**Tetracycline**

**Antibiotic Class:**
Tetracyclines

**Antimicrobial Spectrum:**
*Staphylococcus aureus, Streptococcus pneumonia, Streptococcus pyogenes, Streptococcus agalactiae, Campylobacter jejuni, Haemophilus influenzae, Neisseria gonorrhoeae, Neisseria meningitides, Clostridium spp., Peptostreptococcus spp., Peptococcus spp.* *Bacteroides melaninogenicus, Bacteroides fragilis*

**Mechanism of Action:**
Inhibits bacterial protein synthesis by binding with the 30S ribosomal subunit.

**Pharmacodynamics:**
Tetracyclines produce a combination of concentration and time-dependent killing (AUC:MIC ratio).

**Pharmacokinetics:**
Dose of 500mg PO: Cmax: 1.5-5 mcg/mL; Tmax: 2-4 hours; Half-life: 6-12 hours; Volume of distribution: 108 L/kg; Table 3

**Adverse Effects:**
GI: epigastric burning, abdominal discomfort, nausea, vomiting, anorexia, diarrhea, esophagitis, esophageal ulcers, dysphagia, candidal superinfections
Teeth and bone: (dose/duration related) yellow discoloration of teeth, which turns into a gray-brown permanent discoloration, hypoplasia of enamel, teeth demineralization, skeletal growth retardation
Hepatotoxicity: rare, but fatal; intrahepatic cholestasis, jaundice, azotemia, acidosis, irreversible shock
Renal Toxicity: hyperphosphatemia, acidosis, polyuria, polydipsia
Photosensitivity and hyperpigmentation: red rash to blistering on sun-exposed areas; photoallergic reactions manifested by paresthesias of hands, feet, nose, photo-onycholysis
Auditory: tinnitus, hearing loss
Vision: visual disturbances
CNS: lightheadedness, dizziness, ataxia, drowsiness, headache

**Dosage:**
Oral: 250mg, 500mg capsules

Adult dosing (common indications):
Acne vulgaris: 250 mg PO q other day to 500 mg PO q24h
Bartonellosis: 1-2 g/day divided PO in 2-4 doses
Brucellosis: 500 mg PO q6h 4 x 3 plus streptomycin
Chlamydia psitacii infection: 1-2 g/day divided PO in 2-4 doses
Rickettsial disease: 1-2 g/day divided PO in 2-4 doses
Nongonococcal urethritis: 500 mg PO q6h x 7 days
Pediatric dosing:
25-50mg/kg/day in 2 to 4 divided doses OR 0.6-1.2g/m² in 2 – 4 divided doses

Table 4

Disease state based dosing:
Renal failure:  CrCl > 50mL/min: 250mg to 500mg q6h
  CrCl 10-50 mL/min: 250mg to 500mg q12h to q24h
  CrCl < 10 mL/min: Not recommended
Hepatic failure: No dosing changes recommended at this time.

**Contraindications/Warnings/Precautions:**
Contraindications: Hypersensitivity to tetracycline antibiotics.
Precautions: Usage in newborns, infants, and children less than 8 years of age; risk for tooth discoloration; Renal or liver impairment; Phototoxicity; Veneral disease with suspected coexistent syphilis

**Drug Interactions:**
Oral contraceptives: Decreased contraceptive effectiveness
Warfarin: Increased warfarin effect
Barbiturates, phenytoin, carbamazepine: Decreased serum concentrations of doxycycline
Ethanol: Decreased doxycycline serum concentrations
Antacids, didanosine, sucralfate, multivitamins: decreased tetracycline absorption
Kaolin, bismuth subsalicylate: decreased absorption of tetracycline
Food: Decreased absorption of tetracycline
Milk: Decreased absorption of tetracycline

Table 6

**Pregnancy:**
Category D: Risk established, but benefits may outweigh risk.

**Monitoring Requirements:**
Therapeutic: Culture and sensitivities, serum levels, signs and symptoms of infection, white blood cell count
Toxic: Hypersensitivity syndrome reaction, serum sickness like reaction or single organ dysfunction – Monitor: CBC, LFTs, urinalysis, urea, creatinine, chest radiograph; Drug-induced lupus: monitor antinuclear antibody and hepatic transaminases; General long-term therapy: Liver and renal function tests, Hematopoietic studies

**Brand names/Manufacturer:**
Available by many names and manufacturers