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Research Article

**STUDY TO KNOW THE HEMATOLOGICAL CHANGES THAT
OCCUR IN MALARIA****Dr. Farah Arshad Chishtee¹, Dr. Afia Basit², Dr. Naima Ghias³**
Mayo Hospital Lahore^{1,2,3}**Abstract:**

Objective: The aim of this study is to know the hematological changes that occur during the incubation period of Malaria.

Study Design: A descriptive study.

Place and Duration: In the Medical Department of Mayo hospital, Lahore for six months duration from June 2018 to December 2018.

Methodology: All patients over 12 years of age were included in the study because of a positive smear for falciparum malaria. The following patients were not included in this study: those suffering from non-falciparum malaria; those suffering from congenital hemolytic anemia and bleeding disorders. A thorough history and a specific clinical examination were performed, including complete blood picture, peripheral smear, platelet count, reticulocyte count, urine, prothrombin time, partial thromboplastin time.

Results: Of the 100 patients, 58% were male and 42% were female (1.38: 1). Anemia was present in 34 patients (female / male ratio 1.42: 1) and showed that women were predominant. The mean age of anemic patients was 21.75. Hemoglobin range (4.2-10.5 g / dl). Hemoglobin was less than 8, in 15 patients (44.11%), male / female ratio (1: 2.25) was found. Anemia was predominantly of hemolytic origin, as determined by indirect bilirubin and an increase in reticulocyte count, and this was found in 94% of total anemic patients. Anemia type was normocytic normocytic (93%) as shown by peripheral smear and blood indexes; however, 7 patients were type small cell hypochromic. Thrombocytopenia was detected in 44 cases with female / male ratio (1.44: 1), the observed range was 20.000-38.7400 / mm³. Platelets counts less than 50000 / mm were found to be significant in 15 patients with female dominance. Most of the patients had a normal leukocyte count (n = 68), but 29% of women with male to male ratio had a leukopenia count of less than 5000 / mm³ (1.9: 1). Leukocytosis was rare in 3% of patients. Prothrombin time and APTT increased in 17% of total patients, ranging from 12.1 s to 38.5 s and 23.2 to 74 s respectively. PT > 32.5 seconds and APTT > 64 seconds were observed in 4 patients. PDF was performed only in patients with elevated PT and APTT and significantly increased in 4% of men with female ratio (1: 1).

Conclusion: The complete blood picture is useful for detecting the patients with severe malaria and to get much information from them, so that early and aggressive treatment is performed on time. In addition, physicians should know the possible hematological complications of falciparum malaria and be prepared to treat the patient with blood transfusion and fresh frozen plasma.

Key words: complete blood count, complications, falciparum malaria.

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INTRODUCTION:

Humans are host to about 300 species of parasite species and more than 70 species of protozoa, some derived from our primate ancestors, some of them from domesticated animals, or from other species from which we have been in contact during our relatively short history. In the world.1 Plasmodium vivax, Plasmodium Malaria and Plasmodium ovale, developed together with humanity or encountered human species in the early stages of Homo evolution. On the other hand, Plasmodium falciparum was transferred to humans more recently by monkeys, possibly between the end of the Mesolithic and the beginning of the Neolithic era. Malaria is a serious parasitic disease that causes high morbidity and mortality in the developing world. Malaria is one of the most serious diseases contributing to a large part of the total deaths in Pakistan caused by malaria in South Asia. Districts and agencies surrounding the Islamic Republic of Afghanistan and the Iranian Republic represent 37% of the malaria burden with an annual parasitic incidence (API) of over 4.5 / 1000 inhabitants. The high prevalence rate of P. falciparum (71.7: 1633/2275) constitutes an important health hazard, and 28.2% of P. vivax (282/2275) may cause serious complications such as cerebral malaria.6. Complications observed in P. vivax: thrombocytopenia; liver dysfunction; kidney damage and acute respiratory distress syndrome (ARDS). Monoval infection with P. vivax may cause cerebral malaria and multiple organ dysfunction. In a Pakistan study, the most common finding was thrombocytopenia. Low hemoglobin, oligo / anuria at admission, hyperbilirubinemia, cerebral malaria, diffuse intravascular coagulation and high serum creatinine were the main determinants of mortality. Severe anemia, respiratory distress, jaundice, contraction and bleeding were more prominent in young children in malaria. Anemia was significantly more common among pregnant women than non-

pregnant women and was more common in malaria pregnant women than in non-pregnant women. In this non-immune refugee population, severe complications of falciparum malaria are fast and frequent; Aggressive chemotherapy is necessary to reduce morbidity and mortality.

MATERIALS AND METHODS:

This descriptive study was held in the Medical Department of Mayo hospital, Lahore for six months duration from June 2018 to December 2018. All patients over 12 years of age were included in the study because of a positive smear for falciparum malaria. The following patients were not included in this study: those suffering from non-falciparum malaria; those suffering from congenital hemolytic anemia and bleeding disorders. Once included, a detailed history has been written in the past about specific references to jaundice, anemia, and signs and symptoms indicating bleeding anywhere. A focused clinical examination was made with the following: pallor, jaundice, splenomegaly, hepatomegaly, petechiae, and ecchymosis. Relevant studies including whole blood, peripheral smear, platelet count, reticulocyte count, urinary DR, prothrombin time, partial thromboplastin time and fibrinogen degradation were selected in selected patients. A detailed research form was used to record clinical data and related laboratory research. For quantitative variables, the mean (x) and standard deviation (SD) and the frequency / percentages of the qualitative variables were applied after the data analysis in the SPSS 18 version. The results of the study were compared with the local or international studies.

RESULTS:

A total of 100 patients were studied to observe various hematological changes in Falciparum malaria. Different age groups (12-60 years) affected by Falciparum malaria are given in Table 1.

Table 1: Age distribution among malarial patients

Age (years)	No.	Male (n=58)	Female (n=42)	Mean	SD
12– 20	35	21	14	16.23	2.27
21– 30	27	14	13	25.44	2.45
31– 40	19	11	8	35.70	2.61
41– 50	22	5	6	43.95	1.68
51= 60	8	7	1	54.99	2.4

The majority of the patients in this study (n = 62) were associated with age groups below 30 years of

age. 58% of every 100 patients were male and 42% were female and the ratio was male (1.38: 1).

Table 2: Symptoms of malaria (n=100)

Symptoms	No.	%
Fever	92	92.0
Classic tertian fever	21	21.0
Chills	67	67.0
Headache	82	82.0
Fatigue/malaise/myalgia	71	71.0
Symptom Suggestive of Anemia	25	25.0
Nausea or vomiting	52	52.0
Change in behavior/ Conscious level	33	33.0
Jaundice	15	15.0
Diarrhea	21	21.0
Cough	18	18.0
Epistaxis	6	6.0
Bleeding from any site	4	4.0

Table 2 summarizes the main clinical symptoms in malaria patients. Fever was the most common in 92 patients (51 males and 41 females). In total, jaundice was detected in 17 patients (8 males and 9 females).

A total of 25 patients (10 males and 15 females) had symptoms of anemia (1: 1.5). Epistaxis was found in 9 patients (5 males and 4 females).

Table 3: Signs of malaria (n=100)

Signs	No.	%
Temperature > 98.6deg;F	82	82.0
Afebrile	21	21.0
Orthostasis or hypotension	16	16.0
Anemia	29	29.0
Jaundice	19	19.0
Petechiae/Ecchymoses/Bruises	4	4.0
Hepatomegaly	25	25.0
Splenomegaly	38	38.0

Table 3 shows common physical findings. The most common temperature was 82 patients (46 male, 36 female). The second most common symptom was splenomegaly in 38 patients (males 22 and females

16). Anemia was found in 29 patients (12 in males and 17 in females). Jaundice is also important with 19 (men 7 and women 12).

Table 4: Investigation profile of 100 patients presented with falciparum malaria

Investigation	Range	Mean	S.D.
Hb(gm/dl)	4.2 - 15.5	11.58	2.95
TLC/cumm	2300–18300	6985.5	2428.69
Neutrophils	38 - 84%	64.26%	9.04
Lymphocytes	14 - 56%	32.87%	7.9
Eosinophils	1 - 6%	1.88%	1.16
Monocytes	1 - 6%	1.93%	1.45
PCV (l/l)	.17 - .53	0.403	0.108
MCV (fl)	55 – 98	87.27	8.44
MCHC(gm/dl)	23.5 - 35.41	28	4.11
MCH (pg)	21.2 - 31.5	28.09	2.5
Platelets /cumm	20000–387400	174781.9	99015.77
Reticulocyte count %	5 - 7.5%	2.45%	2
Indirect Bilirubin(mg/dl)	23 - 4.7	1.28	1.32
Prothrombin time (sec)	12.1 - 38.5	15.62	5.22
APTT (sec)	23.2 - 74	40.72	9.21

Table 4 shows the main laboratory abnormalities in both sexes according to their severity and frequency. Anemia was present in 34 patients (female / male ratio 1.42: 1) and showed that women were predominant. The mean age of anemic patients was 21.75. Hemoglobin range (4.2-10.5 g / dl). Hemoglobin was less than 8, in 15 patients (44.11%), male / female ratio (1: 2.25) was found. Anemia was predominantly of hemolytic origin, as determined by indirect bilirubin and an increase in reticulocyte count, and this was found in 94% of total anemic patients. Anemia type was normocytic normocytic (93%) as shown by peripheral smear and blood indexes; however, 7 patients were type small cell hypochromic. Thrombocytopenia was detected in 44 cases with female / male ratio (1.44: 1), the observed range was 20.000-38.7400 / mm³. Platelets counts less than 50000 / mm were found to be significant in 15 patients with female dominance. Most of the patients had a normal leukocyte count (n = 68), but 29% of women with male to male ratio had a leukopenia count of less than 5000 / mm³ (1.9: 1). Leukocytosis was rare in 3% of patients. Prothrombin

time and APTT increased in 17% of total patients, ranging from 12.1 s to 38.5 s and 23.2 to 74 s respectively. PT> 32.5 seconds and APTT> 64 seconds were observed in 4 patients. FDP, expensive research was performed only in patients with increased PT and APTT, and it was found that male patients increased significantly in 4% of women (1: 1). Hemoglobinuria was detected in five patients.

DISCUSSION:

Malaria is a fairly common disease that has increased in recent years; this was reflected in the increase in the number of patients hospitalized with malaria fever and various complications. This finding is consistent with a previous study in Quetta. The cases were mostly observed in the summer months, whereas in the winter, cases were rarely reported due to excessive cold. Men were more affected than women, 62% were under 30 years old and consistent with other studies in this region. These findings are similar to those found in endemic areas where the disease is more prevalent in young and old women with immunity and increased immunity due to

repeated exposure. The mean duration of the disease was 7.65 days. Complications and severe malaria are more common in patients with late onset in the hospital. The average length of hospitalization was 5.25 days, which was agreed with other studies in Pakistan. Most of the patients belong to Pakistan or Afghanistan indicating that malaria is high in Afghan refugees. The clinical picture is very similar to the study in other countries, but a number of patients are presented atypical. The main complaints during admission are fever (92%), headache (82%), anemia symptoms (25%), jaundice (17%), nosebleeds and bleeding symptoms. The main symptoms were fever (82%), splenomegaly (38) and anemia (29%) and hepatomegaly. These findings are correlated with many studies conducted in the past in different countries. However, he had no fever, no fever, no diarrhea, no fever and no cough, no fever was seen in 18 patients. These findings strongly support the atypical presentations given in the studies. 58 of the 100 patients were female and 42 of them were significantly more common among women ($n = 34$) compared to other studies (F / M ratio = $1.42 / 1$). Causes can be considered late due to cultural ignorance, poverty, repeated and multiple pregnancies. Anemia was found in 34% of patients; this was compared with the study showing an anemia of 18%. This may be due to the fact that the selected patients are patients with severe malaria and late presentation due to multiple reasons. However, in 7% of patients (F / M ratio = $2.5 / 1$), the type was small cell hypochromic. Reasons include multiple pregnancy-induced iron deficiency, recurrent malaria and worm infestation, and bleeding that may be due to malaria. 44.11% of total anemic patients had a significant aspect of malaria management and also received blood transfusion, indicating the severity and speed of anemia development. Our findings are correlated with subsequent studies and show thrombocytopenia in 44% of patients. Leukopenia is not relatively rare; It occurs in 25% of patients, leukocytosis is not common and occurs in 7% of patients who are consistent with other national studies. Pancytopenia occurs at a rate of 7%, but it is important in the evaluation of a febrile patient by considering the possibility of malaria. Although thrombocytopenia was less than $5.0000 / \text{mm}^3$, it was seen in 15% and PT and APTT were changed in 17 patients. The incidence of clinical CID was only in 4 patients and this finding was well correlated with the international study.

CONCLUSION:

We concluded that TBM is an important investigation. The selection of patients with severe malaria is easy to make informative and useful, so

that early and aggressive treatment is performed on time. In addition, physicians should know the possible hematological complications of falciparum malaria and be prepared to treat the patient with blood transfusion and fresh frozen plasma. This is probably the most effective measure to reduce the high mortality rate of malaria in developing countries such as Pakistan.

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