ORIGINAL RESEARCH

Evaluation of incidence of thrombocytopenia in malarial patients at a tertiary hospital

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ABSTRACT
Background: To study incidence of thrombocytopenia in malarial patients at a hospital. **Materials & methods:** A total of 100 malaria cases positive on peripheral smear were studied. Malarial parasites were detected by thin & thick smear examination. Laboratory investigations were done. The results were analysed using SPSS software. **Results:** A study included 100 malaria positive cases. P.vivax is comparatively more common than P.Falciparum and it is more common in males. **Conclusion:** Thrombocytopenia occurs in both malaria but it is more severe in P. falciparum as compared to P.vivax.
Keywords: Malaria, Thrombocytopenia, P.vivax.

INTRODUCTION

Malaria continues to be a cause of high mortality and morbidity throughout the developing world. [1] Countries in which malaria had been previously eradicated or adequately controlled have recently seen a resurgence of malaria. It is not surprising that there also is an increase in the incidence of imported malaria in the United States. [1]

Malaria is an endemic problem in 91 countries, and India is a major contributor for malaria cases in Southeast Asia, with 89% of total cases as per records of 2015. [2] In India, about 27% population lives in malaria high-transmission zone (more than 1 case per 1000 population) and 58% in low-transmission zone. [3]

Malaria is commonly associated with various degrees of hematological complications like anemia and thrombocytopenia. The anemia is usually due to varied reasons ranging from hemolysis to comorbidities like parasitic infections, folate, iron, and vitamin B12 deficiencies in endemic areas, antimalarials, and further complicated by the coexistence of thalassemia and other haemoglobinopathies. [4] Although anemia associated with malaria has received widespread attention from the scientific community due to its associated mortality, thrombocytopenia remains neglected to a greater extent. The presence of thrombocytopenia can act as a guide to clinical diagnosis for primary care physicians where other tests may not be available. A typical attack of malaria comprises three distinct stages: Cold stage, hot stage and sweating stage. The clinical features of malaria vary from mild to severe, and complicated, according to the species of parasite present, the patient's state of immunity, the intensity of infection and also the presence of concomitant conditions such as malnutrition and other diseases. Malaria parasite affects multiple organs of the body such as liver, spleen, brain, gastro intestinal tract, gall bladder, pancreas, blood vessels and placenta. Hence the clinical picture could be of wide spectrum ranging from simple malaise to life threatening central nervous symptoms like coma. Hematological abnormalities have been observed in patients with malaria, with anemia, and thrombocytopenia being the most common. [5,6]

A number of observational studies have confirmed the association of thrombocytopenia to malaria. Both non-immunological as well as immunological destruction of platelets have been implicated in causing thrombocytopenia. The speculated mechanisms are

coagulation disturbances, sequestration in spleen, antibody mediated platelet destruction, oxidative stress, and the role of platelets as cofactors in triggering severe malaria. Abnormalities in platelet structure and function have been described as a consequence of malaria, and in rare instances platelets can be invaded by malaria parasites. [7,8] Hence, this study was conducted to study the incidence of thrombocytopenia in malarial patients at a hospital.

MATERIALS & METHODS

This study was conducted at geetanjali medical college and hospital, Udaipur over three months period. A total of 100 malaria cases positive on peripheral smear were studied. Malarial parasites were detected by thin & thick smear examination. The smears were stained as thin smear stained by Leishman stain & thick were stained by Field stain. Laboratory investigations were done. Data were analyzed and patients with thrombocytopenia have been divided into following grades:

Grade 0–Within normal limit (1,50,000 or above)
Grade 1-Between 75,000 to 1,50,000
Grade 2-Between 50,000 to 75,000
Grade 3-Between 25,000 to 50,000
Grade 4-Less than 25,000

From this grading, patients were categorized according to parasite infection. The results were analysed using SPSS software.

RESULTS

A study included 100 malaria positive cases. The most common are grade 1 &grade 2 thrombocytopenia in P. Vivax and grade 3 & 4 thrombocytopenia in P. Falciparum.P.vivax is comparatively more common than P.Falciparum and it is more common in males.

Table 1: Distribution of malarial infection according to species and gender

Malarial infection	No. of cases (%)	Females	Males
P. Vivax	70	30 (42.8)	40 (57.2)
P. Falciparum	30	10 (33.3)	20 (66.7)
Total	100	40 (40)	60 (60)

Table 2: Distribution of malarial infection according to species and severity of thrombocytopenia

Severity of thrombocytopenia in P. Vivax	P.vivax no. of cases (%)	P.Falciparum No. of cases (%)
Grade 1	15 (30)	4 (16)
Grade 2	20 (40)	2 (8)
Grade 3	10(20)	13 (52)
Grade 4	5 (10)	6 (24)
Total	50(100)	25(100)

DISCUSSION

Malarial fever remains a major health problem in tropical regions, including India. Sporozoites from the salivary gland of infected mosquitoes are transferred into the human host, where they invade the liver parenchyma and mature into schizonts which release merozoites. These merozoites infect the red blood cells and can further mature into gametocyte or erythrocytic schizonts. Thrombocytopenia is a common associated finding in acute malaria, and it can occur in both P. falciparum and P. vivax infections. Thrombocytopenia is also seen in patients with acute febrile illness due to viral causes, but its presence is considered as a diagnostic clue for malaria in endemic areas. [9] Hence, this study was conducted to study the incidence of thrombocytopenia in malarial patients at a hospital.

In the present study, 100 malaria positive cases are included. The most common are grade 1 & grade 2 thrombocytopenia in P. Vivax and grade 3 & 4 thrombocytopenia in P. Falciparum. A study by Kumar M et al, showed the incidence of thrombocytopenia was seen in 80% of total malaria patients. There was a significant (P = 0.0001) association of severity of thrombocytopenia with symptoms and signs of malaria except for rigor. There was no significant (P > 0.05) association of severity of thrombocytopenia with age. There was a significant (P = 0.003) association of severity of thrombocytopenia with M antigen. The analysis of variance showed that there was a significant (P = 0.0001) difference in Lung Function Test (LFT) and Kidney Function Test (KFT) parameters with severity of thrombocytopenia; whereas in blood parameters, only red blood cell counts were associated significantly with the severity of thrombocytopenia. Thrombocytopenia is a frequent overall manifestation of both falciparum and vivax malaria. Severe thrombocytopenia is identified in all age groups, commonly in males, and increases the risk of death from falciparum or vivax malaria, particularly in those with concurrent severe anemia. Early diagnosis and prompt treatment of malaria reduces the complications and adverse outcomes of the disease. [10]

In the present study, P.vivax is comparatively more common than P.Falciparum and it is more common in males. Another study by Gupta NK et al, study group of 230 patients: 130 (56.51%) were positive for Plasmodium vivax, 90 (39.13%) were positive for P. falciparum and 10 (4.34%) had mixed infection with both P. vivax and P. falciparum. Out of 130 cases detected with vivax malaria, 100 cases had thrombocytopenia. Out of 90 cases detected with falciparum malaria, 70 cases had thrombocytopenia. Among 10 cases of mixed infection, 9 cases had thrombocytopenia. Presence of thrombocytopenia in a

patient with acute febrile illness in the tropics increases the possibility of malaria. The above finding can have therapeutic implications in context of avoiding unnecessary platelet infusion in malaria patients. [11] P. vivax was the common species in our study, though many of the patients who were included in our study had infection with P. falciparum (39.13%) and mixed infection (4.34%). Faseela et al., [12] in her study found similar results. Colonel et al., [13] reported thrombocytopenia in 72% of patients with malaria infection. Jamal et al., [14] in their study on pediatric patient have reported low platelet count in 72% of the patients with malaria infection. However, few studies reported slightly lower incidence of thrombocytopenia like 40% [15] and 58.97%. [16] Thrombocytopenia in malaria was found in 78.4% of cases in a study by Jadhav U M, et al. [17] similarly Shetty G, et al. [18] from Mangalore also reported thrombocytopenia in 72.0% cases of malarial infection. According to Meenai F J, et al. [19] overall 103 (85.83%) patients were found to have low platelet count. The mechanism of thrombocytopenia in malaria could be attributed to peripheral destruction and consumption by disseminated intravascular coagulation (DIC), sequestration of platelets by the spleen, immune mediated destruction, or oxygen free radicals induced damage to platelets.

CONCLUSION

Thrombocytopenia occurs in both malaria but it is more severe in P. falciparum as compared to P.vivax.

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