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Research Article

STUDY OF CLINICAL, HAEMATOLOGICAL PROFILE AND OUTCOME IN PATIENTS WITH MALARIA IN A TERTIARY CARE CENTER

Pavani Kiranmayi Munagala, Priyadarshini P and Purushotham Rao B

Department of General Medicine, Andhra Medical College, Viskhapatanam

A R T I C L E I N F O

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A B S T R A C T

Malaria is a major vector-borne infection in India and Visakhapatnam district is one of them. The objective of study is to correlate the haematological and clinical profile with the final outcome.

Materials: Patients with Malaria confirmed by Peripheral Smear, Quantitative buffy coat, or Antigen Assay were investigated, examined and followed up at King George Hospital, Visakhapatnam, from January 2018 to December 2018.

Results: Of the 50 patients, 5 had severe anemia. Plasmodium falciparum was the most frequently observed species. 59.25% of the patients with falciparum malaria had splenomegaly. Lymphocytosis was observed in 36% of the patients. Leucopenia was seen in 16%. Neutrophilia occurred in 22% of cases. Thrombocytopenia was observed in 68% of the patients. Prothrombin time was increased in 22% of the total cases.

Conclusions: Severe anaemia was a poor prognostic factor and had an adverse outcome. Thrombocytopenia was commonly seen. Increased bleeding time was associated with high morbidity.

INTRODUCTION

Malaria is a protozoan disease which is transmitted by the bite of infected female Anopheles mosquitoes. Malaria is a problem in 91 countries with 3 billion population and causes 1200 deaths each day. Malaria remains today, as a heavy burden on tropical communities, a threat to non-endemic countries and a danger to travellers.[1] P.falciparum as well as P.vivax can cause significant hematological changes with high incidence of thrombocytopenia, anemia, lymphopenia and monocytosis.[2] Blood indices should be included in patient evaluations as various hematological abberances can lead to the diagnosis of malaria.[3] Patients infected with different malarial parasites exhibited two distinctive hematological parameters with neutrophil and eosinophil counts being the two parameters most effected, patients infected also shown changes in leucocyte count, platelet count and hemoglobin concentration during infection.[4]

Aims and Objectives

To study and correlate the heamatological and clinical profile with final outcome in patients diagnosed with malaria.

MATERIAL AND METHODS

This study was a prospective observational case series of 50 consecutive cases of malaria from January 2018 to December 2018 admitted in Medical ward at Department of General medicine, King George hospital, Visakhapatnam

Patients diagnosed with malaria on peripheral smear and Quantitative buffy coat or antigen assay were admitted in the medical ward, underwent detailed history, a complete hematological profile which includes complete blood picture and clinical evaluation and followed up every day to correlate the clinical outcome, morbidity and mortality.

Inclusion Criteria

All new cases diagnosed with malaria with required diagnostic tests were included.

Exclusion Criteria

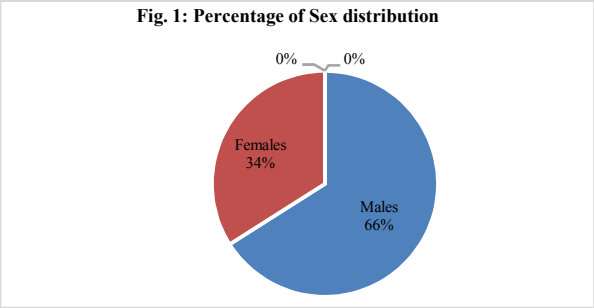
All cases of pyrexia of unknown origin, already diagnosed cases of malaria were excluded.

RESULTS

Sex Distribution: Males 33 and females 17 enrolled, total subject population 50.

Corresponding author:* **Pavani Kiranmayi Munagala
Department of General Medicine, Andhra Medical College, Viskhapatanam

Fig. 1: Percentage of Sex distribution



Ratio of male to female ratio is 1.94:1

Table 1 Demographic Distribution In The Study

Geographical locality	Males	Females	Percentage
Rural	22	12	68%
Urban	11	05	32%
Total	33	17	100%

In this study, the majority of the population was from rural areas. About 68% of the patients were from rural areas. The M: F distribution in rural areas was 2: 1 even in the urban patients the M: F ratio was around 2.4:1.

Table 2 Age Distribution in the Study

Age group	No of patients	Percentage
21-30	21	42%
31-40	16	32%
41-50	7	14%
51-60	5	10%
> 60	1	2%

In this study, the predominant age group affected was the age group between 20-40 years. More than 70% of the patients were young individual who were working. The number of people above the age of 60 years was very less i.e., 2%.
The mean age in this study was 34.74 years.

Fig. 2: Distribution of Plasmodium Species In The Study

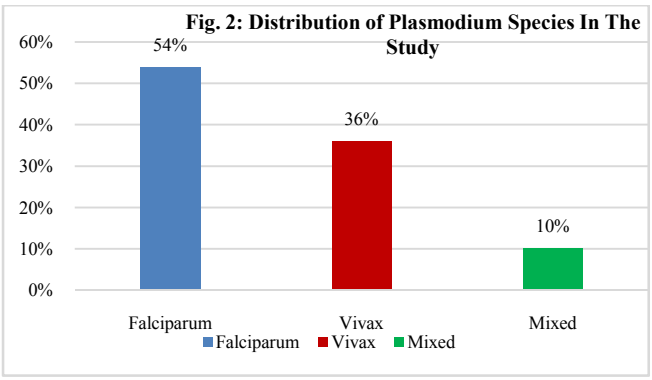


Table 3 Symptoms of the Patients at the Presentation

Symptoms	Pl.falciparum (%)	Pl.vivax (%)	Total (%)
Fever	96.3	94.4	96
Chills and rigors	77.8	72.2	78
Easy fatiguability	33.3	22.22	28
Nausea and vomiting	44.44	44.44	48
Cough	7.4	5.5	8
Altered sensorium	14.8	0	12

Table 4 Clinical Signs in Patients In The Course of Study

CLINICAL SIGN	Percentage	Falciparum	vivax	Mixed
Pallor	74%	81.48%	61.1%	80%
Splenomegaly	48%	59.25%	22.2%	80%
Icterus	16%	25.9%	0	20%
Hepatomegaly	16%	22.22%	5.5%	20%
CNS involvement	18.5%	0	20%	12%

Table 5 Severity of Anaemia in the Study

Severity of anaemia	No of patients	Percentage
Mild	11	22%
Moderate	12	24%
Severe	8	16%
Total	31	62%

Table 6 Leucocytic Counts in the Study

Leucocytes	Falciparum	Vivax	Mixed	Total
Lymphocytosis	12(44.4%)	5(27.7%)	1(20%)	18(36%)
Lymphopenia	5(18.5%)	0	1(20%)	6(12%)
Neutrophilia	7(25.9%)	3(16.6%)	1(20%)	11(22%)
Neutropenia	6(22.2%)	2(11.1%)	0	8(16%)
Eosinophilia	0	2(11.1%)	1(20%)	3(6%)
Monocytosis	4(14.8%)	3(16.6%)	0	7(14%)

Table 8 Association of Anaemia and Splenomegaly

Anemia	Splenomegaly		Total
	Present	Absent	
Present	16	15	31
Absent	8	11	19
Total	24	26	50

Association of Anaemia and Splenomegaly

Anaemia was present in 62% of patients, and among them, 24 patients had splenomegaly i.e., 51.6% of the patients with anaemia had splenomegaly. And 66.6% of patients who had splenomegaly were found to have anaemia.

Table 9 Association of Thrombocytopenia and Splenomegaly

Thrombocytopenia	Splenomegaly		Total
	Present	Absent	
Present	18	16	34
Absent	6	10	16
Total	24	26	50

Association of Thrombocytopenia and Splenomegaly

Of the total 50 cases, 34 patients had thrombocytopenia and 52.9% of the patients with thrombocytopenia had splenomegaly. 75% of the patients with splenomegaly had thrombocytopenia.

Table 10 Hematological Indices in the Study

INDICES	Total	falciparum	vivax	mixed
PCV decreased	86%	88.8%	83.3%	80%
Hematocrit decreased	14%	18.5%	5.5%	20%
Elevated ESR	60%	74%	39%	60%
aPTT	14%	14.8%	5.55%	40%
Thrombin time	22%	26%	16.6%	20%
Bleeding time	6%	7.4%	0	20%

Erythrocyte Sedimentation Rate (ESR)

Very high ESR >60 mm/hr was seen in 14% of the total patients. 6 out of 27 patients with falciparum malaria had very high ESR. 1 out of 5 with mixed infection had very high ESR. None of the18 patients with vivax malaria had very high ESR.

Activated partial thromboplastin time: Mean aPTT was 29.0

Thrombin Time: Mean PT was 13.99 seconds.

Bleeding time: Mean bleeding time was 5.08 seconds. Out of the three patients with increased bleeding time, two presented with bleeding.

Table 11 Mortality in The Study

No of deaths	Total	Falciparum	vivax	mixed
No of patients	01 (2%)	01(3.7%)	0	0

Patient with mortality was infected with falciparum malaria, had severe anemia with increased bleeding required blood transfusion because of hemodynamically instability and a more extended stay at the hospital.

DISCUSSION

Sex distribution in the study 1.94:1 was found less than Bhakshi *et al*[5] with M: F – 2.9:1 Age distribution in our study is slightly higher in the younger age group (< 30 years) and lesser in age group (30-49 years) when compared to Malhotra *et al*.[6] Mean age (34.74 years) is slightly higher when compared to other studies Sharma *et al*[7] (27.44 years) and Bhakshi *et al*[5] (25.8 years).

Table 12 Comparison of symptoms with other studies

Symptoms	Mehta *et al*[8]	Malhotra *et al*[6]	Present study
Fever	100%	100%	96%
Vomiting	43.3%	-	48%
Cough and SOB	4.47%	-	8%
Altered sensorium	-	50%	12%

Table 13 Comparison of signs with other studies

Signs	Malhotra *et al*[6]	Present study
Pallor	75%	74%
Icterus	25%	16%
Splenomegaly	31.25%	48%
CNS involvement	12.5%	12%

Splenomegaly was seen in 48% of the patients in our study, and similar rates were observed in a survey by Murthy *et al*[9] with 50%. High incidence of splenomegaly was noted in a study conducted by Ram *et al*[10] the where incidence was 88.75% in their study. Nand *et al*[11] also observed a comparatively high incidence of 60%.

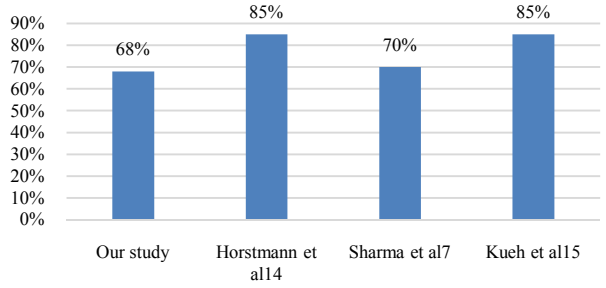
Table 14 Comparison of Plasmodium species in different studies

Species	Reddy *et al*[12]	Bhakshi *et al*[5]	Present study
Pl. falciparum	36.8%	60%	54%
Pl. Vivax	61.2%	35%	36%
Mixed	1%	5%	10%
Total	100%	100%	100%

Table 15 Comparison of hematological parameters in different studies

Parameters	Sharma *et al*[7]	Malhotra *et al*[6]	Naval hospital[13]	Present study
Anaemia	86.7%	81.2%	78%	62%
Leucocytosis	13%	-	-	12%
Leucopenia	6.6%	13.7%	26%	18%
Thrombocytopenia	90%	41%	36%	68%

Fig. 3: THROMBOCYTOPENIA COMPARED TO OTHER STUDIES



Erythrocyte sedimentation rate

In our study, the patients with falciparum malaria with elevated ESR was seen in 74.07% cases. This was comparable to the study by Bakshi *et al*[5] with of 75% cases.

Coagulation Profile

Prothrombin time: In our study PT was increased in 25.9% of cases with falciparum malaria. In a study conducted by R Clemens *et al*[16] PT prolonged in 22.7% of cases of falciparum malaria.

Activated partial thromboplastin time: In our study, APTT was found to be increased in 14% of the patients. In a study conducted by S.Roy *et al*.[17,] APTT increased in 16.6% of the patients this was similar to what we observed in our study.

Bleeding time: 6% of patients had increased bleeding time, which is in accordance with study by Sharma *et al*[7], where 6.7% of patients had increased bleeding time.

In a study by S Roy *et al*[17] on falciparum malaria cases 5% of the patients have increased bleeding time and in our study, it was 7.4% patients.

CONCLUSIONS

Malaria was found to affect people of the younger age group of the 3rd and 4th decade and predominantly in rural areas.

Falciparum malaria was more common being a tertiary care center and more debilitating than other species of malaria.

Anemia, splenomegaly, thrombocytopenia were commonly seen in cases of malaria.

Increased bleeding time and altered coagulation profile was found to cause more hemodynamical instability and morbidity. Severe anaemia is a poor prognostic factor and it increased the duration of hospital stay and even mortality.

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