DOI: https://doi.org/10.53350/pjmhs221610100

ORIGINAL ARTICLE

Etiological Spectrum of Pancytopenia in Children of Southern Punjab

ZILL-E-RUBAB[1*], JAWAD ZAFFAR CHOUDRY[2], ASMA NASEER CHEEMA[1], ZULFIQAR ALI RANA[1]
[1]*Department of Paediatric Hematology, Children Hospital and Institute of Child Health Multan-Pakistan*
[2]*Department of Hematology, Combined Military HospitalMultan-Pakistan*
Correspondence to Dr. Zill-e-Rubab, Email: Zillerubab_naqvi@yahoo.com Tel:+92-334-6049907

ABSTRACT

Background: Pancytopenia is an intermittent hematological finding in children presenting with erratic clinical features like fever, pallor, petechiae, bleeding, distended abdomen, failure to thrive.
Aim: To evaluate the pattern of causes responsible for pancytopenia in children of southern Punjab.
Study Design: Randomized control trail.
Methodology: We enrolled 121 children, aged 1-15 years with pancytopenia after written informed consent for a period of one year in Pathology department of Children's Hospital-Multan. Cell morphology was studied through microscopy on blood peripheral film and bone marrow aspiration film. The relevant investigations were performed to assess the pattern of causative agents in pediatric population of Southern Punjab, Pakistan. Data was presented as percentage through SPSS v20.0.
Results: Fever, pallor and body-aches were the common (80%) clinical presentations in our patients. Mean ± SD age of patients was 7.1± 3.98 years. 56.50% of patients with pancytopenia had hyper-cellular marrow while 43.50% had hypo-cellular marrow. Aplastic anemia and Acute Lymphoblastic Leukemia were the common causes for pancytopenia.
Conclusion: We concluded that aplastic anemia and ALL were the most common causes of pancytopenia in Southern Punjab, Pakistan. Infections and other treatable causes were also important causes of thrombocytopenia present in significant number (21.7%) of patients which we can address timely and reverse the serious outcomes.
Keywords: Anemia, Bone Marrow, Megaloblastic and Pancytopenia.

INTRODUCTION

Pancytopenia is a clinic hematological condition commonly found in paediatric population. It is defined as decrease in all three cellular elements of blood i.e., red blood cells, white blood cells and platelets. Hemoglobin <10gm/dl, TLC <4000cmm and Platelets < $100x10^6/L$[1]. The geographical distribution and genetic alterations have an effect on the underlying causes[2]**.** Patients with cytopenias usually present with pallor, fever, dysnea bleeding, bruising and infections. On examination visceromegaly (hepatosplenomegaly) also found commonly[2,3]. Pancytopenia is not a disease but a triad of findings that occurs due to a number of disease processes involving bone marrow primarily or secondarily[4]. The etiological spectrum includes many diseases like viral illness, megaloblastic anemia, infectious diseases, aplastic anemia and malignancies. These may be transient, self-limiting, treatable or life threatening. Its patho-physiology includes processes like suppression of hematopoietic cell production, unproductive hematopoiesis and overactive reticulo-endothelial system. All these processes result in trapping of normal cells thus causing hypersplenism, or replacement of marrow tissue occurs by abnormalor malignant cells[5,6].

Thus literature review revealed that it may be the result of any primary hematological or medical disorder[7]. Hence, their knowledge is important in-order to treat underlying disease and in making their management plan[2]. If the cause of pancytopenia is unclear than bone marrow aspiration/ examination becomes. This is mainly required in case of hypoplasia/aplasia to exclude aplastic anemia and to rule out leukaemia or other malignant infiltration[8]. In South Punjab the causes of pancytopenia particularly in paediatric patients are not well defined and sometimes create problems for the treating paediatrician.

The objective of the study was to evaluate the pattern of causes responsible for pancytopenia in children of southern Punjab.

METHODOLOGY

This study was conducted in the pathology department of children hospital Multan. Children enrolled were 121 with age ranging 1-15 years who had pancytopenia on peripheral film. Written informed consent hadtaken from their attendants (most of the time parents) for bone marrow examination. A detailed history was taken from the attendents and physical examination of the patients wasdone. Laborotory investigations included complete blood count (RBC, Hb TLC,DLC) peripheral blood and marrow aspiration smears were made using Geimsa stain and their morphologies studied under light microscope.
Statistical analysis: Data was presented as percentage and frequency through SPSS v20.0. Age was presented as mean±SD.

Received on 16-05-2022
Accepted on 26-09-2022

RESULTS

There were many clinical features among children. Fever, pallor and body-aches were the common (80%) clinical presentations in our patients. Of total, 15% had bruises. Only 10% of patients presented with petechial heamorrhage, 4% with bleeding gums and 2% with epistaxis as shown in table-1.

Table-1: Clinical features of pancytopenia

Clinical features	Frequency	%age
Pallor	97	80%
Fever	97	80%
Bodyaches	97	80%
Bruises	18	15%
Petechial hemorrhages	12	10%
Bleeding gums	5	04%
Epistaxis	3	02%
Hepatomegaly	26	22%
Splenomegaly	30	25%
Lymphadenopathy	27	23%

Table-2: Etiology of pancytopenia (n=121)

Etiology	Frequency	%age
Aplastic Anemia	50	41.3%
Acute Lymphoblastic Leukemia	29	23.9%
Infections	18	14.1%
Storage disorder	7	5.4%
Idiopathic thrombocytopenic purpura	5	4.3%
Malaria	4	3.3%
Chemotherapy	3	2.2%
Megaloblastic anemia	3	2.2%
Thalassemia	2	1.1%

Mean age with SD among subjects was 7.1±3.98 years. 56.50% of patients with pancytopenia had hyper-cellular marrowwhile 43.50% had hypo-cellular marrow. The commonest cause of pancytopenia

in our study population was aplastic anemia (41.3%) as shown in table-2.

It was analyzed that there was significant correlation among age group and types of disorders in patients with pancytopenia (*p*-value= <0.05). Most of the patients 84(69.42%) were belong to age group of 1-5 years and 11-15 years of children were least common to be patients of pancytopenia as they were only 13(10.75%) as shown in table-3.

Table-3: Correlation of age group and types of disorders

Etiology	Age group		
	1-5 years	6-10 years	11-15 years
Hereditary	05(5.95%)	02(8.33%)	02(15.38%)
Neoplastic	23 (27.39%)	03(12.5%)	03(23.08%)
Aplasia	27(32.14%)	15(62.5%)	08(61.54%)
Infection	20(23.81%)	02(8.33%)	0(0.00%)
Nutritional	03(3.57%)	0(0.00%)	0(0.00%)
Others	06(7.14%)	02(8.33%)	0(0.00%)
Total	84(69.42%)	24(19.83%)	13(10.75%)
***P*-value**= 0.029*			

*Statistically significant

DISCUSSION

Pancytopenia is a condition in which all three cell lines are reduced.[9] It should be suspected when a patient presents with unexplained pallor, prolonged fever and bleeding tendency. The management and the prognosis of patients depend upon the severity of pancytopenia and underlying pathology also plays an essential role[10]. Age, gender, presenting complaints, clinical features, trephine biopsy slides where marrow aspiration was not conclusive and those observations were compared with the studies conducted both nationally and internationally. In present study male to female ratio was 1.3:1. This pattern of male dominance had reported in other studies, 1.8:1 in study by Jan AZ, 1.2:1 by Gayathri and Rao et al E and 2.1: 1 by Kumar R et al[11,12]. In our study fever, pallor and body aches were common clinical presentations that were comparable to other studies.[13-16] Hepatomegaly and splenomegaly seen in patients of acute leukemia followed by megaloblastic anemia while Hepatosplenomegaly and Lymphadeopathy seen in patients of Acute Lymphoblastic Leukemia. In our study on south Punjab population Aplastic Anemia was the most common causes of pancytopenia. Similarly, few other studies showed that aplastic anemia as a cause with a common cause of pancycytopenia (28.3%)[17-19]. Acute Lymphoblastic Leukemia was another common cause of pancytopenia in present study with a frequency of 23.9%. Our results were in line with results of another study that showed ALL as other important cause of pancytopenia. Other studies had also reported Acute Lymphoblastic Leukemia as a common cause of pancytopenia presented with 23.9% by Jan AZ[12], 18.6% by Syed Nadeem Mansoor[18]. Another study conducted in 2018 by Ramesh Chand reported 14.28%[13]. ALL is a common malignancy in children representing almost 75% of all cases of acute leukemia in paedriatic patients[15]. Infections were the third common cause of pancytopenia in our study. We have encountered 2.2% cases of myelodysplastic syndrome which was in contrast with a study that had reported 21.3% cases.

Limitations: Single centre study with limited financial resources and no genetic screening was done among patients.

CONCLUSION

We concluded that aplastic anemia and ALL were the most common causes of pancytopenia in Southern Punjab, Pakistan. Infections and other treatable causes (Megaloblastic anemia, Malaria) were also importantcauses of thrombocytopenia present in significant number (21.7%) of patients which we can address timely and reverse the serious outcomes. Bone marrow examination in these patients is important to diagnose and understand the disease process and in planning further investigations and management.

Authors' Contribution: ZER&JZC: Conceptualized the study, analyzed the data, and formulated the initial draft, **ANC&ZAR:** Contributed to the analysis of data and proofread the draft

Conflict of Interest: None to declare

Financial Disclosure: None

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