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Research Article

THE CLINICAL PROFILE AND COMPLICATIONS OF MALARIA FEVER ATTENDING A TERTIARY CARE CENTRE IN KUMAON REGION OF UTTARAKHAND

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ABSTRACT

BACKGROUND: Malaria remains a major health hazard in developing countries like India. The present study is aimed to study clinical profile and complications of malaria in a tertiary care hospital. **Materials and Methods**: This study was done at the S.T.M. Govt. Hospital, GMC Haldwani, a tertiary care hospital in Kumaon region of Uttarakhand. A total of 50 cases were included in the study that were positive for malaria parasites, P. vivax and P. falciparum on peripheral smear examination with conventional microscopy and / or by rapid diagnostic test. **Results**: In our study predominant symptoms were fever (100%), vomiting (60%), headache (70%) and jaundice (40%) and signs were splenomegaly (70%), pallor (64%), icterus (40%), and hepatomegaly (10%). In this study, 34% patients suffered from uncomplicated malaria and 66% from complicated malaria. Anemia and hyperbilirubinemia was the most frequently encountered combination of complications. **Conclusions**: P. vivax was the major parasite type causing malaria, affecting mainly younger population and causing severe malaria.

INTRODUCTION

Malaria is one of the most serious parasitic infection worldwide, affecting 300–500 million people and causing over 1 million deaths annually. India contributes to 80% of Southeast Asia malaria burden with 24 million cases per year[(1)]. Cases of malaria, as seen round the year, peak during monsoon season from July to October. The proportion of P. vivax and P. falciparum varies in different parts of India.[(2)]

P. falciparum infection can lead to cerebral malaria, acute renal failure, acute malarial hepatitis, hypoglycemia, hyperpyrexia, noncardiogenic pulmonary edema, adult respiratory distress syndrome, adrenal insufficiency-like syndrome, hyperparasitemia, blackwater fever, cardiac arrhythmias, and gastrointestinal syndromes.[(3,4)] P.Vivax malaria was considered to have a benign course with multiple relapses but during the past few years, the trend in the clinical manifestations of vivax malaria has been changing and it has become a major cause of severe and even fatal malaria.[(5,6)]

Our study was carried out to analyze this shift in the clinical profile of patients with complicated malaria, trends in clinical features and severity of disease in both P. falciparum and P. vivax infections.

MATERIAL AND METHODS

This study is done at the Department of Medicine, Sushila Tiwari Memorial Govt.Hospital, GMC, Haldwani, a tertiary care hospital in Kumaon region of Uttarakhand. This was prospective observational study done on 50 confirmed cases of malaria of age more than 15 years admitted in our hospital from Feb 2018 to Oct 2018. All patients were informed about the study and informed consent was taken. Patients were enrolled in study with the following inclusion and exclusion criteria.

Inclusion Criteria: All the cases who tested positive for malaria (either by peripheral smear or rapid diagnostic test) and treated in the Dept. of Medicine in the age group of 15 years and above were included.

Exclusion Criteria: Patients presenting with fever but neither malaria smear or rapid diagnostic test were positive.

Severe malaria was diagnosed as per WHO guidelines
Categorization of severe malaria was according to WHO guidelines (2014)[(7)]

1. Impaired consciousness/coma
2. Repeated generalised convulsions
3. Renal failure (serum creatinine >3 mg/dl)

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4. Jaundice (serum bilirubin >3 mg/dl)
5. Severe anaemia (Hb<5 gm/dl)
6. Pulmonary edema/ acute respiratory distress syndrome
7. Hypoglycaemia (plasma glucose < 40 mg/dl)
8. Metabolic acidosis
9. Circulatory collapse/shock (systolic BP < 80mm Hg)
10. Abnormal bleeding and disseminated intravascular coagulation (DIC)
11. Hemoglobinuria
12. Hyperpyrexia (temperature >106 ^{0}F or >42^{0}C)
13. Hyperparasitemia (>5% parasitized RBCs).

Diagnostic methods

M P Card test done by detecting malarial antigen using Advantage mal card test, J Mitra and Co. Pvt. Ltd..,Conventional thick and thin peripheral smear stained with Leishman stain, examined under oil immersion. The slide was considered negative when there were no parasites in 100 HPF. DENGUE CARD TEST for IgM/IgG antibody and NS1 antigen was used based on immunochromatographic method. Dengue Day 1, J Mitra and Co. Pvt. Ltd card test was used. WIDAL TEST was performed by using standarised TO and TH antigen (span kit) according to the standard as described in packaged insert. Doubling dilution of 1:20 to1:60 for initial screening followed by further dilution to achieve end titre. IgM ELISA SCRUB TYPHUS was done for detecting IgM antibodies to Orientia tsutsugamushi by using 56 kd recombinant antigen kit of InBioss India.

Complete blood count (hematology autoanalyzer), Peripheral blood film for cell morphology, random blood sugar, liver function test, renal function test, urine examination, blood and urine culture and sensitivity, chest X-ray PA view, ultrasonography of abdomen. Other appropriate blood tests and CSF examination were done wherever needed.

A detailed history and complete general and systemic examination was done for cases recruited in the study as per case sheet proforma and the data was analysed using SPSS (Statistical Package for Social Sciences) Version 15.0 statistical Analysis Software (SPSS, Inc., Chicago, IL).

OBSERVATIONS AND RESULTS

A total of 50 patients were hospitalized, out of which 41(82%) were males and 9 (18%) were females.(Table 1)

Table 1 Sex distribution of malaria cases in study population

Sex	Number of cases	Percentage(%)
Male	41	82%
Female	09	18%
Total	50	100%

Out of 50 patients, 45(90%) were vivax malaria while 3(6%) were P. falciparum and 2(4%) were mixed infection (both falciparum + vivax).(Figure 1)

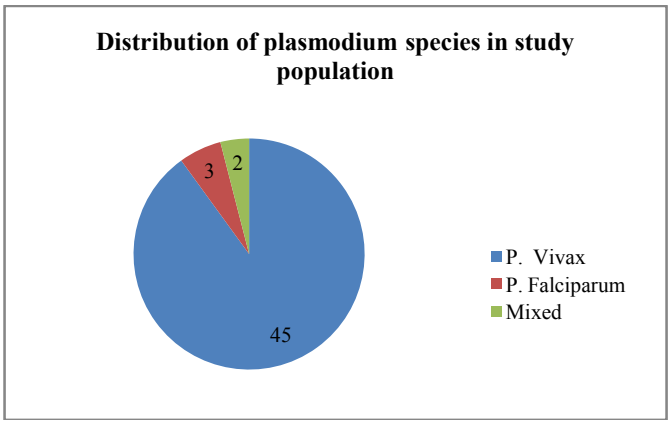

Figure 1 Distribution of plasmodium species in study population

Majority of the patients were between the age group of 21-40 years with the highest incidence between the age group of 21-30 years. (Table 2)

Table 2 Age distribution of malaria cases in study population.

Age Groups (years)	Number of cases	Percentage(%)
21-30	18	36%
31-40	12	24%
41-50	10	20%
51-60	6	12%
>60	04	8%
Mean±SD	27.9±12.67	

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±4.14 days. The fever is followed by headache in 35 patients (70%). General physical signs on admission were all patients had fever 50 (100%), 32 (64%) pateints had pallor and 20(40%) patients had icterus. (Table 3).

Table 3 Clinical features of patients admitted in hospital

Symptoms	Number of patients	Total Percentage (n=50)100%	P.Vivax (n=45)	P.Falciparum (n=3)	Mixed (n=2)
Fever	50	100%	45(100%)	3(100%)	2(100%)
Headache	35	70%	30(67%)	3(100%)	2(100%)
Arthralgia/Myalgia	16	32%	13(28.9%)	2(66%)	1(50%)
Nausea and vomiting	30	60%	25(55.6%)	3(100%)	2(100%)
Jaundice	20	40%	17(37.8%)	3(100%)	0
Pain abdomen	25	50%	22(48.9%)	3(100%)	0
Altered sensorium	5	10%	03(6.7%)	01(33%)	01(50%)
Febrile seizures	2	04%	01(2.2%)	01(33%)	0
Signs					
Splenomegaly	35	70%	32(71%)	3(100%)	0
Hepatomegaly	5	10%	3(6.7%)	2(66%)	0
Pallor	32	64%	30(66.7%)	2(66%)	0
Icterus	20	40%	37.7(85%)	3(100%)	
Dehydration	22	44%	18(40%)	3(100%)	1(50%)
Pain Abdomen	8	16%	5(11.1%)	2(66%)	1(50%)
Rashes	0	0	0	0	0

On routine blood investigation mean Hb level 9.14±2.7 gm/dl in 32(64%) patients with severe anemia (Hb level <5 gm/dl) was observed in 5(10%) patients, Thrombocytopenia was present in 30(60%) patients. Abnormal liver function test (increased serum bilirubin) was observed in 20(40%). An abnormal kidney function test was observed in 10(20%) patients, out of which 1(2%) patient needed 2 sessions of hemodialysis. (Table 4,Figure 2))

Table 4 different complications of malaria

S.No.	complications of malaria	No .of cases (n=50)
1.	Impaired consciousness	10 (20%)
2.	Clinical jaundice	20 (40%)
3.	Severe renal impairment (s. creatinine >3 mg/dl)	10 (20%)
4.	Anemia	32 (64%)
5.	Circulatory collapse or shock	02 (4%)
6.	Thrombocytopenia	30 (60%)

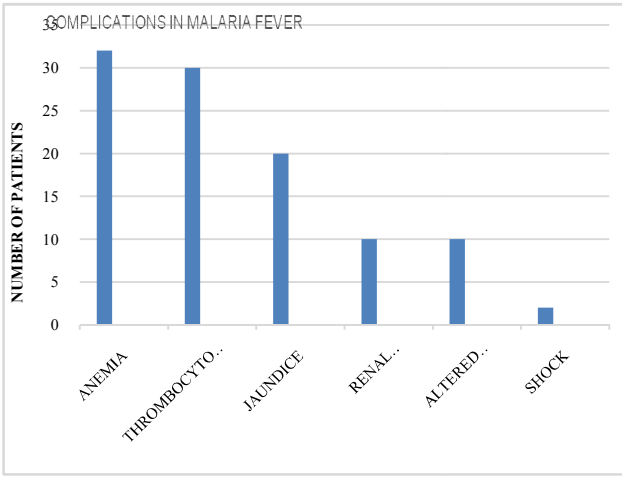

Figure 2 complications of malaria

It was postulated that anemia, thrombocytopenia and jaundice were the common complications found in this study.. Severe anemia was observed in 5 patients out of 32 patients of malaria with anemia. Deranged liver function found in 20 patients with 17 cases of P, vivax and 3 cases of P.faiciparum.(Table 5)

Table 5 Distribution of complicated malariacases according to WHO guideline.

S.No.	Criteria No. of cases	P. Vivax (n = 45)	P. Falciparum	Mixed
1.	Hb<5mg%	03	01	01
2.	Total Bilirubin >3mg/dl	17	3	0
3.	S.Creatinine>3mg%	08	2	0
	Metabolic acidosis pH<7.2	2	3	0
4.	Spontaneous bleeding	05	3	0
5.	Blood sugar <80mmhg	15	3	2
6.	Systolic B P<80 mmmHg	1	1	0

In our study, there were 33 (66%) patients of complicated malaria and 17(34%) patients of uncomplicated malaria.(Table 6)

Table 6 Correlation of malaria species with severity of malaria.

Species	Complicated	Uncomplicated	Total
P. Vivax	30	15	45
P. Falciparum	2	1	3
Mixed	1	1	2
Total	33	17	50

In this study, there was 100% survival with the case fatality rate being 0%. All forms of severe malaria were treated by artesunate combination therapy as recommended by latest guidelines of WHO.

DISCUSSION

P. vivax malaria has been considered to be a benign form of malaria, with low mortality rate but Studies done across the world have shown that vivax is also trending for various complications and mortality.

Our study had male preponderance with 41(82%)males compared to 9(18%)females. The male preponderance was probably due to increased outdoor activities in farm workers and labourers from dawn to dusk. According to a study by Das *et al*, burden of malaria was also higher in males than females.[8]

Most of the patients were between the age group of 15 and 40 year with highest incidence in the younger age group of 21 and 30 years, which is the most actively working group of population leading to increased exposure to the vector borne diseases like dengue, malaria and scrub typhus. In our study the bulk of the patients were either involved in farm or forestry operations.

Since the hospital is situated in kumaon region , the majority of the cases were reported from the same region and small number from the adjacent state as well. The incidence of malaria in this region is seasonal and the maximum cases were reported with the onset of rainy season. Our results are in conformity with the incidence pattern as reported by earlier workers in different parts of India. In our study the P. vivax was the major parasite species (90%) encountered, followed by P. falciparum(6%) and mixed infections (4%) which was in concordance with another study by Singh R *et al* showing the prevalence of vivax was more, 71.8% versus falciparum (28.2%)[9].

Fever was the most common symptom observed and majority of the patients presented within a week of onset of symptoms (mean duration of 6.68 days). Complications of malaria like anemia, thrombocytopenia, abnormal liver function, acute renal failure, altered sensorium etc. found in our study were also reported in several studies carried out in various tertiary care and referral hospitals.

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

In one study from Orissa, 86.7% of patients had anemia and 10% had severe anemia[10] The present study demonstrated anemia in 32(64%), out of which 5(10%) subject had severe anemia. Thrombocytopenia has been reported to be associated with malaria with incidence ranging from 40% to 80%. Thrombocytopenia is thought to be caused by increased splenic sequestration, immune mediated destruction and shortened platelet survival[11] The present study demonstrated thrombocytopenia in 30(60%) patients.

In one study from KMC Hospital, Mangalore 11 patients (20%) showed hyperbilirubinemia[12].The present study showed hyperbilirubenemia in 20(40%) patients. Hyperbilirubenemia in falciparum malaria results from intravascular hemolysis of parasitized RBC's, hepatic dysfunction and an element of

microangiopathic hemolysis due to DIC.[13] 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).[14] In our study deranged renal function was observed in 10(20%) subjects.

CONCLUSION

Malaria is a major health concern in this region, particularly in rainy season and it was found to affect younger population predominantly.. Our study showed a high prevalence of complicated malaria with Plasmodium vivax as the major parasite type causing malaria and complications. Most malaria patients had splenomegaly as clinical sign, along with fever, chills and rigors. Clinical recognition and early initiation of effective treatment decreases the complications and morbidity in malaria.

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