FREQUENCY OF BICYTOPENIA AMONG PATIENTS PRESENTING TO TERTIARY CARE HOSPITAL WITH MALARIA

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ABSTRACT

Objective: To determine the frequency of bicytopenia among patients presenting to Medical Wards with Malaria.

Study Design: Cross-sectional study.

Place and Duration of Study: This study was conducted in Department of Medicine, Khyber Teaching Hospital Peshawar, from June, 2017 to November, 2017.

Materials and Methods: 100 patients who were diagnosed with Falciparum malaria on peripheral smear examination were included in the study. Sampling technique used was Non-probability consecutive sampling. Frequency of bicytopenia in terms of low white blood cell (WBC) count and low platelet counts was determined by taking 3000/cmm as the cut off for WBC count and 150,000/cmm as the cut off for platelet count. Data was formulated using SPSS 23. Results were expressed as percentages. Mean and standard deviation were taken where required.

Results: In this study males were 58% and females were 42%. The male to female ratio was 1.38:1. Average age of the patients was 24 years$\pm$4 SD. Bicytopenia was found among 32 adults with falciparum malaria. Out of these, 17 were male and 15 were female patients.

Conclusion: Bicytopenia is a common problem in clinical and haematological practice. The incidence is high in malaria patients. Therefore prompt action is required when patients presenting with malaria develop bicytopenia so that one can be treated to reduce morbidity and prolong survival.

Key Words: falciparum malaria; peripheral smear, bicytopenia; white blood cell count; platelet count

INTRODUCTION

Bicytopenia refers to a reduction below normal values of WBC and platelet counts. It can be inherited or acquired. It is caused by decrease in or damage to hematopoietic stem cells and their microenvironment. It can also progress to pancytopenia by causing reduced erythropoiesis resulting in hypoplastic or aplastic bone marrow, maturation defects or differentiation defects such as myelodysplasia. Drugs, chemicals, toxins, infections (malaria) and radiations are important causes of bicytopenia and pancytopenia[1]. Weakness, fatigue and pallor result from anemia; petechiae, purpura and bleeding occur due to thrombocytopenia and infections occur due to leucopenia[2].

Malaria is caused by Plasmodium of genus (falciparum, vivax, ovale, malariae and knowlesi) transmitted to humans by female anopheles mosquito[3]. Malaria affects about 300-500 million people and causes more than a million deaths per year worldwide[4]. The prevalence of plasmodium in Pakistan among treatment seeking patients with suspected malaria was 6.6% in Pakistan and 10.8% in Khyber Pakhtunkhwa[5]. As of 2010, a total of 95 million people which constitute 60% of the total 161 million people afflicted with malaria, live in malaria endemic areas, and Pakistan is one of such areas. In 2006, Malaria Disease Surveillance Program in Pakistan, registered 3.5 million slides and 127825 confirmed cases of malaria with an annual parasite incidence (API) of 0.8 case per 100 population[6].

Bicytopenia is a complication of malaria. A study conducted at Combined Military Hospital, Lahore from 2013 - 2014 also found bicytopenia in a significant number of patients afflicted with malaria[7]. A total of 131 patients were recruited in the study. On day one of admission to hospital, severe thrombocytopenia was seen in 30(22.6%), moderate in 67(50.4%) patients, mild in 26(19.5%) and normal platelet count in 8(6%) of the patients. On day 4 severe thrombocytopenia was seen in 14(10.5%), moderate in 45(33.8%) and mild in 32 (24.1%) of the patients. Leucopenia on day 1 was seen in 39(29.3%) patients. On Day 4, leukopenia was seen in 27(20.3%) patients.

Since malaria is a common infection seen in Pakistan, and it has multiple complications; bicytopenia being one of them, we planned our current study to determine the morbidity associated with malarial infection in terms of bicytopenia.

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MATERIALS AND METHODS

This was a Cross sectional study conducted in Department of Medicine, Khyber Teaching Hospital, Peshawar from June 2017 to November 2017. Total Sample size was 100. Sampling technique was Non probability consecutive sampling. Male and female patients aged between 18 and 57 years were recruited in the study. Approval for the study was taken from the Hospital Ethical Committee. Data was collected after taking informed written consent from all patients. All patients who were positive on peripheral smear examination for plasmodium falciparum were included in the study. Patients who had developed bicytopenia due to other causes were excluded from the study. Both admitted patients and patients seen in the outpatients' department (OPD) were enrolled in the study. Laboratory investigations were done under supervision of single expert pathologist having minimum of five years of experience. Frequency of bicytopenia in terms of low white blood cell (WBC) count and low platelet counts was determined by taking 3000/cmm as the cut off for WBC count and 150,000/cmm as the cut off for platelet count.

Data were analyzed by using Statistical Package for Social Sciences (SPSS) version 23. Quantitative variables were described in terms of mean ± standard deviation. Categorical data were described in terms of frequency and percentages. Bicytopenia was stratified among age and gender to see effect modification. P-value less than 0.05 was considered significant. Data were presented in tables.

RESULTS

A total of 100 patients presenting with malaria were included in the study. There were 58 (58%) males and 42(42%) were females. Male to female ratio was 1.38:1.

Average age of the patients was 24 years+4 SD with range 18 to 57 years. Patient's age was divided in four categories, out of which most common age group for presenting with malaria was 18-27 years. 42(42%) patients were aged between 18-27 years; 30(30%) patients were in the age range of 28-37 years, 18(18%) were aged between 38-47 years and the remaining 10 (10%) were in the 4th group aged between 48-57 years. (Table 1)

The frequency of bicytopenia among adults with malaria was found in 32 (32%) patients while 68 (68%) patients were free of bicytopenia.

Age wise distribution of bicytopenia shows that bicytopenia was observed in majority of patients having

Table 1: Age Wise Distribution of the Patients

	Frequency (n)	Percent (%)	Mean + SD
18-27	42	42	24 years+4 SD
28-37	30	30	
38-47	18	18	
48-57	10	10	
Total	100	100.0	

Table 2: Age Wise Distribution of Bicytopenia

		Bicytopenia		Total	p-value
		Yes	No		
Age (in years)	18-27	14	28	42	0.008
		33.3%	66.6%	100.0%	
	28-37	6	24	30	
		20%	80%	100.0%	
	38-47	8	10	18	
		44.4%	55.5%	100.0%	
	48-57	4	6	10	
		40%	60%	100.0%	
Total		32	68	100	
		32%	68%	100.0%	

Table 3: Gender Wise Distribution of Bicytopenia

		Bicytopenia		Total	p-value
		Yes	No		
Gender	Male	17	41	58	0.369
		29.31%	70.68%	100.0%	
	Female	15	27	42	
		35.71%	64.28%	100.0%	
	Total	32	68	100	
		32%	68%	100.0%	

younger ages. 14 (14%) patients aged between 18-27 years had bicytopenia; 6 (%) patients aged between 28-37 had bicytopenia; 8 (8%) patients aged between 38-47 years were affected and 4 (4%) patients aged between 48-57 years turned out to be having bicytopenia. (Table 2)

Both male and female patients were found to be equally affected by bicytopenia. Among the 32 patients with bicytopenia, 17 were male and 15 were female patients. (Table 3).

DISCUSSION

Malaria is the most widespread public health problem of the tropics among blood infections. Falciparum and vivax malarias are major health problems in Pakistan. In the last decade, there has been a six folds increase in falciparum malaria, which now comprises 42% of all malaria cases recorded by National Malaria Control Program, Pakistan[10].

All cases of falciparum malaria are potentially severe and life threatening, especially when managed inappropriately. A major reason for progression from mild through complicated to severe disease is missed or delayed diagnosis. Once diagnosed, the priority for treatment of complicated and severe disease is the parenteral administration of adequate, safe doses of an appropriate antimalarial, in the setting of highest possible level of clinical care[11].

Plasmodium vivax is the most common prevalent malaria infection and is an important cause of morbidity in endemic areas of Asia, Oceania, Central and South America.[12] Infection due to plasmodium vivax is less severe than falciparum, and blood parasite levels are lower. Parasitized red blood cells do not develop knobs, therefore any microvascular obstruction with resultant brain, kidney, lung, or other organ complications rarely occur[13].

Bicytopenia and pancytopenia are not uncommon haematological problems encountered in clinical practice and should be suspected on clinical grounds when a patient presents with unexplained pallor, prolonged fever and tendency to bleed. Bone-marrow examination for the evaluation of bi- or pancytopenia is a frequently requested investigation. It is one of the most frequent and safe invasive procedures, with little or no risk of bleeding even in the presence of severe thrombocytopenia.

In this study, adult patients aged between 18 and 67 years were included. The male to female ratio was 1.38: 1. Male predominance is also observed in other studies conducted locally in Peshawar,[3,4,15] Jamshoro[16], Abbottabad.[1] Studies conducted abroad Nepal[7], India[17] and Yemen.[18]

Malaria is found to be associated with cytopenias[19], so a clinical assessment with jaundice, spleen and Complete blood count can help us make the complete diagnosis and ruling out other diseases as well. Leukopenia is frequently associated with disease like typhoid fever so while making clinical assessment of malaria some time getting leukopenia misdirects the clinician against the diagnosis of malaria and towards other delay in management and recovery of the patient. By knowing that pancytopenia is seen in quite a number of confirmed cases of malaria helps in early diagnosis, confident management and earlier discharge of the patient[20,21].

CONCLUSION

Bicytopenia is a very important clinical and hematological problem with an extensive differential diagnosis. Bicytopenia is common in the younger age group of patients infected with malarial parasite. It is very important to know the common causes of bicytopenia in our community, as some of them are completely curable while others can be treated to reduce morbidity and prolong survival.

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