THROMBOCYTOPENIA IN PLASMODIUM FALCIPARUM MALARIA

Shuaib Ansari, Haji Khan Khoharo*, Allauddin Abro, Israr Ahmd Akhund†, Fatima Qureshi***

Department of Medicine, Liaquat University Hospital Hyderabad/Jamshoro,* Muhammad Medical College Mirpurkhas, **Department of Biochemistry, Ghulam Muhammad Medical College, Sukkur, †Department of Physiology, Muhammad Medical College, Mirpurkhas

Background: Malaria is usually associated with reduced blood cell counts & mild to moderate thrombocytopenia is a common association of malaria. The cause of thrombocytopenia is poorly understood, but the immune-mediated lysis, sequestration in the spleen and dyspoietic processes in the marrow with diminished platelet production have all been postulated. This study was conducted to evaluate thrombocytopenia in the patients suffering from acute Plasmodium falciparum malaria. **Methods:** This descriptive case series study was conducted at a tertiary care hospital, Liaquat University of Medical & Health Sciences Jamshoro, over a one-year period. A total of 370 Plasmodium falciparum positive on peripheral blood film were studied. Full blood counts were determined by using automated Coulter analyzer. Thick & thin smears were stained with Giemsa stains and studied by haematologist. Data was analyzed using the SPSS version 10.0. **Results:** Out of 370 patients, 260 were male & 110 were female, with M:F ratio of 2.36:1. Mean age was 34±1.7 years (range 16-53 years). Haemoglobin values were 12.7±1.4g% and white blood cells counts were found 12600±450/µL. Out of 370, 114 (30.81%) had normal platelet counts, and 256 (69.18%) had thrombocytopenia (p<0.05). The mild, moderate and severe thrombocytopenia were found in 39 (10.5%), 180 (48.6%) and 37 (10%) respectively (p<0.05). **Conclusions:** We found high frequency of mild to moderate thrombocytopenia in the Plasmodium falciparum malaria. Finding of thrombocytopenia is of diagnostic help as it raises the suspicion of malaria.

Keywords: Thrombocytopenia, Malaria, Plasmodium falciparum

INTRODUCTION

The estimated annual global incidence of malaria is 300–500 million cases and about 20 million deaths occur worldwide each year.[1] In Pakistan, half a million-malaria cases occur annually and an estimated fifty thousand deaths occur each year mostly in infants, children and pregnant women. Hence, malaria is a major public health problem of this country, which threatens millions of people.[2] Annual parasite incidence and plasmodium falciparum ratio in Sindh are increasing as reported in year 2004.[3] In the last decade there has been a six fold increase in P. falciparum malaria, which now comprises 42% of all malaria cases recorded by the National Malaria Control Programme.[4] Malaria is usually associated with various degrees of reduced blood counts, and mild to moderate thrombocytopenia is a common association of malaria but its is rarely associated with haemorrhagic manifestations or a component of disseminated intravascular coagulation.[5] The cause of thrombocytopenia is poorly understood, but the immune-mediated lysis, sequestration in the spleen and a dyspoietic process in the marrow with diminished platelet production have all been postulated. Abnormalities in platelet structure and function have been described as a consequence of malaria, and in rare instances, platelets can be invaded by malarial parasites themselves.[6] Tumour Necrosis Factor and IL-10 have been implicated in the development of Plasmodium falciparum malaria induced anaemia, but the role of these cytokines has not been studied in the development of thrombocytopenia in patients with acute malaria.[7]

This study was conducted to evaluate thrombocytopenia in the patients suffering from acute falciparum malaria.

MATERIALS AND METHODS

This descriptive case series study was conducted at a tertiary care hospital, Liaquat University of Medical & Health Sciences Jamshoro, over a 1 year period. A total of 370 P. falciparum patients, positive on peripheral blood film, were included & studied. Full blood counts were determined by using automated Coulter analyzer. Thick and thin smears were stained with Giemsa stains and were studied by haematologist. Those with reduced platelet count were re-evaluated by manual method. Patients with thrombocytopenia were divided in three categories.

1. Mild thrombocytopenia: <150,000 but more than >50,000/l.
2. Moderate thrombocytopenia: <50,000 but more than ≥20,000/l.
3. Severe thrombocytopenia: <20,000/l.

Patients with history of bleeding disorder, cerebral malaria, acute renal failure and drug intake such as Quinine, sulfadoxine-pyrimethamin, thiazides, co-trimoxazole, and other haemolytic agents were excluded from the study. Data was analyzed using the SPSS version 10.0. The comparisons of difference in the means were calculated by Student's t-test and the difference in proportions by chi-square test. A p-value of <0.05 was taken as significant.

RESULTS

A total of 370 patients with Plasmodium falciparum malaria were studied during one year period from April 2007 to May 2008. Out of 370 patients, 260 were male & 110 were female, with M:F ratio of 2.36:1. Mean age was 34±1.7 years (range 16–53 years). Haemoglobin values were 12.7±1.4g% and white blood cells counts were found 12600±450/µL. Out of 370, 114 (30.81%) had normal platelet counts and 256 (69.18%) had thrombocytopenia (p<0.05). The mild, moderate and severe thrombocytopenia were found in 39 (10.5%), 180 (48.6%) and 37 (10%) respectively (p<0.05) (Table-1). The mean platelet count was 170,000±56,500/µL (range 18000-380.0000/µL). Fever was the most common symptom; all patients were febrile at the time of admission. Other clinical features like anaemia, jaundice, vomiting, and diarrhoea were noted in 290 (78.37%), 18 (4.86 %), 300 (81.08%) and 10 (2.70%) respectively. The spontaneous bleeding and mortality was not seen in our study.

Table-1: Distribution of variables in patients with and without thrombocytopenia in plasmodium falciparum study group (n=370)

Variable	thrombo-cytopenia (n=256)	No thrombo-cytopenia (n=114)	*p*
Age (years)	32±11	36±7	-
Male	180	80	0.32
female	85	25	
Mild	39	-	0.001
Moderate	180	-	0.03
severe	37	-	0.001
Haemoglobin <10 g/dl	76	104	0.02
Haemoglobin >10g/dl	180	10	0.03
*WBC count (<11000/µl)	76	104	0.05
*WBC count (>11000/µl)	180	10	0.03

*whit blood cell count

DISCUSSION

Thrombocytopenia often accompanies malaria and is usually mild to moderate and very rarely symptomatic. Haematological abnormalities are common. Thrombocytopenia occurs in 60-80%[8] and anaemia in 25%.[9] Finding of thrombocytopenia with anaemia is an important clue to the diagnosis of malaria in patients with acute febrile illness.[10] In this study 69.18% of patients suffering from malaria showed some degree of thrombocytopenia. These figures are comparable to studies done by other investigators as 71% by Robinson[11] and 58.97% by Rodringuez *et al.*[12] Thrombocytopenia is considered to be an important predictor of severity in childhood falciparum malaria.[13] Bashwari *et al*[14] from Saudi Arabia has reported anaemia in 60% and thrombocytopenia in 53% of cases. Thrombocytopenia is seen in patients with acute febrile illness due to viral causes as well but its presence is considered an important diagnostic clue for malaria in endemic areas as suggested by previous investigator[10] and particularly so when associated with anemia.[15] In Liberia Mahmood et al[16] studied a total of 145 patients who had Plasmodium falciparum malaria. Out of these 109 (75.18%) had thrombocytopenia. The sensitivity of the platelet count was considered as a predictor of malaria, was 80.11% while specificity was 81.36%. The positive predictive value was 63.87% and the negative predictive value was 90.86% He concluded an extended search for malarial parasite in patients having thrombocytopenia on smear.[16] Mild to severe thrombocytopenia should alert the possibility of malarial infection, as Plasmodium falciparum was found to be common species in these patients.[17] It is a general consensus that thrombocytopenia is very common in malaria[18] and this is usually believed to be more common in Plasmodium falciparum malaria, as has been observed in this study.

CONCLUSION

In conclusion, we found high frequency of mild to moderate thrombocytopenia in the Plasmodium falciparum malaria. Finding of thrombocytopenia is of diagnostic help as it raises the suspicion of malaria. Patients with acute febrile illness having combination of thrombocytopenia and anaemia should alert the treating physician about the possibility of malaria infection which can be confirmed with specific tests.

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Address for Correspondence:

Dr. Haji Khan Khoharo, Bungalow No. C-17/II, Phase I Anwer Villas, Behind Government Technical College, New Wahdat Colony, Qasimabad, Hyderabad, Pakistan. **Tel:** +92-321-3010577.
Email: drhajikhan786@gmail.com|