International Journal of Research in Medical Sciences
Kohli K et al. Int J Res Med Sci. 2018 Dec;6(12):4106-4109
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: http://dx.doi.org/10.18203/2320-6012.ijrms20184915

Original Research Article

Clinicopathological profile of malaria patients in an Central African United Nations hospital

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Received: 17 August 2018
Accepted: 03 November 2018

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ABSTRACT

Background: Malaria is one of the most widespread diseases in the world. It is endemic in 91 countries. Each year 300-500 million cases of malaria are confirmed with 1.5-2.7 million deaths. Malaria is a major public health problem in Africa. A large number of united nations troops are deployed in central Africa making them vulnerable to malaria infection. Present study was undertaken to find out the clinical and laboratory findings of malaria cases in a United Nation's referral hospital in Central Africa.
Methods: It is a retrospective study of 150 confirmed and treated cases of malaria for a period of one year in a referral hospital for peace keeping troops and employees of United Nations in Democratic Republic of Congo (DRC). Patients positive by ICT or slide positive were included. Detailed history, examination and lab features of these patients were recorded and analyzed.
Results: A total of 150 patients were included in the study. Out of which 145 patients were of pure *P. falciparum* malaria, 02 patients had only *P. vivax*, and 03 patients were having mixed malaria. Fever was the main symptoms found in all patients. Headache was the second most predominant symptoms in (70%) patients. Other signs and symptoms were vomiting (31%), myalgia (38%), jaundice (10%), hepatosplenomegaly (15%), pallor (42%) and decreased urine output (8%). Duration of symptoms was between 4 to 15 days. Thrombocytopenia was observed in 43% patients. Jaundice in (10%), transaminitis in (25%). Anaemia was seen in 53% patients.
Conclusions: Malaria was found to be the most common cause of admission in our hospital. It is important to suspect malaria in all persons deployed in DRC and presenting with fever and associated headache, jaundice, transaminitis and thrombocytopenia. Early diagnosis and treatment can be lifesaving to prevent complications and mortality.

Keywords: Anemia, Headache, Thrombocytopenia, Severe malaria

INTRODUCTION

Malaria is a major public health problem worldwide. Africa bears the largest burden (88%). Sub-Saharan Africa remains the region with the highest disease burden and accounts for 88 and 90% of the global clinical cases and deaths, respectively.[1] It's a leading cause of death in Africa. The Republic of Congo (DRC) is one of the 54 countries where malaria transmission is still high.[2] Malaria is a life-threatening disease caused by protozoan parasites of the genus plasmodium that are transmitted to humans through the bites of infected female Anopheles mosquitoes. Five different plasmodium species have been demonstrated to infect humans: *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium ovale*, *Plasmodium malariae* and *Plasmodium knowlesi*. Of these, *P. falciparum* is the most dangerous, with the highest rates of complications and mortality.[2] In 2000, the World

Health Organization (WHO) estimated 262 million cases of malaria globally, leading to 839,000 deaths against 214 million cases and 438,000 deaths in 2015.[3] All over the country, *P. falciparum* is the predominant malaria parasite. The latest estimations from the National Malaria Control Programme (NMCP) indicate that clinical malaria account for 47.9% of all outpatient consultations in public hospitals, 64.8% of hospital admissions and 18.4% of deaths.[4] Symptoms of malaria vary from fever, malaise, nausea, vomiting, confusion, dizziness, disorientation, headache, chills and cough. Common signs are hepatomegaly and splenomegaly. Pallor and icterus may be present in severe cases. Common laboratory derangements include anemia, transaminitis and thrombocytopenia in falcifarum malaria. All patients with fever in this region need to be tested for malaria. This study was designed to assess the clinical and laboratory parameters in hospitalised patients in this part of Africa. No study of similar kind was found in this region.

METHODS

This is a retrospective hospital based study. Study was conducted in a United Nation hospital located in central African country DRC. This hospital is catering for approximately 25000 troops and dependents of United Nation. The study population was multinational and predominantly comprised of troops from various Asian and European and African countries.

All Malaria positive patients (peripheral smear positive or rapid test positive) admitted in this hospital were included in the study. A total of 150 cases of malaria were treated during 1 August 2016 till 31st August 2017.

Inclusion criteria was a positive ICT or slide positive for malarial parasite. Clinical and laboratory findings of all confirmed cases of Plasmodium admitted to this hospital were included. All documents were studied in detail for history, clinical examination, biochemical and radiological parameters. Clinical parameters like age, duration of illness, fever pattern, headache, vomiting, fatigue, altered sensorium, urinary output, convulsion, hepatomegaly and splenomegaly were noted. Laboratory investigations performed like, haemoglobin, TLC, platelet count, bilirubin, blood urea, serum creatinine, and blood glucose level were studied. All patients were treated by IV/oral artesunate combination therapy using standard regimen.

RESULTS

A total of 150 patients who were admitted for malaria either on peripheral smear examination or antigen based rapid diagnostic test or both were included in the study. The study group had 138 males and 12 were females (Table 1). Out of 150 cases 145 had falciparum 5 had vivax (including 3 patients of mixed infection). The average age distributions of most patients were between 20-40 years (Table 2).

Table 1: Sex distribution of the malaria patients.

Male	Female
138	12

Table 2: Age distribution of the patients predominant young population as troops were the main clientele.

Age (yrs)	*P. falciparum*	*P. vivax*	Mixed malaria	Total
20-30	52	02	-	54
30-40	45	-	03	48
40-50	42	-	-	42
> 50	06	-	-	06
Total	145	02	03	150

Fever was presenting symptoms in 100% of cases second common presentation was headache approximately in 70% cases myalgias in 38% patients. Other symptoms like GI symptoms were vomiting (31%), pain abdomen (10%). Signs present were pallor in 42%, hepatomegaly 25% splenomegaly in 19%, 15% had hepatosplenomegaly. CNS symptoms were seizures 4% and altered sensorium in 5% cases. Detailed figure of signs and symptoms are as per Table 3.

Table 3: Clinical features seen in the study.

Symptoms and signs	No of patients (%)
Fever	100
Headache	70
Body ache	38
Vomiting	31
Pain Abdomen	20
Altered sensorium	05
Oliguria	08
Jaundice	10
Hepatomegaly	25
Splenomegaly	19
Seizure	4
Pallor	42
Hepatosplenomegaly	15

On investigations 61% patients had anemia. thrombocytopenia was observed in 44%, jaundice in 10%, transaminitis in 25%. 09 patients were having severe malaria as per WHO guidelines. Investigation reports are as per Table 4.

Out of all severe malaria cases 04 had cerebral malaria, decreased urine output was seen in 8% and 4% developed AKI. 3 had malarial hepatitis. Only 03 cases required blood transfusion due to severe anaemia. Mean duration of symptoms was 5 to 15 days.

Table 4: Hematologic abnormalities observed were anemia and thrombocytopnia, tranaminitis jaundice and AKI.

Parameters	No. of cases	%
Haemoglobin (gm%)		
<8	05	10
8-13	87	58
>13	58	32
Platelets		
<70000	22	14.66
70000-150000	44	29.33
>150000	84	56
WBC (mm3)		
<4000	16	10.66
>11000	20	
S Bil (mg/dl)		
1-3	6	4
>3	9	6
AST (U/L)		
20-40	112	74.66
>40	38	25.33
ALT (U/L)		
20-40	112	74.66
>40	38	25.33
Urea (mg/dl)		
<30	120	80
>30	30	20
Creatinine (mg/dl)		
1-3	40	26.66
>3	06	4

DISCUSSION

Our study has shown a majority of male patients (138). It is comparable to studies of Wasnik PN et al and Vishwanath K et al.[5,6] In our study, it is also due to the clientele consists mainly of male troops deployed in the mission.

The age distributions of most patients were between 20-40 years, with max patients in the age group of 20 to 30 yrs. This is similar to other studies by Muddaiah et al.[17] This may be due to more outdoor activity by young people and young age profile of UN troops.

Our study has predominantly falcifarum infection. This is because *P. falciparum* is by far the predominant malaria parasite occurring in this country accounting for almost 100% of malaria cases.[7] This observation on the extreme predominance of *P. falciparum* in the DRC is in accordance with findings from studies conducted in other Central African countries.[8,9]

Fever and headache were the most common symptom in the study. The presenting complaints are similar to other studies by Vishwanath K et al.[6] Other symptoms included pain abdomen, vomiting, myalgia, altered sensorium, oliguria, seizure and jaundice, which were seen in other studies too.[5, 6,10]

On clinical examination pallor was seen in 42% and icterus in 10% cases. Hepatomegaly in 6%, Splenomegaly 19.3%, hepatosplenomegaly 12%, altered sensorium 5.3%, seizure 4%, and oliguria in 08 % cases. In a study from south Asia splenomegaly has been found in as high as 68.8% cases of *P. falciparum*.[11]

The laboratory parameters predominantly revealed anaemia. Haemoglobin less than 13 gm% was reported in 68% cases, only 10 % cases were found to have Hb less than 8 gm%. Only 03 patients required blood transfusion. One study from India has reported 86.7% anemia in malaria cases.[12] Anemia is due to accelerated RBC removal by spleen, RBC destruction by parasite and ineffective erythropoiesis. Splenic clearance of all RBCs is also increased. In nonimmune Individuals and in areas with unstable transmission, anemia can develop rapidly and transfusion is often required. Our results are similar to study done by, Wasnik PN et al and Jelia S et al.[5,13]

Second common laboratory finding was thrombocytopenia (44%). Similar findings were observed by Jadhav et al.[14] Mechanism of thrombocytopenia is not known, however various theories are immune mediated lysis, sequestration in spleen, and diminished production in marrow. Thrombocytopenia has been documented in 79.82% cases of falciparum patients.[15]

Transaminitis was seen in 25%, and raised bilirubin in 10% cases. LFT derangements in falciparum malaria are due to intravascular hemolysis of parasitised RBCs. Hepatic dysfunction also contributes. LFT derangements were seen in other studies by Saya RP et al.[16]

As per WHO standard guidelines of severe malaria 09 cases had severe disease. 5 had cerebral malaria, 2 patients had seizures, and 04 developed AKI requiring dialysis. CSF analysis was normal. Our study was similar to study done by Muddaiah M et al, Jelia S et al.[13,17]

Renal impairment is common among adults with severe falciparum malaria. Our study was nearly similar to study done by Wasnik PN et al, Kocher DK et al, Jelia S et al.[5,18,13]

CONCLUSION

Malaria continues to be a public health problem globally. Malaria was found to be the most common cause of admission in our hospital. It is important to suspect malaria in all persons deployed in DRC and presenting with fever and associated headache. Classical symptoms of intermittent fever with chills and splenomegaly are not always present. Patients with jaundice, transaminitis and thrombocytopenia need to be suspected to have malaria. All complicated cases were due to delayed diagnosis hence high level of suspicion, early diagnosis and

treatment can be life saving preventing complications and mortality.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Kohli K, Das AK. Clinicopathological profile of malaria patients in an East African United Nations hospital. Int J Res Med Sci 2018;6:4106-9.