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COURSE TITLE: SYSTEMIC PHARMACOLOGY IN NURSING PRACTICE

COURSE CODE: PHA 324

Classify the antimalarial agents and state the mechanism of action of each class of drug listed.

* **Chloroquine**

Drug class: Antimalarial & Antirheumatoid

Antimalarial mechanism of action

* Chloroquine and other similar quinolones(e.g hydroxychloroquine, quinine) become concentrated in parasite food vacuoles preventing the polymerization of the hemeoglobin product , heme, into hemozoin and thus eliciting parasite toxicity due to the build up of heme
* It is not active against liver stage parasites (and primaquine must be added for the radical cure of these species)
* Malarial parasites have a limited ability to synthesize amino acids and rely upon amino acids obtained by the breakdown of host hemoglobin molecules in digestive vacuoles.
* Degradation of hemoglobin releases both amino acids as well as a toxic heme metabolite ferriprotoporphyrin IX which is normally detoxified by a PH-dependent polymerization of ferriprotoporphyrin IX is inhibited, its increased concentration in the parasites food vacuoles will cause oxidative damage to membranes and death of the parasite.
* **Quinine(& Quinidine) for malaria**

Mechanism of Action:

Its precise mechanism as an antimalarial is poorly understood. In plasmodium falciparum quinine has been found to inhibit nucleic acid synthesis , protein synthesis, and glycolysis; it also binds with hemazoin in parasitized erythrocytes.

Quinine is effective as malarial suppressant and in control of overt clinical attacks. Its primary action is schizontocidal, no lethal effect is exerted on sporozoites or pre-erythrocitic tissue forms.

Quinine blocks cardiac K&Na channels similar to quinidine.

* **Primaquine**

Mechanism of action

Active against the hepatic stages of all human malarial parasites. Some gametocytes are destroyed while others cannot undergo maturation division in the gut of the mosquito

Mefloquine

Mechanism of action

Chemically related to quinidine .Has strong blood schizonticidal activity against P.falciparum and P.vivax but not against hepatic stages or gametocytes.

* **Pyrimethamine+Sulfadoxine**

Mechanism of action

Folic acid antagonists: The rationale for there combination is a synergistic effect to inhibit folic acid synthesis and a differential requirement between host and a parasite for nucleic acid precursors involved in growth.

This activity is highly selective against plasmodia and Toxoplasma gondii.

Pyrimethamine is chemically related to trimethoprim. It acts slowly against erythrocytic forms of susceptible strains of all four human malarial species. It is not adequately gametocidal or effective against liver stages.

* **Artesunate& Artemether(Artemisinin analogs)**

Mechanism of action

Produces a free radical when it undergoes an iron-catalyzed cleavage of an endoperoxide bond in the parasite food vacuole.

It is a rapidly acting blood schizonticide with some activity gamatocytes but no activity against the hepatic stages of the malarial parasite.

* **Arteether**

Mechanism of action

This compound used for I.M administration in complicated/cerebal malaria.Because of its longer elimination .