



## THROMBOCYTOPENIA IN MALARIA AND ITS CLINICAL IMPORTANCE

\*<sup>1</sup>Dr. Tapan Biswas and <sup>2</sup>Dr. Animesh Mondal

<sup>1</sup>M. D., Assistant Professor, Department of Medicine, I.D & B.G Hospital, Kolkata -10 West Bengal, India.

<sup>2</sup>Assistant Professor, Malda Medical College, Malda, West Bengal.

**\*Corresponding Author: Dr. Tapan Biswas**

M. D., Assistant Professor, Department of Medicine, I.D & B.G Hospital, Kolkata -10 West Bengal, India.

Article Received on 01/11/2019

Article Revised on 22/11/2019

Article Accepted on 12/12/2019

### ABSTRACT

**INTRODUCTION:** Malaria is a disease that affects almost all blood components but thrombocytopenia is the most common haematological findings. Thrombocytopenia is frequently noticed in both falciparum and vivax malaria. **Materials and Methods:** The study was conducted in a tertiary centre for infection disease Hospital at Kolkata in West Bengal, India. We included all the patients who were admitted with thrombocytopenia and malaria. Excluded those who were co-infection with dengue, chikungunya, scrub typhus or others infection. **Result:** A total of 140 patients were included. 98 (70%) had platelet count <100000/mm<sup>3</sup>. Six patient had severe thrombocytopenia and developed different type of complication. **Conclusion:** Malaria is associated with thrombocytopenia. And thrombocytopenia is correlated with severe malaria. Thrombocytopenia is a good diagnostic tool and prognostic marker in both type of malaria. Objectives. To evaluate the predictive value of thrombocytopenia in malaria.

**KEYWORDS:** Malaria and thrombocytopenia; Thrombocytopenia and severe malaria; Diagnostic and prognostic marker of malaria.

### INTRODUCTION

Malaria is caused by Plasmodium parasites. It is spread through the bites of infected female *Anopheles* mosquitoes. Out of 5 species, *P. falciparum* and *P. vivax* are common. According to the latest *World Malaria Report*, released in November 2018, there were 219 million cases of malaria in 2017, up from 216 million cases in 2016.<sup>[1]</sup> The estimated number of malaria deaths stood at 445 000 in 2017, a similar number to the previous year (446 000).<sup>[1]</sup> According to the World Malaria Report 2017, more than half of the population are at risk.<sup>[2]</sup> In India total number of malarial case is 1.31 million (0.94-1.83 million) and deaths is 23990 (1600-46500).<sup>[2]</sup> Malaria remains today one of the major health problems in most parts of India with increased morbidity and mortality.<sup>[3]</sup>

Thrombocytopenia is a marker for Diagnosis of Malaria.<sup>[4]</sup> Thrombocytopenia is a hall mark of malaria, with enough evidence to suggest that it is commoner in vivax.<sup>[5]</sup> The platelet count correlated inversely with disease severity.<sup>[6]</sup> Thrombocytopenia is associated with malaria with ranging from 40% to 85%.<sup>[7]</sup>

Causes of thrombocytopenia is still poorly understood. Initial hypothesis was decrease bone marrow production but now it is ruled out. A number of observational studies have confirmed the association of

thrombocytopenia to malaria.<sup>[8]</sup> Both non-immunological as well as immunological destruction of platelets have been implicated in causing thrombocytopenia. The speculated mechanisms are coagulation disturbances, sequestration in spleen, antibody mediated platelet destruction, oxidative stress, and the role of platelets as cofactors in triggering severe malaria. Thrombocytopenia is a common finding in malaria, but its correlation with the type of malaria and prognostic implications has not been evaluated in large studies.

### METHODOLOGY

The study was conducted in a tertiary care centre for infection (I.D& B.G) Hospital at Kolkata in West Bengal, India. It was a retrospective observational study on all febrile patients with thrombocytopenia. All patients, who are 18yr. or above, diagnosed with malaria on peripheral smear were enrolled for the study. Total number of population was 140. The Study was conducted from 1<sup>st</sup> July to 31<sup>st</sup> December, 2018. Baseline platelet counts were done on the day of presentation. Daily platelet counts were done to see the both increasing trend or decreasing trend at least 3 to 4 day. Thrombocytopenia was defined as platelet count <1 lac/cumm. Platelet count was done at "Automatic cell counter, part-4" and corroborated with slide count from peripheral smear. The malaria was diagnosed by "Rapid kit test" followed by thick & thin smear of peripheral

blood. The most common causes of thrombocytopenia was dengue which was excluded by NS1Ag, and dengue IgM. Others causes of thrombocytopenia were hypoplastic anemia, severe sepsis, leukemia were excluded by CBC & Peripheral smear. Chicken pox, measles, diphtheria, influenza were excluded clinically.

## RESULT

A total of 156 patients diagnosed on peripheral smear with malaria were enrolled for the study. 16 were excluded for coinfection with dengue or associated sepsis. Out of 140 patient, 100 patients had *P. vivax* mono-infection, 22 had *P. falciparum* malaria and 18 had mixed malaria. Hence, total 140 patients with malaria were included in the study. The age of patients ranged from 18 to 70 years. Number of patient had low platelet count <1 lac/cumm was 98(70%). Average platelet count amongst them was 85,800/cumm and mean hemoglobin was 9.2 gm%. Three patient was presented with cerebral malaria with platelet count was below 40,000/cmm. Two patient shown feature of acute renal failure whose platelet count was below 50,000/ccm. One patient had jaundice with platelet count was 47,000/ccm. None of them had ARDS, Circulatory failure. None of them had any bleeding disorder. No age or sex prediction was observed.

## DISCUSSION

Malaria is a disease that affects almost all blood components. Reduced platelet production and survival, and increased splenic uptake of platelets are causes of severe thrombocytopenia leading to bleeding diathesis. Initially thrombocytopenia was thought to be a feature of *P. falciparum*. Since the beginning of the 1970s, reports of similar degree of thrombocytopenia in *P. vivax* and *P. falciparum* infections started coming in.<sup>[9]</sup> Most of the major publications related to frequency of thrombocytopenia in *P. vivax* malaria were published in the late 1990s, probably due to availability of automated machines. Around the same time, reports of severe, complicated malaria with *P. vivax* infection also started being published. But by WHO, thrombocytopenia is not considered to be a severity criterion by itself due to the inability to cause death per se.<sup>[10]</sup>

Many studies have shown a wide range of thrombocytopenia and severity in *P. vivax* malaria but they included only pediatric patients. In other study percentage of thrombocytopenia was 40% to 85%.<sup>[7]</sup> but in this study it is 70%. One study in Pakistan found 53% of thrombocytopenia in malaria.<sup>[11]</sup> Thrombocytopenia is common occurrence in malaria as can be used as a reliable diagnostic marker.<sup>[12]</sup> We excluded dengue as well as sepsis patients as these are the major causes of thrombocytopenia in our region.

We also assessed the association of thrombocytopenia with complication of malaria specially *vivax* malaria. More recent data in India has shown how thrombocytopenia exhibited a heightened frequency and

severity among patients with *P. vivax* infection.<sup>[13]</sup> Thus, this study highlights that all complications of malaria are observed with low platelet count. So, thrombocytopenia may be used as a severity marker of severe malaria. It should be included in the WHO definition of severe malaria. But only platelet count is not an independent predictor of severity of malaria.

## CONCLUSION

Malaria is associated with thrombocytopenia. And thrombocytopenia increased chances of complications specially in *vivax* malaria. Thrombocytopenia is a good diagnostic tool and prognostic marker in both type of malaria. Presence of thrombocytopenia in a patient with acute febrile illness in the tropics increases the possibility of malaria. Thrombocytopenia may not be a cause of mortality by itself, but it can be as severity marker of malaria. We also recommend separate guidelines for management of *P. vivax* with platelet count <1 lac/cumm. It identifies the set of patients who will need aggressive management.

## ACKNOWLEDGMENTS

We acknowledged the vital role of paramedical staff and lab technician in our medical institute to providing the proper medical care for these patient. We also acknowledge others Faculties and medical officer who encouraged us to publish this article. We also acknowledge the junior doctors who help us by drawing blood.

**Consent:** Informed consent is taken from each patient.

## CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests regarding the publication of this paper.

## REFERENCES

1. World malaria report - World Health Organization <https://apps.who.int/iris/bitstream/handle/9789241565653-eng>, 2018.
2. Malaria in India - Malaria Site - [www.malariasite.com/malaria-india.2024-Thrombocytopenia in Malaria: A clinical study.](http://www.malariasite.com/malaria-india.2024-Thrombocytopenia%20in%20Malaria%3A%20A%20clinical%20study) [www.alliedacademies.org/articles/thrombocytopenia-in](http://www.alliedacademies.org/articles/thrombocytopenia-in).
3. Thrombocytopenia as a Marker for Diagnosis of Malaria, [www.iosrjournals.org/iosr-jdms/papers/Vol13-issue9/](http://www.iosrjournals.org/iosr-jdms/papers/Vol13-issue9/).
4. Thrombocytopenia in malaria: its usefulness in a clinical... [journals.sagepub.com/doi/10.1177/0049475514543941](http://journals.sagepub.com/doi/10.1177/0049475514543941).
5. The clinical implications of thrombocytopenia in adults with...[bmcmedicine.biomedcentral.com/track/pdf/10.1186/](http://bmcmedicine.biomedcentral.com/track/pdf/10.1186/).
6. Thrombocytopenia in malaria. - PubMed Central (PMC) [www.ncbi.nlm.nih.gov](http://www.ncbi.nlm.nih.gov), 2004; 96(9).
7. Study of thrombocytopenia in patients of malaria- [www.ncbi.nlm.nih.gov](http://www.ncbi.nlm.nih.gov), Jan-Jun 2013; 3(1).

8. P. J. Beale, J. D. Cormack, and T. B. Oldrey, "Thrombocytopenia in malaria with immunoglobulin (IgM) changes," *British Medical Journal*, 1972; 1(796): 345–349.
9. WHO, "Severe falciparum malaria," *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 2000; 94(1): S1–S90.
10. Shiraz Jamal Khan, Yasir Abbass, and Mumtaz Ali Marwat- Thrombocytopenia as an Indicator of Malaria in ... - Hindawi [www.hindawi.com/journals/mrt/2012/405981](http://www.hindawi.com/journals/mrt/2012/405981).
11. Dr.Jitendra Kumar et al - Thrombocytopenia as a Marker for Diagnosis of Malaria. [www.iosrjournals.org/iosr-jdms/papers/Vol13-issue9/](http://www.iosrjournals.org/iosr-jdms/papers/Vol13-issue9/).
12. D. K. Kochar, A. Das, A. Kochar et al., "Thrombocytopenia in Plasmodium falciparum, Plasmodium vivax and mixed infection malaria: a study from Bikaner (Northwestern India)," *Platelets*, 2010; 21(8): 623–627.