV injections and taking rectal temperatures. Apply pressure to venipuncture sites for 10 min.
- Monitor intake and output, appetite, and nutritional intake. Etoposide causes mild-to-moderate nausea and vomiting. Prophylactic antiemetics may decrease frequency and duration of nausea and vomiting.
- Lab Test Considerations: Monitor CBC and differential before and periodically during therapy. The nadir of leukopenia occurs in 7–14 days. Notify physician if absolute neutrophil count is less than 1000/mm³. The nadir of thrombocytopenia occurs in 9–16 days. Notify physician if the platelet count is less than 75,000/mm³. Recovery of leukopenia and thrombocytopenia occurs in 20 days.
- Monitor liver function studies (AST, ALT, LDH, bilirubin) and renal function studies (BUN, creatinine) before and periodically during therapy to detect hepatotoxicity and nephrotoxicity.

Potential Nursing Diagnoses
- Risk for injury (Side Effects)
- Risk for infection (Side Effects)

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. Do not confuse VePesid (etoposide) with Versed (midazolam). Do not confuse etoposide (VePesid) with etoposide phosphate (Etopophos).

- Solution should be prepared in a biologic cabinet. Wear gloves, gowns, and mask while handling medication. Discard equipment in designated containers.
- Avoid contact with skin. Use latex-free gloves to prevent an allergic reaction. If contact with skin occurs, immediately wash skin with soap and water.
- IV: Capsules should be refrigerated. Capsules are stable for 24 mo when refrigerated.

- Intravenous Infusion: Dilute with D5W or 0.9% NaCl to achieve a final concentration of 0.2–0.4 mg/mL (concentrations >0.4 mg/mL may result in precipitation occurring). The 0.2 mg/mL solution is stable for 48 hr. The 0.4 mg/mL solution is stable for 24 hr. Discard if precipitate forms. Rate: Infuse slowly over 30–60 min. Temporary hypotension may occur with infusions rates slower than 30 mg/min.

- Y-Site Compatibility: allopurinol, amifostine, aminoglycosides, carboplatin, cisplatin, cytarabine, doxorubicin, doxorubicin liposome, fludarabine, gemcitabine, granisetron, melphalan, ondansetron, paclitaxel, piperacillin/tazobactam, sargramostim, sodium bicarbonate, taxotere, thiotepa, topotecan, vinorelbine.

- Y-Site Incompatibility: cefepime, filgrastim, idarubicin.

- Additive Compatibility: carboplatin, cisplatin, cytarabine, floxuridine, fluorouracil, hydroxyzine, ifosfamide, ondansetron.

- Patient/Family Teaching
- Instruct patient to take etoposide exactly as directed, even if nausea or vomiting occurs. If vomiting occurs shortly after dose is taken, consult physician. If a dose is missed, do not take at all.
- Instruct patient to notify health care professional if fever; chills; sore throat or other signs of infection; bleeding gums; bruising; petechiae; or blood in urine, stool, or emesis occurs. Caution patient to avoid crowds and persons with known infections. Caution patient to avoid crowds and persons with known infections. Caution patient to drink alcoholic beverages or take products containing aspirin or NSAIDs.

- Instruct patient to notify health care professional if rapid heartbeat, difficulty breathing, abdominal pain, yellow skin/eyes, weakness, paresthesia, or gastrointestinal distress occurs.
- Instruct patient to inspect oral mucosa for redness and ulceration. If mouth sores occur, advise patient to use soft toothbrush and electric razor. Caution patient to avoid crowded places and persons with known infections.

- Discuss with patient the possibility of hair loss. Explore coping strategies.
etoposide

- Advise patient to use contraception.
- Instruct patient not to receive any vaccinations without advice of physician.
- Emphasize the need for periodic lab tests to monitor for side effects.

Evaluation/Desired Outcomes
- Decrease in size or spread of malignancies in solid tumors.

Why was this drug prescribed for your patient?