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Thrombocytopenia: A Predictor of Falciparum Malaria at Tertiary Care Hospital

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Abstract: The aim of the present work was to evaluate frequency of thrombocytopenia in the hospitalized malaria patients. Hospital based prospective study from August 2010 to January 2011 was conducted at medical units of the tertiary care center of Liaquat University of patients with acute febrile illness without localizing signs were considered for the study. Peripheral smear examination for malarial parasite was taken as a standard for the diagnosis of malaria. Those with positive MP were then included in the study. Hematological parameters were determined by using automated analyzer. Those with reduced platelet count were re-evaluated with manual method. A total of 256 patients were subjected for malaria testing during the study period. One hundred and twenty (120) patients had a positive peripheral smear. One hundred two (85%) were P. falciparum positive and 18 (15%) were P. vivax positive. Eighty four (70%) patients had thrombocytopenia. Ninety (75%) were male and thirty (25%) female. The mean age was 42±6 years. Eighty (95%) patients with thrombocytopenia were P falciparum positive and only 4 (5%) patients had vivax malaria. Thrombocytopenia was mild in 18 (21.4%) patients, moderate in 58 (69%) and severe in 08(9.6%) patients. The frequency and severity of thrombocytopenia observed in hospitalized patients should alert the possibility of malarial infection. In these cases P falciparum was found to be the common species and P vivax less common species.

Key words: Malaria · Thrombocytopenia · Plasmodium · Occurrence · Severity · Hospitalized Patients

INTRODUCTION

Malaria is a global health problem and is one of the most prevalent human infection worldwide with an annual incidence of 300 to 500 million cases with one, to three million deaths. According to the United Nations World Health Organization (WHO), Pakistan has been classified as a country with moderate malaria prevalence and relatively well-established malaria control program [1]. Approximately 40% of world population lives in malaria endemic area including southeast Asia, India, Pakistan, Bangladesh, Africa, areas of middle east and Central and South America [2]. Pakistan being a part of this endemic belt has an incidence of one case per thousand populations [3, 4]. The bulk of mortality is seen in infants. Those who survive to adulthood, acquire significant immunity with low grade parasitemia and few symptoms [5].

Severe malaria has been a major cause of mortality worldwide and Plasmodium falciparum is the main species for most of these deaths [6]. Hematological abnormalities have been observed in patients with malaria, anemia and thrombocytopenia being the most common [7]. The pathology of anemia in malaria is related to cytokine release [8]. The cause of thrombocytopenia is poorly understood, although increased platelet destruction is significant and platelet lifespan is reduced during malaria. It is often associated with palpable splenomegaly and circulating immune complexes [9].

The aim of this study was to assess the frequency of thrombocytopenia in hospitalized patients of malaria.

MATERIALS AND METHODS

This hospital based, prospective study was conducted in the Medical Units of Liaquat University of

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Medical and Health Sciences, Jamshoro. Patients with fever of less than one week in duration and without localizing signs on examination were considered for the study. Malarial Parasite (MP) examination using thick and thin smears stained with Giemsa stain were requested for patients suspected of having malaria. Full blood picture was performed and peripheral smear positive for malarial parasite was taken as a gold standard for the diagnosis of malaria.

Those with reduced platelet count were confirmed by manual method and divided in to three categories according to platelets count: Mild thrombocytopenia (150,000 to >50,000/c.mm), moderate thrombocytopenia (50,000 to >20,000/c.mm) and severe thrombocytopenia (less than 20,000/c.mm).

The local ethical committees of the institute approved the study protocol and all patients gave written and informed consent.

Data Analysis: SPSS version 16 was used for to analyze data. The variables of clinical assessment have been described as range and proportions. P value of less than 0.05 was taken as significant.

Exclusion Criteria: Patients with high grade fever and negative MP peripheral blood film in three samples taken twice daily were excluded. Similarly patients with localizing signs as cause of fever (pneumonia, meningitis, skin infections) and patients with history or clinical features suggesting dengue fever or enteric fever were excluded. HIV, chronic liver disease and those patients with history of bleeding disorder, thrombocytopenia or purpura.

RESULTS

A total of 256 patients were subjected to malaria testing during the study period. 120 (47%) patients had positive peripheral smear for malarial parasite. Out of these 102 (85%) were P. falciparum positive and 18 (15%) were P. vivax positive (Figure 1). Eighty four (70%) patients had thrombocytopenia. Ninety patients (75%) were males and 30 (25%) females (Figure 2). The mean age was 42 ± 6 years. Out of Eighty four patient with thrombocytopenia, eighty (95%) patients were suffering from falciparum malaria and only four (5%) had vivax malaria (Figure 3). Eighteen (21.4%) patients had mild thrombocytopenia, fifty eight (69%) had moderate and

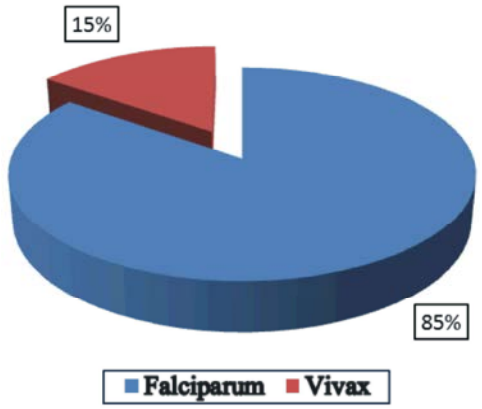

Fig. 1: Malaria positive cases.

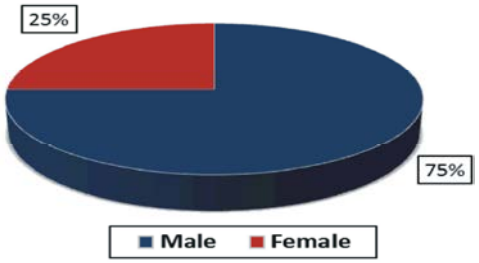

Fig. 2: Sex distribution of malaria among studied patients.

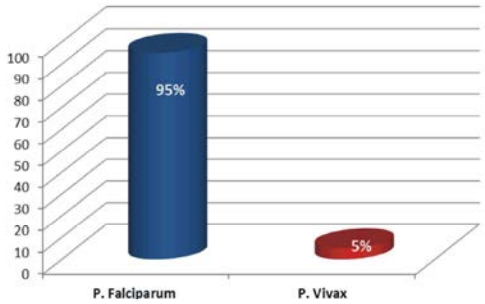

Fig. 3: Frequency of the causative MP among thrombocytopenic patients.

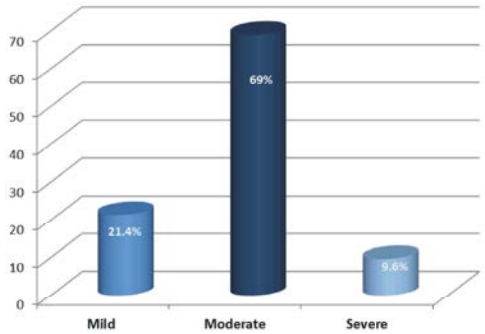

Fig. 4: Percentage distribution of thrombocytopenia in malaria positive cases.

eight (9.6%) had severe thrombocytopenia (Figure 4). None of these patients required platelet transfusion. Hemoglobin of less than 9 g/dl was found in 36 (43%) patients and all those were suffering from falciparum malaria.

DISCUSSION

In our country malaria is one of the leading causes of acute febrile illness. The clinical diagnosis of malaria is often difficult, However hematological abnormalities are common leading to thrombocytopenia which occurs in 60-80% and anemia in 25% [9]. The low platelet count emerged as the strongest predictor of malaria. In a study including over two thousand patients with fever, Erhart *et al.* [10] reported a platelet count of less than 150,000 that increases the likelihood of malaria [12-15]. Finding of thrombocytopenia with anemia is an important predictor to the diagnosis of malaria in patients of acute febrile illness [12]. In this study 70% of patients suffering from malaria showed some degree of thrombocytopenia. These figures are comparable to studies done by other investigators as 71% by Robinson *et al.* [12] and 58.97% by Rodriguez *et al.* [13]. Mahmood and Yasir [14] studied a total of 145 patients who had P. falciparum malaria. Out of these 109 (75.18%) had thrombocytopenia. Beg MA [15] stated that nearly 56% of 521 patients develop disease complications, which included thrombocytopenia (36.4%), anemia (23.4%), thrombocytopenia plus anemia (32.7%).

The sensitivity of the platelet count was considered as a predictor of malaria with 80.11% while specificity was 81.36%. The positive predictive value was 63.87% and the negative predictive value was 90.86%. Patel [16] found the sensitivity of low platelet count for diagnosing malaria is 100% and the specificity is 70%. The negative predictive value is 100% and the positive predictive valve is 86%. Bashwari *et al.* [17] from Saudi Arabia reported anemia in 60% and thrombocytopenia in 53% of malaria cases. Thrombocytopenia is a common observation in falciparum malaria with spontaneous recovery on treatment [18]. The possible cause for thrombocytopenia is disseminated intravascular coagulation, or excessive removal of platelets by the reticulo-endothelial system [19]. Anti-Platelet IgG has also been implicated in the pathogenesis of thrombocytopenia [20]. Hence, we propose that in any patient with fever and recent travel history, platelet count is an important clue to the diagnosis of malaria. Mild to severe thrombocytopenia was observed in hospitalized patients, which should alert the possibility of malarial infection, as P. falciparum was found to be common species in these patients.

In conclusion, we found thrombocytopenia in more than half of our patients with malaria, more so in those suffering from plasmodium falciparum infection. Therefore, malaria should be a consideration in febrile patients with low platelets counts. Presence of thrombocytopenia in a patient with acute febrile illness in the tropics including Pakistan increases the probability of malaria. This may be used in addition to the clinical and microscopic parameters to support the suspicion of this disease and timely initiation of the therapy.

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