

Medicine for Managers

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Malaria

People going on holiday to sun-kissed lands should never forget about malaria. Caused by a form of micro-organism or protozoan called *Plasmodium*, the disease derives its name from the Italian *malaria* meaning bad air because of its association with the so-called ‘poisonous vapours’ of the swamps. It causes the deaths of more children world-wide than any other infectious disease.

Malaria is transmitted from person to person by the bite of an infected *Anopheles* mosquito.

There are at least five varieties of organism that can cause malaria in the human. The disease was suspected three hundred years ago but was first identified in 1880 by Laveran and its transmission by mosquito was shown about twenty years later.



The parasite or *protozoan* is a single-celled organism of the type (genus) called *Plasmodium*. The most dangerous form of parasite is *Plasmodium falciparum*.

The life cycle of the disease is complex. Following the bite of an infected female

mosquito the organisms rapidly travel in the blood stream to the liver. During the next fourteen days the organisms multiply and



develop after which they burst out of the liver and invade red blood cells and undergo further multiplication.

The frequency of this phase depends on the type of malarial parasite involved but the timing of the exacerbations of clinical symptoms (principally fever and shivering) coincide with the rupture of infected red blood cells.

The organisms differentiate into different forms in the host body including sexual forms (gametocytes), which are taken up by female mosquitoes during a meal of blood.

The organisms enter the mosquito's gut, multiply and ultimately reach the insect's salivary glands from which the process starts again.

Malaria exists in more than 100 countries including popular holiday destinations. Areas include large parts of Africa and Asia, Dominican Republic and Haiti, Central and South America, the Middle East and some of the Pacific Islands.

After an incubation period of between about 10-20 days, the disease typically starts with general viral symptoms of a fever, headache, shivering, muscle aches, dry cough, sweating and diarrhoea and vomiting.

The temperature may be quite high (in excess of 38.5C). More serious symptoms include bleeding, anaemia, convulsions and organ failure.

A characteristic symptom of some types of malaria is the development of cyclical symptoms.

Patients suddenly develop fever, shivering sweating and aching every two days (tertian fever) with *Plasmodium vivax* or *Plasmodium ovale* or every three days (quartan fever) with *Plasmodium malariae*.

The pattern is less consistent with *Plasmodium falciparum* which may show cyclical features but they may be almost continuous.

Sometimes serious complications of malaria arise. The destruction of red blood cells by the malarial parasite reduce the oxygen carrying capacity of the blood and the anaemia which results can be quite severe.

*The NHS Choices website
"Travel Vaccinations"
gives useful advice and
details other websites
where information can be
obtained*

Blackwater fever is a complication where red cells burst in the blood stream (haemolysis) releasing haemoglobin directly into the blood vessels and into the urine.

Not uncommonly the problem leads to kidney failure. Rarely malaria can affect the brain which swells causing seizures or coma and resulting in permanent damage.

Other rare complications may include liver failure, shock, damage or rupture of the spleen or dehydration.

Diagnosis of malaria should be suspected if a patient develops flu-like or other symptoms after travel abroad, even if only for a brief stop-over.

The diagnosis may be made by a blood test involving microscopy of a 'thick film' of blood under a microscope which will demonstrate the malarial parasites in the blood. When a diagnosis is made, treatment starts immediately.

Antimalarial treatment of established infection consists of the use of anti-protozoal drugs which may be administered orally or intravenously.

The major group of drugs used are called artemisinins and are used in combination to prevent the development of resistance to any one drug. Quinine and other drugs used in prophylaxis are used as part of the combination to treat the disease.

Treatment is effective if the disease is diagnosed promptly and treatment is started immediately. It is normally initiated in hospital and the more severe cases of malaria may require other supportive measures necessitating admission to an intensive care unit.

The mainstay of management of malaria is preventative treatment when travelling to an area where malaria exists and where treatment is recommended. Detailed travel information about malaria (and other illnesses to which travellers are vulnerable) is widely published. A common source of reference, which is updated monthly, may be found in MIMS.

Medication is principally used according to the region to be visited:

- a. Chloroquine is used where drug resistance is low. It is no longer recommended for falciparum malaria because of resistance to the drug. If used it is started one week before departure until four weeks after return.

- b. Mefloquine (Lariam) is effective and is started 2½ weeks before departure until 4 weeks after return.
- c. Is used in combination for some types of malaria using similar regimes.
- d. Proguanil, often used combined with Atovaquone (Malarone) is used as prophylaxis against falciparum malaria, started 2 days before entering the affected area and continuing for one week after leaving it.
- e. Doxycycline may be used, started - 12 days before entering the endemic area and continued for four weeks after leaving.

It is essential to obtain the correct medication and the choice should be based on medical advice.

Medication for antimalarial prophylaxis is not available on NHS prescription.

Patients must pay for any drugs for such purpose having obtained a private prescription (Chloroquine and Proguanil can be purchased).

Pregnant women are advised to avoid travelling in areas of the world affected by malaria because their risk of contracting the more severe form of the disease is increased and some prophylactic antimalarial drugs are unsafe for use during pregnancy because of maternal or foetal side effects.

Of course malaria may also be prevented by avoiding being bitten by mosquitoes. It may

be impossible to avoid bites completely but any protection that minimises bites will reduce the risk.

Measures may include:

- Staying where there is effective screening on doors and windows and with filtration air-conditioning
- Using a mosquito net
- Using insect repellent
- Wearing clothing that protects the body (including the limbs) from bites, especially in the evenings, which is the mosquito's favoured feeding time.

Malaria should not be underestimated and prophylaxis and prevention is essential if going to an infected area.

The World Health Organisation reported 219 million cases and 660,000 deaths in 2010 and some other authorities have suggested that the figures may be higher.

Some may balk at the cost of prophylaxis but, whatever the cost, it is well worth it!

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