Thrombocytopenia in Children with Malaria – A Study from Tertiary Care Hospital Delhi, India

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***Abstract*- Objective**: To study the occurrence and severity of thrombocytopenia in children with malaria

Method: It was a retrospective study, done at Vardhman Mahavir medical college and safdarjang Hospital, Delhi, India. Data regarding positive cases of malaria <12 years of age admitted in the hospital between January 2010 to January 2013 were obtained. Patients were further assessed for thrombocytopenia and its severity. Data were analysed by Chi square test using SPSS version.

Result- A total of 140 cases were included in the study. Plasmodium vivax was indentified in 98 (70%) patient while plasmodium falciparum in 28 (20%) and mixed infection in 14 (10%) patients. Thrombocytopenia was observed in 98 (70%) cases of which 36 (25.71%) cases have mild 20 (14.28%) cases moderate and 40 (28.50%) cases had severe thrombocytopenia. Thrombocytopenia was found equally in vivax and falciparum infection.

Conclusion: - Thrombocytopenia is commonly seen malaria. In any acute febrile illness with thrombocytopenia malaria should be kept in differential diagnosis.

***Index Terms*-** Thrombocytopenia, malaria, Plasmodium vivax, Plasmodium falciparum, mixed infection.

I. Introduction

Malaria is estimated to be directly responsible for around one million deaths annually worldwide (1). The morbidity and mortality burden cased by malaria is nearly 3% (2). Even though Africa accounts for 90% of the mortality burden for malaria, south-east Asia still suffers considerable mortality and morbidity. India contributes 75%-77% of the total malaria in south East Asia and about 95% of the population of moderate to high risk of malaria in Southeast Asia region is living in India (3). Malaria is caused by protozoa parasite of the genus plasmodium which infects and destroys red blood cells. Four species of plasmodia (plasmodium falciparum, plasmodium vivax, plasmodium malaria, plasmodium ovale) causes malaria in humans of which plasmodium falciparum is the most common cause of severe (life threatening) malaria. Malaria parasite affects multiple organs of the body like liver, spleen, brain, gastrointestinal tract, pancreas, kidney, blood vessels, and placenta. So, the clinical pictures could be of wide spectrum ranging from simple malaria to life threatening central nervous system symptoms. Thrombocytopenia has been reported to be associated with malaria, with an incidence ranging from 60%--80%, with some studies reporting a lower incidence in vivax malaria as compared to falciparum malaria (4). A number of observational studies have confirmed the association of thrombocytopenia to malaria but till date the cause of thrombocytopenia is poorly understood. The speculated mechanism leading to thrombocytopenia are coagulation disturbances, splenomagely, bone marrow alteration, antibody mediated platelet destruction, oxidative stress, and the role of platelets as cofactors in triggering severe malaria (5,6,7). In view of paucity of data in children from Indian studies, we conducted this study to find out occurrence and severity of thrombocytopenia in children with malaria and to correlate the low platelet count and type of malaria.

II. Materials and Methods

This was a retrospective study of medical records of children, admitted to Vardhman Mahavir Medical College and Safdarjang Hospital, New Delhi, India, with the diagnosis of malaria. The study period was between January 2010 to January 2013. The inclusion criteria was children <12 years with a diagnosis of malaria. Patients with history or clinical features suggesting chronic liver disease and those with history of bleeding disorder, haematological malignancy, diagnosed cases of Idiopathic thrombocytopenic perpura were exclude from the study.

Thrombocytopenia was defined as platelet count of less than 150000 cells/µL, patients were divided into three subgroups based on platelet count. Thrombocytopenia was considered severe if platelet counts were less than 50000 cells/µL, moderate if between 50000 and 100000 and mild if between 100000 and 150000 cells/µL. Data were analyzed by Chi- Square test using the SPSS version. P value of < 0.05 was taken as significant.

III. Results

A total of 146 patients had malaria during the study period, out of which 140 patients [84(60%) males, 56 (40%) females] met the inclusion criteria (Table 1). Majority of patients were between 7 to 9 year (32.14%) (Table1). Thrombocytopenia was observed in 70% and its severity is shown in Table 2. Platelet count ranged from 5000 to 300000 cells/µl. Least documented platelet count was 5000 cells/µl which was in plasmodium Vivax malaria. In the study group of 140 patients, 98(70%) had vivax, 28 (20%) had falciparum and 14 (10%) had mixed infection (both vivax and falciparum).Out of 98 cases detected with vivax malaria 66 (68%) cases had platelet count less than 150000/µl,

out of which 25 patient(38%) had a platelet count less than 50000/µl. Out of 28 patients detected with falciparum malaria 18 patients (65%) had platelet counts less than 150000/µl in which 8(44%) patients had platelet count less than 50000/µl. It was noted that severe thrombocytopenia was more common with plasmodium falciparum than vivax infection. (Table2). However, these differences were not statistically significant. Twenty patients had bleeding manifestation and required platelet transfusion.

Table 1.
Age and sex distribution of patients with malaria

Age group (years)	No of cases	Male	Female	Percentage
1-3	31	20	11	22
4-6	37	22	15	26
7-9	45	23	22	33
9-12	27	19	8	19
Total	140	84	56	100

Table 2
Platelet counts in patients with different type of malaria [n (%)]

Category	>150000/ µL	150000-100000/µL	100000-50000/µL	<50000/µL	Total
P.vivax	32(32.26)	28(28.57)	13(13.26)	25(25.5)	98
P.falcip.	10(35.71)	6(21.42)	4(14.28)	8(28.5)	28
Mixed	2(14.28)	2(14.28)	3(21.42)	7(50)	14
Total	44(31.42)	36(25.71)	20(14.28)	40(28.5)	140

IV. Discussion

Malaria is endemic in many parts of India. Though, Delhi comes under low risk zone of malaria but in recent few years, number of malaria cases has increased. Malaria affects almost all blood components and is a true haematological infectious disease. Thrombocytopenia and anaemia are the most frequently malaria associated haematological complication of malaria. In endemic areas, malaria has been reported as the major cause of low platelet count and is a sensitive but non-specific indicator of infection with malaria parasite. Platelet counts of less than 150000/µl increases the likelihood of malaria by 12-15 times [8,9]. Plasmodium vivax was the common species in our study. Faseela et al (6) in her study found similar results which were attributed to endemicity for malaria in that area. Colonel et al (10) from Pakistan reported thrombocytopenia in 72% patients with malaria infection. Jamal et al (11) in their study on paediatric patients from Karachi, Pakistan have reported low platelet counts in 72% of their patients who were suffering from material infection. The prevalence of thrombocytopenia in malaria was reported as 85% (falciparum) and 72% (vivax) in the study by Horstmann et al (12). But few studies (8,13) reported slight lower incidence of thrombocytopenia like 40% and 59%. In our study thrombocytopenia was found in 70% of patients. Mild to moderate more common than serve thrombocytopenia. There was no significant difference in severity between species. The vivax malaria is commonly associated with mild haematological abnormalities. Although sever thrombocytopenia is commonly reported to be associated with Plasmodium falciparum infection and has been reported to occur in patients co infected with both Plasmodium falciparum and Plasmodium Vivax, its occurrence has been rarely reported in cases of Plasmodium vivax malaria (14).In our study thrombocytopenia was observed in 68% of patients with vivax malaria, in that 38% had severe thrombocytopenia. The least platelet count documented in our study was 5000/µl, and it was seen in vivax infection.

The exact mechanism of thrombocytopenia is not well understood however, immune mediated lysis, sequestrating in the spleen have been documented. An abnormality in platelet structure and function has been described as a consequence of malaria parasites themselves. Decreased thrombopoiesis has been ruled out, because platelet-forming megakaryocytes in the marrow are usually normal or increased [8, 15, 16].

V. Conclusion

We found significant thrombocytopenia in almost three fourth of our patients with malaria. In any acute febrile illness with thrombocytopenia malaria should be kept in differential diagnosis. Presence of thrombocytopenia is not a distinguishing feature between the two types of malaria.

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