

Evaluation of Thrombocytopenia In Malarial Infections

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ABSTRACT

Malaria is a protozoal disease of worldwide importance. The causative agent, Plasmodium, is transmitted from one human being to another by the bite of Anopheline mosquito. World Health Organization (WHO) has reported the occurrence of 214 million new cases during the year 2015. Malaria is commonly associated with hematological changes; anemia and thrombocytopenia being the most common. In present study the occurrence and severity of thrombocytopenia was documented in patients with malaria. 29 patients diagnosed as suffering from malaria, were registered and platelet count was determined, along with routine investigations. Out of these 29 patients, 28 (96.5 %) were suffering from P. vivax infection and one (3.5%) was positive for P. falciparum. No patient showed the infection with both P. vivax and falciparum. No patient was positive for Dengue antibodies. Although presence of thrombocytopenia in febrile patients also raises suspicion of Dengue fever, in our environment it is the malaria about which we should think first. Thrombocytopenia in these patients was tolerated well and only one patient needed platelet transfusion.

Key Words: Malaria Thrombocytopenia.

INTRODUCTION

Malaria is a protozoal disease of worldwide importance. The causative agent, Plasmodium, is transmitted from one human being to the other by the bite of Anopheline mosquito. Five species of Plasmodium can cause disease in humans (Plasmodium vivax, Plasmodium falciparum, Plasmodium malariae, Plasmodium ovale and Plasmodium knowlesi)¹. World Health Organization (WHO) has reported the occurrence of 214 million new cases during the year 2015². With estimated burden of 1.6 million cases annually, Pakistan has been grouped by WHO, with Afghanistan, Sudan and Yemen, in category 3 countries. Two parasites which account for malaria in Pakistan are Plasmodium vivax and Plasmodium falciparum³. As malaria affects many organs in the body, the symptoms can vary from malaise to life threatening conditions like coma. Malaria is commonly associated with various haematological changes; anaemia and thrombocytopenia being the most common^{4,5}. Although P.falciparum is known for most of the severe complications and malaria associated mortality⁶, P.vivax has emerged in the recent past, as very severe and potentially lethal condition^{7,8}. The mechanism of production of thrombocytopenia has been investigated during the past years but exact mechanism couldn't be elucidated.

Nevertheless the occurrence of thrombocytopenia in malaria seems to be a multifactorial phenomenon and probably involves an increase in platelet destruction and consumption⁹. Although some people have reported the occurrence of bleeding due to thrombocytopenia in malaria^{10,11}, a low platelet count in this condition is usually tolerated well and, commonly, does not result in severe bleeding¹².

After the recent epidemic of Dengue fever in Punjab province, the condition of febrile illness with thrombocytopenia has become the phenomenon of concern for caring physicians and for general public as well.

AIM AND OBJECTIVE

To Evaluate The Severity of Thrombocytopenia in Malaria.

MATERIAL AND METHODS

This prospective study was effectuated from August 2015 to January 2016 at Independent University Hospital, Faisalabad. A total 31 patients were included for studies. These patients were picked up out of 127 patients that were referred to the lab for malaria testing during this period. Written consent was taken from the patients. The diagnosis of malaria was confirmed by examining 'Thick and thin film' (the gold standard procedure)

and cases turned out to be positive, were included in the study . The routine investigations were carried out in Pathology lab of Independent University hospital Hospital . All patients undergone for complete blood count on automated hematology analyzer ‘Medonic’ by Merck Diagnostics, Germany. ‘Dengue fever’ was excluded by determining IgM, IgG antibodies by ELISA method. Data were analyzed by SPSS-method-20. Grading of thrombocytopenia was carried out according to NCI Common Terminology Criteria for Adverse Events, Version 3.0[13]. According to it thrombocytopenia is divided into five grades:

- Grade 0: Within normal limit, platelet count 150,000 or above.
- Grade I: Platelet count between 75,000 and 150,000.
- Grade II: Platelet count between 50,000 and 75,000.
- Grade III: Platelet count between 25,000 and 50,000.
- Grade IV: Platelet count less than 25,000.

Table A: Age and sex distribution of study group

Age	Years	Male (%)	Female (%)	Total (%)
1	14	04 (13.8 %)	03 (10.3 %)	07 (24.1 %)
15	25	07 (24.1 %)	06 (20.7 %)	13 (44.8 %)
26	40	04 (13.8 %)	04 (13.8 %)	08 (27.6 %)
41	60	01 (03.5 %)	00 (00.0 %)	01 (03.5 %)
Total		16 (55.2 %)	13 (44.8 %)	29 (100 %)

Table B: Hemoglobin W B C Platelet Count

G / dL x 10⁹/L x 10⁹/L
 Mean 10.45 9.35 152.48
 S D 1.74 1.76 106.82
 Range 7.6 – 13.2 3.2 – 11.8 31 – 459

Out of 29 patients, 28 (96.5 %) suffered from P. vivaxinfection and one (3.5%) was positive for P. falciparum. No patient of mixed infection with both P. vivax and falciparum was noted. No patient was positive for Danguue antibodies.

Out of 28 cases of vivax malaria, 15 (53.57)cases had thrombocytopenia, 13 (46.43%) cases had normal platelet count. 6 (21.43%) cases had Grade I thrombocytopenia, 5 (17.86%) cases had Grade II thrombocytopenia, 4 (14.28%) cases had Grade III thrombocytopenia and no case had Grade IV thrombocytopenia. The one case detected with falciparum malaria had Grade 3

RESULTS

Out of these 31 patients two had seticemia and were excluded from the group. Twenty eight patients had Plasmodium vivax malaria, while only one patient was suffering from Plasmodium falciparum infectin. Out of 29 patients 16 (55.2%) were males and 13 (44.8%) were females. Age of patients was between 1 year and 51 years, with majority of cases between 15 and 40 years of age (comprising about 72%). A total 07 (24.1%) patients were belonging to pediatric age group [Table A]. Mean hemoglobin value was 10.5 ± 1.7 g/dl (ranging from 7.6 g to 13.2 g) and mean white blood cell count was 9.35 ± 1.76 x10⁹/L (ranging from 3.2 to 11.8x10⁹/L). Mean platelet count was 152.48 ± 106.86 x10⁹/L (ranging from 31 to 459 x10⁹/L) [Table B]. All the patients had fever at the time of presentation, followed by nausea , vomiting and anorexia. Most common sign was anemia followed by splenomegaly. Hepatomegaly was noted in four patients . The spontaneous bleeding and mortality was not seen.

thrombocytopenia. Out of total 29, 13 (46.43%) cases had normal platelet count. No patient was detected with Grade IV thrombocytopenia. Majority of patients tolerated thrombocytopenia well and for only one patient platelet transfusion was required.

DISCUSSION

Malaria is endemic in our country and Plasmodium vivax and Plasmodium falciparum are responsible for this disease in this region. Malaria is a true hematological disease and affects almost all blood components; the most frequent complications being thrombocytopenia and anemia. It has been reported that in endemic areas malaria is the major cause of low platelet counts. The finding of thrombocytopenia is so characteristic of malaria, that in some places, it is used as an indicator of malaria in patients who present with fever. Platelet count of lower than 150,000/μl (150x10⁹/L)

increases the likelihood of diagnosis of malaria 12-15 times^{14,15,16}. Plasmodium vivax proved to be the commonest species in our study, though one of the patients had infection with P. falciparum (3.45%). No patient of mixed infection was noted. In our study, thrombocytopenia was seen in 53.57% cases which data is comparable to results of Faseela et al¹⁷. Colonel et al.,¹⁸ told a figure of 72% and Jamal et al¹⁹ also reported low platelet count in 72% of pediatric malaria cases. Few other studies have quoted the incidence of thrombocytopenia in 40%¹⁴ and 58.97%²⁰ of malaria patients.

The exact mechanism of thrombocytopenia in malaria is unknown. Fajardo and Tallent showed the presence of P. vivax inside platelets and they were of the opinion that the parasite concerned directly lyses platelets²¹. Both immunological and non-immunological mechanisms have been described to explain the destruction of platelets in patients of malaria^{22,23}. In these patients, platelet forming megakaryocytes are normal or increased in number in the bone marrow, which rules out 'decreased thrombopoiesis' as the cause of thrombocytopenia^{14,24,25,26}.

There is good tolerance of low platelet count in malaria. This can be explained on basis of platelet activation and their enhanced aggregability^[16]. The hemostatic responses may be enhanced by activation of platelets which makes bleeding episodes a rare phenomenon in malarial infections, despite significant thrombocytopenia.²⁷

One of the limitations of this study is that there was no matched control group.

CONCLUSION

In febrile patients, the finding of thrombocytopenia increases the likelihood of diagnosis of malaria and the same happening was evident in our study. Although thrombocytopenia also raises suspicion of Dengue fever, in our environment it is the malaria about which we should think first. The above finding can have therapeutic implications in the context of avoiding unnecessary platelet transfusions in malaria patients. The finding of thrombocytopenia may be used, in addition to the clinical features, to heighten the suspicion of malaria and prompt confirmation of diagnosis and initiation of the treatment.

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