High Alert

DACTINomycin (dak-ti-noe-**mye**-sin)

actinomycin-D, Cosmegen

Classification

Therapeutic: antineoplastics

Pharmacologic: antitumor antibiotics

Pregnancy Category C

Indications

Alone or with other treatment modalities in the management of: Wilms' tumor, Rhabdomyosarcoma, Ewing's sarcoma, Trophoblastic neoplasms, Testicular carcinoma, Metastatic nonseminomatous testicular cancer, Gestational trophoblastic neoplasia. As a component of regional perfusion for treatment of locally recurrent solid malignancies.

Action

Inhibits RNA synthesis by forming a complex with DNA (cell-cycle phase–nonspecific). **Therapeutic Effects:** Death of rapidly replicating cells, particularly malignant ones. Also has immunosuppressive properties.

Pharmacokinetics

Absorption: IV administration results in complete bioavailability.

Distribution: Widely distributed, with extensive tissue binding; does not cross the blood-brain barrier. Crosses the placenta.

Metabolism and Excretion: Excreted in bile (50%) and feces (14%) as unchanged drug; small amounts excreted unchanged by the kidneys (10%).

Half-life: 36 hr.

TIME/ACTION PROFILE (effects on blood counts)

ROUTE	ONSET	PEAK	DURATION
IV	7 days	14–21 days	21–28 days

Contraindications/Precautions

Contraindicated in: Hypersensitivity; ***OB, Lactation:*** Pregnancy or lactation; Patients with concurrent or recent chickenpox or herpes zoster infection; ***Pedi:*** Children <6 mo.

Use Cautiously in: Active infections; Immunosupressed patients; Concurrent radiation therapy; Hepatic dysfunction; Patients with childbearing potential.

Adverse Reactions/Side Effects

CNS: lethargy, malaise. **GI:** anorexia, nausea, stomatitis, vomiting, abdominal pain, ascites, diarrhea, dysphagia, esophagitis, hepatotoxicity, ulceration. **Derm:** acne, alopecia, erythema (especially of previously irradiated skin), hyperpigmentation (especially of previously irradiated skin), skin eruptions, photosensitivity, rash. **EENT:** pharyngitis. **Endo:** hypocalcemia, gonadal suppression. **Hemat:** anemia, leukopenia, thrombocytopenia, febrile neutropenia, neutropenia. **Local:** phlebitis at IV site. **MS:** myalgia. **Resp:** pneumonitis. **Misc:** fever.

Interactions

Drug-Drug: ↑ bone marrow depression with other **antineoplastics** or **radiation therapy**. May ↓ antibody response to **live-virus vaccines** and ↑ risk of adverse reactions (avoid concurrent use).

Route/Dosage

Dose in obese or edematous patients should be based on body surface area.

Wilms' Tumor, Rhabdomyosarcoma, Ewing's Sarcoma

IV (Adults and Children >6 mo): 15 mcg/kg/day for 5 days administered in various combinations and schedules.

Metastatic Nonseminomatous Testicular Cancer

IV (Adults): 1000 mcg/m^2 as single dose in combination with other agents.

Gestational Trophoblastic Neoplasms

IV (Adults): 12 mcg/kg/day for 5 days as a single agent *or* 500 mcg /day for 2 days in combination with other agents.

Regional Perfusion in Locally Recurrent Solid Malignancies

Regional perfusion (Adults): *Lower extremity/pelvis*— 50 mcg/kg; *uppper extremity*— 35 mcg/kg.

NURSING IMPLICATIONS

Assessment

- Monitor vital signs before and frequently during therapy.
- Monitor for bone marrow depression. Assess for bleeding (bleeding gums, bruising, petechiae, guaiac stools, urine, and emesis) and avoid IM injections and rec-

tal temperatures if platelet count is low. Apply pressure to venipuncture sites for 10 min. Assess for signs of infection during neutropenia. Anemia may occur. Monitor for increased fatigue, dyspnea, and orthostatic hypotension.

- Assess IV site frequently for inflammation or infiltration. Dactinomycin is a vesicant. Patient should notify nurse if pain or irritation at injection site occurs. If extravasation occurs, infusion must be stopped and restarted in another vein to avoid damage to subcut tissue. If extravasation occurs, apply ice compresses to the site for 15 min four times daily for 3 days. Dactinomycin is extremely corrosive to soft tissue. If extravasation occurs during intravenous use, severe damage to soft tissues will occur; may cause contracture of the arms.
- Monitor intake and output, appetite, and nutritional intake. Assess for nausea and vomiting; usually begin a few hr after administration and persist for up to 20 hr. Administration of an antiemetic before and periodically during therapy and adjustment of diet as tolerated may help maintain fluid and electrolyte balance and nutritional status.
- Side effects other than nausea and vomiting may be delayed in onset (2–4 days after course of treatment) and may not peak until 1–2 wk after treatment.
- ***Lab Test Considerations:*** Monitor CBC and differential before and periodically during therapy. Platelets and leukocyte counts begin to drop 7–10 days after beginning therapy. The nadirs of thrombocytopenia and leukopenia occur in 3 wk. Recovery occurs 3 wk later..
- Monitor for hepatotoxicity (↑ AST, ALT, LDH, and serum bilirubin).
- Monitor renal function (BUN and serum creatinine).

Potential Nursing Diagnoses

Risk for infection (Adverse Reactions)
Impaired oral mucous membrane (Side Effects)

Implementation

- ***High Alert:*** Fatalities have occurred with 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 dactinomycin with daptomycin.**
- Avoid contact with skin; highly toxic; both powder and solution must be handled and administered with care. Inhalation of dust or vapors and contact with skin or mucous membranes, especially those of the eyes, must be avoided. Avoid exposure during pregnancy. Review special handling procedures prior to handling and follow diligently. If spillage occurs, irrigate skin with copious amount of water for at least 15 min and remove all contaminated clothing and shoes. If splashed into eye, irrigate with water for at least 15 min and consult ophthalmologist.

IV Administration

- **IV:** Reconstitute each 0.5-mg vial with 1.1 mL of sterile water for injection without preservatives to achieve a concentration of 500 mcg/mL (0.5 mg/mL). Do not reconstitute with water containing preservatives (benzyl alcohol or parabens) since this causes precipitation. Reconstituted solution should be gold-colored. Discard any unused solution.
- Prepare solution for IV administration in a biologic cabinet. Wear gloves, gown, and mask while handling IV medication. Discard IV equipment in specially designated containers.
- **Direct IV:** Change needle between reconstitution and direct IV administration. ***Rate:*** May be injected into Y-site of free-flowing infusions of 0.9% NaCl or D5W over a period of 10–15 min.
- **Intermittent Infusion:** ***Diluent:*** May be further diluted in 50 mL of 0.9% NaCl or D5W. ***Rate:*** Infuse over 10–15 min.
- **Y-Site Compatibility:** acyclovir, alfentanil, allopurinol, amifostine, amikacin, aminophylline, amiodarone, amphotericin B colloidal, amphotericin B lipid complex, amphotericin B liposome, ampicillin, ampicillin/sulbactam, anidulafungin, argatroban, atracurium, aztreonam, bivalirudin, bleomycin, bumetanide, buprenorphine, butorphanol, caclium chloride, calcium gluconate, caspofungin, cefazolin, cefepime, cefoperazone, cefotaxime, cefotetan, cefoxitin, ceftazidime, ceftriaxone, cefuroxime, chloramphenicol, chlorpromazine, ciprofloxacin, cisatracurium, cisplatin, clindamycin, cyclophosphamide, cyclosporine, daptomycin, daunorubicin hydrochloride, dexamethasone, dexmedetomidine, dexrazoxane, digoxin, diltiazem, diphenhydramine, dobutamine, docetaxel, dopamine, doxorubicin hydrochloride, doxycycline, droperidol, enalaprilat, ephedrine, epinephrine, ertapenem, erythromycin, esmolol, etoposide, etoposide phosphate, famotidine, fenoldopam, fentanyl, fluconazole, fludarabine, foscarnet, fosphenytoin, furosemide, ganciclovir, gemcitabine, gentamicin, glycopyrrolate, granisetron, haloperidol, heparin, hetastarch, hydralazine, hydrocortisone, hydromorphone, idarubicin, ifosfamide, imipenem/cilastatin, insulin, isoproterenol, ketorolac, labetalol, leucovorin, levofloxacin, levorphanol, lidocaine, linezolid, lorazepam, magnesium sulfate, mannitol, melphalan, meperidine, meropenem,

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DACTINomycin

mesna, metaraminol, methohexital, methotrexate, methyldoapte, methylprednisolone, metoclorpamide, metoprolol, metronidazole, midazolam, milrinone, mitomycin, mitoxantrone, morphine, nfacillin, nalbuphine, naloxone, nesiritide, nitroglycerin, nitroprusside, norepinephrine, octreotide, ondansetron, oxaliplatin, paclitaxel, palonosetron, pancuronium, pemetrexed, pentamidine, pentazocine, pentobarbital, phenobarbital, phentolamine, phenylephrine, piperacillin/tazobactam, potassium acetate, potassium chloride, potassium phosphates, procainamide, prochlorperazine, promethazine, propranolol, quinupristin/dalfopristin, ranitidine, remifentanil, rituximab, sargramostim, sodium acetate, sodium bicarbonate, sodium phosphates, succinylcholine, sufentanil, tacrolimus, teniposide, theophylline, thiopental, thiotepa, ticarcillin/clavulanate, tigecycline, tirofiban, tobramycin, tolazoline, topotecan, trastuzumab, trimethoprim/sulfamethoxazole, vancomycin, vasopressin, vecuronium, verapamil, vinblastine, vincristine, vinorelbine, voriconazole, zidovudine, zoledronic acid.

- **Y-Site Incompatibility:** dantrolene, diazepam, filgrastim, indomethacin, pantoprazole, phenytoin.

Patient/Family Teaching

- Instruct patient to notify health care professional if fever; chills; sore throat; 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. Instruct patient to use soft toothbrush and electric razor. Caution patient not to drink alcoholic beverages or take products containing aspirin or NSAIDs; may increase GI irritation.
- Instruct patient to inspect oral mucosa for erythema and ulceration. If ulceration occurs, advise patient to use sponge brush and rinse mouth with water after eating and drinking. Stomatitis may require treatment with opioid analgesics.
- Inform patient that this medication may cause irreversible gonadal suppression. Advise patient that this medication may have teratogenic effects. A nonhormonal method of contraception should be used during therapy and for at least 4 mo after therapy is concluded.
- Discuss with patient the possibility of hair loss, which usually occurs 7–10 days after administration. Explore coping strategies.
- Instruct patient not to receive any vaccinations without advice of health care professional.
- Inform patient that this medication may cause irreversible gonadal suppression. Advise patient that this medication may have teratogenic effects. A nonhormonal method of contraception should be used during therapy and for at least 4 mo after therapy is concluded.
- Emphasize the need for periodic lab tests to monitor for side effects.

Evaluation/Desired Outcomes

- Decrease in size or spread of malignancy.

Why was this drug prescribed for your patient?