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Thrombocytopenia as an Index of *Plasmodium falciparum* Severity in Adult Population: A Review Paper

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Abstract:- Malaria is commonly related with more than a few stages of reduced blood counts as revealed by reduced platelets and white cell counts and barely related with hemorrhagic observations or an aspect of disseminated intravascular coagulation. Thrombocytopenia is often seen in falciparum malaria but the exact mechanism for this is unclear. A large and thorough search through peer reviewed publications, conferences, articles and a book was the approach adopted for the review. This review shows the value of low platelet count as an early indicator of acute malaria. The probable mechanism that causes thrombocytopenia in malaria have been discussed to include; A direct interaction between plasmodium and platelets, immune mechanism destruction, destruction of platelets by spleen under the influence of parasite antigen bound to the surface, suppression of thrombopoiesis by parasitic antigen that infiltrate the bone marrow, alteration of splenic function and oxidative stress. It was found out that reduced platelet be counted which tiers from slight to average is a frequent affiliation of the *Plasmodium falciparum* infection thereby predicting its severity.

Keywords: Malaria, Thrombocytopenia, *Plasmodium falciparum*

I. INTRODUCTION

Malaria is typically related to reduced blood cells count and pleasant to reasonable reduced platelet number. The rationale of low thrombocyte count is insufficiently understood, however the immune-mediated cell destruction, chelation of the spleen and dyspoietic approaches in the marrow with decreased thrombocyte production were postulated. (Marcus *et al.,* 2011) This study review is targeted at exposing the function of Platelet count as an indicator to predict the severity of Plasmodium infection.

II. BODY

Malaria is a disease of global importance. It is prompted by way of *Plasmodium* parasites and these parasites unfold via bites of mosquitoes. There are 5 species of *Plasmodium* parasites that sets off malaria in human but just 2 of the 5 pose greatest threat in humans. The two are *Plasmodium falciparum* and *Plasmodium vivax* (WHO, 2008). In 2018, *Plasmodium falciparum* accounted for about 99% of assessed malaria incidences in World Health Organization of the African Region, 50% of incidences in the WHO South-Eastern Asia region, 71% of incidences in Eastern part of the Mediterranean with 65% in the Western part of the Pacific vicinity (WHO, 2018). The modern Global Malaria Data published in November, 2020 says there were 229 million instances of malaria in 2019 in comparism to 228 million situations as at 2018 (WHO, 2019). The estimated degree of malaria demise consequences results at 409,000 in 2019, in contrast with 411,000 deaths in 2018. Malaria is endemic in Nigeria having *Plasmodium falciparum* as the major species of it (Uko *et al*., 2002). *Plasmodium falciparum* infection is accountable for as much as 82% of the infections while *Plasmodium malariae* and also *Plasmodium ovale* are attributed for approximately 14% and 5% respectively (Onyido *et al*., 2011). Malaria is frequently related with some various stages of hematological complications such as Anaemia and Thrombocytopenia. The Anaemia is usually due to parasitic haemolysis of red cells and the effect of oxidative stress posed by antimalarial drugs (Gosh *et al*., 2007). In a systematic review conducted by (Marcus Vinicius *et al*., 2011) reported that platelet count lower than 150,000cumm^3 varies from 24-94% in patients with mild malaria and its rate of occurence was not distinct with two(2) principal taxon that have an effect on humans (vivax and falciparum). Insignificant loss of blood is cited in incidence review of cases with *Plasmodium vivax* infection and may be described with the aid of medullary compensation with the release of mega platelet. Mahmood and Yasir, 2008, in Liberia studied a sum of 145 patients who had *Plasmodium falciparum* malaria. Outside of these populace, 109 frequency at 75.18% had reduced platelet count. The sensitivity and specificity of the thrombocytes count regarded as an indicator of malaria was 80.11% and 81.36% respectively. The positive and negative predictive value was 63.87% and 90.86% respectively. An incidence pronounced 60% and 88% in sensitivity and specificity of reduced thrombocyte count for malaria diagnosis in mild febrile patients. A study from India, (Patel *et al.*, 2004) indicates the sensitivity of decreased platelet count collectively with mild febrile symptoms as 100% for *P. falciparum* infection analysis, with a specificity, positive

predictive worth and negative predictive worth of 70%, 86% and 100% respectively, the peripheral circulation via megakaryocytes, thereby preserving decent early haemostasis. Also, a research conducted by Shuaib *et al*., 2009 at University of Medical and Health Sciences Liaquat, Jamshoro over a period of a year reported mild to moderate and severely reduced thrombocyte count in 39people at 10.5%, 180people at 48.6% and 37people at 10% of the total sampling population respectively (370 peripheral blood film of patients). Also, in a case of 27 patients with acute vivax malaria, 24 out of these patients are thrombocytopenic. However on treatment platelet count revert back to normal while anaemia and spleenomegaly were absent. Other causes of thrombocytopenia were ruled out by complete history and by conducting physical examination. DIC was also ruled out by peripheral blood smear examination and measurement of FDP.

Malaria parasitaemia has been demonstrated to have influences on some haematological features from this study while some haematological features are more suggestive of *P. falciparum* infection than others. Anaemia (<11 g/dl), thrombocytopenia (<150x10^9/l) and changes in whole WBC count (<4x10^9/l) have been recognized as the crucial haematological indicators of *P. falciparum* infection in the studied population. Although changes in haematological parameters are solely indicators of possibly malaria infection, during use with other clinical and microscopy features, they relatively enhance malaria evaluation and timely further remedy for Plasmodium falciparum infection

III. CONCLUSION AND RECOMMENDATION

Thrombocytopenia can be a marker of improved severity of plasmodiasis and there should be a need for aggressive management of this disease. There should also be a desire to reexamine the scientific spectrum and severity of *Plasmodium vivax and Plasmodium falciparum* caused malaria mainly in light of reduced platelet count. Thrombocytopenia may not be a reason of mortality by itself but less attention is paid to it by clinicians and other health professionals in Nigeria because it is rarely associated with severe bleeding. We therefore recommend the formulation of separate pointers for management of *P. vivax* and *P. falciparum* with platelet count looking at the severity profile of thrombocytopenia of such patients. Patients with such cases having reduced red cell count and thrombocytopenia should be of interest to clinicians about the potentiality of a malaria infection which can be validated by uisng unique malaria tests.

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