

Ceftriaxone

Antibiotic Class:

Third-Generation Cephalosporin

Antimicrobial Spectrum:

Staphylococcus aureus (methicillin susceptible), Coagulase negative Staphylococci, *Streptococcus pneumoniae* (penicillin susceptible), *Streptococcus spp.*, *Haemophilus influenzae*, *Moraxella catarrhalis*, *Neisseria meningitidis*, *Neisseria gonorrhoeae*, *Enterobacteriaceae*, *E. coli*

Mechanism of Action:

Cephalosporins exert bactericidal activity by interfering with bacterial cell wall synthesis and inhibiting cross-linking of the peptidoglycan. The cephalosporins are also thought to play a role in the activation of bacterial cell autolysins which may contribute to bacterial cell lysis.

Pharmacodynamics

Cephalosporins exhibit time-dependent killing ($T > MIC$)

Pharmacokinetics:

Dose of 1g

C_{max}: 123-151mcg/L

Half-life: 8 hours

Volume of distribution: 10.7L

Table 11

Adverse Reactions:

Hypersensitivity: Maculopapular rash, Urticaria, Pruritis, Anaphylaxis/angioedema, eosinophilia

Hematologic: Hypoprothrombinemia, Neutropenia, Leukopenia, Thrombocytopenia

GI: Diarrhea, *C. difficile* disease

Renal: Interstitial nephritis

Table 14

Dosage:

IV: 1g, 2g, 250mg, 500mg

Dosing in adults:

Meningitis: 2g IV q24h

Intraabdominal infections: 1-2g IV q12-24h

Pelvic inflammatory disease: 1-2g IV q12-24h

Bone and/or joint infection: 1-2g IV q12-24h

Gonorrhea: 250mg IM x 1 dose

Dosing in pediatrics:

50-100mg/kg divided q12-24h

Table 12

Disease state based dosing:

Renal failure: No dosing changes recommended at this time.

Hepatic failure: No dosing changes recommended at this time.

Dosing during Continuous Renal Replacement Therapy

CVVH (Continuous venovenous hemofiltration): 2g IV q12-24h

CVVHD (Continuous venovenous hemodialysis): 2g IV q12-24h

CVVHDF (Continuous venovenous hemodiafiltration) 2g IV q12-24h

Note: CVVH is mainly for fluid removal alone. Many institutions will employ more CVVHD or CVVHDF which combine dialysis with fluid removal.

Contraindications/Warnings/Precautions:

Contraindications: Hyperbilirubinemic neonates; increased risk for bilirubin encephalopathy (kernicterus)

Precautions: hypersensitivity to penicillins, history of gastrointestinal disease, particularly colitis, renal impairment

Drug Interactions:

Cyclosporine: an increased risk of cyclosporine toxicity (renal dysfunction, cholestasis, paresthesias)

Live Typhoid Vaccine: decreased immunological response to the typhoid vaccine

Pregnancy Risk Factor:

B

Monitoring parameters:

Therapeutic: Culture and sensitivities, serum levels, signs and symptoms of infection, white blood cell count

Toxic: Urinalysis, BUN, SCr, AST and ALT, skin rash, Neutropenia and leukopenia, Prothrombin time in patients with renal or hepatic impairment or poor nutritional state, as well as patients receiving a protracted course of antimicrobial therapy, and patients previously stabilized on anticoagulant therapy.

Brand names/Manufacturer: Rocephin®/Roche