Original Research Article

The retrospective study of clinical and neurological manifestations in malaria

Siddarth Sadhnani

Sadhnani Medical Director, Siddhartha Endocrine Diagnostic centre, 202, Moghal's Deccan Towers, Basheerbagh, Hyderabad-32 INDIA.
Email: drsadhnani@gmail.com

Abstract

Objectives: Malaria is a mosquito borne blood disease and the symptoms of malaria has been changing every year, therefore this study was conducted to study the clinical and neurological manifestations in malarial patients. **Methods:** This observational study was undertaken in Siddhartha Endocrine Diagnostic centre, Basheerbagh, Telangana, where there is high prevalence of malaria over period of 2015-2016. A total of 200 pts were studied. Patients with malarial positive by peripheral blood smear or rapid diagnostic test were included. **Results:** Total 200 patients over a period of 1year, with age group 12-70years.Males are commonly affected than the females. Clinical symptoms, such as high fever, chill, vomiting, anemia, splenomegaly, jaundice, respiratory distress, convulsions, and neurological manifestations were recorded. **Conclusion:** Malaria is one of the most common infectious disease throughout the world. Early diagnosis and treatment can prevent further complications and deaths due to malaria.

Key Word: Malaria, Plasmodium falciparum, P.vivax, P. ovale, P. malariae, Prevalence, Clinical, Neurological manifestations.

Address for Correspondence:
Dr. Siddhartha, Sadhnani Medical Director, Siddhartha Endocrine Diagnostic centre, 202, Moghal's Deccan Towers, Basheerbagh, Hyderabad-32 INDIA.
Email: drsadhnani@gmail.com
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INTRODUCTION

Malaria is a mosquito borne blood disease caused by parasitie belonging to the Plasmodium group. Malaria is an endemic disease and causes major public health problem[1]. It is most infectious disease throughout the world. More than 500 million are affected with malaria every year[2]. If treated in the early stages, malaria can be cured. Symptoms usually begin ten to fifteen days after being bitten by an infected mosquito. If not properly treated, people may have recurrences of the disease months later. Clinical symptoms, such as high fever, chill, vomiting, headache, anemia, splenomegaly, jaundice, respiratory distress, convulsions, and neurological manifestations. Neurological involvement is more with the P. falciparum because of its unique characteristics leading to micro vasculature[3].Among the 4 plasmodium species which are responsible for malaria, P. Falciparum most prevalent. In India 60% of the malaria infections are due to P. vivax while 35-40% due to P. falciparum. India is one of the major contributors to malarial morbidity and mortality[4]. Many cases of P. falciparum and P. vivax with severe pathological conditions are recorded every year. Falciparum malaria is a fatal disease causing high fever, intense headache and vomiting. Neurological manifestations associated with falciparum malaria includes cerebral malaria which is characterized by confusion, convulsions and rapidly progressive coma5. Cerebral malaria is one of the most dangerous complications of falciparum malaria. Cerebral malaria, acute encephalopathy by falciparum commonly affects children and adolescents6. It as mortality rate up to 50% other symptoms include intracranial haemorrhage, cerebral arterial occlusion, seizures, peripheral nerve involvement. Splenic rupture is a dangerous complication of vivax malaria, and P. malariae infection occasionally gives rise to a fatal nephrotic syndrome. Plasmodium

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infection causes an acute febrile illness occuring at either 48 or 72 hour intervals. The severity of the attack depends on the Plasmodium species.

MATERIAL AND METHODS

This study was performed among the patients with intermittent fever, rigors, myalgia, headache, nausea, vomiting etc, at Siddhartha Endocrine Diagnostic centre, Basheerbagh, Telangana, over period of one year. Total number of 200 patients were diagnosed as malarial positive by peripheral blood smear or rapid diagnostic test .The patients above the age of 12 years with malaria positive were included in the study. Informed consent was obtained after explaining the research procedure. Patients coexisting with other disease leptospirosis and/or dengue are excluded from the study. Blood smears were prepared on the glass slides by pricking the finger of the patients complaining of intermittent fever. Films were fixed with methanol before staining with Giemsa. For specific diagnosis of *different species of Plasmodium*, slides were examined by Nikon Eclipse-600 microscope at ×100. Clinical symptoms, such as high fever, chill, vomiting, anemia, splenomegaly, jaundice, respiratory distress, convulsions, and neurological manifestations were recorded. Out of 200 malarial positive cases 20-40 patients had *P. vivax* malaria with neurological manifestations. Neurological manifestations of *P. vivax* malaria include symptoms such as high grade fever with altered sensorium, cerebral malaria, altered behaviour, convulsions etc

STATISTICAL ANALYSIS

The obtained data was analyzed by SPSS software. Chi-square test and student t test was used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

RESULTS

A total of 200 malaria cases were observed during 2015-2016 from Siddhartha Endocrine Diagnostic centre, Basheerbagh, Telangana. Among them, 150 pts had *P. vivax*, 30 had *P. falciparum*, and 20 were the cases of mixed infection diagnosed by rapid diagnostic test and peripheral blood smear. The age group was in the range of 12-70 years, males 140, and females 60 the maximum numbers of malaria patients were recorded from the age group of 31-40 years, followed by 21-30 years (Table 1) . Generally, male patients dominated in almost all age groups. Incubation periods in P. falciparum,P. vivax, P. ovale, and P. malariae varies. All four species exhibit symptoms a few days before the febril attack. Prepatent period and Incubation period is included in table 2.Symptoms of malaria High fever (101 to 105°F) with chills in 90% of patients with p. vivax, few patients present with pain in epigastric region without fever(3-4),1-2 had urticaria, splenomegaly 20-30% of vivax and 40% of p.falciparum malaria ,herpies labialis -20 pts of vivax . Other symptoms, such as headache, sweating, nausea, and joint pain were slightly high in *P. falciparum* cases compared to *P. vivax(Table 3)*. Neurological manifestations include cerebral malaria, altered sensorium, altered behaviour, convulsions etc. On evaluation 30% of cases with diminished level of consciousness, convulsions in 20% cases, cranial 10%, cerebral dysfunction 12%, peripheral neuropathy in 3(Table 4). Disease severity and Duration is discussed in table 5. *P. vivax* is the most widespread infection in India which results in a pronounced morbidity. P. *vivax* also cause life threatening complications and even death. Almost in all the cases platelet count was 70,000/mm^3in vivax, 84000/mm^3 in mixed malaria. Thrombocytopenia was noticed in 99%, leucopenia 50% of all the patients. Hb value 6 to 12, Serum bilirubin level 1.42 in falciparum and 2.04 mg in mixed malaria, Blood urea levels 5-98mg/dl, Serum creatinine 2.6mg/dl in falciparum malaria. When treated the patient for 3-4 days, the resistance rate in falciparum malaria was 18%, while the relapse rate was 20% in *P. vivax* malaria patients. We observed that, cases of *P. vivax*, *P. falciparum*, and mixed infections were in 60%, 34%, and 6%, respectively

Table 1: Age wise distribution

Age	No. Of patients
11-20	15
21-30	50
31-40	70
41-50	40
51-60	16
61-70	7
>70	2
Total	200

Table 2: Prepatent period and Incubation in different Plasmodium species

	P. falciparum	P. vivax	P. ovale	P. malariae
Prepatent period (days)	6-9	8-12	10-14	15-18
Incubation period (days)	7-14	12-17	16-18	18-40

Table 3: Clinical features in Malaria

Symptoms	Percentage
High fever with chills	90%
pain in epigastric region without fever	5%
Vomitings	50%
Headache	20%
Sweating	40%
Splenomegaly	30%
Hepatomegaly	20

Table 4: Neurological manifestation in malaria

Parameters	Percentage
Diminished level of consciousness	30%
Convulsions	20%
Cranial Involvement	10%
Cerebral dysfunction	12%
Peripheral neuropathy	35%

Table 5: Disease severity and Duration

	P. falciparum	P.Vivax	P.ovale	P.Malariae
Severity	severe	moderate to severe	mild	moderate to severe
Symptom Duration	2-3 weeks	3-8weeks	2-3 weeks	3-24 weeks
Maximum Infection Duration (untreated)	6-17months	5-8years	12-20 months	20-50years
Complications	Cerebral	Splenic rupture	-	Renal

DISCUSSION

Malaria can affect all age groups and most infectious disease throughout the world. Peripheral blood smear and rapid diagnostic test positive cases were examined, amongst these male's patients were higher as compared to females[7]. This study demonstrates clinical and neurological findings in malaria due to various plasmodium species. The most frequently implicated species was *P. vivax*, accounting for 60% of cases, while *P. falciparum* accounted for 40%. The results are in accordance with the earlier findings in which *P. vivax* and *P. falciparum* were reported to be 55 and 45%[8]. This indicates that *P. vivax* is the most widespread infection in India with morbidity. Recently, it had been reported that *P. vivax* also has immense potential to cause life threatening complications and even death. Symptoms of malaria High fever (101 to 105°F) with chills in 90% of patients with p.vivax, few patients present with pain in epigastric region without fever(3-4),1-2 had urticaria, splenomegaly 20-30% of vivax and 40% of p.falciparum malaria ,herpies labialis -20 pts of vivax . Other symptoms, such as headache, sweating, nausea, and joint pain were slightly high in *P. falciparum* cases compared to *P. vivax*. Jaundice is one of the manifestations of severe malaria. It results from the intravascular haemolysis of parasitized erythrocytes, hepatic dysfunction and microangiopathic haemolysis associated with disseminated intravascular coagulation. Chawla *et al* increased serum bilirubin levels up to >9-10mg%, due to intravascular haemolysis and associated renal failure, leading to decreased excretion of bilirubin[9]. Murthy *et al* in their study of observed that high serum bilirubin levels in malaria were associated because of histopathological changes to the liver[10]. 70-75% of all malaria cases had thrombocytopenia. Immunogloblulins act on platelets and destroy platelets in spleen. Malaria parasites also destroys platelets directly. According to Lim et.al platelet count in malaria cases could be useful f for post follow up treatment .Anemia in malaria cases occur due to lysis of red cells by schizonts,bone marrow suppression ,splenic sequestration. Hematological abnormality which is most commonly seen in malaria is thrombocytopenia followed by anemia[11]. Both are seen with all types of malaria but most commonly with P. Falciparum malaria[12].We observed that 50-60% of all malaria cases had anemia less than average count reported by Kim et.al but similar to that reported by Oh et.al. Abdul Rasheed et.al reported that headache in 60-70% of vivax and 40-50% of falciparum patients[13]. Neurological manifestations include cerebral malaria, altered sensorium, altered behaviour, convulsions etc. P.Vivax does not include meningitis, it produces severe headache, falciparum malaria may cause cerebral malaria due to cerebral sequestration of infected red blood cells, but not found in vivax malaria. According to Kochar *et al* inflammation may occur because of increase in the levels of vascular[14].

CONCLUSION

In every fever cases malaria should be included in the differential diagnosis from June to January. Most of the malaria cases missed by the clinicians, to avoid such conditions early diagnosis and treatment can prevent deaths due to malaria.

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