

A study of role of thrombocytopenia in the prognosis of the patients with malaria

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Abstract

Introduction: Thrombocytopenia is an early and consistent feature of malaria, but its pathogenesis remains incompletely understood. In falciparum malaria there is increased platelet consumption as evidenced by shortened survival of radio labelled platelets. **Aims and Objectives:** To Study Role of Thrombocytopenia in the Prognosis of the Patients with Malaria. **Methodology:** After approval from institutional ethical committee, the present study was cross sectional study was carried out at tertiary care hospital in the urban setting. The study period was 1 year from March 2015 to March 2016. Study population consisted of patient diagnosed as case of malaria and admitted at tertiary care hospital during period of one year, Z-test (Standard Error of Difference Between two Proportion) used for statistical analysis. **Result:** The majority of the patients were form the age group 30-40 i.e. 26.36% followed by 40-50-20.00%; 50-60-17.27%; 20-30-15.45%; 10-20-10.90%; >60-10.00%. The majority of the patients were Male i.e. 70.90% followed by Females 38.18%. All 51 cases of severe malaria had thrombocytopenia and 35 cases of uncomplicated malaria had thrombocytopenia. Out of 26 cases of mild thrombocytopenia 12 (46.15%) cases belongs to severe malaria while uncomplicated malaria consisted of 14 (53.84%) cases. Among 29 cases of moderate thrombocytopenia 14 (48.28%) cases had severe malaria while 15 (51.72%) cases had uncomplicated malaria. Out of 31 cases of severe thrombocytopenia 25 (80.64%) cases had severe malaria while only 6 (19.35%) of uncomplicated malaria had severe thrombocytopenia. Significantly more numbers of cases of severe malaria have severe thrombocytopenia as compared to uncomplicated malaria. ($z=4.96$; $p<0.001$). **Conclusion:** In our study we have found that more numbers of cases of severe malaria have severe thrombocytopenia as compared to uncomplicated malaria hence it can be concluded that the thrombocytopenia correlates with the severity of the Malaria.

Keywords: Thrombocytopenia, Severe malaria, Prognostic factors of Malaria.

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INTRODUCTION

Thrombocytopenia is an early and consistent feature of malaria¹⁻⁴, but its pathogenesis remains incompletely understood. In falciparum malaria there is increased platelet consumption as evidenced by shortened survival of radiolabelled platelets⁵ and the finding of plentiful megakaryocytes in patients' bone marrow⁶ and appropriately elevated plasma thrombopoietin levels⁷. Both systemic microvascular sequestration⁸ and

endothelial activation^{9,10} may play a pathophysiological role, a hypothesis supported by the observation that the radio labelled platelets of patients with falciparum malaria are diffusely sequestered, rather than pooling in the liver or spleen⁵. Yet while thrombocytopenia is a ubiquitous laboratory finding, it had been thought to have limited clinical significance, as major bleeding is relatively uncommon in the disease¹¹. Recently it has been suggested that thrombocytopenia may have important implications for patient triage. Population studies have shown an association between thrombocytopenia and outcome¹² and a recent study from India proposed that thrombocytopenia should be added to the World Health Organization (WHO) criteria for the definition of severe malaria¹³.

MATERIAL AND METHODS

After approval from institutional ethical committee, the present study was cross sectional study was carried out at tertiary care hospital in the urban setting. During The study period was 1 year from March 2015 to March 2016.

Study population consisted of patient diagnosed as case of malaria and admitted at tertiary care hospital during period of one year, Patient admitted in inpatient department (Both wards and intensive care unit), Patient both male and female above the age of 12 years are included in, study group, Patient with smear positive for malaria parasite were included into study while Smear negative malaria parasite with fever and chills, rigors although with, clinical suspicion with malaria are excluded from study group, Thrombocytopenia of any other cause E.g. Aplastic anemia and viral fever-like Dengue, Chikungunya, HIV positive patients, Pregnant females, Patients not willing to participate in study excluded from the study. By this way Total 110 Patients were included into study. Z-test (Standard Error of Difference Between two Proportion) used for statistical analysis.

RESULT

Table 1: Age wise Distribution of the Patients

Age	No.	Percentage
10-20	12	10.90%
20-30	17	15.45%
30-40	29	26.36%
40-50	22	20.00%
50-60	19	17.27%
>60	11	10.00%
Total	110	100%

The majority of the patients were form the age group 30-40 i.e. 26.36% followed by 40-50-20.00%; 50-60-17.27%; 20-30-15.45%; 10-20-10.90%; >60-10.00%.

Table 2: Gender- wise distribution of the patients

Sex	No.	Percentage
Male	78	70.90%
Female	42	38.18%
Total	110	100.00%

The majority of the patients were Male i.e. 70.90% followed by Females 38.18%.

Table 3: Distribution of malaria cases according to thrombocytopenia and severity

Thrombocytopenia	Un-complicated malaria	Severe malaria	Total	'Z' Score	'p' value	Significance
Normal platelet count	24 (100%)	00 (0.00%)	24 (100%)	NA	NA	NA
Mild thrombocytopenia (150,000 to >50,000/c.mm)	14 (53.84%)	12 (46.16%)	26 (100%)	0.25	> 0.05	NS
Moderate thrombocytopenia (50,000 to >20,000/c.mm)	15 (51.72%)	14 (48.28%)	29 (100%)	0.98	> 0.05	NS
Severe Thrombocytopenia (less than 20,000/c.mm)	06 (19.35%)	25 (80.64%)	31 (100%)	4.92	<0.001	S
	59	51	110			

NA = Not Applicable, NS = Not Significant, S = Significant

All 51 cases of severe malaria had thrombocytopenia and 35 cases of uncomplicated malaria had thrombocytopenia. Out of 26 cases of mild thrombocytopenia 12 (46.16%) cases belongs to severe malaria while uncomplicated malaria consisted of 14 (53.84%) cases. Among 29 cases of moderate thrombocytopenia 14 (48.28%) cases had severe malaria while 15 (51.72%) cases had uncomplicated malaria. Out of 31 cases of severe thrombocytopenia 25 (80.64%) cases had severe malaria while only 6 (19.35%) of uncomplicated malaria had severe thrombocytopenia. Significantly more numbers of cases of severe malaria have severe thrombocytopenia as compared to uncomplicated malaria. (z= 4.96; p<0.001).

DISCUSSION

The majority of the patients were form the age group 30-40 i.e. 26.36% followed by 40-50-20.00%; 50-60-17.27%; 20-30-15.45%; 10-20-10.90%; >60-10.00%. The

reason could be because the most active age group in outdoor activities are most commonly exposed to mosquitos and hence this is common. In our study we have found that out of 31 cases of severe thrombocytopenia 25 (80.64%) cases had severe malaria while only 6 (19.35%) of uncomplicated malaria had severe thrombocytopenia. Significantly more numbers of cases severe malaria have severe thrombocytopenia as compared to uncomplicated malaria. (z= 4.96; p<0.001). These findings are similar to Liberia, Mahmood and Yasir¹⁴ studied a total of 145 patients who had P. 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%. Another study has reported 60% sensitivity and 88% specificity of thrombocytopenia for malaria diagnosis in acute febrile patients¹⁵. In another

important study from India, Patel *et al.* reports the sensitivity of thrombocytopenia together with the acute febrile syndrome as 100% for malaria diagnosis, with a specificity of 70%, a positive predictive value of 86% and a negative predictive value of 100%¹⁶. Mahmood and Yasir¹⁴ concluded an extended search for malarial parasite in patients having thrombocytopenia on smear. Mild-to-severe thrombocytopenia observed in hospitalized patients was considered enough to alert the possibility of malarial infection, as *P. falciparum* was found to be common species in these patients. Our study also connotes that falciparum malaria is more common at lower platelet counts as compared to vivax infection and overall the chances of finding falciparum malaria are almost twice than that of finding vivax malaria in thrombocytopenic patients. It is a general consensus that thrombocytopenia is very common in malaria¹⁷ and previously it was believed that it is more common in *F. malaria*. Recent studies have shown that thrombocytopenia is equally or even more common in *P. vivax* malaria contrary to the popular belief that it may be observed in *P. falciparum* malaria^{19, 20}. More recent data in India has shown how thrombocytopenia exhibited a heightened frequency and severity among patients with *P. vivax* infection²¹.

CONCLUSION

In our study we have found that more numbers of cases of severe malaria have severe thrombocytopenia as compared to uncomplicated malaria hence it can be concluded that the thrombocytopenia correlates with the severity of the Malaria.

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