

THROMBOCYTOPENIA IN PATIENTS OF MALARIA

Preeti Bajaj¹, Balbir Singh Shah², Amrit K Dhooria³, Manvi Gupta⁴

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ABSTRACT: Background: Thrombocytopenia is commonly seen in patients of Malaria. This study was done to show frequency and severity of thrombocytopenia in patients diagnosed with malaria. Method: The study was carried out on 180 diagnosed cases of Malaria in the Department of Pathology, Dayanand Medical College & Hospital, Ludhiana, Punjab, India from January 2010 to June 2011. Malaria was diagnosed by examination of thick and thin blood films (smears). Patients with peripheral blood smear positive for malarial parasite were included in the study. Platelet count was obtained by using an automated cell counter. Reduced platelet count (thrombocytopenia) was confirmed by manual method and subdivided as mild thrombocytopenia ($>50-149 \times 10^3/\mu\text{L}$), moderate ($>20-49 \times 10^3/\mu\text{L}$) and severe ($< 20 \times 10^3/\mu\text{L}$). **RESULTS:** A total of 180 patients positive for Malaria were included in the study. 99 patients (55%) were positive for Plasmodium vivax, 74 patients (41%) were positive for Plasmodium falciparum and 7 patients (4%) had mixed infection (Plasmodium vivax and Plasmodium falciparum). Out of the total 180 patients, 153 (85%) patients had thrombocytopenia. Mild thrombocytopenia was seen in 100 patients (55%), Moderate thrombocytopenia in 41 patients (23%) and severe thrombocytopenia in 12 patients (7%). The remaining 27 patients (15%) had normal platelet counts. In mild thrombocytopenia, 62% cases were seen in P. Vivax followed by (37%) and (1%) in P. Falciparum and mixed infection (P. Falciparum & P. Vivax), respectively. The age group of the patients ranged from 10-84 years. The highest proportion (48.3%) of different types of malaria was in 20-45 years of age followed by 31.7% in more than 45 years of age. 100 patients (56%) were males and 80 patients (44%) were females. **CONCLUSION:** In our study, thrombocytopenia was the haematological parameter studied. Thrombocytopenia is quite frequently associated with malaria and has been reported by many workers.

KEY WORDS: Malaria. Thrombocytopenia, Plasmodium vivax, Plasmodium falciparum

INTRODUCTION: Malaria remains today one of the major health problems in most parts of India with increased morbidity and mortality [1]. Malaria is caused by protozoa parasite of the genus Plasmodium which infects and destroys red blood cells. Four species of Plasmodia [Plasmodium falciparum (P. falciparum), Plasmodium malariae, Plasmodium ovale and Plasmodium vivax (P. vivax) cause malaria in humans of which P. falciparum is the most common cause of morbidity and mortality [2]. Haematological abnormalities have been observed in patients with malaria, anaemia and thrombocytopenia being the most common [3].

MATERIALS AND METHODS: This hospital based study was conducted on 180 diagnosed cases of Malaria in the department of Pathology, Dayanand Medical College & Hospital, Ludhiana, Punjab, India from January 2010 to June 2011. Malaria was diagnosed by examination of thick and thin blood films (smears). Patients with peripheral blood smear positive for malarial parasite were included in the study. Platelet count was obtained by using an automated cell counter. Reduced platelet count

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(thrombocytopenia) was confirmed by manual method and subdivided as mild thrombocytopenia ($\geq 50-149 \times 10^3/\mu\text{L}$), moderate ($>20-49 \times 10^3/\mu\text{L}$) and severe ($<20 \times 10^3/\mu\text{L}$). The study was approved by the ethics committee. Data was entered in excel spreadsheet and statistical analysis was performed. Correlation of mild, moderate and severe thrombocytopenia with different types of malaria, age and sex was done.

RESULTS: A total of 180 patients positive for Malaria were included in the study. 99 patients (55%) were positive for *Plasmodium vivax*, 74 patients (41%) were positive for *Plasmodium falciparum* and 7 patients (4%) had mixed infection (*Plasmodium vivax* and *Plasmodium falciparum*). Out of the total 180 patients, 153 (85%) patients had thrombocytopenia. Mild thrombocytopenia was seen in 100 patients (55%), Moderate thrombocytopenia in 41 patients (23%) and severe thrombocytopenia in 12 patients (7%) (Table 1). The age group of the patients ranged from 10-84 years. 100 patients (56%) were males and 80 patients (44%) were females.

The platelet counts in the malaria patients ranged from $4-333 \times 10^3/\mu\text{L}$. Among the *Vivax* malaria patients, 62 had mild thrombocytopenia, 8 had moderate thrombocytopenia and 2 had severe thrombocytopenia. Normal platelet counts were seen in 27 patients. Among the *falciparum* malaria patients, 37 had mild thrombocytopenia, 30 had moderate thrombocytopenia and 7 had severe thrombocytopenia. Among the patients suffering from mixed (*Vivax* and *falciparum* malaria) infection, mild thrombocytopenia was seen in 1 patient. Moderate and severe thrombocytopenia was seen in 3 patients each (Table 2). None of the patients suffering from *Falciparum* and mixed infection had normal platelet counts.

Table 1: Platelet Counts in Malaria Patients:

Platelets	No: of patients
Normal platelet counts ($\geq 150 \times 10^3/\mu\text{L}$)	27
Mild thrombocytopenia ($\geq 50-149 \times 10^3/\mu\text{L}$)	100
Moderate thrombocytopenia ($>20-49 \times 10^3/\mu\text{L}$)	41
Severe thrombocytopenia ($<20 \times 10^3/\mu\text{L}$)	12

Table 2: Platelet Counts in patients with different types of Malaria

Type of Malaria	Normal platelet count $\geq 150 \times 10^3/\mu\text{L}$	Mild thrombocytopenia $\geq 50-149 \times 10^3/\mu\text{L}$	Moderate thrombocytopenia $>20-49 \times 10^3/\mu\text{L}$	Severe thrombocytopenia $<20 \times 10^3/\mu\text{L}$	Number of patients
P. vivax	27	62	08	02	99
P. falciparum	-	37	30	07	74
Mixed	-	01	03	03	07

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Table 3: Association of thrombocytopenia with different types of malaria

	FALCIPARUM	VIVAX	MIXED INFECTION	Chi-square	P value
MILD	37 (37.0)	62 (62.0)	1 (1.0)	17.6	<0.001*
MODERATE	30 (73.2)	8 (19.5)	3 (7.3)	52.7	<0.001*
SEVERE	7 (58.3)	2 (16.7)	3 (25.0)	31.5	<0.001*

Figures in parenthesis are percentages (*statistical significant)

In mild thrombocytopenia, 62% cases were seen in *P. Vivax* followed by (37%) and (1%) in *P. Falciparum* and mixed infection (*P. falciparum* & *P. vivax*), respectively. The association between mild thrombocytopenia and type of malaria were statistically significant. (Table 3)

Table 4: Association of sex with different type of malaria

	FEMALE	MALE	P value
FALCIPARUM	34 (45.9)	40 (54.1)	>0.05
Vivax	44 (44.4)	55 (55.6)	>0.05
Mixed	2 (28.6)	5 (71.4)	>0.05

Figures in parenthesis are percentages (*statistical significant)

Proportion of *P. Falciparum* malaria was 54.1% among males as compared to 45.9% in females. The association between sex and *P. Falciparum* malaria was not statistically significant. (Table 4)

Table 5: Association of age with different types of malaria

Age in years	Falciparum	Mixed	Vivax	Total	Chi-square	P value
10-19	13 (36.1)	4 (11.1)	19 (52.8)	36 (20.0)	7.09	0.02*
20-45	33 (37.9)	3 (3.4)	51 (58.6)	87 (48.3)	13.79	0.001*
More than 45	28 (49.1)	0.0	29 (50.9)	57 (31.7)	6.72	0.03*
Total	74 (41.1)	7 (3.9)	99 (55.0)	180 (100.0)		

Figures in parenthesis are percentages (* statistical significant)

Table 5 shows that highest proportion (48.3%) of different types of malaria were in 20-45 years of age followed by 31.7% in more than 45 years of age.

In 10-19 years age group, most common was *P. Vivax* (52.8%) followed by *P. falciparum* (36.1%). The association of age (10-19 years) and different types of malaria was statistically significant. (Table 5)

DISCUSSION: Previous studies also show a high incidence of thrombocytopenia in cases of malaria. Colonel et al [40] reported thrombocytopenia in 72% patients with malaria infection. In Liberia, Mahmood et al studied a total of 145 patients who had *P. falciparum* malaria. Out of these, 109(75.18%) had thrombocytopenia [5]. Bashwari et al [6] from Saudi Arabia reported thrombocytopenia in 53% of malaria cases. Shaikh et al [7] revealed 85.5% patients with malaria

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having a low platelet count. Zubair et al reported thrombocytopenia in 89% patients with *P. vivax*. 68.4% had mild thrombocytopenia, 17.5% had moderate thrombocytopenia and 3.5% had severe thrombocytopenia. 10.5% had normal platelet counts [8]. Among the various haematological changes in malaria, thrombocytopenia is the most consistent one, which occurs in more than half of the patients [9]. In our study, thrombocytopenia was found in 85% of malaria patients. The majority of patients had mild to moderate thrombocytopenia.

CONCLUSION: In our study, thrombocytopenia was the haematological parameter studied. Thrombocytopenia is quite frequently associated with malaria and has been reported by many workers [10].

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AUTHORS:

1. Preeti Bajaj
2. Balbir Singh Shah
3. Amrit K Dhooria
4. Manvi Gupta

PARTICULARS OF CONTRIBUTORS:

1. Associate Professor, Department of Pathology, Dr. Vasant Rao Pawar Medical College, NAS.
2. Professor & HOD, Department of Pathology, PIMS, Jalandhar.
3. Attending Consultant, Department of Pathology, DMCH, Ludhiana, Punjab.

4. Senior Resident, Department of Pathology, DMCH, Ludhiana, Punjab.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Preeti Bajaj,
Associate Professor, Pathology,
Dr. Vasant Rao Pawar Medical College Hospital &
Research Centre, Adgaon, Nashik, Maharashtra.
Email – dr.prbajaj@gmail.com

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