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Clinico-hematological analysis of Pancytopenia in Pediatric patients in a tertiary care hospital

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ABSTRACT

***Background*:** Pancytopenia is common in paediatric population and is due to various causes ranging from non malignant to malignant lesions. Its exact etiology is important to know for the specific treatment of the patients.
Aims: To determine the spectrum of pancytopenia with its frequency, common clinical presentation and etiology on the basis of bone marrow examination in children from 2 months to 12 years.
Methods: All patients aged 2 months to 12 years having pancytopenia were included. History, physical and systemic examination and hematological parameters at presentation were recorded. Hematological profile included hemoglobin, total and differential leucocyte count, platelet count, reticulocyte count, peripheral smear and bone marrow aspiration/biopsy.
Results: During the study period, out of the 2000 admissions in paediatric ward, 100 patients had pancytopenia on their peripheral blood smear (5%). Out of those, 90 patients were finally studied. Cause of pancytopenia was identified in 80 cases on the basis of bone marrow and other supportive investigations, while 10 cases remained undiagnosed. Most common was aplastic anemia (25%), Common clinical presentations were pallor, fever, petechial hemorrhages, visceromegaly and bleeding from nose and gastrointestinal tract.
Conclusion: Pancytopenia is a common medical condition in children. Maximum diagnostic yield can be achieved by correlation with clinical findings, peripheral blood findings and with other laboratory and radiological parameters Though acute leukemia and bone marrow failure were the usual causes of pancytopenia, infections and megaloblastic anemia are easily treatable and reversible.

KEYWORDS

INTRODUCTION
Pancytopenia is a common medical condition characterized by reduction in all the cellular elements of the peripheral blood lineages: leukocytes, platelets, and erythrocytes.[1] There are multiple causes of pancytopenia varying widely in children, ranging from transient marrow suppression to marrow infiltration by life threatening malignancy. It is relatively different in the developing countries from the developed ones. Peripheral Pancytopenia requires microscopic examination of a bone marrow biopsy and a marrow aspirate to assess overall cellularity and morphology. Although pancytopenia is a common clinical finding with extensive differential diagnosis, there is a relatively little discussion of this abnormality in literature and there is the lack of data on pancytopenia in pediatric age group, especially with regards to clinical and etiological findings, in South-East Asia.
This study has been undertaken to identify easily treatable and reversible causes of pancytopenia.

Materials and methods
The study was conducted in a tertiary care hospital in Kolkata over a period of one year. Patients between 2 months and 12 years of age admitted with bicytopenia or pancytopenia were included in the study.

The exclusion criteria were the patients beyond these age limits, diagnosed cases of aplastic anemia and leukemia, clinical suspicion of genetic or constitutional pancytopenia, history of blood transfusion in the recent past, and those who were not willing for admission or for bone marrow examination.

Pancytopenia was defined as haemoglobin <10 g%, absolute neutrophil count (ANC) < 1,500/µl, and platelet count < 100,000/µl. Bicytopenia was a decrease in any of the two cell lines. Severe pancytopenia was defined as haemoglobin < 7 g%, ANC < 500/µl, platelet count <200,00/µl, and reticulocyte count < 1%[2].

RESULT
Out of 2000 patients admitted to Department of Pediatrics, 100 (5%) patients presented with pancytopenia. From those, 10 patients failed to complete inclusion criteria, and finally 90 patients were included in the study.

Out of 90 patients, 60 (66.7%) were males and 30 (33.3%) females, with male to female ratio of 2:1 (**Table - 1**), their ages ranged from two month to 12 years.

AGE	MALE(N=60)	FEMALE(N=30)	TOTAL(N=90)
2 months to 2yrs	35	12	47(52.2%)
3 yrs to 8 yrs	15	10	25(27.8%)
9 yrs to 12 yrs	10	08	18(20%)
TOTAL	60	30	90

Considering the etiological pattern of all the 90 cases that were included in the study due to pancytopenia, aplasticanemia 23 (25.6%) was the most common cause of pancytopenia followed by septicemia 10 (11.1%) while leukemia was found in 17 (18.9%) of cases (**Table - 2**).

Etiology	No. of cases(n=90)	percentage
Aplastic anaemia	23	25.6
Megaloblastic anaemia	02	02.2
Enteric fever	05	05.6
malaria	10	11.1
Septicaemia	10	11.1

Leishmaniasis	08	08.9
Gauchers disease	02	02.2
Acute myeloid leukemia	01	01.1
Acute lymphoblastic leukemia	16	17.8
Lymphoma	03	03.3
No cause identified	10	11.1

The most common symptom was pallor in 75 (83.3%) cases and fever in 65 (72.2%) which was often prolonged for weeks, other symptoms included petechial hemorrhages, hematuria and joint pains ,hepatosplenomegaly, lymphadenopathy etc.(**Table - 3**)

Symptoms	No. of cases	Percentage
Pallor	75	83.3
Fever	65	72.2
Petechial haemorrhage	20	22.2
Hepatomegaly	65	72.2
Splenomegaly	60	66.7
Lymphadenopathy	20	22.2
Bony tenderness	15	16.7

A patient having more than one clinical feature is counted in each category. Hence the sum may be more than the total number of cases in the study.

DISCUSSION

Peripheral pancytopenia is not a disease by itself; rather it describes simultaneous presence of anemia, leucopenia and thrombocytopenia resulting from a number of disease processes. The variation in the pattern of disease has been attributed to differences in methodology and stringency of diagnostic criteria and other demographic parameters. The incidence and prevalence of pancytopenia has not been calculated in India, so far. In our study the incidence of pancytopenia was 5% among all the admitted patients. Tilak et al, found the incidence to be 374 per million hospital attendance per year.3 This major difference in our study is due to different group of population selected.[3]

Different studies done at different places showed variable frequency of pancytopenia [4, 5, 6]. Identification of the disease is of prime importance, since this is the key to appropriate management [4]. Diagnosis of pancytopenia requires microscopic examination of a bone marrow biopsy specimen and a marrow aspirate to assess overall cellularity and morphology [7]. In our study male dominated female in all the age group with male to female ratio of 2:1 which was comparable to other studies done by Amieleena C, et al. [8] and Goel RG, et al. [9] reported the male to female ratio of 1.64:1 and 1.76:1 respectively.

Malignancies like ALL and aplastic anemia are more common and dangerous causes of pancytopenia. In our study, 25.6% had aplastic anemia and 22.2% had malignancies in comparison to 20 and 21% in a study by Bhatnagar, et al. [10]. 10 cases of malaria had pancytopenia. 7 were caused by P. Vivax and 3 by P. falci. Hemophagocytic syndrome due to P. Vivax has been reported to cause Pancytopenia [11]. Visceral leishmaniasis (Kala azar) presenting as pancytopenia has been seen in 8 patients in the study. Hypersplenism due to enlarged spleen causes pancytopenia in these patients [12].

The most common clinical manifestation was pallor and it was present in 83.30% of the patients. This finding was comparable to the study done by Memon, et al. [6] and Khodke, et al. [13].

CONCLUSION

Pancytopenia is a common occurrence in paediatric patients. Though acute leukemia and bone marrow failure were the usual causes of pancytopenia,infections and megaloblastic anemia are easily treatable and reversible.

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