**Meropenem**

**Antibiotic Class:**
Carbapenem

**Antimicrobial Spectrum:**
- **Aerobic gram-positive microorganisms:** *S. aureus* including penicillinase-producing strains, *Group D streptococcus* including *Enterococcus spp.*, *Streptococcus pneumoniae*, *S. pyogenes*, *S. viridans* group
- **Aerobic gram-negative microorganisms:** *Acinetobacter spp.*, *Citrobacter spp.*, *Enterobacter cloacae*, *E. coli*, *H. influenzae*, *K. pneumoniae*, *P. aeruginosa*
- **Anaerobic gram-positive microorganisms:** *Peptostreptococcus spp.*
- **Anaerobic gram-negative microorganisms:** *Bacteroides spp.*, *Fusobacterium spp.*

**Mechanism of Action:**
Cause rapid bacterial cell death by covalently binding to penicillin-binding proteins (PBPs) involved in the biosynthesis of mucopeptides in bacterial cell walls. Bactericidal effects result through inhibition of cellular growth and division and the loss of cell wall integrity, eventually causing cell wall lysis. The primary target is PBP 2.

**Pharmacodynamics:**
Carbapenems produce time-dependent killing

**Pharmacokinetics:**
- Cmax: 61.6mcg/ml
- Half-life: 0.98 hours
- Volume of distribution: 12.5L

**Adverse Reaction:**
- Hematologic: Bleeding, gastrointestinal hemorrhage, bone marrow aplasia (leucopenia, neutropenia, thrombocytopenia, anemia)
- Cardiovascular System: Phlebitis or thrombophlebitis
- Central Nervous System: Headache, insomnia, agitation, confusion, dizziness, nervousness, paresthesia, hallucinations; Seizures
- Gastrointestinal: Nausea, abdominal pain, vomiting, diarrhea, constipation
- Renal: Dysuria, kidney failure
- Hepatic: Abnormalities of liver function tests
- Dermatologic: Rash, pruritus

**Dosing forms:**
- 20 mL (500mg meropenem) injection vial for intravenous administration
- 30 mL (1g meropenem) injection vial for intravenous administration
- 100 mL (500mg meropenem) vial: powder for reconstitution for intravenous administration
- 100 mL (1g meropenem) vial: powder for reconstitution for intravenous administration
**Dosing:**
Intra-abdominal infections: 1 g IV every 8 hrs
Meningitis, bacterial: 2 g IV every 8 hrs

**Disease state based dosing:**
Renal failures: See Table 4
Hepatic failures: Dosage adjustment is not required.

**Dosing during Continuous Renal Replacement Therapy**
CVVH (Continuous venovenous hemofiltration): 1g IV q12h
CVVHD (Continuous venovenous hemodialysis): 1g IV q12h
CVVHDF (Continuous venovenous hemodiafiltration) 1g IV q12h
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:**
Precautions: Anaphylactic reactions to beta-lactam antibiotics, renal impairment, patients with epilepsy, history of seizures or other neurological disorders, Liver dysfunction (possible hepatotoxic effects)

**Drug Interactions:**
Live Typhoid Vaccine: A decreased immunological response to the vaccine

**Pregnancy Risk Factor:**
Category B

**Monitoring parameters:**
**Therapeutic:**
Resolution of clinical signs of infection (fever, decreased white blood cell count), Culture and sensitivity, CBC w/differential, urinalysis, temperature

**Toxicity:**
Hepatic and renal function tests during therapy

**Brand names/Manufacturer:**
- Merrem/Astra Zeneca in the following countries: United States, Italy, Australia, Canada, Mexico, New Zealand
- Merrem/Astra Zeneca in the following countries: United Kingdom, Ireland, Sweden, South Africa, Belgium, Switzerland, Spain, Germany, Netherlands, Denmark, Portugal, Hong Kong, Israel, Norway, Thailand, Singapore, Finland, Brazil, Malaysia, Greece, Chile, Hungary, and the Czech Republic
- Optinem/Astra Zenica in Austria
- Meropen/Sumitomo in Japan