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MATRIC NO:17/MHS07/015

DEPT: PHARMACOLOGY

TETRECYCLINE

Mechanism of action: tetracyclines inhibit bacterial protein synthesis by preventing the association of aminoacyl-tRNA with the bacterial ribosome, to interact with their targets these molecules need to traverse one or more membrane systems depending on whether the susceptible organism is gram positive or gram negative. Tetracyclines enter susceptible organisms via passive diffusion & by an energy-dependent transport protein mechanism unique to the bacterial inner cytoplasmic membrane. Tetracyclines concentrate intracellularly in susceptible organisms. The drugs bind reversibly to the 30S subunit of the bacterial ribosome. This action prevents binding of aminoacyl-t-RNA to the mRNA–ribosome complex, thereby inhibiting bacterial protein synthesis.

Indication of use: Upper respiratory tract infections

Lower respiratory tract infections

Skin and soft tissue infections

Urinary tract infections

Uncomplicated urethral, endocervical or rectal infections, inclusion conjunctivitis, trachoma, and lymphogranuloma venereum

Relapsing fever

Cholera

As adjunctive therapy in intestinal amebiasis caused by Entamoeba histolytica.

In severe acne, adjunctive therapy with Tetracycline may be useful.

Toxicity: The concurrent use of Tetracycline has been reported to result in fatal renal toxicity. Absorption of Tetracyclines is impaired by antacids containing aluminum, calcium or magnesium and preparations containing iron, zinc, or sodium bicarbonate.

Also, Decomposed tetracyclines may cause potentially fatal nephrotoxicity (Fanconi's syndrome); therefore, outdated or decomposed medications should be discarded.

Adverse effects: Gastrointestinal

Gastrointestinal side effects have included anogenital lesions with monilial overgrowth, anorexia, black hairy tongue, dysphagia, enamel hypoplasia, enterocolitis, epigastric distress, diarrhea, glossitis, nausea, permanent tooth discoloration, and vomiting. Rarely, esophageal ulceration has been reported with oral tablets and capsules

Renal

Renal side effects generally occurred in patients with pre-existing renal disease and have been the result of accumulation of tetracycline. Renal side effects have included increased BUN and Fanconi's syndrome. In patients with pre-existing renal impairment, tetracycline may cause azotemia, hyperphosphatemia, and acidosis. Patients with dehydration are particularly vulnerable.

Nervous system

There have been several cases of benign intracranial hypertension (pseudotumor cerebri) and bulging fontanels in infants

Hematologic

Hematologic side effects have included hemolytic anemia, thrombocytopenia, thrombocytopenic purpura, neutropenia, and eosinophilia

Hypersensitivity

Hypersensitivity side effects have included urticaria, angioneurotic edema, anaphylaxis, anaphylactoid purpura, exacerbation of systemic lupus erythematosus, hypersensitivity myocarditis, and serum sickness-like reactions (fever, rash, arthralgia).

Hepatic

Hepatic side effects have included increased liver enzyme levels, hepatotoxicity, liver failure, and bile duct paucity with prolonged cholestasis. These may be dose-related.

Other

Other side effects have included superinfection due to overgrowth of resistant organisms. The long-term use of tetracyclines has been associated with microscopic brown-black discoloration of the thyroid gland; however, abnormal thyroid function has not been reported.

Metabolic

Metabolic side effects have included azotemia, hyperphosphatemia, and metabolic acidosis. Increases in serum BUN levels may occur as a result of the anti-anabolic action of tetracycline and not necessarily indicate renal disease.