Piperacillin

Antibiotic Class:
Penicillin (ureidopenicillin and piperazine penicillin)

Antimicrobial Spectrum:
Gram-positive: *Streptococcus spp., Enterococcus, Listeria monocytogenes*
Gram-negative: *Pseudomonas aeruginosa, Klebsiella, Serratia, Enterobacter, Enterococcus, H. influenzae, E. coli, Proteus mirabilis, Salmonella spp., Shigella spp.*

Mechanism of Action:
Exerts bactericidal activity via inhibition of bacterial cell wall synthesis by binding one or more of the penicillin binding proteins (PBPs). Exerts bacterial autolytic effect by inhibition of certain PBPs related to the activation of a bacterial autolytic process.

Pharmacodynamics:
Penicillins produce time-dependent killing

Pharmacokinetics:
Cmax: 240mcg/ml; Half-life: 1 hour; Table 6

Adverse Effects:
Hematologic: anemia, thrombocytopenia, neutropenia, agranulocytosis
CNS: seizures, headache, dizziness, fatigue
Endocrine: hypokalemia
Renal: nephrotoxicity, interstitial nephritis
Hepatic: transient increases in transaminases
Other: Jarisch-Herxheimer Reaction (fever, chills, sweating, tachycardia, hyperventilation, flushing, and myalgia)

Dosage:
Adult: 3-4g IV q4-6h
Pediatric: 1 month -12 years: 50 mg/kg q4h

Disease state based dosing:
Renal failure: CrCL 20-40 mL/min: 3-4g q8h
CrCL < 20 mL/min: 3-4g q12h
Supplement after Hemodialysis: 1g

Contraindications/Warnings/Precautions:
Contraindications: hypersensitivity to piperacillin or other penicillins
Precautions:

- Cephalosporin hypersensitivity
- Patients with mononucleosis are more likely to develop a skin rash
- Coagulation abnormalities (bleeding time, platelet disorders)
- Patients with electrolyte and fluid abnormalities (contains 1.85 mEq of sodium per gram)

Drug Interactions:
Live Typhoid Vaccine - decreased immunological response to the typhoid vaccine
Methotrexate – increased methotrexate toxicity
Probenecid - increased piperacillin levels
Vecuronium - enhanced and/or prolonged neuromuscular blockade which may lead to respiratory depression and paralysis

Pregnancy:
Category B: No evidence of risk in humans but studies inadequate.

Monitoring Requirements:
Therapeutic: Culture and sensitivities, signs and symptoms of infection
Toxic: Periodic CBC, urinalysis, BUN, SCr, AST and ALT, diarrhea, skin rash

Brand names/Manufacturer:

- HUBERCILINA (ICN - SPAIN)
- PIPERACILLIN (Mayne CANADA)
- PIPRACIL (Wyeth - CANADA)
- PIPRIL (Lederle - AUSTRALIA)