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FREQUENCY OF PANCYTOPENIA IN CHILDREN PRESENTING WITH MALARIA

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Abstract

Background: Pancytopenia is a hematological disorder that is caused by a numbers of factors including infections.

Objective: The aim of this study was to find out the frequency of Pancytopenia in Children Presenting with Malaria.

Material and method: The present cross-sectional descriptive study was carried out at the Department of Pediatrics Gambat Institute of medical and health sciences for a period of six months from May 2016 to October 2016 after taking permission from the ethical board of the institute**.** A total of 240 children of various age group (6 months to 18 years) presented with fever, chills, and rigors tested positive for malaria were included. Patients with fever underwent investigations, including special smears and MP. Informed consent from parents was obtained. Data analysis was performed using SPSS version 24.

Results: In the current study a total of 240 malarial individuals were enrolled out of which 144(60%) were male and 96(40%) were females. A total of 93(38.7%) children had pancytopenia, whereas 147(61.25%) were not observed with Pancytopenia. Pancytopenia was more frequent in younger children. Pancytopenia was most prevalent in children with age below 5 years old 24 (36.3%), followed by age 6-10 years 49 (48.5%) and over 16 years old 7 (43.75%) participants**.** Pancytopenia was seen in 55 (38.1%) male and 34 (35.4%) female malaria patients.

Conclusion: The present study concluded that pancytopenia is associated with malaria and in this study its prevalence was 38.7%. Therefore early diagnosis and treatment of malaria is crucial for the prevention of pancytopenia.

Key words: Frequency; Pancytopenia; Children; Malaria

Introduction

A condition in which all three types of blood cells (RBCs, WBCs, and Platelets) have a lower number than normal is termed as Pancytopenia. This is not a specific disorder but a syndrome which affects the bone marrow and causes hematological abnormalities, including pancytopenia in peripheral blood smears. The etiology, clinical pattern, treatment choices, and outcomes in different studies.[1] Haemoglobin levels below 12 gm%, WBC count < 4 × 109/L, and platelet count < 100 ×

109/L are the three signs of pancytopenia . Anaemia is classified as moderate (9-12 gm.%), medium (5-9 gm%), or severe (Hb count < 5 gm%). Leucopenia is characterized as mild (WBCs greater than 3,000/mm3), moderate (WBCs between 1,000 and 3,000/mm3), or severe (WBCs less than 1,000/mm3). The categorization of thrombocytopenia is mild (platelet count >50,000/mm3), moderate (platelet level 20,000-50,000/mm3), and severe (platelet count <20,000/mm3).[2] Pancytopenia often develops gradually over time. Symptoms are usually anaemia and thrombocytopenia, with leukopenia being an uncommon cause of first presentation. According to several studies, pancytopenia is caused by a mix of geographical variance and genetic anomalies.[3] A bone marrow biopsy is essential to diagnose the etiology of pancytopenia. Radiological, biochemical, and microbiological testing can all be useful in certain situations. The management and prognosis of pancytopenia are determined by its severity & underlying etiology. Thus, identifying the appropriate reason will assist in treatment.[4,5] Malaria is an infection caused by Plasmodium genus (malariae, falciparum, vivax, knowlesi and ovale,) and transmitted to humans by female anopheles mosquitos. It affects 300-500 million people worldwide and causes over a million deaths each year.[6] In Pakistan, 6.6% of patients seeking treatment for suspected malaria tested positive for Plasmodium.[7] In 2010, over 60% of Pakistan's population of 161 million people lived in malaria-endemic areas. In 2006, the Malaria Disease Surveillance Programme in Pakistan recorded 3.5 million slides and 127825 confirmed cases of malaria, with an annual parasite incidence (API) of 0.8 cases per individual.[8] Pancytopenia is a malaria complication. A research from India found pancytopenia in 4% of people suffering from malaria [9], whereas a study from Pakistan found it in 9% of malaria patients.[10] Therefore the present study was carried out to find out the frequency of pancytopenia in children presenting with malaria.

Material and method

The present cross-sectional descriptive study was carried out at the Department of Pediatrics Gambat Institute of medical and health sciences for a period of six months from May 2016 to October 2016 after taking permission from the ethical board of the institute**.** A total of 140 children of various age group (6 months to 18 years) presented with fever, chills, and rigors tested positive for malaria were included in this study while individuals suffered from leukemia, had known hematological abnormalities and pancytopenia of other etiologies were excluded . Malaria patients under 18 years old were included in an OPD research study. Patients with fever underwent investigations, including special smears and MP. Informed consent from parents was obtained. The given information was entered into a predesigned proforma. Exclusion criteria were strictly followed to prevent bias and confounding in the study outcomes. Data analysis was performed using SPSS version 24. Quantitative variables were given as means ± standard deviation. Data was described using percentages and frequencies. Pancytopenia was categorized by age and gender to assess impact modification. Post-stratification was performed using the Chi Square test. P values less than 0.05 are considered significant. Data was presented using tables, graphs, and charts.

Results

In the current study a total of 240 malarial individuals were enrolled out of which 144(60%) were male and 96(40%) were females. Demographic features of the study participants presented in **table 1**. A total of 93(38.7%) children had pancytopenia, whereas it was not observed in 147(61.25%) patients. Pancytopenia was more frequent in younger children. Pancytopenia was most prevalent in children with age below 5 years old 24 (36.3%), followed by age 6-10 years 49 (48.5%) and over 16 years old 7 (43.75%) participants as shown in **table 2.** Pancytopenia was seen in 55 (38.1%) male and 34 (35.4%) female malaria patients as presented in **table 3.**

Table 1. Study participants age wise distribution		
Age in Years	Frequency/percentage	Mean + Standard deviation
<= 5	66 (27.5%)	9.51 Years +5.23 SD
6 – 10	101 (42.0%)	
11 – 15	57(23.7%)	
16+	16(6.66%)	
Total	240	

Table 2. Pancytopenia age wise distribution				
Age in Years	Pancytopenia Yes	Pancytopenia No	Total	Value of P
Less than 5 years	24(36.3%)	42(63.6%)	66	0.007
6 – 10	49(48.5%)	52(51.4%)	101	
11 – 15	13(22.8%)	44(77.1%)	57	
16+	7(43.75%)	9(56.2%)	16	
Total	93(38.7%)	147(61.25%)	240(100%	

Table 3. Pancytopenia gender wise distribution			
Gender	Pancytopenia Yes	Pancytopenia No	Total
Male	55(38.1%)	89(61.8%)	144
Female	34(35.4%)	64 (66.6%)	96
Total	89(37%)	153(63.7%)	240

Discussion

Malaria is a prevalent health problem in tropical regions. In Pakistan, Vivax and Falciparum malaria are the most significant public health concerns. Falciparum malaria now accounts for 42% of all malaria cases in Pakistan, representing a 6-fold increase over the last decade, according to the National Malaria Control Programme.[11] Malaria caused by falciparum can be lethal and severe if not properly treated. Undiagnosed or delayed malaria can lead to serious consequences. To treat severe F. Malaria with complications, it's important to provide sufficient medical care and administer safe anti-malarial medications after diagnosis.[12] P.vivax malaria is the most prevalent and leading cause of disease in South and Central America, Asia, and Oceania.[13] P. vivax malaria is less severe and has lower blood parasite levels. Because parasitized RBCs lack knobs, they are less likely to clog microvasculature, resulting in less difficulties for major organs such as the brain, lungs, and kidneys.[14] Pancytopenia is a frequent hematological condition that should be found in cases of prolonged fever, hemorrhage, or pallor. A bone marrow examination is recommended to determine the reason of pancytopenia. This procedure is minimally invasive and has a low risk of bleeding, even with low platelet levels.[15] In the current study Pancytopenia was most prevalent in children with age below 5 years old 24 (36.3%), followed by age 6-10 years 49 (48.5%) and over 16 years old 7 (43.75%) participants. Local and international studies found comparable age ranges.[16, 17] Our study included both male and female children with pancytopenia, as it was not gender-specific. There were 34 females (35.4%), 55 males (38.1%).our study findings are comparable with the study conducted in Peshawar and jamshoro Pakistan in those in which males were more than females. [18,19] ·Over all prevalence in our study was 38.78%. The findings of the present research was similar to the study conducted by ul Haq, Sami, et al. [20] they carried out a cross-sectional study on the malarial patient to find out the prevalence of pancytopenia. They reported 36% prevalence. Plasmodium falciparum malaria may produce pancytopenia. Malaria is more prevalent in low-income communities with inadequate sanitation facilities. Eliminating mosquito breeding areas and spraying pesticides on the home's premises will effectively kill adult mosquitos that enter. Taking anti-malarial drugs is a smart way to avoid malaria.[21] The likely symptoms & signs of severe P. vivax malaria includes cerebral malaria, pancytopenia severe anaemia, jaundice, acute renal failure, splenic rupture & acute respiratory distress syndrome. Acute pulmonary oedema &Severe anaemia

are also common. It is notable that there are no distinct signs & symptoms/management of severe malaria caused by P. vivax, but, quick and efficient management should be like the complicated & severe malaria caused by P. falciparum according to thWHO[2]

Conclusion

The present study concluded that pancytopenia is associated with malaria and in this study its prevalence was 38.7%. Therefore early diagnosis and treatment of malaria is crucial for the prevention of pancytopenia.

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