Gentamicin:

Class: Antibiotic.

Indications:

Treatment of susceptible bacterial infections, normally gram-negative organisms, including *Pseudomonas*, *Proteus*, *Serratia*, and gram-positive *Staphylococcus*; treatment of bone infections, respiratory tract infections, skin and soft tissue infections, as well as abdominal and urinary tract infections, and septicemia; treatment of infective endocarditis

Available dosage form in the hospital: 20 MG AMP OR VIAL, 0.3% EYE DROPS, 10MG EYE OINT, 80MG VIAL OR AMP.

Trade Names:

Dosage:

Usual dosage ranges:

I.M., I.V.:

Conventional: 1-2.5 mg/kg/dose every 8-12 hours; to ensure adequate peak concentrations early in therapy, higher initial dosage may be considered in selected patients when extracellular water is increased (edema, septic shock, postsurgical, or trauma)

Once daily: 4-7 mg/kg/dose once daily; some clinicians recommend this approach for all patients with normal renal function; this dose is at least as efficacious with similar, if not less, toxicity than conventional dosing

Intrathecal: 4-8 mg/day

Indication-specific dosing: I.M., I.V.:

Brucellosis: 240 mg (I.M.) daily or 5 mg/kg (I.V.) daily for 7 days; either regimen recommended in combination with doxycycline

Cholangitis: 4-6 mg/kg once daily with ampicillin

Diverticulitis (complicated): 1.5-2 mg/kg every 8 hours (with ampicillin and metronidazole)

Endocarditis: Treatment: 3 mg/kg/day in 1-3 divided doses

Meningitis *Enterococcus* sp or *Pseudomonas aeruginosa:* I.V.: Loading dose 2 mg/kg, then 1.7 mg/kg/dose every 8 hours (administered with another bacteriocidal drug)

Pelvic inflammatory disease: Loading dose: 2 mg/kg, then 1.5 mg/kg every 8 hours

Alternate therapy: 4.5 mg/kg once daily

Plague *(Yersinia pestis):* Treatment: 5 mg/kg/day, followed by postexposure prophylaxis with doxycycline

Pneumonia, hospital- or ventilator-associated: 7 mg/kg/day (with antipseudomonal beta-lactam or carbapenem)

Synergy (for gram-positive infections): 3 mg/kg/day in 1-3 divided doses (with ampicillin)

Tularemia: 5 mg/kg/day divided every 8 hours for 1-2 weeks

Urinary tract infection: 1.5 mg/kg/dose every 8 hours

Dosing: Renal Impairment

Conventional dosing:

Cl_{cr} ≥60 mL/minute: Administer every 8 hours

Cl_{cr} 40-60 mL/minute: Administer every 12 hours

Cl_{cr} 20-40 mL/minute: Administer every 24 hours

Cl_{cr} <20 mL/minute: Loading dose, then monitor levels

High-dose therapy: Interval may be extended (eg, every 48 hours) in patients with moderate renal impairment (Cl_{cr} 30-59 mL/minute) and/or adjusted based on serum level determinations.

Intermittent hemodialysis (IHD) (administer after hemodialysis on dialysis days) (Heintz, 2009): Dialyzable (~50%; variable; dependent on filter, duration, and type of IHD):

Loading dose of 2-3 mg/kg loading dose followed by:

Mild UTI or synergy: 1 mg/kg every 48-72 hours; consider redosing for pre-HD or post-HD concentrations <1 mg/L

Moderate-to-severe UTI: 1-1.5 mg/kg every 48-72 hours; consider redosing for pre-HD concentrations <1.5-2 mg/L or post-HD concentrations <1 mg/L

Systemic gram-negative rod infection: 1.5-2 mg/kg every 48-72 hours; consider redosing for pre-HD concentrations <3-5 mg/L or post-HD concentrations <2 mg/L

Note: Dosing dependent on the assumption of 3 times/week, complete IHD sessions.

Peritoneal dialysis (PD):

Administration via PD fluid:

Gram-positive infection (eg, synergy): 3-4 mg/L (3-4 mcg/mL) of PD fluid

Gram-negative infection: 4-8 mg/L (4-8 mcg/mL) of PD fluid

Administration via I.V., I.M. route during PD: Dose as for Cl_{cr} <10 mL/minute and follow levels

Continuous renal replacement therapy (CRRT) (Heintz, 2009; Trotman, 2005): Drug clearance is highly dependent on the method of renal replacement, filter type, and flow rate. Appropriate dosing requires close monitoring of pharmacologic response, signs of adverse reactions due to drug accumulation, as well as drug concentrations in relation

to target trough (if appropriate). The following are general recommendations only (based on dialysate flow/ultrafiltration rates of 1-2 L/hour and minimal residual renal function) and should not supersede clinical judgment:

CVVH/CVVHD/CVVHDF: Loading dose of 2-3 mg/kg followed by:

Mild UTI or synergy: 1 mg/kg every 24-36 hours (redose when concentration <1 mg/L)

Moderate-to-severe UTI: 1-1.5 mg/kg every 24-36 hours (redose when concentration <1.5-2 mg/L)

Systemic gram-negative infection: 1.5-2.5 mg/kg every 24-48 hours (redose when concentration <3-5 mg/L)

Common side effect:

Cardiovascular: Edema, hyper/hypotension

Central nervous system: Ataxia, confusion, depression, dizziness, drowsiness, encephalopathy, fever, headache, lethargy, pseudomotor cerebri, seizures, vertigo

Dermatologic: Alopecia, erythema, itching, purpura, rash, urticaria

Endocrine & metabolic: Hypocalcemia, hypokalemia, hypomagnesemia, hyponatremia

Otic: Hearing impairment, hearing loss (associated with persistently increased serum concentrations; early toxicity usually affects high-pitched sound), tinnitus

Renal: BUN increased, casts (hyaline, granular) in urine, creatinine clearance decreased, distal tubular dysfunction, Fanconi-like syndrome (high dose, prolonged course) (infants and adults), oliguria, renal failure (high trough serum concentrations), polyuria, proteinuria, serum creatinine increased, tubular necrosis, urine specific gravity decreased

Pregnancy Risk Factor: D