Research article

Comparison of Platelet Count in Malaria Positive and Negative Subjects with Hematology Analyzer and Microscopic Examination

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Abstract
This study included 250 blood samples submitted for malaria investigation and were evaluated under microscope for malarial parasites and platelet count. All samples were additionally analyzed for platelet count with automated haematology analyzer. Thirty seven (37) samples were found to be malaria positive microscopically. Out of 37 cases with malaria positive microscopically, thrombocytopenia was observed in 24 (64%) cases of malaria. So there is association of thrombocytopenia with malaria.

Key words: Malaria, thrombocytopenia, P. falciparum

Introduction

Over 300 to 500 million people are infected by malaria yearly[1] with the mortality rate of 1%[2]. It is epidemic and endemic in Africa, Central and South America, the Middle East and parts of Asia; regions with hot, humid environment which is ideal for breading of anopheles mosquito and is transmitted by bite of infected female anopheles mosquito. It is also transmitted by blood transfusion, trans-placentally and between drug addicts by reusing syringes[3]. Four species of plasmodia i.e. P. vivax, P.ovale, P. falciparum and P. malariae can cause malaria which is distinguishable on peripheral blood smear[4]. Plasmodium sporozoites are injected by the bite of female mosquito, reach liver, multiply there and released after 1-2 weeks to infect red cells. Severe cases of malaria are seen in falciparum infection. The severity of malaria may be determined by the magnitude of parasitaemia. The malaria is usually presented with febrile paroxysms, malaise and anemia[2]. The main hematological findings in patient's blood are anemia, thrombocytopenia, variable (low, normal, high) white cell (WBC) count, bleeding and parasitaemia[2,5]. Malaria is still common in oasis and costal areas of the Saudi Arabia. Expatriate work force also imports malaria from their home countries especially endemic areas of malaria[6]. This study aimed to evaluate malaria and platelet count to assess correlation.

Methodology

Two hundred and fifty (n=250) adult subjects suspected of malaria were selected from Riyadh Medical

Complex. Thirty seven (37) were found positive for malarial infection microscopically by thick and thin smears. Platelet counts were performed manually[7] as well as with automated hematology analyzer (Cell Dyn 3700). All slides were stained by Giemsa method[8]. Identification and level of parasitemia was done for each positive case[9].

Results

In this study two types of plasmodium species, P. falciparum and P. vivax were found on thick and thin smear. There were 34(92%) cases of falciparum and 3(8%) cases of vivax. The comparison of positive and negative cases is given in Table 1. Five (20.1%) patients had platelet count less than 50×10^9/L, eleven (45.1%) had thrombocytopenia in the range of 50- 100×10^9/L and eight (34.8%) had thrombocytopenia in the range of 100 – 150 x 10^9/L. Out of these five patients, three had parasitemia in the range of 3-10%. Maximum parasitemia was found to be 10% while 0.1% was the lowest. There were 8 (21.6%) patients who have parasitemia of 1% or above. These patients had platelet count of 60×10^9/L or less and this high parasitemia was inversely related to platelet count. A low platelet count was associated with high parasitaemia ($p<0.05$).

Table - 1: Platelet count in malaria positive and negative cases with microscopy and hematology analyzer

Methods	Platelet count in malaria positive cases	Platelet count in malaria negative cases
Microscopy	117 ± 35.06	285.6 ± 41.01
Hematology analyzer	137 ± 48.13	292.3 ± 40.3

Discussion

Thrombocytopenia is a well-documented finding in falciparum malaria and in mixed falciparum/ vivax infection [10,11]. A platelet count less than 150×10^9/L was considered thrombocytopenia but is not associated with adverse outcome[12]. Thrombocytopenia is considered as an important indicator of malaria [13]. Maximum thrombocytopenia occurs on the fifth or sixth day of infection and gradually returns to normal within 5-7 days after parasitemia has ceased [14]. In the present study thrombocytopenia of less than 150×10^9/L was found in 24 (65%) of the malaria cases. Mean platelet count in P. falciparum infection was 141×10^9/L in hematology analyzer while on microscopy the mean platelet count was 120×10^9/L.

Thrombocytopenia has been observed in 60-80% of both P. falciparum and vivax infection[15]. The shortened life span of platelet is 2–3 days in comparison to 7- 10 days in normal controls [15,16]. The mechanism of thrombocytopenia in malaria is still unclear. Fajardo and Tallent [17] suggested a direct lytic effect of parasite on platelets. Both non-immunological destruction and immunological mechanism involving platelet specific antibodies have been demonstrated [18-19]. Mohanty et al suggested that thrombocytopenia in malaria is partly immune mediated[20]. During malarial infection, initial

hyperactivity results in aggregation and later hypoactivity of platelets causes intravascular lysis. There is peripheral destruction and consumption of platelet in infected persons. Srichaikul noted that despite thrombocytopenia, the number of megakarocytes in the bone marrow remained adequate or increased in malarial infection [18]. Ladhani et al found that a low platelet count is associated with parasite density but not with bleeding problem or mortality [13].

Thus screening complete blood count can be a rapid and inexpensive yet valuable component in the diagnostic investigation of any patient suspected of malaria, particularly the patient with pyrexia of unknown origin and thrombocytopenia.

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