Thrombocytopenia and other complications of Plasmodium vivax malaria

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Abstract

Most of the complications of malaria including thrombocytopenia and cerebral malaria are seen commonly with plasmodium falciparum malaria. But the trend is changing and the incidence of severe and complicated vivax malaria is increasing. We are presenting 7 cases of plasmodium vivax malaria admitted in Sri Guru Ram Das Institute of Medical Sciences And Research, Amritsar in the age group of 1- 15 years over a time period of 3 months from August 2010 to October 2010.

Key Words: Malaria, Plasmodium vivax, thrombocytopenia, cerebral malaria
Accepted

Introduction

Malaria is a mosquito borne disease caused by a eukaryotic protest of the genus plasmodium. Plasmodium vivax is the most frequent and widely distributed cause of recurring (tertian) malaria worldwide. Each year there are more than 250 million cases of malaria, killing between 1 and 3 million people [1]. Most deaths occur because of P. falciparum infection, [2] which causes life-threatening cerebral, respiratory, renal, hepatic, hemodynamic, and hematologic dysfunction in 1% of cases [3]. In contrast, most P. vivax infections are relatively milder and run a benign course [4]. Case reports Over a time period of 3 months from August to October 2010, 7 cases were diagnosed with plasmodium vivax malaria. Out of these 2 were female and 5 were male.Four patients belonged to Amritsar district and 3 were from Gurdaspur district of Punjab. Two patients had cerebral malaria with symptoms in the form of abnormal movements. Out of these one patient had presented with altered sensorium and showed concomitant positivity for both plasmodium falciparum and vivax malaria. One patient had complaint of urticarial rash. None of the patients had complaint of cough, vomiting or diarrhea.

On examination 5 patients had pallor. One patient had severe anemia requiring blood transfusion. Five patients had significant hepatosplenomegaly. Routine investiga-tions were done in all cases which showed thrombocytopenia in 4 patients (platelet count < 1 lakh/cumm). Two patients had platelet counts <50000/cumm, out of these 1 patient had mucosal bleeding and required platelet transfusion. One patient had leucopenia but no thrombocytopenia. Other complications of malaria like hypoglycemia, renal failure, pulmonary oedema, splenic rupture and algid malaria were not seen in any of the cases. All the children were screened for various causes of fever including malaria, dengue, enteric fever, sepsis and UTI by using various laboratory investigations like rapid diagnostic tests and peripheral blood smear for malaria, dengue IgM antibody and NS1 antigen test for dengue fever, widal for enteric fever, blood culture and urine culture. G6PD deficiency was ruled out in all the patients.

All the patients were treated successfully with oral antimalarials chloroquine and primaquin. The 2 patients presenting with cerebral symptoms were treated with intravenous artesunate. Mean time for disappearance of parasite from peripheral smear was 3.14 ± 0.69 days. All the patients recovered completely and were discharged home.

The average duration of stay in the hospital for all patients was 5.3 ± 2.88 days. On discharge platelet count and total leucocyte count returned to normal in all patients. Details about all the patients is given in Table 1.

Discussion

Severe and complicated malaria is usually caused by P. falciparum but it has been increasingly observed that P. vivax malaria, which was otherwise considered to be a benign malaria, with a low case-fatality ratio, can also occasionally result in severe disease as with P. falciparum malaria.

CNS complications including cerebral malaria is one of the severe complications of malaria reported mainly with falciparum malaria. In plasmodium falciparum cerebral malaria is mainly due to sequestration of infected erythrocytes in cerebral vessels. Very few cases have been reported with vivax malaria. A study conducted in India has reported 2 cases of cerebral complications with vivax malaria. In two studies conducted in 2008 in Austalia it was found that cerebral symptoms can present with both plasmodium falciparum or vivax malaria [5, 6]. In our study 2 patients had developed severe malaria with cerebral symptoms. In our study only one patient had combined infection with falciparum and vivax malaria who suffered from more severe disease than those with vivax malaria alone and required intravenous artesunate. This corresponds to some of the previous studies but contradicts the others. Maitland and colleagues have suggested that the earlier age peak for P. vivax disease may protect against the later-acquired P. falciparum through species-transcending immunity [7]. Studies have shown that symptoms of P. vivax or P. falciparum infection are, indeed, significantly reduced by recent previous P. vivax infection (but not P. falciparum infection) [8]. In contrast, the two new studies in PLoS Medicine report that mixed species infections had worse outcomes than infections of either species alone [2, 3]

Severe thrombocytopenia is common in isolated falciparum and mixed falciparum/vivax malaria, but is very rare in isolated P.vivax infection. In Horstmann's series [9], the lowest count in 39 cases of vivax malaria was 44×109/L. Pukrittayakamee et al. [10] described a case of a volunteer experimentally infected with the Chesson's strain of P. Vivax with a platelet count of 20×109/L. Recently a case of vivax malaria associated with an initial platelet count of 5×109/L was reported from India [11] . In our study 2 patients presented with platelet counts < 50000, 1 presented with gum bleeding and required platelets transfusion. Both non-immunological destruction [12] as well as immune mechanisms involving specific platelet-associated IgG antibodies that bind directly to the malarial antigen in the platelets have been recently reported to play a role in the lysis of platelets and the development of thrombocytopenia [13]. In clinical trials, recombinant – macrophage colony stimulating factor (M-CSF) has been known to cause a reversible dose dependent thrombocytopenia. Elevated M-CSF levels in malaria, by increasing macrophage activity may mediate platelet destruction in such cases [14]. Oxidative stress damage of thrombocytes has also been implicated in the etiopathogenesis based on the finding of low levels of platelet superoxide-dismutase and glutathione-peroxidase activity and high platelet lipid peroxidation levels in malaria patients, when compared to those of healthy subjects [15] .

The trend of disease with plasmodium vivax malaria is changing. It is increasingly recognized that serious and life threatening complications can occur with vivax malaria. There is an urgent need to re-examine the clinical spectrum and burden of P. vivax malaria so that adequate control measures can be implemented against this emerging but neglected disease.

Table 1. Description of 7 patients on presentation

Case no.	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7
Age	1.5 yr	1 yr	1 yr	13 yr	12 yr	6 yr	2 yr
Sex	M	F	F	M	M	M	M
Fever	7 days	5 days	3 days	10 days	5 days	4 days	14 days
Cerebral symptoms	Absent	Present	Present	absent	absent	absent	absent
Hepatomegaly	Present	Present	Present	Absent	Present	Absent	Present
Splenomegal	Present	Present	present	absent	Present	absent	Present

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Haemoglobin	8.8	6.8	2.9	12.6	10.4	6.8	7.9
TLC (cells/cumm)	10,700	6100	20,000	3200	5100	6000	7200
Platelet count (cells/cumm)	40000	48000	1 lac	1.1 lac	73000	1.8 lac	1.5 lac
Peripheral smear	p. vivax	P. vivax	p. vivax	p. vivax	p. vivax	p. vivax	p. vivax
Rapid diagnostic test	P. vivax	P. vivax	P. vivax	P. vivax	P. vivax	P. vivax	p. vivax
Associated infection	No	P. falciparum	No	no	No	no	No
G6PD deficiency	-ve	-ve	-ve	-ve	-ve	-ve	-ve
Inotropic support	No	No	Yes	no	No	no	No
Blood/blood product transfusion	No	Yes	Yes	no	No	no	No
Drug given	Oral chloroquine	Intravenous artesunate	Intravenous artesunate	Oral chloroquine	Oral chloroquine	Oral chloroquine	Oral chloroquine
Disappearance of parasite	3 days	4 days	4 days	3 days	3 days	3 days	2 days
Discharge	10 days	9 days	5 days	4 days	4 days	3 days	3 days

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