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Bone Marrow Study in Adult with Pancytopenia

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Abstract

Background- Pancytopenia is a common haematological condition often encountered in day to day clinical practice.

Methods- This was a cross-sectional study conducted over a period of one year. All the cases of pancytopenia with hemoglobin less than 10 gm/dl, total leucocyte count of less than 4000/mm3 and platelet count less than 150,000/mm3 were included in the study.

Results- Hypoplastic marrow was the commonest aspiration finding followed by erythroid hyperplasia, hematological malignancies and megaloblastic anemia.

Conclusion -Major differential diagnostic considerations of pancytopenia are hypoplastic anemia, hematological malignancies and megaloblastic anemia.

Keywords- Pancytopenia, Haematological Condition, Anaemia.

Introduction

Pancytopenia is a common haematological condition often encountered in day to day clinical practice. It is defined as a decrease in all the three cell lines of blood viz., red blood cells, leucocytes, and platelets. Many diseases affect production of these cells by bone marrow resulting into pancytopenia i.e., simultaneous presence of anaemia, leucopenia, and thrombocytopenia. Pancytopenia is defined as haemoglobin of < 9 gm/dl, WBC < 4,000/cmm, and platelets < 100,000/cmm. Severe pancytopenia is defined as absolute neutrophil count < 500/cmm, platelet count < 20,000/cmm, and corrected reticulocyte count < 1%[1,2].

Presenting symptoms of pancytopenia may be attributable to anaemia, leucopenia, and/or thrombocytopenia. Anaemia may present with fatigue, breathlessness, and cardiac symptoms. Neutropenia may present with febrile illness due to increased susceptibility to infections. Patients with thrombocytopenia may present with mucocutaneous bleed or bruising. Pancytopenia should be suspected on clinical grounds in any patient presenting with unexplained anaemia, prolonged fever and bleeding tendency. The severity of pancytopenia and underlying aetiology determine the management and prognosis[3].

Marrow aspirate has been primarily utilized for cytological assessment. Trephine biopsy; on the other hand, allow for studies of the marrow's overall cellularity, detection of focal lesions, and extent of infiltration by various pathologic entities.[4] Rationale for this study is to identify the diagnostic reliability of bone marrow aspiration and biopsy in diagnosing various causes of pancytopenia.

Materials and Methods

This was a cross-sectional study conducted over a period of one year. All the cases of pancytopenia with hemoglobin less than 10 gm/dl, total leucocyte count of less than 4000/mm3 and platelet count less than 150,000/mm3 were included in the study. Cases of chemotherapy induced pancytopenia were excluded. Relevant clinical findings of the patients were obtained. All the patients fulfilling the criteria were subjected to complete blood count, and peripheral blood smear examination. After taking informed consent bone marrow aspiration (BMA) was performed from posterior iliac crest of the patients. However, trephine biopsy was performed only in 48 cases. BMA smears were stained with Wright stain for microscopy and when required special stains such as periodic acid-Schiff and myeloperoxidase stain were performed. Trephine biopsy specimens were fixed in Bouin's fixative and hematoxylin and eosin stained sections were examined. Data were analyzed using Microsoft Excel.

Results

Maximum number of cases was seen in age group of 15-30 years (30.0%) followed by 30-45 years (28.0%).

Table 1: Bone marrow aspiration findings

Diagnosis	No. of cases	Percentage
Percentage (%)		
Hypoplastic marrow	18	36.0
Erythroid hyperplasia	12	24.0
Megaloblastic anemia	6	12.0
Normocellular marrow	3	6.0
Myelodysplastic syndrome	3	6.0
Acute lymphoblastic leukemia (ALL)	3	6.0
Non-Hodgkin lymphoma (NHL)	3	6.0
Leishmaniasis	1	2.0
Plasmacytosis	1	2.0
Total	50.00	100.00

Hypoplastic marrow was the commonest aspiration finding followed by erythroid hyperplasia, hematological malignancies and megaloblastic anemia.

Discussion

Pancytopenia is a common hematological finding with variable clinical presentations. It often poses diagnostic challenge to physician and the knowledge of accurate etiologies of this condition is crucial in the management of the patient.

In this study, most common cause of pancytopenia was hypoplastic anemia followed by hematological malignancies, megaloblastic anemia, leishmaniasis and Gaucher disease. BME was able to diagnose the cause of pancytopenia which was similar to study of Jha et al.[5] Twenty three percent of cases in this study remained undiagnosed and BMA findings in those cases were erythroid hyperplasia, eosinophilia and reactive myeloid hyperplasia, and in 5 cases marrow finding was normal. In some studies hypoplastic anemia was next to megaloblastic anemia and latter was the commonest cause of pancytopenia.[6] But in a study by Keisu et al[7] neoplastic disease was the commonest cause of pancytopenia, unlike present study in which it was second in the list. The high frequency of malaria and kalazar in their study may be due to study done in an endemic area. In our study only 1 cases of pancytopenia showed leishmaniasis; and malaria

was not detected. Only a single study showed MDS as the second commonest cause of pancytopenia.

CONCLUSION

Major differential diagnostic considerations of pancytopenia are hypoplastic anemia, hematological malignancies and megaloblastic anemia.

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