A brief review on Malaria Disease (Causes, Treatment, Diagnosis)
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Abstract
Malaria is caused by a parasite called Plasmodium, which is transmitted via the bites of infected mosquitoes. In the human body, the parasites multiply in the liver, and then infect red blood cells. The human malaria parasite has a complex life cycle that requires both a human host and an insect host. In Anopheles mosquitoes, Plasmodium reproduces sexually (by merging the parasite’s sex cells).

Key Words: Infection; Plasmodium; Malaria.

Introduction
Most malaria infections cause symptoms like the flu, such as a high fever, chills, and muscle pain. Symptoms tend to come and go in cycles. Some types of malaria may cause more serious problems, such as damage to the heart, lungs, kidneys, or brain. These types can be deadly. The disease can be controlled and treated if diagnosed early on. Unfortunately, this is not possible in some areas of the world lacking in medical facilities, where malaria outbreaks can occur. At the moment, a vaccine for the disease is still yet to be discovered.

Malaria incidence rates are estimated to have fallen by 30% globally between 2000 and 2013 while estimated mortality rates fell by 47%.

In people, the parasite reproduces asexually (by cell division), first in liver cells and then, repeatedly, in red blood cells (RBCs). When an infected female Anopheles mosquito bites a human, it takes in blood. At the same time, it injects saliva that contains the infectious form of the parasite, the sporozoite, into a person’s bloodstream. The thread-like sporozoite then invades a liver cell. There, during the next week or two (depending on the Plasmodium species), each sporozoite develops into a schizont, a structure that contains thousands of tiny rounded merozoites (another stage of the parasite). When the schizont matures, it ruptures and releases the merozoites into the bloodstream.

Causes of Malaria
Malaria is caused by the bites from the female Anopheles mosquito, which then infects the body with the parasite Plasmodium. This is the only mosquito that can cause malaria.

The successful development of the parasite within the mosquito depends on several factors, the most important being humidity and ambient temperatures.

When an infected mosquito bites a human host, the parasite enters the bloodstream and lays dormant within the liver. For the next 5-16 days, the host will show no symptoms but the malaria parasite will begin multiplying asexually.

The new malaria parasites are then released back into the bloodstream when they infect red blood cells and again begin to multiply.

Malaria was first discovered to be a parasite disease in 1880. The name of the disease comes from the Italian word mal'aria, meaning "bad air." Malaria is transmitted by infected mosquitoes, which then infect humans with a parasite via bites. The most common time for these mosquitoes to be active is between dusk and dawn. There were an estimated 198 million cases of malaria in 2013 and 584,000 deaths. A malaria vaccine for humans is still yet to be discovered. An estimated 3.3 billion people in 97 countries are at risk of malaria, nearly half of the world's population.

Annual funding for malaria control in 2013 was three times the amount spent in 2005, yet it represented only 53% of global funding needs.
Diagnosis of Malaria

Malaria is usually confirmed by the microscopic examination of blood films or by antigen-based rapid diagnostic tests (R. D. T). Microscopy is the most commonly used method to detect the malarial parasite—about 165 million blood films were examined for malaria in 2010. Despite its widespread usage, diagnosis by microscopy suffers from two main drawbacks: many settings (especially rural) are not equipped to perform the test, and the accuracy of the results depends on both the skill of the person examining the blood film and the levels of the parasite in the blood. The sensitivity of blood films ranges from 75–90% in optimum conditions, to as low as 50%. Commercially available R. D. Ts are often more accurate than blood films at predicting the presence of malaria parasites, but they are widely variable in diagnostic sensitivity and specificity depending on manufacturer, and are unable to tell how many parasites are present.

Treatment of Malaria

Malaria may be treated with oral medications. The most effective treatment for *P. falciparum* infection is the use of artemisinins in combination with other anti malarials (known as artemisinin-combination therapy, or ACT), which decreases resistance to any single drug component.

These additional antimalarials include: amodiaquine, lumefantrine, mefloquine or sulfadoxine/pyrimethamine. Another recommended combination is dihydroartemisinin and piperaquine. A. C. T is about 90% effective when used to treat uncomplicated malaria. To treat malaria during pregnancy, the WHO recommends the use of quinine plus clindamycin early in the pregnancy (1st trimester), and A. C. T in later stages (2nd and 3rd trimesters).

In regions where laboratory tests are readily available, malaria should be suspected, and tested for, in any unwell person who has been in an area where malaria is endemic. In areas that cannot afford laboratory diagnostic tests, it has become common to use only a history of fever as the indication to treat for malaria thus the common teaching "fever equals malaria unless proven otherwise". A drawback of this practice is that it increases the risk for aspiration pneumonia, which is a potentially fatal complication that must be dealt with immediately. Turn the patient every 2h. Do not allow the patient to lie in a wet bed. Pay particular attention to pressure points.

Keep a careful record of fluid intake and output. If this is not possible, weigh the patient daily to calculate the approximate fluid balance. All patients who are unable to take oral fluids should receive dextrose containing maintenance fluids, unless contraindicated (fluid overload), until they are able to drink and retain fluids. Check the speed of infusion of fluids frequently: too fast or too slow an infusion can be dangerous.

Nursing care

Good nursing care of patients with severe malaria is of vital importance. Ensure meticulous nursing care. This can be lifesaving, especially for unconscious patients. Maintain a clear airway. Nurse the patient in the lateral or semi-prone position to avoid aspiration of fluid. If the patient is unconscious, insert a nasogastric tube and aspirate the stomach contents to minimize the risk for aspiration pneumonia, which is a potentially fatal complication that must be dealt with immediately. Turn the patient every 2h. Do not allow the patient to lie in a wet bed. Pay particular attention to pressure points.

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Report deterioration of the level of consciousness, occurrence of convulsions or changes in behaviour of the patient immediately. All such changes suggest developments that require additional treatment.

If the rectal temperature rises above 39°C, remove the patient’s clothes, give oral or rectal paracetamol and make the child comfortable with tepid sponging and fanning.

References


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