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MEDICAL LABORATORY SCIENCE

PHA 302

BACTERIAL PROTEIN SYNTHESIS INHIBITOR

1)CHLORAMPHENICOL: Chloramphenicol is a bacteriostatic broad-spectrum antibiotic that is active against both aerobic and anaerobic gram-positive and gram-negative organisms.

It is active also against rickettsiae*. Haemophilus influenzae, N. meningitidis, and some strains of Bacteroides are highly* susceptible, and for them chloramphenicol may be bactericidal.

Clinically significant resistance emerges and may be due to production of chloramphenicol acetyltransferase, an enzyme that inactivates the drug.

**MECHANISM OF ACTION**

1. Chloramphenicol blocksproper binding of 50S site which, stops protein synthesis.
2. It does inhibit mitochondrial ribosomal protein synthesis because these ribosomes are 70S, the same as those in bacteria.
3. It hinders the transfer of the elongating peptide chain to the newly attached amino acyl tRNA at the ribosome mRNA complex.
4. It specifically attaches to the 50S ribosome and therefore hinder the access of aminoacyl-tRNA to the acceptor for amino acid incorporation
5. It prevents formation of peptide bond
6. This may be responsible for the dose related anemia caused by chloramphenicol
7. It prevents bacterial protein synthesis by binding to the 50s ribosomal subunit.

INDICATION FOR USE: Because of potential toxicity, bacterial resistance, and the availability of other effective drugs, chloramphenicol may be considered mainly for treatment of serious rickettsial infections, bacterial meningitis caused by a markedly penicillin-resistant strain of pneumococcus or meningococcus, and thyphoid fever.

TOXICITY:Toxicity for newborn infants:

1) Newborn infants lack an effective glucuronic acid conjugation

2) mechanism for the degradation and detoxification of chloramphenicol.

3) Consequently, when infants are given dosages above 50 mg/kg/d, the drug may accumulate, resulting in the gray baby syndrome, with vomiting, flaccidity, hypothermia, gray color, shock, and collapse.

4) Dose related anemia, idiosyncratic aplastic anemia, gray baby syndrome.

ADVERSE EFFECTS: Gastrointestinal disturbances: Adults occasionally develop nausea, vomiting, and diarrhea.

1. Oral or vaginal candidiasis may occur as a result of alteration of normal microbial flora.
2. Bone marrow disturbances*: Chloramphenicol commonly causes a dose-related reversible* suppression of red cell production at dosages exceeding 50 mg/kg/d after 1-2 weeks.
3. Aplastic anemia is a rare consequence of chloramphenicol administration by any route. It is an idiosyncratic reaction unrelated to dose, though it occurs more frequently with prolonged use. It
4. tends to be irreversible and can be fatal.

6. Bacteriostatic activity against susceptible bacteria