

Thrombocytopenia in adults with acute malaria

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Objective

To compare the incidence and severity of thrombocytopenia in various types of malaria

Methods

This study was conducted from June 2004 to May 2007 at the Infectious Diseases Unit, Rashid Hospital Dubai. The diagnosis of malaria was confirmed by thick and thin film staining and platelet count was performed by automated Beckman Coulter machine. Thrombocytopenia was defined as mild (Plat $50-150 \times 10^3$ cells/ul), moderate (Plat $20-50 \times 10^3$ cells/ul) and severe (Platelets $<20 \times 10^3$ cell/ul).

Results

A total of 110 malaria patients were included and 56 (50.9%) had *P. falciparum* malaria, whereas, 52 (47.27%) and 2 (1.8%) patients suffered from *P. vivax* and *P. malariae* respectively. The mean age was 31.9 ± 9.59 years. The males out numbered the females, 102 (92.72%) vs 8

(7.27%). Overall, 87.27% of the patients were found to have low platelet count. There was no significant difference in the incidence of thrombocytopenia between *P. falciparum* (91%) and *P. vivax* (84.62%) cases ($p > 0.05$). However, severe thrombocytopenia was observed in *P. falciparum* (10.71%) than *P. vivax* (3.84%) patients.

Conclusion

In contrast to the previous studies, we did not observe significant difference in the incidence of thrombocytopenia between *P. falciparum* and *P. vivax* malaria. Furthermore, the incidence of thrombocytopenia was quite high, which, as to the best of our knowledge has not reported before, particularly in *P. vivax* patients. (Rawal Med J 2009;34:170-172).

Key words

Thrombocytopenia, *P. falciparum*, *P. vivax*, malaria.

INTRODUCTION

An estimated three to five hundred million new cases of malaria occur each year¹ and disease is endemic in about 91 countries putting over 40% of world population at risk.² The well recognized hematological abnormalities associated with malaria include anemia, thrombocytopenia, and atypical lymphocytosis.³ Leucopenia, leukocytosis, neutropenia, monocytosis and eosinophilia have also been reported.⁴ In particular, thrombocytopenia is considered to be a classical finding and could be encountered even in mild/uncomplicated disease and low platelet may present an important marker for diagnosis of malaria in febrile patients living or visiting an endemic area.⁵ The aim of this study was to evaluate the incidence and severity of thrombocytopenia in different types of acute malaria in adult patients admitted in Rashid hospital.

PATIENTS AND METHODS

This was a hospital based study conducted from Jun 2004 to May 2007 at the Infectious Diseases Unit of

Rashid Hospital Dubai, UAE. The study was designed to include the demographics (age, sex, nationality and history of travel) and clinical information of the patient as well as platelet changes in relation to the type of malaria. Patients with clinical history and/or findings suggestive of chronic liver disease, bleeding disorder, thrombocytopenia, drug intake or conditions which can cause thrombocytopenia were excluded from the study.

The diagnosis of malaria was confirmed by thin and thick blood films stained with Leishman's stain. Platelet count was performed using an automated Beckman Coulter machine. All malaria positive smears were reviewed by a hematologist for identification of species and review of smear for platelets count. Other laboratory investigations were performed when and where it was necessary. Thrombocytopenia was defined as mild (Plat $50-150 \times 10^3$ cells/ul), moderate (Plat $20-50 \times 10^3$ cells/ul) and severe (Platelets $<20 \times 10^3$ cell/ul).⁶ Data was analyzed by SAS Enterprise Guide 4.1.

RESULTS

Out of 110 patients, *P. Falciparum* malaria was slightly commoner than *P. vivax*-56 (50.9%) vs 52 (47.27%) respectively, while *P. malariae* was positive in 2 (1.8%) patients. The mean age of patients was 31.9 ± 9.59 years (range 14-76 years). The males outnumbered the females, 102 (92.72%) vs 8 (7.27%). Except for one UAE national, all patients were expatriates who lived in or visited the UAE. Out of 110 patients; 65 (59%) were Indian, 24 (21.81%) Pakistani, 14 (12.72%) Africans and 8 (7.27%) were the other nationals. History of recent travel to a malaria endemic area was positive in the 87 (79%) patients.

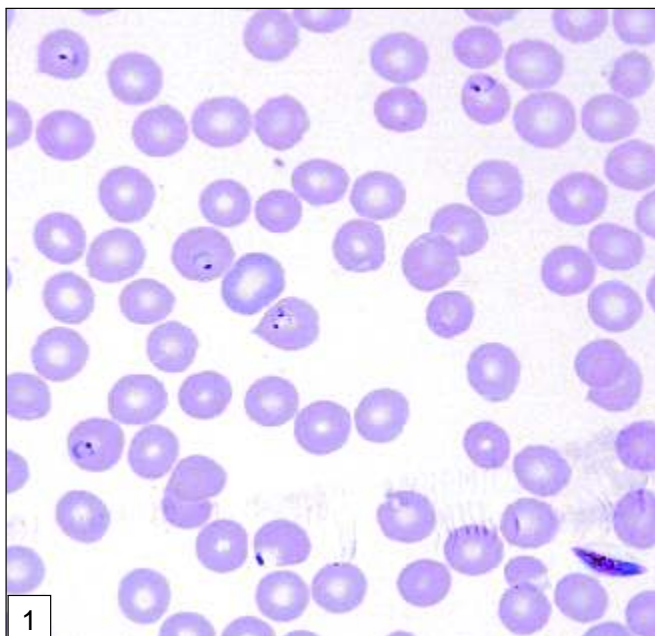


Fig.1: Ring forms and a gametocyte diagnostic of *P. Falciparum* with thrombocytopenia

Overall, 96 (87.27%) patients were found to have low platelet count. The mean platelet count was $77.13 \pm 54.71 \times 10^3$ cells/ul (range $9-346 \times 10^3$ /ul) (Fig.1). Among 56 *P. falciparum* malaria patients, 51 (91%) had thrombocytopenia and the mean platelets count was $78.96 \pm 59.04 \times 10^3$ cells/ul (range $10-364 \times 10^3$ /ul), whereas, out of 52 *P. vivax* patients, low platelet count was observed in 44 (84.61%) patients and mean platelet count was $75.30 \pm 50.39 \times 10^3$ cells/ul (range $9-280 \times 10^3$ /ul) ($p > 0.05$). When severity of thrombocytopenia was

compared between the two groups, in *P. falciparum* cases; 29 (51.78%) had mild, 16 (28.57%) moderate and 6 (10.71%) had severe thrombocytopenia, whereas, in patient with *P. vivax*, 26 (50%) had mild, 16 (30.76%) moderate and 2 (3.84%) had severe thrombocytopenia (Fig 2).

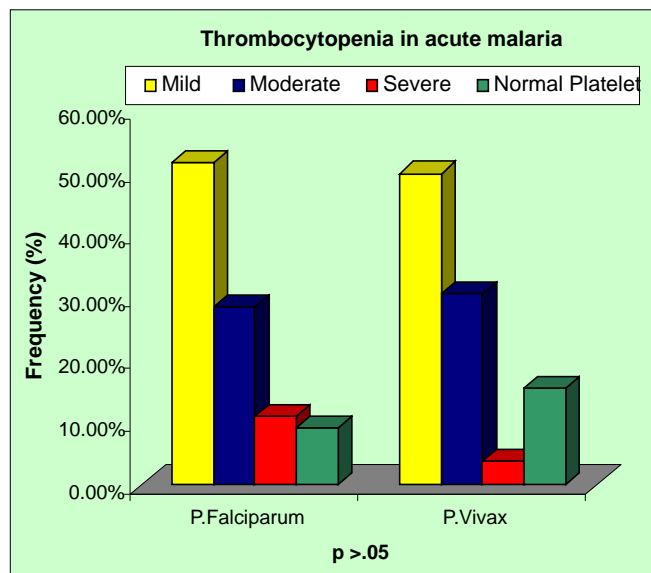


Fig 2. Platelet changes in *P. Falciparum* and *P. Vivax* malaria.

The patients who suffered from *P. malariae* had normal platelet count. Bleeding tendency was not observed in any of the patients and none required platelet transfusion, even with platelet count as low as 9000 cells/ul. In most of the patients, platelet count rose to reference range within 3-5 days of the treatment. Two patients succumbed to death due to complicated *P. falciparum* malaria (cerebral malaria).

DISCUSSION

Imported malaria is a common cause of acute febrile illness in the UAE, despite its classification as a malaria free country by WHO.⁷ Thrombocytopenia complicates up to 60-80% cases of malaria,⁸ and its occurrence is an important diagnostic clue for malaria in a febrile traveler returning from a malaria endemic area.⁹ Although variable degree of reduction in circulating platelet count are consistently reported in the different types of malaria,^{10,11} severe thrombocytopenia is quite rare

in *P. vivax* malaria.^{12,13} Platelet counts of 20,000/ul or less have been reported in 1.5% and 8.5% in *P. vivax* and *P. falciparum* malaria respectively in large study involving 1500 cases of malaria in India.¹⁴

In our study, 87.27% of patients with malaria developed thrombocytopenia, a percentage far higher than that reported by other investigators.¹⁵⁻¹⁷

Moreover, there was no significant difference in the incidence of thrombocytopenia in *P. falciparum* (91%) and *P. vivax* (84.61%). We also observed higher incidence of severe thrombocytopenia (*P.falciparum*-10.71% and *P. vivax*-3.84%) in our patients in comparison to other investigators.¹⁴ In our series, none of our patient had any bleeding tendency even with platelet count of 9000cells/ul, as reported by others.¹⁸

The mechanism of thrombocytopenia in malaria is still not well understood but decreased thrombopoiesis,³ peripheral destruction induced by *P. falciparum* immune complexes generated by malarial antigens leading to sequestration of the injured platelets by macrophages in the spleen,¹⁹ and disseminated intravascular coagulation²⁰ have been postulated. In acute malaria infection, platelets are found to be hypersensitive and there is increased concentrations of platelet-specific proteins such as beta thromboglobulin (β TG), platelet factor 4 (Pf4). Production of thromboxane A2 and prostacyclin also increased.²⁰ The hypersensitive (hyperactive) platelets may enhance hemostatic responses and may be this is why bleeding episodes are rare in acute malarial infections, despite the significant thrombocytopenia.¹⁷

CONCLUSION

The incidence of thrombocytopenia caused by acute malaria in hospitalized adult patients was found to be higher than reported earlier, especially in *P. Vivax* and no significant difference was observed between *P. Falciparum* and *P. Vivax* patients.

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Received: April 30, 2009 Accepted: August 1, 2009

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