Nafcillin

**Antibiotic Class:**
Penicillin (penicillinase-resistant penicillin)

**Antimicrobial Spectrum:**
*Staphylococcus spp.*, *Streptococcal 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: 20mcg/ml; Half-life: 0.5-1 hours; Table 6

**Adverse Effects:**
Hematologic: neutropenia, agranulocytosis, bone marrow depression
CNS: seizures, fever, pain
Renal: interstitial nephritis
Hepatic: transient increases in transaminases
Other: thrombophlebitis, tissue necrosis, Jarisch-Herxheimer Reaction (fever, chills, sweating, tachycardia, hyperventilation, flushing, and myalgia)

**Dosage:**
Table 7

**Disease state based dosing:**
Renal failure: A 50% dose reduction may be appropriate in patients with renal and hepatic insufficiency.
Hepatic failure: A 50% dose reduction may be appropriate in patients with renal and hepatic insufficiency.

**Dosing during Continuous Renal Replacement Therapy**
CVVH (Continuous venovenous hemofiltration): 2g IV q4-6h
CVVHD (Continuous venovenous hemodialysis): 2 g IV q4-6h
CVVHDF (Continuous venovenous hemodiafiltration): 2 g IV q4-6h
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: Anaphylaxis to nafcillin or other penicillins
Precautions: Cephalosporin hypersensitivity

Drug Interactions:
Nafcillin is an inducer of the cytochrome P450 3A4 isoenzyme. Caution should be exercised and monitoring is suggested when concomitantly administering nafcillin with drugs that have narrow therapeutic windows and are substrates of the CYP3A4 enzyme.

- Chloramphenicol – decreased nafcillin efficacy
- Cyclosporine - decreased cyclosporine concentrations
- Live Typhoid Vaccine - decreased immunological response to the typhoid vaccine
- Nifedipine - decreased nifedipine efficacy
- Probenecid – increased nafcillin levels
- Warfarin – decreased anticoagulant effectiveness

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

Brand names/Manufacturer:
- Nafcill (Bristol Myers – USA, Apothecon - USA)
- Nafcillin Sodium (Geneva - USA)
- Nallpen (Baxter – USA)
- Unipen (Wyeth – USA, CANADA)