**ganciclovir** (gan-sye-kloe-vir)

**Classification**
Therapeutic: antivirals

**Pregnancy Category C**

**Indications**
- IV: Treatment of cytomegalovirus (CMV) retinitis in immunocompromised patients, including HIV-infected patients (may be used with foscarnet). Prevention of CMV infection in transplant patients at risk. Congenital CMV infection in neonates.

**Action**
- CMV converts ganciclovir to its active form (ganciclovir phosphate) inside the host cell, where it inhibits viral DNA polymerase. **Therapeutic Effects:** Antiviral effect directed preferentially against CMV-infected cells.

**Pharmacokinetics**
- **Absorption:** IV administration results in complete bioavailability.
- **Distribution:** Widely distributed; enters CSF.
- **Protein Binding:** 1–2%.
- **Metabolism and Excretion:** 90% excreted unchanged by the kidneys.
- **Half-life:** Adults: 2.9 hr; Children 9 mo-12 yr: 2.4-0.7 hr; Neonates: 2.4 hr. (q in renal impairment).

**TIME/ACTION PROFILE (antiviral levels)**

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>rapid</td>
<td>end of infusion</td>
<td>12–24 hr</td>
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</tbody>
</table>

**Contraindications/Precautions**
- Contraindicated in: Hypersensitivity to ganciclovir or acyclovir; Bone marrow depression or immunosuppression or thrombocytopenia (do not administer if ANC 500/mm³ or platelet count 25,000/mm³).

**Use Cautionarily in:** Renal impairment

**Dosage**
- **Adults and Children ≥3 mo:** Induction—5 mg/kg q 12 hr for 14–21 days. Maintenance regimen—5 mg/kg/day or 6 mg/kg for 5 days of each week. If progression occurs, q to q 12 hr regimen. Prevention—5 mg/kg q 12 hr for 7–14 days, then 5 mg/kg/day or 6 mg/kg for 5 days of each week.
- **Neonates:** Congenital CMV infection—12 mg/kg/day divided q 12 hr x 6 weeks.
- **Renal Impairment:**
  - **Adults and Children:** Induction—CCr 50–69 mL/min: 2.5 mg/kg/dose q 12 hr; CCr 25–49 mL/min: 2.5 mg/kg/dose q 24 hr; CCr 10–24 mL/min: 1.25 mg/kg/dose q 24 hr; CCr 10 mL/min: 0.625 mg/kg/dose q 24 hr; CCr ≤10 mL/min: 0.625 mg/kg 3 times/week after hemodialysis.

**NURSING IMPLICATIONS**
- **Assessment**
  - Diagnosis of CMV retinitis should be determined by ophthalmoscopy before treatment with ganciclovir.
  - Culture for CMV (sputum, blood, throat) may be taken before administration. However, a negative CMV culture does not rule out CMV retinitis. If symptoms do not respond after several weeks, resistance to ganciclovir may have occurred. Opti-
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**Adverse Reactions/Side Effects**

- CNS: SEIZURES, abnormal dreams, coma, confusion, dizziness, drowsiness, head-
  ache, malaise, nervousness.
- Resp: dyspnea.
- CV: arrhythmias, edema, hypertension, hypotension.
- GI: ileus, nausea, vomiting.
- GU: renal impairment, hematuria, renal toxicity.
- Derm: alopecia, photosensitivity, pruritus, rash, urticaria.
- Endic: hypoglycemia. 
- Hemat: neutropenia, thrombocytopenia, anemia, eosinophilia.

**Interactions**
- **Drug-Drug:** Risk of bone marrow depression with antineoplastics, radiation therapy, or zidovudine. Toxicity may be by probenecid. Risk of seizures with imipenem/cilastatin. Concurrent use of other nephrotoxic drugs, cyclosporine, or amphotericin B risk of nephrotoxicity.

**Route/Dosage**
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Intermittent Infusion:
● Maintain adequate hydration throughout therapy.

IV:
● Do not administer subcut or IM; severe tissue irritation may result.
● Prepare solution in a biologic cabinet. Wear gloves, gown, and mask while handling medication. Discard all equipment to specifically designated containers.
● IV: Observe infusion site for phlebitis. Rotate infusion site to prevent phlebitis.
● Monitor neutrophil and platelet count at least every 5–7 days during maintenance or more frequently if the macula or optic nerve is threatened. Ophthalmologic exams should be performed weekly during induction and every 2 wk after therapy.
● Monitor liver function tests (AST, ALT, serum bilirubin, alkaline phosphatase) periodically during therapy. May cause elevations of ALT and AST.

Y-Site Incompatibility:
● Aldehydes, allopurinol, amphotericin B colloidal, amphotericin B lipid complex, amiodarone, ampicillin, ampicillin/sulbactam, amsacrine, anidulafungin, argatroban, azalectin, aztreonam, benztropine, bivalirudin, bleomycin, calcium chloride, calcium gluconate, calcium hydroxypatite, calcium sulfate, chloral hydrate, chlorpromazine, cidofovir, cisplatin, cyclophosphamide, cyclosporine, dacarbazine, daptomycin, dexamethasone, dexamethasone sodium phosphate, dexamethasone, diltiazem, dobutamine, doxorubicin, doxorubicin liposome, doxorubicin hydrochloride, doxorubicin liposomal, doxorubicin, doxacurium, eptifibatide, etoposide, etoposide phosphate, famotidine, fentanyl, filgrastim, fluconazole, fluorouracil, fosfomycin, foscarnet, furosemide, gemcitabine, gentamicin, heparin, hetastarch, hydrocortisone, hydroxyzine, idarubicin, imipenem/cilastatin, irinotecan, isoproterenol, itraconazole, ivabradine, ketorolac, levofloxacin, lidocaine, magnesium sulfate, meperidine, methotrexate, methylprednisolone, metoclopramide, metronidazole, midazolam, morphine, multivitamins, mycophenolate, nalbuphine, nicardipine, norepinephrine, ondansetron, oxacillin, palonosetron, papaverine, penicillin G, pemphigus, pentamidine, pentazocine, phenelzine, phenindione, phenytoin, piperacillin/tazobactam, potassium acetate, prochlorperazine, promethazine, propofol, prostaglandin E1, proteinase inhibitors, proteinuria, protamine, ranitidine, ranolazine, remifentanil, renin-angiotensin, rituximab, rocuronium, sodium acetate, sufentanil, teniposide, thiotepa, tigecycline, trimethoprim, tropisetron, vancomycin, vasopressin, vinblastine, vincristine, voriconazole, zosultraconazole.

Y-Site Compatibility:
● Acetaminophen, acyclovir, alfentanil, aminophylline, amphotericin B, ampicillin, ampicillin/sulbactam, amsacrine, azathioprine, aztreonam, benztropine, bumetanide, busulfan, calcium chloride, calcium gluconate, calcium hydroxypatite, calcium sulfate, chloral hydrate, chlorpromazine, clindamycin, cyclophosphamide, cyclosporine, dacarbazine, dexamethasone, dexamethasone sodium phosphate, dexamethasone, diltiazem, dobutamine, doxorubicin, doxorubicin liposome, doxorubicin hydrochloride, doxorubicin liposomal, doxorubicin, doxacurium, eptifibatide, etoposide, etoposide phosphate, famotidine, fentanyl, filgrastim, fluconazole, fluorouracil, fosfomycin, foscarnet, furosemide, gemcitabine, gentamicin, heparin, hetastarch, hydrocortisone, hydroxyzine, idarubicin, imipenem/cilastatin, irinotecan, isoproterenol, itraconazole, ivabradine, ketorolac, levofloxacin, lidocaine, magnesium sulfate, meperidine, methotrexate, methylprednisolone, metoclopramide, metronidazole, midazolam, morphine, multivitamins, mycophenolate, nalbuphine, nicardipine, norepinephrine, ondansetron, oxacillin, palonosetron, papaverine, penicillin G, piperacillin/tazobactam, potassium acetate, prochlorperazine, promethazine, propofol, prostaglandin E1, proteinase inhibitors, proteinuria, protamine, ranitidine, ranolazine, remifentanil, renin-angiotensin, rituximab, rocuronium, sodium acetate, sufentanil, teniposide, thiotepa, tigecycline, trimethoprim, tropisetron, vancomycin, vasopressin, vinblastine, vincristine, voriconazole, zosultraconazole.
CONTINUED

Ganciclovir

Precautions: concurrent full course of pyridoxine, quinupristin/dalfopristin, sodium bicarbonate, streptokinase, secnidazole, sertorexetine, diamox, thiocyanate, levodopa, ticarcillin, trimethoprim/sulfamethoxazole, vancomycin, vecuronium, verapamil, vincristine.

Patient/Family Teaching

- Inform patient that ganciclovir is not a cure for CMV retinitis. Progression of retinitis may continue in immunocompromised patients during and after therapy. Advise patient to have regular ophthalmic exams at least every 6 wk. Duration of therapy for CMV prevention is based on the duration and degree of immunosuppression.
- Advise patient to notify health care professional of fever; chills; sore throat; 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. Instruct patient to use soft toothbrush and electric razor. Patient should be cautioned not to drink alcohol beverages or take products containing aspirin or NSAIDs.
- Advise patient that ganciclovir may have teratogenic effects. A nonhormonal method of contraception should be used during and for at least 90 days after therapy.
- Caution patient to use sunscreen and protective clothing to prevent photosensitivity reactions.
- Emphasize the importance of frequent follow-up exams to monitor blood counts.

Evaluation/Desired Outcomes

- Treatment of the symptoms of CMV retinitis in immunocompromised patients.
- Prevention of CMV retinitis in transplant patients at risk.

Why was this drug prescribed for your patient?