VOLUME - 9, ISSUE - 10, October - 2020 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Pathology

BONE MARROW PROFILE OF PANCYTOPENIA IN PEDIATRIC PATIENTS ATTNEDING RIMS ,RANCHI

Md Alimuddin Ansari	Junior Resident ,RIMS,ranchi
Shaoor Nazish*	Junior Resident ,RIMS,ranchi *corresponding Author
Md Mushtaque Ansari	Associate Professor,RIMS,ranchi
A.k Sinha	Professor,RIMS Ranchi

ABSTRACT This study was carried out to identify the causes of pancytopenia in pediatric population attending in RIMS, Ranchi. It was a prospective study conducted over a period of one year in the Department of Pathology, RIMS ,Ranchi .

Bone marrow profile of 100 Pediatric patients fulfilling the criteria of Pancytopenia were examined.

Mean age of study was 12±5.4 years , with M:F of 1.17:1.

The commonest cause was Megaloblastic Anemia see in 38 cases(38%) followed by Aplastic anemia in 30 cases(30%). 7 cases(7%) had Mixed Nutritional anemia and Acute leukemia was seen in 5 cases(5%). Remaining cases were of Erythroid Hyperplasia (11%) and Normal Bone marrow study(5%).

There were 2 cases of Gaucher's disese in this study.

KEYWORDS : Bone marrow profile, Megaloblastic Anemia, Aplastic anemia, Pancytopenia

INTRODUCTION

Pancytopenia is defined by reduction of all the three formed elements of blood i,e Red cells, White blood cells and Platelets below the normal reference range.[1] The presenting symptoms are often attributable to the anemia or the thrombocytopenia. Leucopenia is often seen in the subsequent course of the disorder.[2] Varieties of hematopoietic and non-hematopoietic conditions manifest with features of pancytopenia. The underlying mechanisms are decrease in hematopoietic cell production, marrow replacement by abnormal cells, suppression of marrow growth and differentiation, ineffective hematopoiesis with cell death, defective cells formation which are removed from the circulation, antibody mediated sequestration or destruction of cells, and trapping of cells in a hypertrophied and overactive reticuloendothelial system. [1,3]

In cases of ineffective hematopoiesis the marrow may be normocellular or hypercellular.[1] Bone marrow examination is extremely helpful in evaluation of pancytopenia.[4] Few similar studies have been published in the country.[5] This study was carried out with an aim to obtain further information so that it would help in the management of patient with pancytopenia.

MATERIALS AND METHODS

The present study was a cross-sectional study, conducted at the Department of Pathology, Rajendendra Institute of Medical Science over a period of 1 year (July 2017 to June 2018). The inclusion criteria for pancytopenia were hemoglobin (Hb) less than 10 gm/dL, total leukocyte count (TLC) less than 4000/cumm and platelet count less than 100000/cumm.[3,6] in Pediatric patient of age 2 months to 18 years . Cases with recent ongoing infection,systemic illness , history of recieving chemotherapy ,radiotherapy, recent blood transfusion were excluded. In each case complete blood count, Peripheral Blood Smear were performed and bone marrow aspiration (BMA) was done by the standard technique using Salah needle, from the anterior ,posterior iliac crest and from Tibia under local anesthesia with standard aseptic precautions. Leishman's stain was used to stain all bone marrow smears. When required Estimation of Serum Ferritin, Vitamin B12 and Folic acid were done. The necessary hematological and clinical parameters were also noted.

RESULTS

The total number of bone marrow examination (BMEs) performed over one year for various indications at the Department of Pathology was 960 . In 113 (17.34%) cases, bone marrow examination was performed for the indication of pancytopenia. Thirtteen cases were excluded from the study as there was no representative marrow in the smears. Thus the total number of cases included in the study was 100 (15.74%). There were 53 males and 47 females with male: female ratio of 1.12:1. The mean age was 12±5.4 years with range of 2months- 180 years. Bone marrow aspiration findings and distribution of the patients are shown in Table 1. In cases of hypoplastic bone marrow, 16 cases were male and 14 cases were female with male: female ratio of 1.14:1. In cases of Megaloblastic anemia, 25 were male and 13 were female with male: female ratio of 1.92:1. All 5 cases were of Acute Lymphoblastic leukemia alone. 2 cases were below 5 , 1 between 5-12yr age group and rest 2 were above 12 years of age group. The male: female ratio was 1:4.

Bone Marrow Aspiartion Findings In Case Of Pancytopenia

Bone marrow findings	Number of cases	Percentage
Megaloblastic anemia	38	38
Hypoplastic Bone marrow	30	30
Erythroid Hyperplasia	11	11
Mixed Nutritional Anemia	07	07
Normal bone marrow	05	05
Hematological Malignacy	05	05
Gaucher's disease	02	02
Hypersplenism	02	02
Total	100	100

A Comparison Of Age And Common Hematological Parameters In 4 Common Bone Marrow Findings In Cases Of Pancytopenia

PARAMETERS	APLASTIC ANEMIA (MEDIAN)	MEGALOBLASTICANEMIA(MEDIAN)	MIXED NUTRIONAL ANEMIA (MEDIAN)	ERYTHROID HYPERPLASIA (MEDIAN)
AGE	0.3-18(13)	0.3-18(11.5)	9-16(11)	1.5-18(12)
Hb	2.7-9.5(5.9)	1.8-7.9(5.6)	2.5-7.8(5.8)	3.0-6.8(4.8)

TLC	1000-3900(3050)	900-3900(2800)	2070-3800(3300)	1900-3800 (3200)
PLATELETS	1000-98000 (64000)	1000-98000 (50000)	4900-95000 (75000)	3000-95000 (65000)

DISCUSSION

There are a limited number of studies in the literature evaluating pancytopenic children. Pancytopenia is a feature of many transient illnesses or serious life-threatening diseases. The frequency of pattern of diseases causing them varies in different population groups and this has been attributed to differences in methodology and stringency of diagnostic criteria, geographic area, period of observation, genetic differences, nutritional status, prevalence of infections and varying exposure to myelotoxic drugs among others.The published studies on pancytopenia have also been limited by the referral nature of patient population. There are varying reports on the underlying etiology of pancytopenia from various parts of the world. In a study in France by Imbert *et al.* 213 consecutive adult pancytopenic patients were reviewed and underlying malignant myeloid disorders were found in 42% of their cases and various malignant lymphoid disorders in 18%, followed by aplastic anemia in 10%. In a study from Zimbabwe comprising 134 patients with pancytopenia, megaloblastic anemia was the most frequent cause, followed by aplastic anemia and acute leukemia[9] Jha *et al.[10]* from Nepal studied the causes of pancytopenia in 148 patients. The commonest etiology of pancytopenia in their study was hypoplastic bone marrow seen in 43 cases (29%), followed by megaloblastic anemia in 35 cases (23.6%) and hematological malignancy in 32 cases (21.6%). In children, hypoplastic bone marrow (38.1%) and in adults megaloblastic anemia (30.2%) was the commonest etiology A study from Pakistan found megaloblastic anemia as the most prevalent diagnosis and the major cause of bicytopenia and pancytopenia in the bone marrow aspirates performed in their pediatric unit. [11] Another study from Pakistan by Memon *et al.[12]* on 230 pancytopenic children found the most common causes of pancytopenia as aplastic anemia, megaloblastic anemia, leukemia and infections. The common clinical presentations of pancytopenic children in their study were pallor, fever, petechial hemorrhages, visceromegaly and bleeding from nose and gastrointestinal tract.Studies from India on etiology of pancytopenia are limited and have shown variable causes, depending on the referral population and nutritional status of the study area. Etiological profile of adult pancytopenic patients was studied by Varma *et al.[2]* and Kumar *et al.[4]* Tilak *et al.[13]* and Khunger *et al.[14]* included children along with adults while doing a clinico-hematological analysis of 77 and 200 pancytopenic patients, respectively; Bhatnagar *et al.[15]* and Gupta *et al.[16]* have however evaluated causes of pancytopenia exclusively in children. In children, Bhatnagar *et al.*, [15] who retrospectively analyzed 109 pediatric patients presenting with pancytopenia, found megaloblastic anemia as the single most common etiological factor causing pancytopenia in 28.4% children, followed by acute leukemia and infections in 21% patients each, and aplastic anemia in 20% cases. Gupta *et al.[16]* reviewed 105 children aged 1.5-18 years with pancytopenia. In their study, aplastic anemia was the most common cause of pancytopenia (43%), followed by acute leukemia (25%). Infections were the third most common cause of pancytopenia of which kala-azar was the most common. Megaloblastic anemia was seen in 6.7% children by them. Fever and progressive pallor were the most common presenting complaints in their cohort, being present in 81.4%, followed by bleeding manifestation In present study, the most common underlying etiology is Megaloblastic anemia seen in 38 (38%), followed by Aplastic anemia in 30 (30%) pancytopenic children. Acute leukemia is seen in 5(5%) children. Other causes were Mixed nutrional anemia (07%), Erythroid hyperplasia(11%), Gaucher disease(2%). Tilak *et al(1999).[13]* ,Khunger *et al(2002),* Khodke *et al(2001)* and Bhatnagar *et al(2005)* from India ,Savage et al(1999) from Zimbabwe, Jha et al(2008), from Nepal and Memon et al(2008) from Pakistan also showed Megaloblastic Anemia as the most common cause of Pancytopenia in children.

STUDY	STUDY POPULATION	MOST COMMON CAUSE	2ND MOST COMMON CAUSE
PRESENT STUDY(n=100)	Children	Megaloblastic anemia	Aplastic anemia
Shano naseem et al(n=139)	Children	Aplastic anemia	Acute leukemia
Bhatnagar et al(n=109)	Children	Megaloblastic anemia	Infections and acute leukemia
Gupta et al(n=105)	Children	Aplastic anemia	Acute leukemia

CONCLUSION

Bone marrow profile is an established diagnostic modality in the evaluation of pancytopenia. BME in most cases gives the specifi c diagnosis. However, in a few cases, additional tests are required.. Megaloblastic anemia was the commonest diagnosis, followed by Aplastic anemia, and Mixed nutrional anemia . Rare causes included Gaucher's disease. Erythroid hyperplasia and normal marrow were seen in 11% and 5% of cases respectively.

REFERENCES

1. Williams DM. Pancytopenia, Aplastic anemia and Pure red cell aplasia. In: Wintrobe's Clinical Hematology, 10th ed. Baltimore: William and Willkins; 1993.1449-1484.
2. Firkin F, Chesterman C, Penington D, Rush B. de Gruchy's Clinical haematology in Medical Practice. 5th ed. London: Blackwell Scientifi c Publications; 1989. 119-136.
3. Khodke K, Marwah S, Buxi G, Yadav RB, Chaturvedi NK. Bone Marrow Examination in Cases of Pancytopenia. JIACM 2001;2:55-59.
4. Varma N, Dash S. A reappraisal of underlying pathology in adult patients presenting with pancytopenia. Trop Geogr Med 1992;44:322-7.
5. Bajracharya SB, Pande R, Bhandari PB, Sinha R, Guragain P. An Approach to Aplastic anemia. Medical Journal of Shree Birendra Hospital. The Journal of the Royal Nepalese Army Medical Corps 2005;7:82-83.
6. Lanzkowsky P. Manualof pediatric hematology and oncology. 2nded. Newyork: churchill Livingstone;1995: p.77-95
7. AlterBP. Bone marrow failure syndromes in children. Pediatr Clin North Am 2002;49:973-88
8. Bhatnagar SK, Chandra J ,Narayan S, Sharma S,Singh V,Dutta AK .Pancytopenia in children:etiologicalprofile.jTropPediatr2005;51:236-9
9. Katar S, Nuri Ozbek M, Yaramisa A,Ecer S,Nutrional megaloblastic anemia in young Turkish children is associated with vitamin B12 deficiency and psychomotor retardation.J Pediatr Hematol Oncol 2006;28:559-62
10. Wickramasinghe SN. Bone marrow. In: His- tology for Pathologists. 3rd edn. Mills SE. (ed). Philadelphia: Lippincott Williams & Wilkins; 2007: 800–36. pp.