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REVIEW ARTICLE

Different Clinical Features of Malaria

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ABSTRACT

Malaria is a major public health problem in India, accounting for sizeable morbidity, mortality and economic loss. Apart from preventive measures, early diagnosis and complete treatment are the important modalities that have been adopted to contain the disease the other causes should also be suspected and investigated in the presence of following manifestations: Running nose, cough and other signs of respiratory infection Diagnosis can be done by Microscopy,RDT etc The treatment of P. falciparum malaria is based on areas identified as chloroquine resistant/ sensitive as ACT Clinical features are Severe manifestations can develop in P. falciparum infection over a span of time as short as 12 – 24 hours and may lead to death, if not treated promptly and adequately Specific antimalarial treatment of severe malaria is an emergency and treatment should be given promptly Parenteral artemisinin derivatives or quinine should be used irrespective of chloroquine sensitivity

Keywords: Artemisinin Combination Therapy (ACT), sulfadoxine-pyrimethamine (SP),_Rapid Diagnostic Test *(RDT),* National Vector Borne Disease Control Programme (NVBDCP),

1. INTRODUCTION

Malaria is a major public health problem in India, accounting for sizeable morbidity, mortality and economic loss. Apart from preventive measures, early diagnosis and complete treatment are the important modalities that have been adopted to contain the disease. The general management should be carried out according to the clinical condition of the patient and judgement of the treating physician. Malaria is one of the major public health problems of the country. Around 1.5 million confirmed cases are reported annually by the National Vector Borne Disease Control Programme (NVBDCP), of which 40–50% are due to Plasmodium falciparum. Malaria is curable if effective treatment is started early. Delay in treatment may lead to serious consequences including death. Prompt and effective treatment is also important for controlling the transmission of malaria. In the past, chloroquine was effective for treating nearly all cases of malaria. In recent studies, chloroquine-resistant P. falciparum malaria has been observed with increasing frequency across the country. The continued treatment of such cases with chloroquine is probably one of the factors responsible for increased proportion of P. falciparum relative to P. vivax. A revised National Drug Policy on Malaria has been adopted by the Ministry of Health and Family Welfare in 2008 and these guidelines have therefore been prepared for clinicians involved in the treatment of malaria.

Clinical features

Fever is the cardinal symptom of malaria. It can be intermittent with or without periodicity or continuous. Many cases have chills and rigors. The fever is often accompanied by headache, myalgia, arthralgia, anorexia, and nausea and vomiting. The symptoms of malaria can be non-specific and mimic other diseases like viral infections, enteric fever etc. Malaria should be suspected in patients residing in endemic areas and presenting with above symptoms. It should also be suspected in those patients who have recently visited an endemic area. Although malaria is known to mimic the signs and symptoms of many common infectious diseases, the other causes should also be suspected and investigated in the presence of following manifestations: Running nose, cough and other signs of respiratory infection

- Diarrhoea/dysentery
- Burning micturition and/or lower abdominal pain
- Skin rash/infections
- Abscess
- Painful swelling of joints

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• Ear discharge
• Lymphadenopathy

All clinically suspected malaria cases should be investigated immediately by microscopy and/or Rapid Diagnostic Test (RDT).

Diagnosis

Microscopy

Microscopy of stained thick and thin blood smears remains the gold standard for confirmation of diagnosis of malaria.

The advantages of microscopy are:

• The sensitivity is high. It is possible to detect malarial parasites at low densities. It also helps to quantify the parasite load.
• It is possible to distinguish the various species of malaria parasite and their different stages.

Rapid Diagnostic Test

Rapid Diagnostic Tests are based on the detection of circulating parasite antigens. Several types of RDTs are available

Some of them can only detect P. falciparum, while others can detect other parasite species also.

The latter kits are expensive and temperature sensitive. Presently, NVBDCP supplies RDT kits for detection of P. falciparum at locations where microscopy results are not obtainable within 24 hours of sample collection.

RDTs are produced by different companies, so there may be differences in the contents and in the manner in which the test is done. The user's manual should always be read properly and instructions followed meticulously. The results should be read at the specified time. It is the responsibility of the clinician or technician doing a rapid test for malaria to ensure that the kit is within its expiry date and has been transported and stored under recommended conditions. Failure to observe these criteria can lead to false/negative results. It should be noted that Pf HRP2 based kits may show positive result up to three weeks of successful treatment.

Early diagnosis and treatment of cases of malaria aims at:

• Complete cure
• Prevention of progression of uncomplicated malaria to severe disease
• Prevention of deaths
• Interruption of transmission
• Minimizing risk of selection and spread of drug resistant parasites.

Treatment of uncomplicated malaria

All fever cases diagnosed as malaria by RDT or microscopy should promptly be given effective treatment. Treatment of P. vivax cases Positive P. vivax cases should be treated with chloroquine in full therapeutic dose of 25 mg/kg divided over three days. Vivax malaria relapses due to the presence of hypnozoites in the liver. The relapse rate in vivax malaria in India is around 30%. For its prevention, primaquine may be given at a dose of 0.25 mg/kg daily for 14 days under supervision. Primaquine is contraindicated in G6PD deficient patients, infants and pregnant women. Caution should be exercised before administering primaquine in areas known to have high prevalence of G6PD deficiency; therefore, it should be tested if facilities are available. Primaquine can lead to hemolysis in G6PD deficiency. Patient should be advised to stop primaquine immediately if he develops symptoms like dark coloured urine, yellow conjunctiva, bluish discolouration of lips, abdominal pain, nausea, vomiting etc. and should report to the doctor immediately. Treatment of P. falciparum cases

The treatment of *P. falciparum* malaria is based on areas identified as chloroquine resistant/ sensitive as listed in annexure.Artemisinin Combination Therapy (ACT) should be given in resistant areas whereas chloroquine can be used in sensitive areas. ACT should be given only to confirmed P. falciparum cases found positive by microscopy or RDT.

What is ACT?

ACT consists of an artemisinin derivative combined with a long acting antimalarial (amodiaquine, lumefantrine, mefloquine or sulfadoxine-pyrimethamine). The ACT used in the national programme in India is artesunate + sulfadoxine-pyrimethamine (SP). Presently, Artemether + Lumefantrine fixed dose combination and blister pack of artesunate + mefloquine are also available in the country. Other ACTs which will be registered and authorized for marketing in India may be used as alternatives.

General recommendations for the management of uncomplicated malaria

• Avoid starting treatment on an empty stomach. The first dose should be given under observation. Dose should be repeated if vomiting occurs within 30 minutes.
• The patient should report back, if there is no improvement after 48 hours or if the situation deteriorates.
• The patient should also be examined for concomitant illnesses.

Severe manifestations can develop in P. falciparum infection over a span of time as short as 12 – 24 hours and may lead to death, if not treated promptly and adequately. Severe malaria is characterized by one or more of the following features:

Clinical features

- Impaired consciousness/coma
- Repeated generalized convulsions
- Renal failure (Serum Creatinine >3 mg/dl)
- Jaundice (Serum Bilirubin >3 mg/dl)
- Severe anaemia (Hb <5 g/dl)
- Pulmonary oedema/acute respiratory distress syndrome
- Hypoglycemia (Plasma Glucose <40 mg/dl)
- Metabolic acidosis
- Circulatory collapse/shock (Systolic BP <80 mm Hg, <70 mm Hg in children)
- Abnormal bleeding and DIC Haemoglobinuria
- Hyperthermia (Temperature >104o F)
- Hyperparasitaemia (>5% parasitized RBCs in low endemic and >10% in hyperendemic areas)

Foetal and maternal complications are more common in pregnancy with severe malaria; therefore, they need prompt attention.

Age in years	Day 1	Day 2	Day 3
<1	½	½	¼
1 – 4	1	1	½
5 – 8	2	2	1
9 – 14	3	3	1½
15 & above	4	4	2

Number of tablets

Table 1. Chloroquine for P. vivax and P. falciparum cases in areas considered to be chloroquine sensitive

Can cases of severe malaria be negative on microscopy?

Microscopic evidence may be negative for asexual parasites in patients with severe infections due to sequestration and partial treatment. Efforts should be made to confirm these cases by RDT or repeat microscopy. However, if the symptoms clearly point to severe malaria and there is no alternative explanation, such a case should be treated accordingly.

Requirements for management of complications

For management of severe malaria, health facilities should be equipped with the following:

- Parenteral antimalarials, antibiotics, anticonvulsants, antipyretics
- Intravenous infusion equipment and fluids
- Special nursing for patients in coma
- Blood transfusion
- Well-equipped laboratory
- Oxygen

If these items are not available, the patient must be referred without delay to a facility, where they are available.

Specific antimalarial treatment of severe malaria

Severe malaria is an emergency and treatment should be given promptly.

Parenteral artemisinin derivatives or quinine should be used irrespective of chloroquine sensitivity

- Artesunate: 2.4 mg/kg i.v. or i.m. given on admission (time=0), then at 12 hours and 24 hours, then once a day (Care should be taken to dilute artesunate powder in 5% Sodium bi-carbonate provided in the pack).
- Quinine: 20 mg quinine salt/kg on admission (i.v. infusion in 5% dextrose/dextrose saline over a period of 4 hours) followed by maintenance dose of 10 mg/kg 8 hourly; infusion rate should not exceed 5 mg/kg per hour. Loading dose of 20 mg/kg should not be given, if the patient has already received quinine. NEVER **GIVE BOLUS INJECTION OF QUININE**. If parenteral quinine therapy needs to be continued beyond 48 hours, dose should be reduced to 7 mg/kg 8 hourly.
- Artemether: 3.2 mg/kg i.m. given on admission then 1.6 mg/kg per day.
- αβ Arteether: 150 mg daily i.m. for 3 days in adults only (not recommended for children).

Malaria can be detected and treated early.

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