

Malaria

Identification : malaria in human is a parasitic disease caused by infection with one or more of four species of intracellular protozoan parasitic, plasmodium Falciparum, p. Vivax , p. Malari, p. Ovale .

The burden of disease malaria causes is considerable, amounting to 300-500 million clinical cases per year, 80% of which occur in Africa. It is responsible for one million death per year- virtually all due to P. Falciparum and 90% of which are in Africa.

Plasmodium falciparum and p. Vivax are the more common worldwide but p. Falciparum represents the most serious public health problem because of the tendency toward severe or fatal infection. The early clinical manifestations of malaria are non specific.

The complete life cycle of human malaria parasite embraces a period of development within the mosquito- extrinsic incubation period and a period of development in human.

Clinical features :

Including fever, hepatomegaly, chills, myalgias, and arthralgias, headache, diarrhea, vomiting and other non specific signs. Splenomegaly, anemia, and often develop after a few days.

Transmission of malaria :

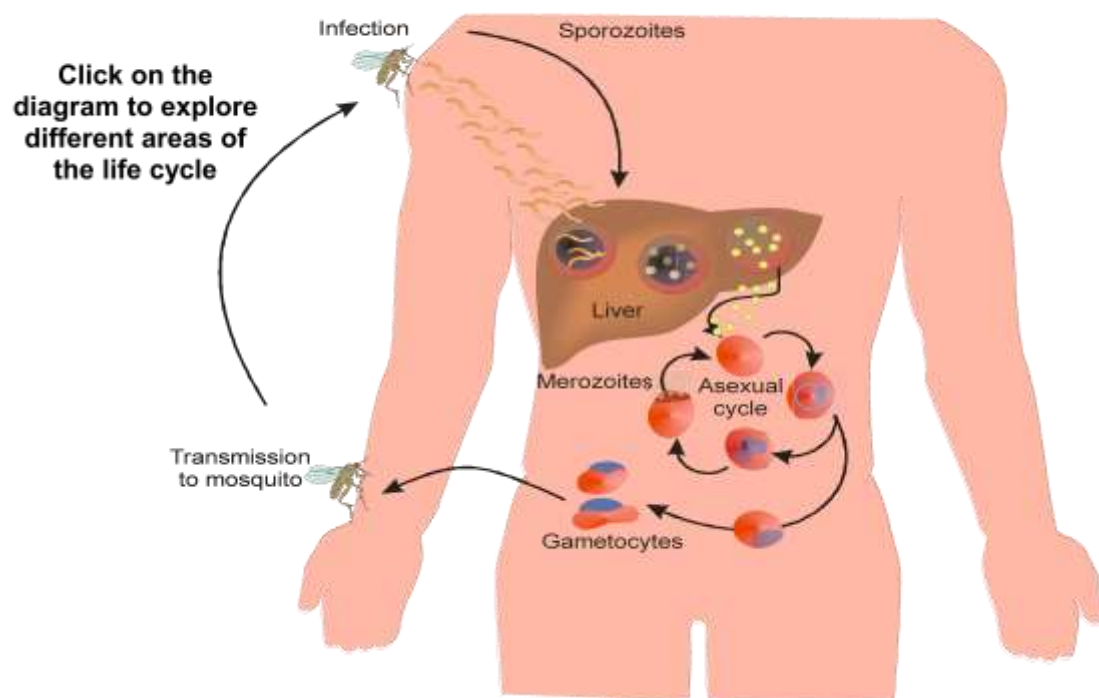
Apart of most common method of transmission- the bite of many species of Anopheles mosquito- other forms of transmission are occurred –namely (1) by blood transmission (2) congenital from the mother to the fetus (3) sharing needles and syringe among drug addicts (4) accident among health workers through needles and instrument puncture, and (5) plasmapheris and organ transplantation .

infection develop :

- Plasmodium infects the human and insect host alternatively and several phases of the parasite life cycle are described.
- During feeding, saliva from the mosquito is injected into the human blood stream. If the mosquito is carrying malaria, the saliva contains primitive stages of malaria parasites called sporozoites.
- *Hepatic, tissue or pre-erythrocytic phase:* Sporozoites invade and develop in liver cells. The infected hepatocyte ruptures to release merozoites.
- *Erythrocytic phase:* Merozoites then invade red blood cells. The red cells lyse and this causes bouts of fever and the other symptoms of the disease. This cycle repeats as merozoites invade other red cells.

- *Sexual phase:* Sexual forms of the parasites develop and are ingested when another female anopheles mosquito feeds. These develop into sporozoites in the gut of the insect host and travel to its salivary glands. Then the cycle starts again..

The Malaria Parasite Life Cycle



1. Transmission

Female anopheles mosquito bites and releases sporozoites into the blood stream. These circulate for about 30 min. and then invade the liver.

2. Pre-erythrocytic phase

Also called the “tissue” or “hepatic” phase

Takes place in hepatocytes. The sporozoites mature into schizonts which rupture to release merozoites. Duration of this phase depends on the species.

In *P. vivax* and *P. ovale*, the schizont may also differentiate into hypnozoites. These are dormant forms of the parasite which may remain in the liver for several months or years and cause relapse in the human host.

3-a. Asexual phase (Erythrocytic schizogony)

Merozoites invade red blood cells. Here they grow and mature into trophozoites which appear as ring forms. The trophozoites develop into schizonts. The infected red blood cells then rupture to release numerous merozoites from the schizont to infect other red cells. Merozoite release results in fever, chills, rigours and other symptoms of malaria infection.

3-b. Sexual phase

Some merozoites differentiate into male and female gametocytes, the forms of Plasmodia infective to mosquitoes. These are taken up by a mosquito during another blood meal. These fuse to form an ookinete in the gut lumen of the mosquito. The ookinete invades the stomach wall to form the

oocyst. This in turn develops and releases sporozoites which migrate to the salivary gland of the mosquito. This mosquito then goes on to infect another human host.

Diagnosis :

The diagnosis of malaria is clinical, parasitological, immunological . clinically a high index of suspicion is the most important feature while the parasitological diagnosis remain the most certain means the diagnosis of human malaria parasites.

Investigation : **Blood Film Examination**

Thick and thin blood films (or “smears”) have remained the gold standard for the diagnosis of malaria. The films are stained and examined by microscopy.

Thick blood film - Used for detecting malaria: a larger volume of blood is examined allowing detection of even low levels of parasitaemia. Also used for determining parasite density and monitoring the response to treatment.



Thin blood film – Gives more information about the parasite morphology and, therefore, is used to identify the particular infecting species of Plasmodium.



Control of malaria :

Control measure are aimed at the individual, against the vector.