ORIGINAL RESEARCH PAPER

General Medicine

A STUDY OF CLINICAL PROFILE OF PANCYTOPENIA AN OBSERVATIONAL STUDY

KEY WORDS: Pancytopenia, Megaloblastic Anaemia

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ABSTRACT

Background: Pancytopenia is characterized by a decrease in all three types of blood cells : erythrocytes, leukocytes, and platelets. This condition can arise from several mechanisms , including the reduced production of hematopoietic cells due to marrow tissue destruction by toxins, replacement by abnormal or malignant tissues , or suppression of normal cell growth and differentiation. In some cases, the bone marrow may still appear normal or even show an increase in cellularity .[1] **Objectives:** TO STUDY CLINICAL PROFILE OF PANCYTOPENIA. **Material and Methods:** Team of trained residents under the guidance of senior consultant ,the study was hospital based observational study which include indoor and outdoor patients diagnosed with Pancytopenia based on a combination of history, clinical findings, CBC, peripheral smear. **Conclusion:** Females in the age group o f 21 to 30 years were more commonly affected by pancytopenia, Vegetarian diet can be one of the contributing factors for pancytopenia, as majority of pancytopenia patients were vegetarian in this study. Fatiguability and pallor are the most common symptom and sign of pancytopenia, irrespective of the etiology. Majority of patients with pancytopenia demonstrated severe anaemia with mild leukopenia and mild thrombocytopenia

INTRODUCTION

Pancytopenia, a clinical and hematological condition, involves the reduction of all three blood cell types , red blood cells (RBCs), white blood cells (WBCs), and platelets. This condition is marked by the concurrent presence of anemia, leukopenia, and thrombocytopenia. [2] While not a disease on its own, it is identified by a trio of anemia, leucopenia and thrombocytopenia .[3] In pancytopenia, anemia is defined by hemoglobin levels below 13.5 g/dL in males and 11.5 g/dL in females. leukopenia is indicated by total leukocyte counts below 4000/mm^3, and thrombocytopenia by a platelet count below 150,000/mm^3.[4] Pancytopenia often shows a bi-modal age distribution, occurring in children and adults in their 30s and 40s, with a reported male to female ratio ranging from 1.4 to 2.6 to 1. Typically resulting from bone marrow failure, pancytopenia can be linked to hypocellular bone marrow, hypercellular marrow, or marrow infiltration. Hypocellular marrow-related pancytopenia may arise from conditions such as aplastic anemia, drug reactions, viral infections , radiation exposure, toxins, autoimmune diseases, malignancies, and paroxysmal nocturnal hemoglobinuria (PNH). Hypercellular marrow pancytopenia can be caused by hypersplenism, megaloblastic anemia, myelodysplastic syndromes, and infections including HIV and tuberculosis. Bone marrow Infiltration related pancytopenia may result from malignancies, granulomas, and fibrosis. The clinical manifestations of pancytopenia vary according to the severity o f anemia, leukopenia , and thrombocytopenia, commonly presenting as generalized weakness, fever, weight loss, abnormal bleeding tendencies, and shortness of breath. The causes of pancytopenia can be broadly divided into centra l types, involving production disorders , and peripheral types, involving increased destruction of blood cells. These factors may act independently or in combination to result in pancytopenia. The development mechanism varies for instance, it can stem from decreased hematopoietic cell production in aplastic anemia, sequestration of normal cells in an enlarged and overactive reticuloendothelial system in hypersplenism, ineffective hematopoiesis in megaloblastic anemia, or replacement by abnormal or malignant tissue in the bone marrow

AIMS AND OBJECTIVES

1. To study the clinical profile of patients with pancytopenia
2. To study the underlying etiological cause of the pancytopenia

Patients and Methods

Source of Data: Department of General Medicine, G.R. Medical College, Gwalior (M.P.) from august 2022 - Jun 2024.
Study Type: Prospective study
Duration of Study: AUGUST 2022 to MARCH 2024
Study Design: The study were a hospital based observational study which were include indoor and outdoor patients diagnosed with Pancytopenia based on a combination of history, clinical findings, CBC, peripheral smear Sample .
Size: The study comprise minimum 130 patients

Sample size calculated by the formula:

$$n = \frac{Z^2\alpha/2 \times PQ}{D^2}$$

Where Zα/2= 1.96, P = 9.1, Z2 α/2× PQ n= ---------- D2 Q = 90.09, THUS n =130

Inclusion Criteria

1. Age >15years
2. Anaemia (Hb<13.5 g/dl in male, 11.5g/dl in female)
3. Leukopenia (total count < 4000cells/ mm3)
4. Platelet count < 1,50,000 cells / mm3

Exclusion Criteria

1. Patients who have received or are receiving cancer chemotherapy
2. Patients who have received o r are receiving radiotherapy
3. Patient with age < 15 years
4. Patients who recently received blood transfusion.

Data Collection

All Patients after obtaining a detailed medical history and physical examination the following investigations will b e done

1. Haemoglobin
2. Total count, differential count and ESR
3. Platelet count
4. Peripheral smear study with reticulocyte count
5. Bone marrow smear study (if indicated)

Other Investigations as Per Clinical Profile

1. Serological study for HIV infection.
2. Chest X- ray
3. USG abdomen and pelvis

Statistical Analysis

All the data were entered In a data collection sheet in an Excel format and analysed using SPSS Software. Numerical values were reported using mean and standard deviation or median. Categorical values are reported using number and percentages . Probability value (p) value less than 0.05 was considered a statistically significant.

OBSERVATIONS

This Study included total 130 patients diagnosed with Pancytopenia. All the study patients were subjected to investigations including haemoglobin, total leukocyte count (TLC), platelet, peripheral smear study and bone marrow study (if indicated). Data thus collected was subjected to statistical analysis and following results were drawn.

1. Age Distribution of Study Patients:

In this study, mean age of study patients was 33.35 ± 15.99 years and median age was 30 years, with the age ranging from 15 to 89 years. Majority of patients were in the age group of 21-30 years (27.69%), followed by 31-40 years (23.07%), ≤20 years (20.76%), above 51 years (19.23%), and 41-50 years (9.23%) (Z=0.4961, p = 0.7098). (Table 1)

Table 1: Age Distribution of Study Patients

Age (Years)	Frequency	Percent (%)
<20	27	20.76
21-30	36	27.69
31-40	30	23.07
41-50	12	9.23
>50	25	19.23
Total	130	100.0

2. Gender Distribution of Study Patients

In this study, out of 130 patients , 80 were female (61.5%) and 50 were male (38.5%). Thus, proportion of females with pancytopenia In this study was significantly higher than males (Z=3.721;p=0.0003).

3. Etiology of Pancytopenia in Study Patients

In this study, etiology of pancytopenia was megaloblastic anemia in 60 patients (46.2%), followed by dimorphic anemia in 38 patients (29.2%), pancytopenia in 29 patients (22.3%), and aplastic anemia in three patients (2.3%) . Percentage of patients with megaloblastic anemia was significantly higher in this study (Z=8.9305;p<0.0001)

4. Past Medical History of Blood Transfusion in Study Patients

In this study, 29 patients (22.3%) had history of blood transfusion, while 101 patients (77.7%) did not have history of blood transfusion (p<0.0001)

5. History of Drug and Addiction in Study Patients

In this study, 113 of 130 patients did not have any significant drug or addiction history (86.9%) (p <0.0001) Smoking alone was the most commonly reported habit in 7 patients (5.4%), while alcohol alone was reported in 4 patients (3.07%), one patient had habit of both alcohol and smoking (0.76%). History of steroid was reported in two patients (1.5%), two patients (1.5%) had history of both smoking and steroid, one patient had history of anti-tubercular treatment (0.76%). (Table 2)

Table 2: History of Drug and Addiction in Study Patients

Drug and Addiction	Frequency	Percent (%)
None	113	86.9
ATT	1	0.76
Alcohol	4	3.07
Smoking	7	3.07
Steroid	2	1.5
Alcohol, Smoking	1	0.76
Smoking, Steroid	2	1.5
Total	130	100

6. Dietary Habits of Study Patients:

In this study, of 130 patients, 104 were vegetarian (80%), while 26 patients were following mixed diet (20%). The proportion of vegetarian patients was significantly higher in this study (p<0.0001) (table 3).

Table 3: Dietary Habits of Study Patients

Dietary Habits	Frequency	Percent (%)
Mixed	26	20
Vegetarian	104	80
Total	130	100

7. Presenting Symptoms of Study patients:

The most common presenting symptom in this study was fatiguability which was observed in 129 out of 130 patients (99.2%), followed by palpitation in 83 patients (63.8%), fever in 54 patients (41.5%), respiratory difficulties in 22 patients (16.9%), bleeding manifestations in only 3 patients (2.3%), and loose stools in only one patient. Thus, fatiguability was the most common presenting symptom, while bleeding manifestations and loose stools were the least common presenting symptoms of pancytopenia in this study (p<0.0001)

8. Clinical Findings in Study Patients

In this study, pallor was observed in all the patients (100%). Icterus was observed in 8 patients (6.15%), and pedal edema was present in 81 patients (62.30%). Other clinical findings included koilonychia in 14 patients (10.76%), muscle wasting in 34 patients (26.15%), raised jugular venous pressure (JVP) in 5 patients (3.84%), glossitis in 4 patients (3.07%) . Thus, the most common clinical finding in pancytopenia patients was pallor (p<0.0001) followed by pedal edema.

Limitations of the Study

- Single centre study
- Smaller sample size

CONCLUSION

This study showed that females in the age group of 21 to 30 years were more commonly affected by pancytopenia. Vegetarian diet can be one of the contributing factors for pancytopenia, as majority of pancytopenia patients were vegetarian in this study. Fatiguability and pallor are the most common symptom and sign of pancytopenia, irrespective of the etiology. Majority of patients with pancytopenia demonstrated severe anemia with mild leukopenia and mild thrombocytopenia. Megaloblastic anemia was the commonest etiology for pancytopenia, while aplastic anemia was the least common etiology in our study population.

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