A Study on Etiological Spectrum and Clinical Spectrum of Pancytopenia

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Abstract
Introduction: *Pancytopenia is a common entity seen in clinical practice. It is a condition where all the three formed blood elements (red blood cells, white blood cells and platelets) are reduced below the normal reference range. It has numerous causes. The spectrum of disorders primarily or secondarily affecting the bone marrow may manifest with peripheral pancytopenia.*
Materials and Methods: *This is a hospital based cross-sectional study of indoor patients of Department of General Medicine, Bhaskar Medical College, Yenkapally, Ranga Reddy, Telangana over a period of 6 months (July 2022-December 2022) including 80 patients. Patients who fulfilled the following inclusion criteria were enrolled in the study after their consent.*
Results: *In the present study, Megaloblastic anemia (37.5%) was the commonest cause of Pancytopenia, followed by nutritional anemia (16.25%), aplastic anemia (11.25%), hypersplenism (10%), malignant diseases (10%), myelodysplastic syndromes (2.5%) and others (12.5%). Others included uncommon causes like Dengue fever (5%), Malaria (2.5%), Multiple myeloma (2.5%), Hemophagocytosis (1.25%) and SLE (1.25%).*
Conclusion: *Uncommon etiological factors like dengue fever, malaria, hemophagocytosis, SLE and multiple myeloma were identified in this study. A comprehensive clinical, haematological and bone marrow study of patients with Pancytopenia usually helps in identification of the underlying cause. However, in view of a wide array of etiological factors, Pancytopenia continues to be a challenge for haematologists.*
Key Words: *Pancytopenia, Megaloblastic anemia, aplastic anemia, myelodysplastic syndromes.*

I.   Introduction

Pancytopenia is a common entity seen in clinical practice. It is a condition where all the three formed blood elements (red blood cells, white blood cells and platelets) are reduced below the normal reference range.[1] It has numerous causes. The spectrum of disorders primarily or secondarily affecting the bone marrow may manifest with peripheral pancytopenia. It is a common clinical problem encountered in clinical practice and should be suspected on clinical ground when a patient presents with unexplained anemia, prolonged fever and bleeding tendency.[2] The presenting symptoms are usually attributable to anemia, leucopenia or thrombocytopenia.

It is suspected when a patient presents with anemia, prolonged fever and a bleeding tendency. Pancytopenia has multiple causes, but the frequency of these causes has been reported in a limited number of studies.[3]

Many hematopoietic and non-hematopoietic conditions manifest with features of pancytopenia. Pancytopenia is a striking feature of many serious and life threatening illnesses ranging from simple drug induced bone marrow hypoplasia, megaloblastic marrow to fatal bone marrow aplasias and leukemias.[4] The

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pattern of diseases leading to pancytopenia is expected to vary in different population groups with their difference in age pattern, nutritional status and prevalence of the infective disorder.[4]

The present study was conducted to assess the etiological pattern, clinical profile and bone marrow morphology of pancytopenia patients.

II. Materials And Methods

This is a hospital based cross-sectional study of indoor patients of Department of General Medicine, Bhaskar Medical College, Yenkapally, Ranga Reddy, Telangana over a period of 6 months (July 2022-December 2022) including 80 patients. Patients who fulfilled the following inclusion criteria were enrolled in the study after their consent.

Inclusion criteria
➢ Age >18 years
➢ Anemia (Hemoglobin<10gm/dl)
➢ Leucopenia (total count < 4000 cells/cumm.)
➢ Thrombocytopenia (platelet count <150000 cells/cumm.)

Exclusion criteria
➢ Patients on cytotoxic drugs
➢ Patients on Radiotherapy
➢ Pregnant female

Study was approved by Human Research Ethics Committee of tertiary care hospital of South Gujarat. Two ml of anticoagulated blood was collected for complete hemogram. The peripheral smear was studied after staining with Leishman's stain. Bone marrow aspiration and biopsy was done in all the patients to identify the etiology. An informed consent was obtained.

Statistical analysis done by software MS Excel 2007 and Open Epi version 2.3. Percentage, mean, standard deviation, chi-square and 'p' values were calculated wherever applicable.

III. Results

In the present study, Megaloblastic anemia (37.5%) was the commonest cause of Pancytopenia, followed by nutritional anemia (16.25%), aplastic anemia (11.25%), hypersplenism (10%), malignant diseases (10%), myelodysplastic syndromes (2.5%) and others (12.5%). Others included uncommon causes like Dengue fever (5%), Malaria (2.5%), Multiple myeloma (2.5%), Hemophagocytosis (1.25%) and SLE (1.25%) (Table 1).

The commonest cause of Pancytopenia reported from various studies throughout the world has been aplastic anemia. This is in sharp contrast with the results of present study where the commonest cause of Pancytopenia was Megaloblastic anemia. This seems to reflect the higher prevalence of nutritional anemia in Indian subjects as well as in developing countries. However similar results have been reported in studies from other Indian centres (Table 2).

Diseases	No. of patients	Percentage (%)
Megaloblastic anaemia	30	37.5%
Nutritional anaemia	13	16.25%
Aplastic anaemia	9	11.25%
Hypersplenism	8	10%
Malignant diseases	8	10%
Dengue fever	4	5%
Myelodysplastic syndrome	2	2.5%
Malaria	2	2.5%
Multiple myeloma	2	2.5%
Hemophagocytosis	1	1.25%
Sle	1	1.25%
Total	80	100 %

Table 1: Etiology of pancytopenia in present study

Clinical features	No. of cases	Percentage
Pallor	80	100
Generalized weakness	37	46.25
Fever	25	31.25
Hepatosplenomegaly	14	17.5
Pedal edema	10	12.5

Easy fatigability	10	12.5
Abdominal distention	8	10
Bleeding	6	7.5
Pain in abdomen	5	6.25
Icterus	5	6.25
Giddiness	4	5
Difficulty in breathing	3	3.75
Lymphadenopathy	2	2.5
Joint pain	2	2.5

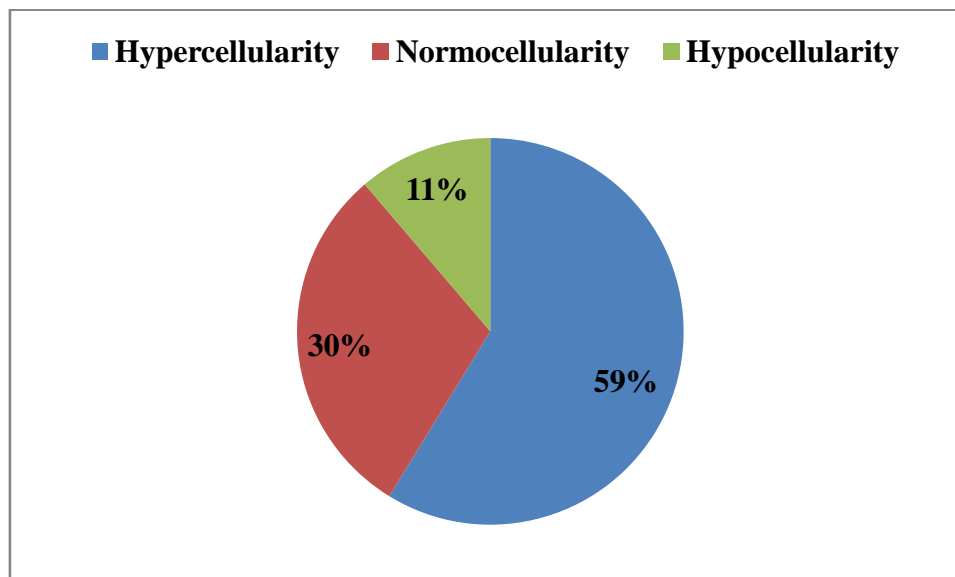**Table 2: Clinical features of patients having Pancytopenia in present study**

Figure 1: Marrow cellularity of patients with Pancytopenia

Bone marrow aspirate in the present study of Pancytopenia showed the following types of cellularity: Hypocellularity (11.25%), Hypercellularity (58.75%), Normocellularity (30%) (Figure 1).

Most of the patients were in the age group of 31-60 years (60%) and the least occurrence was seen in the age group of 61-70 years (3.75%). The sex distribution of Pancytopenia showed a male preponderance. The male to female ratio was 1.35:1.

IV. Discussion

This was the most common cause of Pancytopenia in the present study. There was a male preponderance with male to female ratio 2.3:1. It was most common in the age group of 41-60 years. In the study of Pancytopenia cases by Jha et al, the age range was 10-79 years (31years). There was a male preponderance and male to female ratio was 1.5:1. In the study by Kumar et al, the ages ranged from 14-73 years (39.5%). There was a male preponderance and the male to female ratio was 2:1. Hemoglobin varied from 1g% to 10g%.[6]

This was the second most common cause of Pancytopenia in the present study. The nutritional deficiency of either B12 or folate results in Megaloblastic anemia. Other causes include mixed deficiency anemia (macrocytes and macrocytic). In the study by Shazia Memon mixed deficiency was seen in 20 cases (8.69%).16 Mobina et al, in their study of 392 cases of Pancytopenia found 11.2% cases of mixed deficiency anemia.[7]

This was next common cause of Pancytopenia in the present study. There was a female preponderance with a male to female ratio of 0.8:1. It was most common in the age group of 21-30 years. In the study by Kumar et al, the ages ranged from 12-63years (29 years). There was a male preponderance and male to female ratio was 1.4:1.[8]

This was the next common cause of Pancytopenia in the present study. There was a male preponderance with a male to female ratio of 3:1. It was most common in the age group of 51-60 years. Kumar et al, reported on incidence of hypersplenism in 19/166 cases in which ages ranged from 14-49 years. There was a male preponderance with male to female ratio being 2:1. Shazia Memon et al, in their study of 230 cases found hypersplenism in 10 patients (4.34%).[9]

The male to female was 1:1. It was most common in the age group of 18-20 years. In the study by Jha et al, acute leukemia alone constituted 90.62% of all the hematological malignancies. It accounted for 19.59% of total cases of Pancytopenia.[10]

V.   Conclusion

Uncommon etiological factors like dengue fever, malaria, hemophagocytosis, SLE and multiple myeloma were identified in this study. A comprehensive clinical, haematological and bone marrow study of patients with Pancytopenia usually helps in identification of the underlying cause. However, in view of a wide array of etiological factors, Pancytopenia continues to be a challenge for haematologists.

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