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Interpretation of Bone Marrow Findings in Cases of Pancytopenia – A Study from Jharkhand Region.

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Abstract
BACKGROUND*: Pancytopenia is one of the important laboratory finding, hence bone marrow examination is essential to reach a proper diagnosis. This study was done in patients admitted to RIMS, Ranchi, Jharkhand and we found a variety of benign and malignant conditions involving bone marrow.*
MATERIALS AND METHODS*:*
This was a prospective study performed in 180 cases over a period of six months. The stain was LeishmanGiemsa and bone marrow aspirate needle used was Salah.
RESULTS*:*
Out of 180 cases the most common cause for pancytopenia was megaloblastic anaemia (20.9%) followed by erythroid hyperplasia (18.7%). Other common causes were hypoplastic marrow and acute leukaemia.
CONCLUSION*:*
Bone marrow examination is an important tool in diagnostic work up of pancytopenia. It leads to accurate diagnosis in majority of cases. Hence it should be done in all cases of pancytopenia and correlated clinically and with other laboratory findings.

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I. Introduction

Pancytopenia is a haematological condition where all the three components of blood i.e RBCs, WBCs and platelets decreases.[1] There are various factors which cause pancytopenia by their destructive or suppressive mechanism.[2] Symptoms of pancytopenia are due to anemia, leukopenia and thrombocytopenia i.e pallor, fatigue, weight loss, fever, bleeding etc.[3] Causes of pancytopenia in India are not well defined[4]

Criteria for pancytopenia are- Hb less than 13.5g/dl in males or 11.5g/dl in females; WBC count less than 4000/mm^3 and platelet count less than $150x10^3$/ mm^3.[5]

Management of pancytopenia depends upon the underlying pathology.[6] In Jharkhand and Bihar Kala-azar is an important cause of pancytopenia.[7]

Bone marrow examination are easy, rapid and have important diagnostic value.[8] Present study is performed at Rajendra Institute of Medical Sciences, Ranchi, Jharkhand and is intended to look at bone marrow findings in patients presenting with pancytopenia so that all the differential diagnosis should be kept in mind for proper diagnosis and treatment.

II. Materials And Methods

This was a prospective study conducted over a period of six months (Oct 2017 to March 2018) in the department of Pathology RIMS, Ranchi. Our study got approval from ethical review board. Total 180 patients were examined. All the cases of pancytopenia with haemoglobin less than 10gm/ dl, total leukocyte count of less than 4000/ mm^3 and platelet count less than 150,000/ mm^3 were included in the study. CBC and PBS of all patients were done. Stain used for PBS was LeishmanGiemsa. After that bone marrow aspiration and slide preparation was done. Needle used for aspiration was Salah and site was anterior and posterior superior iliac spine depending upon convenience. Again the stain for bone marrow slides wereLeishmanGiemsa.

III. Results

Causes of pancytopenia based on bone marrow aspiration findings

Diagnosis	Total no. of cases	% of total cases
Myelodysplastic syndrome	9	4.95
Hypoplastic marrow	31	17.05
Megaloblasticanemia	38	20.9
Erythroid hyperplasia	34	18.7
Acute myeloid leukemia	28	15.4
Acute lymphoblastic leukemia	24	13.2
Multiple myeloma	4	2.2
Leishmaniasis	6	3.3
Metastasis	3	1.65
Hypersplenism	3	1.65

Megaloblastic anemia was the commonest aspiration finding followed by erythroid hyperplasia, hypoplastic marrow and acute leukemia. Nine cases of myelodysplastic syndrome and four cases of multiple myeloma were also detected. Six cases of metastasis and hypersplenism were also diagnosed on bone marrow aspiration.

Among haematological malignancies acute myeloid leukemia exceeded acute lymphoblastic leukemia. MDS constituted 3 cases each of refractory anemia with excess of blast- 2 (RAEB- 2) and refractory cytopenia with multilineage dysplasia (RCMD).

The commonest presenting complaint was fever in 40% (72/ 180) of the cases. Pallor was present in all the patients. Splenomegaly was seen in 33.5% (60/180) and hepatomegaly in 30.5% (55/180) of the cases. Lymphadenopathy was present in 8.89% (16/ 180) of the cases.

Anisopoikilocytosis was seen in 36.11% (65/180) and nucleated RBCs in 25.55% (46/180) of cases. Peripheral blood film showed blasts in 29.44% (53/180) of cases. Lymphocytosis was seen in 18.89% (34/180) of cases.

Clinical Findings in Cases of Pancytopenia

Diagnosis	Total no. of cases	Fever	Splenomegaly	Hepatomegaly	Lymph- adenopathy
MDS	9	_____	_____	_____	_____
Hypoplastic marrow	31	13	4	_____	2
Megaloblasticanemia	38	8	4	8	_____
Erythroid hyperplasia	34	6	_____	_____	_____
AML	28	21	23	24	6
ALL	24	17	19	20	8
Multiple myeloma	4	1	_____	_____	_____
Leishmaniasis	6	5	6	2	_____
Metastasis	3	1	1	_____	_____
Hypersplenism	3	____	3	1	_____
Total	180	72	60	55	16

PBS FINDINGS IN CASES OF PANCYTOPENIA

Diagnosis	Anisopoikilo- cytosis	Nucleated RBS	Blasts	Lympho- cytosis
MDS[9]	1	4	1	___
Hypoplastic marrow[31]	___	4	___	28
Megaloblasticanemia[38]	31	12	___	___
Erythroidhyperplasia[34]	11	9	___	___
AML[28]	8	8	28	___
ALL[24]	9	7	24	___
Multiple myeloma[4]	____	___	___	4
Leishmaniasis[6]	____	___	___	___
Metastasis[3]	2	2	___	2
Hypersplenism[3]	3	___	___	___
Total	65	46	53	34

IV. Discussion

Pancytopenia is a common finding in peripheral blood smear examination and bone marrow examination findings predicts the underlying cause hidden behind it.

In our study megaloblasticanemia was most common cause which is comparable to many studies performed. [9-11]The high prevalence of nutritional anemia remains the cause for increased frequency of megaloblassticanemia. [12] Only a single study showed MDS as the second commonest cause of pancytopenia. [13]

Acute leukemia constitutes 28.6% of total cases of pancytopenia in our study which is high compared to study of Jha et al in which it constituted 19.59% of total cases of pancytopenia. [14] However, in study of Kumar et al no cases of acute leukemia was detected. [15] and in study of Tilak et al only one case of acute leukemia was detected as a cause of pancytopenia. [16]

In our study hypoplastic marrow accounts for 17.05% cases of pancytopenia where as in a study done by Pathak R et al in Nepal in 2010 hypoplasticanemia constitutes 42.15% of total cases. [17] Cases of erythroid hyperplasia should be correlated clinically and with other laboratory results. [17]

Kala- azar cases in our study was very low only 3.3% where as it is one of the common cause in some studies done in India and Pakistan. [18] Four cases of multiple myeloma in our study where as it was only one in study by Jha et al. [14]Hypersplenism and other causes of haemolytic anemia must be ruled out in cases of erythroid hyperplasia.

V. Conclusion

Peripheral blood smear and bone marrow examination remains an important tool in diagnosis of pancytopenia. Common causes like megaloblasticanemia and leukemia should always be kept in mind, but other rare causes cannot be ignored. There should be correlation between clinical findings and laboratory parameters for approaching an accurate diagnosis.

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