Pancytopenia – A study of Clinico-Haematological Profile in Adults with its Bone-Marrow Co-Relation in a Tertiary Hospital of Bihar

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ABSTRACT

Introduction: Pancytopenia is characterized by reduction in all the three formed elements of blood i.e., RBC, WBC, Platelet. Disease varies according to age, nutritional status and geographical distribution. Aim of the study was to evaluate the etiological and clinico–haematological profile of patients with pancytopenia and to study the utility of Bone marrow examination.

Material and Methods: This was a five year retrospective study in a tertiary teaching institute of Bihar. 817 pancytopenic adult patients with age group between 18-82 years were studied. There clinical workup, peripheral smear and bone marrow aspiration smears were meticulously analyzed.

Result: Megaloblasticanaemia 31.9%, Acute leukemia 30.5%, Aplastic anaemia 29.9%, Kalazar 6.9%, Non-Hodgkin's Lymphoma (NHL) 0.48%, Multiple Myeloma (MM) 0.24%and Gauchers disease 0.12% were reported.

Conclusion: It is important to workup all cases of pancytopenia to treat the reversible diseases and to reduce mortality and morbidity in serious diseases.

Keywords: Megaloblasticanaemia, Acute Leukemia, Aplastic anaemia, Kalazar

INTRODUCTION

Pancytopenia is common among patients attending hospital.[1] Pancytopenia by itself is not a disease but is the result of various diseases.[2] Thepresentingsymptoms can be due to anaemia, leucopenia or, thrombocytopenia leading to fatigue, dyspnoea. Thrombocytopenia can lead to bruising and mucosal bleeding. Leucopenic features are uncommon as the presenting symptom, but during the course of the disease becomes a life-threatening condition.[3] In pancytopenia, all the three formed elements of blood is reduced below the normal range.[4] Pancytopenia may be due to different diseases and the disease varies according to geographical distribution and genetic difference.[5]

Etiology of pancytopenia can vary from transient marrow suppression due to viral cause to marrow infiltrating life threatening malignancy. So treatment modalities also varies.[1] Bone marrow aspiration plays a significant role in recognising the etiology of pancytopenia.[6] Cause may be primary or secondary to bone marrow.[7] Depending upon the disease entity bone marrow can be hypocellular, normocellular or hypocellular. Early diagnosis reduces the mortality and morbidity in the patients.[8] Cause of pancytopenia can be from simple treatable disease to serious life threatening condition. So, it is important to evaluate these patients to provide them appropriate and correct treatment.

Aim of the study was to evaluate the etiological and clinic-hematological profile of patient with pancytopenia and to study the utility of Bone-marrow examination.

MATERIAL AND METHOD

This was a retrospective study carried out at the Department of Pathology of tertiary teaching Hospital from Jan 2011 to Dec 2015 for a period of 5 years. As this was a retrospective study no ethical issues were present. Patient consent was also not needed. A total of 1318 cases of pancytopenia were present out of which 817 were of adults and the rest children.

Patients above 18 years considered adults. Patients on chemotherapy and immunosuppressive treatment were excluded from the study. Clinical profiles of all patients and their complete blood counts including Haemoglobin concentration, RBC count and total and differential leucocyte count, platelet count, MCV, MCH, MCHC and PCV estimated by automated haematological cell counter. Reticulocyte count and findings of peripheral blood smear stained by Leishman stain was examined. Bone marrow aspiration was done and its slide was examined.

Sensitivity of bone marrow aspiration to diagnose pancytopenia was 99.6%. Only 2 cases of non Hodgkin's lymphoma and 1 case of gaucher's disease could not be diagnosed by bone marrow aspiration only. Special stains were needed for their diagnosis.

STATISTICAL ANALYSIS

Microsoft word 2007 was used to generate tables. Descriptive statistics were used to interpret results.

RESULT

A total of 817 cases were studied. Out of which 512 were male and 305 were female. Age was between 18-82 years with a mean age of 41 years. Pallor was the most common presenting symptom followed by fever and hepatomegaly. Table-1 shows the percentage of presenting symptom.

Our study showed that megaloblastic anaemia was the most common cause of pancytopenia followed by acute leukaemia and aplastic anaemia. There was one case of Gaucher's disease, four cases of Non-Hodgkin's Lymphoma (NHL) and 57 cases

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of Kalazar.

DISCUSSION

Pancytopenia may be due to varied condition and its etiology differs in different population, different methodology and diagnostic criteria, genetic difference, nutritional status, prevalence of infection and exposure to toxic drugs.[4]

Khunger et al in India study of 200 cases reported megaloblastic anaemia in 72%, aplastic anaemia in 14%.[9] Savage et al in Zimbabwe studied 134 patients identifying megaloblastic anaemia to be the most common followed by aplastic anaemia and acute leukaemia. Our study also had similar pattern of disease distribution. Khan et al in Pakistan showed acute anaemia to lead followed by aplastic anaemia and then megaloblastic anaemia.[10] Imbert et al in France studied 213 cases and found malignant myeloid disorder in 42%, lymphoid disorder 18% and aplastic anaemia 10%.[11] Jha et al in Nepal studied 148 pancytopenic patients and found hypoplastic bone marrow in 29%, megaloblastic anaemia 23.6%, haematological malignancy 23.6%.[8]

Common clinical presentation was pallor, fever, petechial haemorrhage, Organomegaly. Khan et al showed 81% cases with pallor followed by fever, then bleeding manifestation.[10] This was similar to our study which show 97.9% pallor followed by fever and bleeding manifestation. Naseem et al showed fever (65.5%) most common followed by pallor and hepatomegaly.[12]

Megaloblastic anaemia was diagnosed by examination of peripheral blood which showed macrocytes with hyper-segmented neutrophils. Due to retarded DNA maturation there is depression on all the series of cells. Bone marrow aspirate were hyper-cellular with increased erythropoiesis and presence of megaloblasts.[13] Megaloblastic change is characterised by sieved nucleus chromatin, asynchronous nuclear maturation and bluish cytoplasm. Giant metamyelocytes are also seen. Megakaryocytes is depressed (Figure-1).

Aplastic anaemia were characterized by pancytopenia in peripheral smear and bone marrow showing hypocellular fatty patchy marrow.[14] Aplasia can be congenital or acquired. Causes of hypoplasia were not evaluated in our study.

Acute leukaemia showed in peripheral smears to be sub-leukaemia leukaemia with reduced in all 3 type of cell. Blast were more than 20% in both peripheral and bone marrow aspirates.[14] 172 cases were of acute myeloid leukaemia and 73 cases were of acute lymphatic leukaemia.

Kalazar cases showed pancytopenia in peripheral blood with increase plasma cell in marrow and *Leishmania donovani* (LD) bodies both intracellular and extracellular (Figure-2). NHL cases had lymphadenopathy with marrow infiltration. Multiple myeloma has typical osteolytic bone lesion with myeloma cell in marrow. One case of Gaucher's disease was also diagnosed.

In our study, megaloblastic anaemia was found to be the commonest disease entity leading to pancytopenia in Bihar. Bihar is among the poorest of the poor northern state[15] so, nutritional deficiency diseases are prevalent here. 40.69%of the people are below poverty line.[15] Bihar has the highest fertility rate (3.7)[16] and folic acid, which is an essential nutrient and its demand increases during pregnancy,[17] leading to its deficiency and resulting in megaloblastic anaemia. As our Institute, despite being a tertiary care centre caters not only the need of referral patients, but also to the patients who common directly without any referral along with this, many free of cost services are provided to the economically backward sections of the society. So a large population, representative of the general population,

Symptom	No. of cases	%
Pallor	800	97.9
Fever	490	59.9
Petechial H'age	343	41.9
Lymphadenopathy	130	15.9
Hepatomegaly	482	58.9
Splenomegaly	343	41.9

Table-1: Showing the percentage of presenting symptom

Disease	No. of cases	%
Megaloblastic Anaemia	291	35.61
Acute leukaemia	245	29.9
Aplastic Anaemia	220	26.92
Kalazar	57	6.9
Non-Hodgkin's Lymphoma	4	0.48
Multiple Myeloma	2	0.24
Gaucher's disease	1	0.12

Table-2: showing distribution of etiological causes of pancytopenia

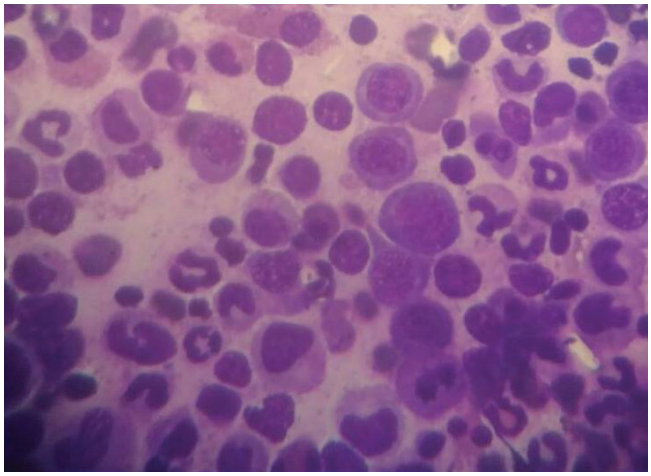

Figure-1: Bone marrow smears showing megaloblasts (Leishmanx400x)

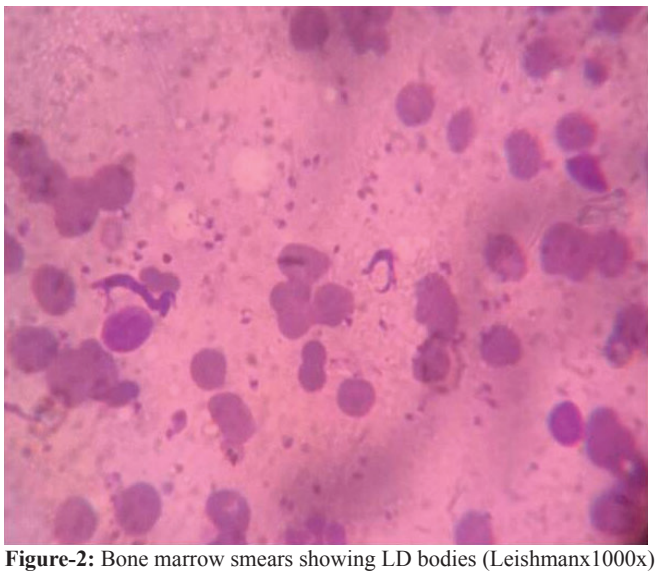

Figure-2: Bone marrow smears showing LD bodies (Leishmanx1000x)

is encountered in our Institute.

CONCLUSION

Pancytopenia is a very common problem encountered in our setting. It mainly presents as weakness, fatigue and pallor. As its etiology is varied so peripheral blood smear and bone marrow aspiration helps us to make a conclusive diagnosis. Megaloblastic anaemia, which is a highly treatable disease, was found to be the commonest underlying cause of the pancytopenia among the adult population in Bihar. This can be attributed to the fact that the large segment of the population belongs to economically backward section. This together with the high fertility rate leads to high prevalence of nutritional deficiencies, which are fully treatable and preventable.

So, it is essential to work up all cases of pancytopenia so that curable disease can be segregated and treated. Rapid diagnosis also helps to reduce morbidity and mortality in serious disease by early intervention. Peripheral blood smear examination and bone marrow aspiration gives a fairly accurate diagnosis of pancytopenia in a short time period and may prevent unnecessary burden on already stressed laboratory in a developing country like ours.

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