

Research Article

Changes in WBC and platelet count in patients with malaria: a hospital based comparative study

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ABSTRACT

Introduction: Malaria is one of the most common infectious diseases of tropics. It presents with varied clinicopathological manifestations. Most of the complication in malaria occurs due to various hematological abnormalities. Present study was aimed to find out abnormalities in WBC and platelet counts in patients with malaria.

Methods: A total 135 patients either hospitalized or treated on an outpatient basis were included in the study after positive identification for malarial parasites on Giemsa stained PSMP smears. WBC and platelet count was carried out on 3 part hematology analyzer (Sysmax KX 21). WBC count less than 4000/cumm was considered as leucopenia and platelet count less than 150000/cumm was considered as thrombocytopenia.

Results: The present study includes 135 patients with malaria from which 72.59% of subjects were male and 27.41% of subjects were female. *P. falciparum* was present in 68.89% of cases, *P. vivax* in 28.15% of cases. Majority of patients had normal leucocyte count (97.03%). Neutrophilia with lymphopenia was observed in both species of malaria in our study. Thrombocytopenia was observed in 89.62% of cases in malaria. Thrombocytopenia in *P. falciparum* was found in 92.48% of cases and in *P. vivax* it was 81.57% of cases.

Conclusion: Present study did not show any significant change in WBC count. Present study showed neutrophilia with relative lymphopenia in both group of malaria. Incidence of thrombocytopenia was observed in both species of malaria without any statistical significance.

Keywords: Neutrophilia, Lymphopenia, Thrombocytopenia

INTRODUCTION

Malaria is the most prevalent parasitic infection in the world and contributes to be a major health problem globally. According to WHO approximately 219 million cases of malaria occurs annually with 660000 deaths in 2010. India contributes 75-77% of total malaria cases in SEAR.¹ Malaria has been entrenched in India for countless years and recent data suggest that burden of disease actually increasing.² Clinical presentation of malaria includes fever, chills, sweating, vomiting, headache, abdominal pain, Hepatomegaly and

splenomegaly. Hematological abnormalities are most common complications in malaria resulted from invasion of malarial parasites in to Red Blood Cells. The hematological abnormalities include anemia, thrombocytopenia and lymphocytosis. Many study showed leucopenia, leucocytosis, neutrophilia, eosinophilia and monocytosis.^{3,4}

Thrombocytopenia is also well recognized and frequent complication of both *P. falciparum* and *P. vivax* malaria and its presence in patients with acute febrile illness increases probability of malaria.⁵ In India incidence of

thrombocytopenia reported in a range from 24% to 94% in various literature.⁶

Present study was aimed to find out alteration in WBC and Platelet count in various prevalent malarial parasites and to correlate it with type and severity of malaria.

METHODS

A total 135 patients either hospitalized or treated on an outpatient basis were included in the study after positive identification for malarial parasites on Giemsa stained PSMP smears. Complete blood count of all cases was carried out on a 3 part cell counter (SysmaxKx 21). WBC count less than 4000/ul was considered as leucocytopenia and more than 11000/ul was considered as leucocytosis. Platelet count less than 150000/ul was considered as thrombocytopenia. The CV of platelet count was <10%. The patients with coexistent Dengue and Leptospirosis were excluded from the study as both conditions are known to contribute thrombocytopenia. All the data were entered on to excel 2007 spreadsheet and analysis was carried out by OpenEpi software.

RESULTS

The present study includes 135 patients with malaria in the age group 2-80 years with mean age 29.98±14.03. 72.59% of subjects were male and 27.41% of subjects were female. P. falciparum was present in 68.89% of cases, P. vivax in 28.15% of cases and mixed infection was found in 2.96% of cases. Overall mean WBC count was 6274.64±1294.74/ul and mean platelet count was 85059±40670.82/μl. Changes in WBC and Platelet count observed in our study was mentioned in Table 1.

Table 1: WBC and platelet count in malaria.

	Decreased	Normal	Increased
WBC Count	3(2.22%)	131(97.03%)	1(0.74%)
Platelet Count	121(89.62%)	7(5.19%)	7(5.19%)

Mean WBC count in P. falciparum and P. vivax were 6280.64±1355.52/μl and 6326.46±1085.96 respectively. Incidence of neutrophilia and lymphocytosis were shown in Table 2. In present study eosinophil and monocyte count were normal in all cases of malaria. None of the cases of malaria showed neutropenia or lymphocytosis in our study.

Table 2: Incidence of neutrophilia and lymphopenia in malaria.

	PF(93)	PV(38)
Neutrophilia	66(70.96%)	24(63.15%)
Lymphopenia	39(41.93%)	9(23.69%)

Present study overall 89.62% cases with malaria presented with thrombocytopenia. In P. falciparum malaria thrombocytopenia was found in 92.48% of cases with mean platelet count 75032±39313.25/ul and in P. vivax malaria thrombocytopenia was found in 81.57% of cases with mean platelet count 109447±33334.26/μl. This difference in platelet count was statistically not significant.

DISCUSSION

In the present study of 135 confirmed cases of malaria males were more commonly affected (72.59%) than females (27.41%) as females are better dressed so they are relatively protected against mosquito bite. P. falciparum and P. vivax malaria was seen in 68.89% and 28.15% of cases respectively.

In our present study there was no significant difference observed in WBC count in both P. vivax and P. falciparum malaria. Similar result was observed by UM Jadhav in their study with mean platelet count in P. falciparum was 6127 and in P. vivax was 6252/ cumm.⁷ In present study WBC count was normal in 97.03%, decreased in 2.22% and increased in 0.74% of cases so; majority of cases had normal WBC count. Some study showed higher number of cases with leucopenia in compared to our study.^{3,8,9} The leucocyte count in malaria is low to normal due to localization of leucocyte away from peripheral circulation to spleen rather than destruction or stasis.¹⁰ Sometimes neutrophilia accompanied by reduced lymphocytes in patients usually leads to the suspicion of acute bacterial infection among clinicians. These variations could be due to the sequestration of lymphocytes in spleen and also release of cytokines.¹¹ In our study Neutrophilia was observed in 70.96% of cases in Pf while in PV 63.15% of cases, with relative lymphopenia in 41.93% of cases in Pf while in PV 23.69% of cases. Eosinophil and monocyte count was normal in our study. Eosinophil count rise after end of one week mainly due to various cytokines released in circulation.

Thrombocytopenia is more common hematological finding in malaria and it serve as indicator of malaria in endemic regions. The mechanism of thrombocytopenia is poorly understood but shortened life span of platelets due to the immune mediated destruction of platelets, elevated M-CSF level in malaria by increasing macrophage activity which induce platelet destruction, sequestration in spleen, increased cytokines, oxidative stress, and pseudothrombocytopenia due to platelet clumps has been postulated.^{12,13} In present study thrombocytopenia was observed in 89.62% of cases. Similar results were found in many literature with range of 72% to 87.09%.^{14,15,16}

Our study showed a higher incidence of thrombocytopenia in P. falciparum patients (92.48%) than the P. vivax group (81.57%) which was not statistically significant for prediction of type of malaria. In study by Dhungat MP showed similar results in their

study.^{6,17} Few study reported higher incidence of thrombocytopenia in vivax malaria in compared to falciparum.¹⁸ Thrombocytopenia in vivax malaria is rarely accompanied by bleeding manifestations and rapidly returns to normal value after commencement of antimalarial treatment. In our study lowest platelet count was 11000/cumm without any evident bleeding manifestation. In India lowest platelet count of 8000/cumm was observed in vivax malaria.¹⁹ In contrast to previous belief that thrombocytopenia is more common in falciparum malaria, the present study showed that thrombocytopenia is equally prevalent in both p. falciparum and p. vivax malaria.

CONCLUSION

Present study did not show any significant change in WBC count, majority of patients had normal WBC count in both P. falciparum and P. vivax malaria. Present study showed neutrophilia with relative lymphopenia in both group of malaria. Incidence of thrombocytopenia was observed in both species of malaria without any statistical significance however it was higher in falciparum malaria as compared to vivax malaria. So thrombocytopenia is not a distinguishing feature between these two species of malaria. Bleeding manifestation was not accompanied by low platelet count.

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Ethical Approval: Not required

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