Study of Clinical Profile of Falciparum Malaria in a Tertiary Referral Centre in Central India

Preetam N Wasnik*, TP Manohar**, NR Humaney**, HR Salkar***

Abstract

Background and Objective: Malaria, a disease with protean manifestations is endemic in India with an estimated 70-100 million cases each year. Of these 45-50% are plasmodium falciparum. The present study is aimed at to study clinical features, complications, response to treatment and outcome in a tertiary care hospital.

Methodology: This hospital based cross sectional study was done on 80 confirmed cases of falciparum malaria (either by peripheral smear or rapid diagnostic test) more than 12 years of age admitted in NKPSIMS and LMH from December 2009 to December 2010. A case sheet proforma was prepared and data (demographic profile, clinical feature, investigation, treatment, and complication) from all indoor patients was collected and analyzed.

Result: Out of 80 patients, 60(75%) were males and 20 (25%) were females. Most of the patients were between the age group 21-40 years with the highest incidence between the age group of 21-30. The numbers of admissions due to malaria increased from June onward with maximum number of cases were found in the month of September. Fever was the most common symptom followed by impaired consciousness. Anemia was present in 52(65%) patients, out of which 5(6.25%) patients had severe anemia. Thrombocytopenia was present in 46(57.5%) patients. Abnormal liver function tests were observed in 28(35%) subjects while abnormal kidney function tests were observed in 26(32.5%) patients.

As per WHO definition of severe falciparum malaria, 37 patients suffered from severe falciparum malaria (46.25%) in the form of impaired consciousness or unarousable coma, clinical jaundice plus evidence of other organ dysfunction, severe renal impairment, severe anemia, circulatory collapse and ARDS. Maximum number, 62(77%) patients received the combination of artesunate and clindamycin. This also showed that the combination of artesunate and clindamycin in severe Plasmodium falciparum malaria is a very good therapeutic option. Apart from being effective in seriously ill patients it is quite safe also. Mortality rate was 6.25%. Cause of death was acute renal failure with metabolic acidosis, aspiration pneumonia secondary to seizure, cerebral malaria and circulatory shock.

Conclusion: Early diagnosis, anticipation of complications, close monitoring of vital parameters and combination therapy to overcome drug resistance perhaps helped to curtail the extent of mortality in this study.

Introduction

Malaria is endemic in India with an estimated 70-100 million cases each year. Of these 45-50% are plasmodium falciparum.1

The mortality in malaria is due to plasmodium falciparum. The considerable mortality and morbidity in falciparum malaria is due to its protean manifestations, multiorgan involvement, and delay in diagnosis and failure of administration of treatment promptly and adequately. The emergence of drug resistance adds to the seriousness of the problem.2

NKPSIMS and LMH Nagpur is tertiary referral centre in central India where patients come from highly endemic region of falciparum malaria like Chhindwara, Balaghat, Gadchiroli etc.

This hospital based cross sectional study is aimed at to study clinical features, complication, response to treatment and outcome in tertiary care hospital.

Material and Method

Study Area: This study was conducted in NKPSIMS and LMH, a tertiary care hospital in central India situated in outskirts of Nagpur city. Being a teaching hospital and tertiary referral centre, case input is primarily from this region and also from bordering districts and states.

Study Design: This was hospital based cross sectional study done on confirmed cases of falciparum malaria admitted in hospital from December 2009 to December 2010. All patients were informed about the study and informed consent was obtained. Approval of institutional ethical committee was taken. A case sheet proforma was prepared and data (demographic profile, clinical features, investigations, treatment, and complication) from all indoor patients were filled and analyzed. Severe falciparum malaria was diagnosed as per guidelines of WHO.

Patients were enrolled in study with the following inclusion and exclusion criteria.

Inclusion Criteria: All the cases tested positive for falciparum malaria (either by peripheral smear or rapid diagnostic test) and treated in the dept. of medicine in the age group of 12 years and above were included.

Exclusion Criteria: Patients presenting with fever (malaria smear and rapid diagnostic test negative) but treated empirically...
for malaria were excluded from study and patient presenting with clinical feature mimicking malaria (malaria parasite test negative) as in leptospirosis, dengue fever and sepsis were excluded.

### Result

A total of 80 subjects were hospitalized, out of which 60(75%) were males and 20 (25%) were females.

Out of 80 subjects, 51(64%) were falciparum malaria while 29(36%) were mixed infection (both falciparum + vivax).

Many of the patients were between the age group of 21-40 years with the high incidence between the age group of 21-30 years (Figure 1).

Majority of cases were from Nagpur district (55) and the rest (25) were from MP (Chhindwara, Sioni) and nearby districts.

The numbers of admission due to malaria increased from June onward with maximum number of cases (32) were found in month of September (Figure 2).

Symptom analysis on admission showed that all the cases (100%) had fever with range of 1 to 20 days with mean duration of 6.68±4.24 days. The fever is followed by impaired consciousness in 14 patients (17.5%) (table 1).

General physical signs on admission were all patients had temperature, 52 (65%) subject had pallor, 28(35%) had icterus, 12 (15%) had systolic blood pressure <100 mm of mercury, hepatomegaly was observed in 23(28.75%), splenomegaly was present in 24(30%) while hepatosplenomegaly was observed in 18(22.5%). crackle was observed in 6(7.5%) while 1 (1.25%) subject had meningeal irritation (table 2).

On routine blood investigation mean Hb level 9.34±2.7 gm/dl with severe anemia (Hb level <5 gm%) was observed in 6(7.5%) patients, leucocytosis was observed in 1 patient while leucopenia was present in 13(16.25%) patients. Abnormal liver function test (increased serum bilirubin) was observed in 26(32.5%) patients, out of which liver enzyme (SGOT and SGPT) was raised in 15 patients. An abnormal kidney function test was observed in 26(32.5%) patients.

Out of 80 subjects, as per WHO definition of severe malaria (WHO guidelines for treatment of severe malaria, second edition 2010); 37(46.25%) patients suffered from severe falciparum malaria (Table 3).

14 patients had impaired consciousness, out of which 3 patients had unarousable coma (cerebral malaria), 3 patients had associated jaundice and 3 patients had renal impairment (serum creatinine >3 mg/dl).

10 patients had clinical jaundice plus evidence of other vital organ dysfunction.

6 patients had severe anemia (Hb <5 gm/dl).

5 patients had severe renal impairment (serum creatinine >3 mg/dl) out of which 2 had metabolic acidosis.

1 patient had circulatory collapse or shock (systolic BP <70 mm)

### Table 2 : Physical sign

<table>
<thead>
<tr>
<th>Signs</th>
<th>No. of cases (n = 80)</th>
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<tbody>
<tr>
<td>Fever</td>
<td>80(100%)</td>
</tr>
<tr>
<td>Pallor</td>
<td>52(65%)</td>
</tr>
<tr>
<td>Icterus</td>
<td>28(35%)</td>
</tr>
<tr>
<td>Systolic BP &lt;100 mm</td>
<td>12(15%)</td>
</tr>
<tr>
<td>Hepatomegaly</td>
<td>23(28.75%)</td>
</tr>
<tr>
<td>Splenomegaly</td>
<td>24(30%)</td>
</tr>
<tr>
<td>Hepatosplenomegaly</td>
<td>23(28.75%)</td>
</tr>
<tr>
<td>Crackle</td>
<td>6(7.5%)</td>
</tr>
<tr>
<td>Meningeal irritation</td>
<td>1(1.25%)</td>
</tr>
</tbody>
</table>

### Table 3 : No. of cases of severe falciparum malaria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>No. of cases (n=80)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impaired consciousness (including cerebral malaria)</td>
<td>14 (17.5%)</td>
</tr>
<tr>
<td>Clinical jaundice plus evidence of other vital organ dysfunction</td>
<td>10 (12.5%)</td>
</tr>
<tr>
<td>Severe renal impairment (sr. creatinine &gt;3 mg/dl)</td>
<td>5 (6.25%)</td>
</tr>
<tr>
<td>Severe anemia (Hb &lt;5 gm/dl)</td>
<td>6 (7.5%)</td>
</tr>
<tr>
<td>Circulatory collapse or shock</td>
<td>1 (1.25%)</td>
</tr>
<tr>
<td>ARDS</td>
<td>1 (1.25%)</td>
</tr>
</tbody>
</table>

Out of 80 subjects, as per WHO definition of severe malaria (WHO guidelines for treatment of severe malaria, second edition 2010); 37(46.25%) patients suffered from severe falciparum malaria (Table 3).
1 patient had ARDS.

All the 80 patients received combination of antimalarial drugs. Artemisinin based combination (ACT) therapy.

62 patients received combination of artesunate and clindamycin.

12 patients received combination of artesunate and sulphadoxine - pyrimethamine.

4 patients received combination of artesunate and quinine.

2 patients received combination of artesunate and doxycycline.

Out of 62 patients who received combination of artesunate and clindamycin, 4(6.45%) patients of severe falciparum malaria receiving this combination expired while rest of patients 58(93.54%) including severe falciparum malaria cases showed good improvement.

8 patients received blood transfusion, 3 subjects received dialysis, and 1 patient required mechanical ventilation during hospitalization.

Out of 80 patients, 72 subjects recovered completely, 3 subjects went discharge against medical advice while 5 subjects expired.

Cause of death in expired patients were aspiration pneumonia secondary to seizure in 1 patient, 2 patients had acute renal failure with metabolic acidosis,1 patient had cerebral malaria while 1 patient died of circulatory shock.

Discussion

This cross sectional study shows males (75%) were affected more as compared to females (25%).

Many of the patients were between the age group of 21-40 years with the high incidence between the age group of 21-30 years.

Since the hospital is situated in outskirts of Nagpur, majority of cases were reported from the same region and small number from the adjacent districts and states as well.

Present study revealed that malaria incidence in this region is seasonal and malaria cases increases with the onset of rainy season. The present study results are in conformity with the incidence pattern as reported by earlier workers in different parts of India.

In this study out of 80 patients, 51 subjects were falciparum positive while 29 patients had mixed infections (falciparum-vivax).

In present study fever was the most common symptom observed in all patients and majority of patients presented within a week of onset of symptoms (mean duration of 6.68±4.24 days).

Fever is followed by impaired consciousness in 14(17.5%) patients. Out of 14 patients, 3(3.75%) patients had unarousable coma (cerebral malaria).

The reported incidence of cerebral malaria is between 2-55%. The reported incidence of cerebral malaria in endemic area is 3.05%.

A study from Jamshedpur in Jharkhand state of India has described the atypical presentation of falciparum malaria comprising convulsion in 28.55%, abdominal pain in 5.7%, hemiplegia in 2.8%, generalized weakness and palpitation in 5.5% cases.

In the present study, patients demonstrated atypical symptoms such as vomiting in 10(12.5%), loose motion in 8(10%), cough in 4(5%), and abdominal pain in 6(7.5%) patients.

The sequestration of erythrocytes, containing metabolically highly active parasite in the vascular bed of internal organ can explain almost all the pathological event in severe and complicated falciparum malaria. Malarial parasite also induce the release of cytokine (TNF-alpha, IL-1; IL-6) initiating many of symptoms and sign of malaria.

Anemia is important cause of high morbidity and mortality in falciparum malaria. Pathogenesis of anemia in malaria is multifactorial. A complex chain of pathological process involving parasite mediated RBC destruction, marrow suppression and accelerated removal of non parasited RBC have all been implicated.

In one study from orissa, 86.7% had anemia and 10% had severe anemia. The present study demonstrated anemia in 52(65%), out of which 5(6.25%) subject had severe anemia.

Thrombocytopenia has been reported to be associated with malaria with incidence ranging from 40.5%-85%. Thrombocytopenia is thought to be caused by increased splenic sequestration, immune mediated destruction and shortened platelet survival.

The present study demonstrated thrombocytopenia in 46(57.5%) patients.

In one study from KMC Hospital, Attavar, 11 patients (20%) showed hyperbilirubinemia.

The present study showed hyperbilirubinemia in 28(35%) patients. Hyperbilirubinemia in falciparum malaria results from intravascular hemolysis of parasitized RBCs, hepatic dysfunction and an element of microangiopathic hemolysis due to DIC.

Deranged renal function like rise in blood urea and creatinine in malaria have been attributed to various factors like dehydration, increased catabolism and impaired renal function.

The deranged renal profile was observed in 27.70% patients in Mahakur et al Behrampur, Orissa (1983). In the present study deranged renal function was observed in 26(32.5%) subjects.

As per WHO definition of severe falciparum malaria, in present study we have observed 37 (46.25%) subjects suffered from severe falciparum malaria in a form of impaired consciousness or unarousable coma, clinical jaundice plus evidence of other organ dysfunction, severe renal impairment, severe anemia, circulatory collapse and pulmonary edema.

Such severe complications were also reported in several studies carried out in a tertiary care and referral hospital.

Due to raising fear of drug resistance and considering severity of illness at the presentation a combination therapy was advocated and thus patient population were selected for various combination of artemisinin based combination therapy (ACT) like artesunate/clindamycin; artesunate/sulphadoxine-pyrimethamine; artesunate/quinine and artesunate/doxycycline.

In our study, maximum number 62(77%) patients received the combination of artesunate and clindamycin. Out of which 4(6.45%) patients of severe falciparum malaria receiving this combination expired while rest of patients, 58(93.54%) including severe falciparum malaria patients receiving this combination showed good improvement. This also showed that the combination of artesunate and clindamycin in severe Plasmodium falciparum malaria is a very good therapeutic option. Apart from being effective in seriously ill patients it is quite safe also.

In our study 5 patients expired, mortality rate was 6.25%. Cause of death was acute renal failure with metabolic acidosis,
aspiration pneumonia secondary to seizure, cerebral malaria and circulatory shock. The present study has less mortality compared to 33.5% in a larger study done in Bikaner Rajasthan.20

Early diagnosis, anticipation of complications, close monitoring of vital parameters and combination therapy to overcome drug resistance perhaps helped to curtail the extent of mortality in this study.

Acknowledgement

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References

1. Malaria Journal 2009; 8:281