gentamicin (jen-ta-mye-sin)

Classification
Therapeutic: aminoglycosides
Pharmacologic: aminoglycosides

Pregnancy Category C

Indications
Treatment of serious gram-negative bacterial infections and infections caused by staphylococci when penicillins or other less toxic drugs are contraindicated. In combination with other agents in the management of serious enterococcal infections. Prevention of infective endocarditis.

Topical, Ophth: Treatment of localized infections due to susceptible organisms.

Action
Inhibits protein synthesis in bacteria at level of 30S ribosome. Therapeutic Effects: Bactericidal action.

Spectrum: Notable for activity against:

Pharmacokinetics
Absorption: Well absorbed after IM administration. IV administration results in complete bioavailability. Some absorption follows administration by other routes.

Distribution: Widely distributed throughout extracellular fluid; crosses the placenta; small amounts enter breast milk. Poor penetration into CSF.

Metabolism and Excretion: 90% excreted unchanged by kidneys.

Half-life: Neonates: 7 days: 3–11.5 hr; Neonates 7–30 days: 3–6 hr; Infants: 3–5 hr; Adolescents: 1–5 hr; Adults: 4–6 hr; Children: 1–2 hr [1] in renal impairment

Contraindications/Precautions
Contraindicated in: Hypersensitivity to gentamicin or other aminoglycosides; Most parenteral products contain bisulfites and should be avoided in patients with known intolerance; Pedi: Products containing benzyl alcohol should be avoided in neonates.

Use Cautiously in: Renal impairment (dose adjustments necessary; blood level monitoring useful in preventing ototoxicity and nephrotoxicity); Hearing impairment; Geri: Difficulty in assessing auditory and vestibular function; age-related renal impairment; Neuromuscular diseases such as myasthenia gravis; GI: Lactation: Pregnancy and lactation; Pedi: Neonates (17 Risk of neuromuscular blockade; difficulty in assessing auditory and vestibular function; immature renal function) and neonates on ECMO require dose adjustments.

Adverse Reactions/Side Effects
CNS: ataxia, vertigo.
EENT: ototoxicity (vestibular and cochlear).
GU: nephrotoxicity.
MS: muscle paralysis (high parenteral doses).

Interactions
Drug-Drug: Inactivated by penicillins and cephalosporins when coadministered to patients with renal insufficiency. Possible respiratory paralysis after inhalation anesthetics or neuromuscular blockers. Incidence of ototoxicity with loop diuretics. Incidence of nephrotoxicity with other nephrotoxic drugs.

Route/Dosage
Many regimens are used; most involve dosing adjusted on the basis of blood level monitoring and assessment of renal function.

IM, IV (Adults): 1–2 mg/kg q8h [r up to 6 mg/kg/day in 3 divided doses]; Once-daily dosing (unlabeled) — 4–7 mg/kg q24 h.

TIME/ACTION PROFILE (blood levels†)

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
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<tbody>
<tr>
<td>IV</td>
<td>15–30 min</td>
<td>15–30 min</td>
<td>6–24 hr</td>
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†All parenterally administered aminoglycosides.

‡Postdistribution peak occurs 30 min after the end of a 30-min infusion and 15 min after the end of a 1-hr infusion.
IM, IV (Neonates premature and/or doxorubicin—2.5 mg/kg/dose q 8–24 hr.)
IM, IV (Neonates full term and/or doxorubicin—2.5–3.3 mg/kg/dose q 6–24 hr.)

Monitor intake and output and daily weight to assess hydration status and renal function.

Evaluate eighth cranial nerve function by audiometry before and throughout therapy.

Obtain specimens for culture and sensitivity before initiating therapy. First dose should be drawn just prior to next dose. Peak level range is 4–12 mcg/mL; trough level range is 0.5–2 mcg/mL. Once daily peaks are 2–3 times greater than multiple dosing.

Potential Nursing Diagnoses
Risk for infection (Indications)
Disturbed sensory perception auditory (Side Effects)
Implementation
• Keep patient well hydrated (1500–2000 mL/day) during therapy.
• IM 10C administration should be deep into a well-developed muscle. Alternate injection sites.

IV Administration
• Intermittent Infusion: Diluent: Dilute each dose in 30–200 mL of D5W or 0.9% NaCl Concentration: Not to exceed 10 mg/mL. Do not use solutions that are discolored or that contain a precipitate. Rate: Infuse slowly over 30 min–2 hr. For pediatric patients, the volume of diluent may be reduced but should be sufficient to permit infusion over 30 min–1 hr.

Y-Site Compatibility: aldesleukin, alemtuzumab, alfentanil, alprostadil, amifostine, amikacin, aminophylline, amiodarone, amsacrine, anidulafungin, aspirin, atropine, aztreonam, benztropine, bivalirudin, bleomycin, bumetanide, busulfan, butorphanol, calcium chloride, calcium gluconate, carmustine, cefazolin, cefepime, cefoperazone, cefuroxime, cefuroxime axetil, chloramphenicol, chlorpromazine, ciprofloxacin, cisatracurium, cisplatin, cyclophosphamide, cyclosporine, cytarabine, dacarbazine, daunorubicin, dabigatran, dabrafenib, dactinomycin, daptomycin, dexmedetomidine, dexrazoxane, digoxin, diltiazem, dexamethasone, dobutamine, docetaxel, docetaxel, dopamine, doxapram, doxorubicin, doxorubicin liposome, doxercycline, doxapram, dopamine, drotaverine, droperidol, dexamethasone, dexamethasone, diphenhydramine, diphenhydramine, diphenhydramine, diphenhydramine, diphenhydramine, diphenhydramine, diphenhydramine, diphenhydramine, diphenhydramine, diphenhydramine, diphenhydramine, 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- Teach patients with a history of rheumatic heart disease or valve replacement the importance of using antimicrobial prophylaxis before invasive medical or dental procedures.

**Topical**: Instruct patient to wash affected skin gently and pat dry. Apply a thin film of ointment. Apply occlusive dressing only if ordered by health care professional. Patient should assess skin and if infection worsens or skin irritation develops, notify health care professional.

**Evaluation/Desired Outcomes**

- Resolution of the signs and symptoms of infection. If no response is seen within 3–5 days, new cultures should be taken.

**Why was this drug prescribed for your patient?**

**Y-Site Incompatibility:**

- allopurinol, amphotericin B chloesteryl, amphotericin B colloidal, amphotericin B lipid complex, amphotericin B liposome, azathioprine, cefoperazone, cefotetan, chloramphenicol, dantrolene, dexamethasone, diazepam, diazoxide, folic acid, furosemide, ganciclovir, heparin, idarubicin, indomethacin, methotrexate, pemetrexed, pentamidine, pentobarbital, phenytoin, propofol, trimethoprim/sulfamethoxazole, warfarin.

**Topical:**

- Instruct patient to wash affected skin gently and pat dry. Apply a thin film of ointment. Apply occlusive dressing only if ordered by health care professional. Patient should assess skin and if infection worsens or skin irritation develops, notify health care professional.

**Patient/Family Teaching**

- Instruct patient to report signs of hypersensitivity, tinnitus, vertigo, hearing loss, rash, diarrhea, or difficulty urinating.

- Advise patient of the importance of drinking plenty of fluids.

- Generic Implication: OPTD indicates all-during one, initiation indicates most frequent. Discontinued = Discontinued.