"PLATELET COUNT", DIAGNOSTIC AND PROGNOSTIC SIGNIFICANCE IN MALARIA PATIENTS

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ABSTRACT

Malaria continues to be a cause of high mortality and morbidity. It can cause anemia and thrombocytopenia. The mechanism of thrombocytopenia in malaria is probably the consequence of several factors. Experimental data and clinical studies have successively emphasized the role of immune factors and the destruction or sequestration of platelets. Thrombocytopenia might be a useful indicator of malaria and can also be used as a marker of response to therapy. This study was conducted to evaluate thrombocytopenia in the patients suffering from acute plasmodium vivax and plasmodium falciparum malaria separately.

OBJECTIVE: To evaluate the effect of malaria on platelet count.

MATERIALS AND METHODS: This is an original descriptive case series study and was carried out in pathology department Khyber Teaching Hospital Peshawar over period of six months from 1st June 2011 to 30 December 2011. Total of 200 malaria parasite positive patients were included in the study. These patients showed malaria parasite in their peripheral blood smear (thick and thin) stained with Giemsa stain. P.vivax and P.falciparum positive cases were grouped separately. Complete blood count was done on automatic hematology analyzer and Platelet count was noted.

RESULTS: Out of 200 patient, 120 were males and 80 were females. 127 (63.5%) were plasmodium vivax positive and 73 (36.5%) were plasmodium falciparum positive. Amongst P. Vivax positive patients 62 (48.81%) showed thrombocytopenia while amongst P. falciparum positive patients 40 (54.79%) showed thrombocytopenia. Thus thrombocytopenia is observed to be more common amongst P. falciparum positive patients.

CONCLUSION: Malaria parasite causes thrombocytopenia.

KEY WORDS: Platelets, thrombocytopenia, malaria.

INTRODUCTION

More than 40% of global malaria burden is borne by population of South East Asia.[1] In Pakistan about half a million malaria cases occur annually and an estimated fifty thousand deaths occur each year mostly in infants, children and pregnant women. Malaria threatens millions of people and is a major health problem in Pakistan.

Platelets, red blood cells and white blood cells are the basic cellular components of the blood. Platelets play an important role in primary haemostasis[2]. Platelets take their origin from megakaryocytes in the bone marrow. When the megakaryocyte is fully mature, platelets are released into the general circulation[3]. About two third of platelets circulate in blood and rest are stored in the spleen. The number of platelets in the peripheral blood is referred to as "Platelet Count". The normal platelets fall between 1,50,000/cmm to 4,00,000/cmm of blood. When the Platelet count is less than 1,50,000/cmm of blood, it is called as thrombocytopenia and when it is more than 4,00,000/cmm of blood, it is referred to as thrombocytosis.

In thrombocytopenia, though the platelet count is less, but the normal functioning of the platelet is maintained, provided there are no associated structural or functional abnormalities of platelets. If the platelet count is low, it may result in

spontaneous bleeding or the normal process of clotting is delayed[4]. Spontaneous bleeding usually occurs, when the platelet count falls below 20,000/cmm of blood.

In case a patient presents with febrile illness, in our country malaria should never be overlooked, especially when there is no obvious cause for the febrile illness as we know that malaria is quite common with > 40% of global malaria burden borne by the population of South East Asia.

According to World Health Organization report 2011, malaria is prevalent in 106 countries of the World[5]. Malaria also ranks high in the existing health problems of Pakistan, especially during monsoon and post monsoon period when there are floods as well. In Pakistan more than 1.6 million cases of malaria are diagnosed annually and much more are left undiagnosed[6].

Malaria can manifest different complications but the most common hematological changes observed are anaemia and thrombocytopenia[7].

Although many reliable and advance tests are available for malaria diagnosis but in our country due to poverty and lack of resources, diagnosis of malaria is still carried out by direct visualization of the malarial parasite in the peripheral blood smear under microscope. Since it is observer based study and therefore depends upon the skills of observer, time spent on each slide, quality of slide and time at which the slide is prepared etc.

Moreover, in the periphery the skilled observer who can identify malaria parasites are hard to find. Therefore, this method cannot be relied upon totally, especially in cases when the patient presents with the clinical symptoms of malaria but his/her peripheral blood smear examination does not confirm the presence of malaria parasite. Under such circumstances changes in hematological parameters can help us to reach a diagnosis.

This study is designed to weigh up the platelet count as a hematological parameter in patients confirmed to be malaria positive.

MATERIALS AND METHODS

This study was conducted in pathology department of Khyber Teaching Hospital Peshawar over a period of six months from 1st June 2011 to 30th December 2011. Only confirmed malaria cases were included in this study. Thick and thin blood films, stained with Giemsa stain were used for confirmation of malaria parasite. Platelet Count was done on Automatic Hematology analyzer after collection of venous blood in EDTA containing tubes. Patients having Platelet count less than 1,50,000/cmm of blood were labeled as thrombocytopenic. Total of 200 patients of various ages and both genders were studied. Minimum age of the patient was 25 days and maximum age of the patient was 86 years.

RESULTS

Out of total 200 patients, 120 were males and 80 were females. Male Female ratio is 1.5:1. Amongst males 73 (60.83%) had P. Vivax in their blood while 47 (39.17%) were infected with P.falciparum. Amongst female 54 (67.50%) were positive for P. Vivax and 26 (32.50%) were infected with P. Falciparum.

Table 1:

Total Number of Patients	200	P.Vivax	%age	P.Falciparum	%age
Male	120	73	60.83	47	39.16
Female	80	54	67.5	26	32.5

Minimum platelet count recorded was 10,000/cmm of blood and maximum platelet count recorded was 4,00,000/cmm. Thrombocytopenia was present in 102 (51%) of cases and 98 (49%) showed platelet count within normal range. Severe thrombocytopenia with Platelet count <20,000/cmm was observed in 1 (0.5 %) case only. No patient with increased platelet count (thrombocytosis) was observed.

Table 2:

Total Number of Patients	200	%age
Patient with Thrombocytopenia	102	51
Normal	98	49
Patient with Severe thrombocytopenia	(1) one	0.5
Patients with thrombocytosis	Nil	Nil

Out of total 200 patients, 127 were P. Vivax positive and 73 were P. falciparum positive. Amongst P. Vivax positive patients 62 (48.81%) showed thrombocytopenia while amongst P. falciparum positive patients 40 (54.79%) showed thrombocytopenia. Thus thrombocytopenia is more common in P. falciparum infected patients than P. Vivax infected patients. It is important to mention that only one patient (0.5%) had platelet count below 20,000/cmm of blood that is severe thrombocytopenia and was suffering from p. falciparum infection.

Table 3

Total Number of Patients	200	%age
Total number of P. Vivax positive cases	127	48.81
Thrombocytopenia In P. Vivax positive cases	62	
Total number of P. falciparum positive cases	73	54.79
Thrombocytopenia In P. falciparum positive cases	40	
Total cases of Thrombocytopenia	102	51%

DISCUSSION

Malaria is a common cause of thrombocytopenia in our country and thrombocytopenia is an important complication of malaria. The degree of thrombocytopenia has a direct relation with the level of parasitaemia in blood[8], this having prognostic significance.

Thrombocytopenia a subnormal level of platelet count in circulating blood, has been reported in 40 to 80% of adults and children suffering from P. Vivax and/or P. falciparum infection in both endemic and non-endemic areas. Study done in Venezuela revealed that 59% of malaria parasite infected patients showed thrombocytopenia[9]. In another study done in India, thrombocytopenia was present in about 88% of the malaria patients[10]. In a study conducted at CMH Quetta, 74% of malaria infected patients showed thrombocytopenia[11]. In a study done at Coney Island Hospital New York, patients presenting with febrile illness who had traveled to malaria endemic areas in recent past, had shown that amongst malaria infected patients 70% showed thrombocytopenia[12]. In a study at JPMC, Karachi, thrombocytopenia was found to be present in 74% of patients affected with P. falciparaum while those affected with P. Vivax infection, 93.33% showed thrombocytopenia[13]. In a similar study conducted at Liaqat University of Medical and Health Sciences, Jamshoro it was observed that 69% of malaria positive patients showed thrombocytopenia[14].

Thrombocytopenia can be caused by decreased platelets production, increased destruction and increased sequestration of platelets in spleen. Whatever the mechanism of thrombocytopenia in malaria, platelet count still holds its importance in malaria prognosis and treatment as platelets count begins to return to normal level within a week of treatment. A study conducted in Africa showed that severity of thrombocytopenia has a direct relation with patients prognosis for survival. Patients who showed severe thrombocytopenia at the time of presentation to a health care facility, had poor prognosis and those who had mild to moderate thrombocytopenia, recovered well[15,16].

Thrombocytopenia is most common in isolated P. falciparum and mixed P.falciparum/P. Vivax infections than isolated P. Vivax infection[17].

The result of our study showed that out of 200 malaria positive 127 were infected with P. Vivax malaria while 73 were infected with P. falciparum malaria, establishing the fact that P.Vivax is still more common than P. falciparum in our society. Amongst P. Vivax infected patients, 62(48.81%) showed thrombocytopenia while amongst patients infected with P.falciparum 40 (54.79%) showed thrombocytopenia. This shows, our study is in accordance with studies performed on this subject

in other parts of the Country as well as abroad. It confirms that thrombocytopenia is more common in P. falciparum malaria and over all thrombocytopenia is a common feature of malaria.

CONCLUSION

Both P.vivax and P.falciparum can cause mild to moderate thrombocytopenia, however it occur more commonly with P.falciparum malaria. Therefore in case of any febrile illness accompanied with thrombocythopenia when no obvious cause can be established, malaria shall always be considered as a possible cause and can be confirmed with other specialized tests including ELISA for parasite specific antigen etc.

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