

DEGREE OF THROMBOCYTOPENIA AND MALARIA PARASITE SPECIES

Shabbir Hussain,¹ Moin Ud Din Sabir,¹ Syed Musharraf Imam,¹ Arshad Khushdil¹

ABSTRACT

Background: Malaria is a common health issue of our country and has shown variable prevalence in different regions of the world. It has a vast array of clinical presentation including, high grade fever with rigors and chills, headache, dizziness, acute renal failure, hepatopathy, joint pains and congenital malaria. It has various abnormalities on laboratory indices like thrombocytopenia, anemia, and leucopenia. **Objective:** This study was conducted to find out the degree of thrombocytopenia and types of the parasites among malaria patients from upper Punjab. **Patients and Methods:** This descriptive case series was conducted in CMH, Kharian, from 1st September, 2011 to 30th September, 2012. All the suspected malaria patients were included on the basis of history, physical examination and diagnosed on laboratory parameters (thick and thin films). The data was entered and analyzed in SPSS version 16. **Results:** Out of the 273 enrolled cases in our study, 190 (69.6%) had malaria. 145 (76.3%) were infected by Plasmodium vivax and 45 (23.7%) had falciparum malaria. Out of these 190 patients 151 (79.5%) had thrombocytopenia, and among these patients having thrombocytopenia, 118 (78.1%) were infected by vivax species and 33 (21.8%) were infected by Falciparum species. **Conclusion:** It is concluded from our study that majority of the patients in this region of country, are suffering from Vivax and Falciparum malaria and present with varying degree of thrombocytopenia.

Key Words: Malaria, Thrombocytopenia, Vivax, Falciparum

INTRODUCTION

Malaria is a major health problem worldwide, with a varying degree of mortality and morbidity.¹ It has been estimated that it effects around 300-500 million people around the globe with an estimated 20 million casualties every year.^{2,3} Malaria has a mortality burden of 3%.⁴ In Pakistan, it is reported that malaria has a prevalence of about 43% and it continues to threaten millions of people.^{5,6}

Malaria is associated with a variety of hematological problems amongst which are anemia and thrombocytopenia.^{7,8} It can lead to various other complications like disseminated intravascular coagulation, acute renal failure, jaundice with hepatic dysfunction, altered consciousness, seizures, vomiting, diarrhea, cough, splenomegaly, and congenital malaria.⁷⁻¹¹

Thrombocytopenia is the most frequently occurring hematological abnormality in patients suffering from malaria but its association with the offending species of the malaria parasite and severity of thrombocytopenia has not been demonstrated in detail in larger groups of our

Population. Various causes for thrombocytopenia have been postulated which include immune mediated lysis, splenic sequestration, dysgenesis,² and raised IL 10 levels.¹²

We have conducted our study in a tertiary care Hospital with a catchment area that includes districts of Gujrat, Mandibahauddin and Jhelum and it provides all the health related services. The objective of the study was to determine the prevalence of the type of malaria parasite and correlate the hematological response with regards to thrombocytopenia among these patients.

PATIENTS AND METHODS

Our study was a descriptive case series conducted in CMH, Kharian, from 1st September 2011 to 30th September 2012. All the patients from 6 months to 12 years of age were included in the study, who presented with high grade fever, rigors, chills, sweating, joint pains, body aches, headache, seizures and dizziness, in the outdoor, indoor and the causality reception centers.

Detailed history and examination were done and filled on a questionnaire. Four ml of venous blood was taken in specialized bottle and sent for Giemsa staining (thick and thin film) and automated Coulter analyzer to evaluate for thrombocytopenia. Those who had decreased platelet counts were again tested by the manual method. Thrombocytopenia was classified in three categories.

1. Paediatric Medicine Department, Combined Military Hospital, Kharian.

Correspondence: Lt. Col. Shabbir Hussain, Consultant, Pediatrician/ Neonatologist, Paediatric Medicine Department, Combined Military Hospital, Kharian, Kharian Cant.

Phone: 0300-9113908

Email: shabbirmoez@yahoo.com

Mild thrombocytopenia: Less than 150,000 to more than 50,000

Moderate thrombocytopenia: Less than 50,000 to more than 20,000

Severe thrombocytopenia: Less than 20,000

This was according to the protocol used by Memon et al.¹³

The criteria of exclusion used in the selection of cases included patients diagnosed to have meningitis, encephalitis, pharyngitis, urinary tract infections, history of a bleeding disorder, drugs (quinine, hemolytic agents) and those who were unwilling to be enrolled in the study. The data collected was analyzed by SPSS 16. Frequency and percentages were calculated for type of species and level of thrombocytopenia.

RESULTS

Out of the 273 suspected malaria patients enrolled in our study, 190 (69.6%) had malaria diagnosed on the Giemsa staining, while 83 (30.4%) cases did not have malaria. Ninety-six (50.5%) cases of malaria were males and ninety-four (49.5%) were females. Amongst those who had malaria 145 (76.3%) were infected with the vivax strain and 45 (23.7%) were infected by the falciparum strain. Out of those who were diagnosed to have malaria 151 (79.5%) had thrombocytopenia and 39 (20.5%) did not have thrombocytopenia.

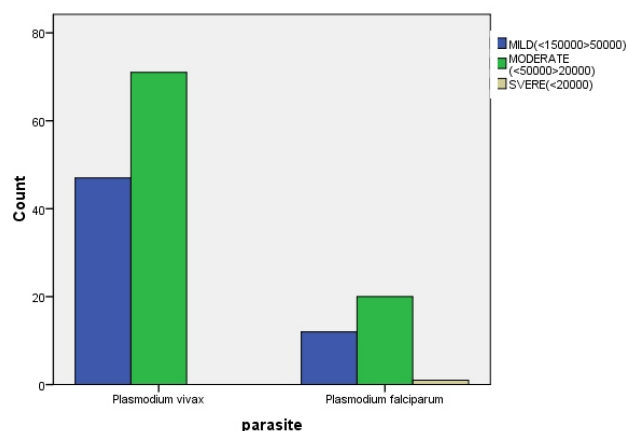
Amongst those who were having thrombocytopenia, 118 (78.1%) were having vivax strain as the offending organism and 33 (21.8%) were suffering from falciparum malaria. Fifty-nine (39.1%) had mild thrombocytopenia, 91 (60.3%) had moderate thrombocytopenia and only 1 (0.7%) had severe thrombocytopenia (Table I).

Table I: Degree of Thrombocytopenia

Thrombocytopenia	Frequency	Percent
Mild(<150000>50000)	59	39.1%
Moderate(<50000>20000)	91	60.3%
Severe(<20000)	1	0.7%
Total	151	100%

Forty-seven (39.8%), were having mild and 71 (60.16%) moderate degree of thrombocytopenia in the vivax infected cases. In Falciparum infected cases 12 (36.3%), 20 (60.6%) and 01 (3.03%) were having mild, moderate and severe degree of thrombocytopenia respectively (Figure I).

Figure I: Parasite and degree of Thrombocytopenia



DISCUSSION

Malaria presents in a variety of clinical scenarios which include fever, jaundice, abdominal pain, altered consciousness, diarrhea, cough, seizures, acute renal failure, hepatopathy and congenital malaria.^{9,10,11} It has been associated with varying degrees of thrombocytopenia. It is present in both vivax and falciparum infections and the absence of normal quantity of platelets on the peripheral film is an indicator of malaria as a cause of the febrile illness.¹⁴ This thrombocytopenia can have hemorrhagic manifestations or can occur as part of disseminated intravascular coagulation.¹⁵

The process by which thrombocytopenia develops is not clearly understood. However, several theories have been postulated which include immune mediated lysis, sequestration, dysgenesis, defective platelet surfaces and the ingestion of the platelet itself by the malaria parasite, all contributing to the development of thrombocytopenia.^{1,14} Casals C, in his study has demonstrated that a raised concentration of IL 10 is responsible for the decreased platelet count.¹² Thrombopoietin is required for growth and production of the platelets and is elevated in situations of platelet depletion. Its levels have been demonstrated to be considerably higher in states of severe malaria with values returning to normal at 14-21 days of the treatment.^{1,16}

In our study, we have found that 79.5% of the patients suffering a malarial infection have thrombocytopenia. These results are comparable to results of 69.18% by Shuaib, 72% by Uttra and 78% by Jadhav.^{2,14,1} However a study conducted by Sheraz demonstrated that 58% of the cases suffering from malaria had thrombocytopenia and Bashwari

established 53% incidence of thrombocytopenia in his study.^{17,18} Hence it can be inferred that finding of thrombocytopenia is an important aid in the diagnosis of malaria. It is considered an important predictor of severity in children suffering from falciparum malaria.¹⁹ We have found that amongst the Plasmodium vivax infected, 39.8% had mild and 60.16% had moderate degree of thrombocytopenia. These results are comparable to studies conducted by Metanat, Makkar and Aggarwal.²¹⁻²³ It has been postulated that reasons for thrombocytopenia in the vivax infected cases include immune/non immune destruction of platelets and evolution of new strain of vivax. Further studies are required in this direction to establish the exact cause.

CONCLUSION

Malaria should be excluded from any febrile illness which has thrombocytopenia as a feature. We have demonstrated in our study that a high frequency of thrombocytopenia is present with plasmodium vivax infections and more cases of vivax malaria are present in this region of our country.

REFERENCES

- Jadhav UM, Patkar VS, Kadam NN. Thrombocytopenia in Malaria- Correlation with type and severity of malaria. JAPI 2004;52:615-18.
- Ansari S, Khoharo HK, Abro A, Akhund IA, Qureshi F. Thrombocytopenia in plasmodium falciparum malaria. J Ayub Med Coll Abbottabad 2009;21(2):145-147.
- Khan MA, Smego RA Jr, Razi ST, Beg MA. Emerging drug resistance and guidelines for treatment of malaria. Med Today 2006;4:817.
- Benet S, Woods T, Liyanage WM, Smith DL. A simplified general method for cluster sample surveys of health in developing countries. World Health Statistics Quarterly, 44:98-106.
- Yasinzai MI, Kakarsulemankhel JK. Incidence of human malaria infection in dessert area of Pakistan. J Agric and Social Sci 2008;4:39-41.
- Roll Back Malaria. WHO Eastern Mediterranean Region. Cairo, Egypt. 2002. p.114.
- Shiraz et al. Thrombocytopenia as an indicator of malaria in adult population. Malar Res Treat. 2012; 2012: 405981.
- Manan JA, Ali H, Lal M. Acute renal failure associated with malaria. J Ayub Med Coll Abbottabad 2006;18:47-52.
- Abro et al. jaundice with hepatic dysfunction in plasmodium falciparum malaria. J Coll Physicians Surg Pak 2009;19:363-6.
- Khalid M et al. Falciparum malaria: various presentations. Pak J Med Sci 2006;22:234-237
- Rasheed A, Saeed S, Khan SA. Clinical and laboratory findings in acute malaria by various plasmodium species. J Pak Med Assoc 2009;51:220-3.
- Casals C, Kai O, Newton CR. Thrombocytopenia in falciparum malaria is associated with high concentrations of IL 10. Am J Trop Hyg 2006;75:434-6.
- Memon AR, Afsar S. Thrombocytopenia in hospitalized malaria patients. Pak J Med Sci 2006;22:141-143.
- Utrra KM, devrajni BR, Shaik K, Shah S. Severity of thrombocytopenia and prolonged bleeding time in patients with malaria. World Appl Sci J 2010;9:484-488.
- Kelton JG, Keystone J, Moore J. Immune mediated thrombocytopenia of malaria. J Clin Invest 1983;71:832-836.
- Kreil A, Wenisch C, Brittenham G, Looareesuwan S. Thrombocytopenia in plasmodium falciparum malaria. Br J Hematolo 2000;109:534-6.
- Khan SJ, Khan FR, Usman M, Zahid S. Malaria can lead to thrombocytopenia. Rawal med J 2008;33:183-5.
- Bashwari LA, Mandil AM, Bahnassy AA, Alshamsi MA, Bukhari HA. Epidemiological profile of malaria in a university hospital in the eastern region of Saudi Arabia. Saudi Med J 2001;22:133-8.
- Patel U, Gandhi G, Friedman S, Niranjana S. Thrombocytopenia in malaria. J Natl Med Assoc 2004;96:121-24.
- Rodriguez-Morales AJ, Sanchez E, Vargas M, Piccolo C, Colina R, Arria M. Anemia and Thrombocytopenia in children with Plasmodium vivax malaria. J Trop Pediatr 2005;10:1093.
- Metanat M and Mood B. Malaria vivax and severe thrombocytopenia. Iran j Parasitol 2010;5:69-70.
- Makkar RP, Mukhopadhyay S, Monga A, Gupta AK. Plasmodium vivax malaria presenting with severe thrombocytopenia. Brazilian J Infec Dis 2002;6(5):263-265.
- Aggarwal A, Rath S, Shashiraj. Plasmodium vivax malaria presenting with severe thrombocytopenia. J Trop Pediatr 2005;51(2):1201-2.