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Patterns of Pancytopenia in a Rural Teaching Hospital of Western UP, India

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Abstract : *The present study was designed to ascertain the percentage of occurrence and causes of new-onset pancytopenia in adult patients in our hospital. All the cases of pancytopenia in adults from January 2011 to December 2014 (four years) were examined in the Department of Pathology, Rama Medical College Hospital, Ghaziabad. Bone marrow aspirations/biopsy were performed in most of the cases. The commonest cause of pancytopenia in our hospital was megaloblastic anaemia followed by dimorphic anemia.*
Keywords: *pancytopenia, bone marrow aspiration, hypersplenism, adult.*

I. Introduction

Pancytopenia is an important disorder characterized by the simultaneous presence of anemia, leucopenia and thrombocytopenia. It is diagnosed when Hemoglobin (Hb) is less then 13.5g/dl in males or 11.5g/dl in females; the leucocytes count is less then $4x10^3$/cu.mm and the platelet count is less than $150x10^9$/L. It is not by itself a disease but results from a number of disease processes that primarily or secondarily involve the bone marrow[1].The commonest clinical manifestations of pancytopenia are usually fever , fatigue , dizziness , weight loss, anorexia, night sweats , pallor, bleeding , splenomegaly, hepatomegaly , and lymphadenopathy[2] .The severity of pancytopenia and the underlying pathology determine the management and prognosis of the patients[3] . Many other studies in the subcontinent also report megaloblastic anemia as the commonest cause of pancytopenia (range 38-74%).[1,3,4]

II. Material & Methods

The present prospective study was conducted in the Department of haematology, Rama Medical College Hospital, Ghaziabad between January 2011 to December 2015. Inclusion criteria were adult patients of both sexes, aged 12 years & above with presence of all 3 of the following Hemoglobin (Hb) is less then 13.5g/dl in males or 11.5g/dl in females; the leucocytes count is less then $4x10^3$/cu.mm and the platelets count is less than $150x10^9$/L. Exclusion criteria for this study were diagnosed cases of malignancy, including leukemia receiving chemotherapy or radiotherapy. Patients were selected according to the guidelines of inclusion criteria. A total of 86 patients fulfilled the inclusion criteria.

Two ml of EDTA (ethylene diamine tetra-acetic acid) anticoagulated blood was collected and processed by five part SYSMEX automated hematology analyzer. The parameters obtained were hemoglobin, red blood cell count, total leukocyte count, differential leukocyte count, platelet count, mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), packed cell volume (PCV). Erythrocyte sedimentation rate (ESR) was estimated by Westergren's method. Peripheral smears stained by Leishman stain were examined in all the cases. Bone marrow aspiration using Salahs needle was done where indicated. Bone marrow examination was not done in many of the cases having hyper-segmented neutrophils and/ or circulating megaloblasts in the peripheral blood. These patients were put on a trial of hematinics and response to therapy measured by rising reticulocyte counts was taken as confirmatory of the diagnosis.

A detailed clinical history & physical examination was also performed on each case.

III. Results

A total of 86 patients who presented with pancytopenia were studied. They consisted of 50 males and 36 females giving a male-to-female ratio of 1.3:1. The age of patients ranged from 14 years to 82 years (mean age, 48 years). The commonest mode of presentation was generalized weakness; other main symptoms were dyspnoea, decreased appetite, and weight loss. Pallor was noted in all cases. Splenomegaly was seen in hypersplenism & dimorphic anaemia. Hepatosplenomegaly was seen in non-Hodgkin's lymphoma. Lymphadenopathy was noted in malignant cases(TABLE 1).

Pancytopenia was the most common indication for bone marrow examination in our hospital during this period and comprised as much as 42% of the cases, in which bone marrow was examined.

Table 1: Clinical Features

Clinical features	No. of Cases	Percentage
Pallor	86	100
Fever	61	70.9
Decreased Appetite	60	69.7
Dyspnoea	48	55.8
Bleeding	24	27.9
Weight loss	23	26.7
Splenomegaly	15	17.4
Hepatomegaly	9	10.4
Lymphadenopathy	4	4.6

The commonest cause of pancytopenia was megaloblastic anaemia 54 cases (62.7%) followed by dimorphic anaemia 10 (11.6%) and hypersplenism 9 (10.4%).
The other causes of pancytopenia were aplastic anaemia 3 (3.4%), myelodysplastic syndrome 1 (1.1%), HIV 3 (3.4%), malaria 2(2.3%) and acute myeloid leukemia 2(2.3%), multiple myeloma 1(1.1%) ,MDS (1.1%), Hodgkin's lymphoma and multiple myeloma 1 (1.1%). (TABLE 2).

Table 2 Causes of Pancytopenia

Type	No. of Cases	Percentage
Megaloblastic anaemia	54	62.7
Dimorphic anaemia	10	11.6
Hypersplenism	9	10.4
Aplastic anaemia	3	3.4
HIV	3	3.4
Malaria	2	2.3
AML	2	2.3
Myelodysplastic syndrome	1	1.1
Hodgkin's lymphoma	1	1.1
Multiple myeloma	1	1.1

Hypersplenism secondary to portal hypertension (cirrhosis) was the third most common diagnosis (n = 9).
Incidence of hypersplenism was 10.4% in our study. Incidence of 29.2% was reported by Arvind Jain et al[8] A high incidence of hypersplenism could be due to increasing trend of chronic alcoholism in today's society. There is an increasing number of patients with chronic liver disease and subsequent hypersplenism [6]
Aplastic anemia, septicemia and myelodysplasia were other common causes. Two patients were the suspected cases of viral hemorrhagic fever. Twelve (13.9%) of the patients expired. Absolute neutrophil count (ANC) below 500/µl was seen in 14 (16.2%) patients, among which 6 had megaloblastic anemia, 3 had aplastic anemia, and 1 had myelodysplasia. Nine patients had platelet counts < 10 x 10^9/L. Of these 6 presented with bleeding.

IV. Discussion

There is a wide range of disorders that manifest as pancytopenia. The variation in frequency of various diagnostic entities causing pancytopenia has been attributed to differences in methodology & stringency of diagnostic criteria, geographic area, period of observation, genetic differences & varying exposure to myelotoxic agents etc (7,8)

The incidence of aplastic anaemia varies from 10 to 52.7% of all pancytopenic patients[7] Our incidence of aplastic anaemia was 3.5%. 2 out of the 3 cases were farmers and gave a history of regular pesticide exposure. An association of aplastic anemia with pesticides has also been reported in various other studies [8,9,10]

Incidence of megaloblastic anaemia was 62% in our study. Incidence of megaloblastic anemia varies from 0.8% to 68% in different studies[7,11-16] The findings of our study corresponds with the findings of the study done by Shweta et al, Tilak and Jain who in their studies found megaloblastic anemia 66%, 68% respectively as the most common cause of pancytopenia (7,16) . Other studies in the developing countries have also found megaloblastic anemia to be the commonest cause of pancytopenia. Our incidence is high compared with the studies of Khodke et al. [17] and Jha et al. [18] in which they were 20% and 15.7%, respectively.

In our country, high incidence of megaloblastic anemia may be due to high prevalence of nutritional deficiencies of Vitamin B12, folic acid or both[17]

Incidence of hypersplenism was 10.4% in our study. Incidence of hypersplenism varies from 3 to 68% [6] All the patients were alcoholics with decompensated liver cirrhosis and subsequent hypersplenism.

Pancytopenia due to HIV (3.4%) and myelodysplastic syndrome (1.1%) was also seen in our study. In this study 4 cases (10%) presented with malignant etiology acute myeloid leukemia 2 (5%), Hodgkin's lymphoma 1(2.5%) and Non-Hodgkin's lymphoma 1 (2.5%). Incidence of leukemia 2.8% and Non-Hodgkin's lymphoma 0.8% were reported by Arvind Jain et al [7]

While the importance of bone marrow examination in pancytopenic patients is well known [2] , significant information is often obtained from thorough clinical examination and peripheral blood smear findings[1] . Hypersegmented neutrophils and circulating megaloblasts and low retic counts are important findings in megaloblastic anemia [1] Bone marrow examination can be deferred in those cases presenting with hepatosplenomegaly and having hypersegmented neutrophils and/ or circulating megaloblasts in the peripheral blood. These patients can be put on a trial of hematinics with a close hematologic follow up[1]

V. Conclusion

Physical findings and peripheral blood picture provide valuable information in the work up of pancytopenic patients and help in planning investigations on bone marrow samples. Megaloblastic anaemia, dimorphic anaemia and hypersplenism are major causes of pancytopenia. However uncommon causes of pancytopenia like leukemia, lymphoma, aplastic anaemia and myelodysplastic syndrome should be kept in mind while planning investigations for the complete work up of pancytopenic patients.

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