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PROPHYLACTIC PLATELET TRANSFUSION IN THROMBOCYTOPENIA DUE TO MALARIA-YES OR NO?

Medicine

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ABSTRACT

Background: Malaria is a global health problem with an annual incidence of about 216 million cases of malaria and an estimated 6,55,000 deaths in 2010. Malaria is endemic in 91 countries and India contributes 77% of the total malaria cases in Southeast Asia. Thrombocytopenia is the most common hematological complication of malaria, but association of thrombocytopenia with different types of malaria and its prognostic implications in context with severity of low platelet count has not been evaluated in many of previous studies. Objective was to study the severity and prognostic value of thrombocytopenia. **Materials and Methods:** We conducted a study on 50 patients from Dakshina Kannada district to evaluate and correlate the presence and severity of thrombocytopenia in these patients with the type of malaria; also to evaluate prognosis of patients with thrombocytopenia who were transfused with platelet concentrate.

Results

- P.vivax was more common as compared to P.falciparum in patients with thrombocytopenia, as opposed to other studies.
- Irrespective of platelet count/transfusion at the time of admission; at the time of discharge the patients had normal counts.
- Platelet transfusion therefore did not improve the prognosis of the patients.

Conclusion: Our study demonstrated that platelet transfusion does not improve prognosis of the patients, if there were no bleeding manifestations as most recover within 1-2 weeks.

KEYWORDS

Malaria, thrombocytopenia, platelet concentrate, platelet transfusion.

INTRODUCTION

Malaria is a global health problem with an annual incidence of about 216 million cases of malaria and an estimated 6, 55,000 deaths in 2010.[1] Malaria is endemic in 91 countries and India contributes 77% of the Total malaria cases in Southeast Asia.[2] Malaria is a Protozoal disease caused by an infection with parasites of the genus Plasmodium and transmitted to man by species of infected female Anopheline mosquito. Five species of Plasmodium (Plasmodium vivax, Plasmodium falciparum, Plasmodium malariae, Plasmodium ovale, and Plasmodium knowlesi) cause malaria in humans.

Early diagnosis remains the key to the effective management of Malaria.[3] The examination of thick and thin blood films under the light microscope is the gold standard in the diagnosis of malaria. Polymerase chain reaction (PCR) is the most sensitive method but it cannot be used for routine purposes. The malarial antigen-based rapid diagnostic tests are a valid alternative to microscopy, used in our hospital. Hematological abnormalities have been observed in patients with Malaria, with anemia and thrombocytopenia being the most common.[3]

A classical 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 very importantly, the presence of concomitant conditions such as malnutrition and other diseases. The malarial parasite involves and affects multiple organs of the body such as liver, spleen, brain, gastro intestinal tract, gall bladder, pancreas, blood vessels and placenta. Therefore,the clinical picture could be of wide spectrum ranging from simple malaise to life threatening central nervous symptoms like coma. Hematological abnormalities have been documented in patients with malaria, with anemia, and thrombocytopenia being the most common.[4,5]

Multiple numbers 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 postulated mechanisms are coagulation disturbances, sequestration in spleen, antibody mediated platelet destruction, oxidative stress, and the role of platelets as cofactors in triggering severe malaria.[6]We conducted this study to correlate the severity of the degree of thrombocytopenia in patients with malaria.

Aim Of The Study

- To evaluate the degree of thrombocytopenia in a population of 50 patients in Dakshina Kannada Suffering from malaria.
- To correlate the presence and severity of thrombocytopenia with the type of malaria.

Materials and Methods

The retrospective, observational study was conducted for a period of 3 months in K S Hegde Hospital from April 2018-June 2018. Ethical clearance was seeked and approved. Out of 80 patients hospitalized for fever, 50 patients with thrombocytopenia were confirmed to have malaria by Malaria Parasite Fluroscent Technique. Complete blood cell count was done using an automated cell count analyzer. A Platelet count of less than 150,000/µl was used to define thrombocytopenia. Patients were divided into three subgroups based on platelet count.

Thrombocytopenia was considered severe if platelet count was <50,000/µl, moderate if 50,000-100,000/µl and mild if 100,000-150,000/µl.

RESULTS

The demographic data was tabulated and demonstrated via multiple graphs. Of the total number of Patients with malaria, 68% were diagnosed with malaria due to P.vivax and 32% due to P.falciparum [Figure 1]. Of the total number of patients, 63% of the patients were male patients and 37% were female patients. Majority of the patients were in the age group of 21-30 years and the least patients were seen in the age group of more than 70 years [Figure 2]. Of the patients reporting thrombocytopenia, only 9 patients had Thrombocytopenia of less than 50,000/ml and majority of the patients had a platelet count of 50,000 – 1lakh/ml, of which P.vivax was more common than P.falciparum. The most important finding that our study revealed was that only 4 patients were transfused with platelet concentrate of the total 50 patients, of which 3 patients were infected with P.vivax and one patient who had very severe Thrombocytopenia was infected with P.falciparum malaria.

Clinical Significance

- P.vivax was more common as compared to P.falciparum in patients with thrombocytopenia, as opposed to other studies.
- 1 patient died due to ARDS whose platelet count was 25000 cells/ml at admission (P.falciparum).
- 4 patients were transfused with platelet concentrate.
- Irrespective of platelet count/transfusion at the time of admission; at the time of discharge the patients had normal counts.
- Platelet transfusion therefore did not improve the prognosis of the patients.

DISCUSSION

Malaria, despite manifesting with aggressive health programs , remains one of the major health problems in the tropics with high morbidity and mortality. Thrombocytopenia is a common feature of malaria and occurs in both P. Falciparum and P.vivax infections regardless of the severity of infection.The absence of the normal quantity of platelets on a peripheral smear(which is used to diagnose malaria and other causes of fever),in a case of fever is often a clue to the presence of malaria and gives the pathologist an indication of the grade of thrombocytopenia associated. Thrombocytopenia is rarely accompanied by clinical bleeding or biochemical evidence of disseminated intravascular coagulation (DIC). Platelet counts rise rapidly with recovery. [5]Finding of Thrombocytopenia with anemia is an important clue to the diagnosis of malaria in patients with acute febrile illness, hence patients with acute febrile illness without localizing signs and symptoms having a combination of anemia and thrombocytopenia should alert the treating physician about the possibility of malaria and appropriate treatment.

Presence of thrombocytopenia is not a distinguishing feature between the two types of malaria. In our study it was found that the prevalence of P.vivax was more than P.falciparum. It is usually believed that thrombocytopenia is more common in P.falciparum malaria; contrary to the popular belief, P.vivax can also give rise to thrombocytopenia as was seen in our study. Severe and complicated malaria is usually caused by the P.falciparum parasite, but P.vivax usually considered a benign parasite that causes Disease resulting in low case-fatality rates, can also occasionally cause severe disease. Most severe Malaria patients have thrombocytopenia; however, platelet concentrate transfusion is indicated only in Patients with systemic bleeding.

Clinical bleeding in severe malaria is not a common feature and occurs in less than 5-10% of individuals with severe disease.

MECHANISM OF THROMOCYTOPENIA: The mechanism of thrombocytopenia in malaria is not clearly known. Immune-mediated lysis causing sequestration of platelets in the spleen and a dyspoietic process in the marrow due to the malaria parasite with diminished platelet production have all been postulated. Abnormalities in platelet structure and function have also been described as a consequence of malaria with rare instances of platelets being invaded by malarial parasites themselves have been reported. Fajardo and Tallent in 1974 demonstrated Plasmodium vivax within platelets by electron microscopy and suggested a direct lytic effect of the parasite on the platelets.[7]Thrombopoietin (TPO), which is the key growth factor for platelet production, is elevated in states of platelet depletion as a positive feedback. TPO serum levels have been shown to be significantly higher in subjects with severe malaria(due to the possibility of a higher stimulation needed for production of normal platelets, due to the infection), normalizing within 14-21 days of therapy.[8] Two Types of changes in platelet dysfunction are seen in malaria. Initially, there is platelet hyperactivity, this is followed by platelet hypo activity. Platelet hyperactivity results from various aggregating agents like Immune complexes, surface contact of platelet membrane to malarial red cells and damage to endothelial Cells. These injured platelets undergo intravascular lysis .The release of these injured platelet contents in the bloodstream can activate the coagulation cascade and contribute to DIC. Transient platelet hypo activity, possibly at the near end of active infection due to fall in thrombopoietin is seen following this phase and returns to normal in one to two weeks.[3] Thrombocytopenia improves with disease resolution and the Platelet count is generally normal within seven days.

CONCLUSION

Although the presence of thrombocytopenia is a common laboratory feature in malaria, its presence is not a distinguishing feature between the two types of malarial infecton caused by P.vivax and P.falciparum. Platelet counts below 40,000 are usually seen in malaria and dengue[9] . Previous studies examining predictors of malaria mortality have not included platelet counts [10] and several studies have shown a consistent inverse correlation between parasitemia at presentation and the platelet count [11]

Our study signifies the importance of thrombocytopenia as an indicator of acute malaria, irrespective of the organism. Falciparum malaria complicated by subdural hematoma has been described in the literature. All these cases had associated thrombocytopenia [12]. Platelet transfusion is indicated in thrombocytopenia in malaria only if the Patient has bleeding manifestations. Platelet transfusion does not improve prognosis of the patients if no Bleeding, as most recover within 1-2 weeks. If thrombocytopenia is present, malaria has to be ruled out before performing expensive tests to rule out other febrile conditions, so that a prompt treatment can be initiated.[13] Unnecessary platelet transfusion is not required for mild to moderate degree of thrombocytopenia in malaria patients which further avoids an unnecessary cost burden in the poor group of patients.[14]

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