

# Assessment of profile of patients with Pancytopenia

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## ABSTRACT

**Background:** Pancytopenia is characterized by a decreased number of at least two blood cell lines. The clinical features depend upon both of the underlying disease process as well as relate to the blood cell lineages affected. Hence; the present study was undertaken for assessing the profile of patients with pancytopenia.

**Materials & methods:** A total of 20 patients with pancytopenia were enrolled. Complete demographic and clinical details of all the patients were recorded. Thorough history of all the patients was obtained. Blood samples of all the patients were obtained. Diagnosis of pancytopenia was established. Clinical profile of all the patients was recorded. All the results were analysed by SPSS software version. Chi square test was used for assessment of level of significance P value of less than 0.05 were taken as significant.

**Results:** Mean age of the patients was 40.3 years. 60 percent of the patients were males while the remaining were females. Generalized weakness and pallor was seen in 100 percent of the patients while fever and bleeding was seen in 60 percent and 15 percent of the patients. Reticulocyte count was  $\leq 0.5\%$ , 0.6 to 1% and 1.1 to 2% in 25 percent, 50 percent and 25 percent of the patients respectively. Hypercellular bone marrow, Hypocellular bone marrow and Normocellular bone marrow was seen in 80 percent, 15 percent and 5 percent of the patients respectively. Megaloblastic anaemia was the cause of pancytopenia in 60 percent of the patients while aplastic anaemia and sepsis was the cause in 15 percent and 10 percent of the patients respectively

**Conclusion:** Bone marrow examinations, aspiration cytology or biopsy are important tool for diagnosis of pancytopenia. Underlying cause and severity of disease determine the outcome of pancytopenia.

**Key words:** Pancytopenia, Profile

## Introduction

Pancytopenia is characterized by a decreased number of at least two blood cell lines. The causes of pancytopenia being quite varied result in diagnostic dilemma. Cytotoxic therapies, including myeloablative radiation therapy and chemotherapy, are common and predictable causes of pancytopenia in patients being treated for malignancies; pancytopenia outside this setting, can be very challenging. Evaluation of patient begins with exhaustive history including but not limited to drug intake, exposure to toxins, family history and febrile illness; followed by meticulous physical examination and detailed investigations including bone marrow evaluation in most cases. All the cases of pancytopenia require a thorough approach to find out the cause.<sup>1-3</sup>

Bone marrow failure state is characterized by presence of pancytopenia or single lineage disorder resulting from defective hematopoiesis. The disorders which produce bone marrow failure syndromes with pancytopenia include aplastic anemia, myelodysplasia, and myelophthisis. These disorders have normocytic and normochromic anemia on peripheral smear with an inappropriately low reticulocyte count.<sup>4,5</sup>

The clinical features depends upon both of the underlying disease process as well as relate to the blood cell lineages affected. Patients with mild pancytopenia are often asymptomatic and in most instances it goes unnoticed unless complete blood count is ordered for some other reason. Or the patients can present with life threatening infection or catastrophic bleeding manifestations. Symptomatic pancytopenia is more common in patients with primary dysfunction of the bone marrow or the stem cells.<sup>6,7</sup>

Hence; the present study was undertaken for assessing the profile of patients with pancytopenia.

## Materials & methods

The present study was conducted with the aim of assessing the profile of patients with pancytopenia. A total of 20 patients with pancytopenia were enrolled. Complete demographic and clinical details of all the patients were recorded. Thorough history of all the patients was obtained. Blood samples of all the patients were obtained.

### Inclusion criteria:

1. Age >18 yrs
2. Patient on chemotherapy for oncological malignancies.
3. New and Previously diagnosed cases of pancytopenia of any cause.
4. Tropical fever

### Exclusion criteria:

1. Age <18 yrs
2. Patients with severe neutropenia
3. Pregnant female

Diagnosis of pancytopenia was established. Clinical profile of all the patients was recorded. All the results were analysed by SPSS software version. Chi square test was used for assessment of level of significance P value of less than 0.05 were taken as significant.

## Results

A total of 20 patients were analysed. Mean age of the patients was 40.3 years. 60 percent of the patients were males while the remaining were females. Generalized weakness and pallor was seen in 100 percent of the patients while fever and bleeding was seen in 60 percent and 15 percent of the patients. Hepatomegaly, splenomegaly and lymphadenopathy were seen in 35 percent, 40 percent and 40 percent of the patients respectively. Haemoglobin concentration was between 1.8 gm% to 5 gm% in 20 percent of the patients while it was between 5.01 gm% to 8 gm% and more than 8 gm% in 50 and 30 percent of the patients respectively. Total leukocyte count was between 500 to 1000 cells/mm<sup>3</sup>, between 1001 to 2500 cells/mm<sup>3</sup> and between 2501 to 4000 cells/mm<sup>3</sup> in 5 percent, 30 percent and 65 percent of the patients respectively. Platelet count was between 10000 to 50000 cells/mm<sup>3</sup>, between 50001 to 100000 cells/mm<sup>3</sup> and between 100001 to 150000 cells/mm<sup>3</sup> in 35 percent, 35 percent and 30 percent of the patients respectively. Reticulocyte count was  $\leq 0.5\%$ , 0.6 to 1% and 1.1 to 2% in 25 percent, 50 percent and 25 percent of the patients respectively. Hypercellular bone marrow, Hypocellular bone marrow and Normocellular bone marrow was seen in 80 percent, 15 percent and 5 percent of the patients respectively. Megaloblastic anaemia was the cause of pancytopenia in 60 percent of the patients while aplastic anaemia and sepsis was the cause in 15 percent and 10 percent of the patients respectively.

**Table 1:** Age-wise distribution

Age group (years)	Number of patients	Percentage of patients
Less than 30	5	25
30 to 40	6	30
41 to 50	6	30
51 to 60	3	15
Total	20	100
Mean	40.3	

**Table 2:** Clinical profile

Clinical profile	Number of patients	Percentage of patients
Fever	12	60
Generalized weakness	20	100
Breathlessness	5	25
Bone pain	4	20
Weight loss	3	15
Dyspnoea	7	35
Bleeding	3	15
Pallor	20	100
Hepatomegaly	7	35
Splenomegaly	8	40
Lymphadenopathy	8	40

Table 3: Haematological profile

Haematological profile		Number of patients	Percentage of patients
Haemoglobin (gm%)	1.8 to 5	4	20
	5.01 to 8	10	50
	More than 8	6	30
Total leucocyte count (cells/mm <sup>3</sup> )	500 to 1000	1	5
	1001 to 2500	6	30
	2501 to 4000	13	65
Platelet count (cells /mm <sup>3</sup> )	10000 to 50000	7	35
	50001 to 100000	7	35
	100001 to 150000	6	30
Reticulocyte count (%)	≤0.5	5	25
	0.6 to 1	10	50
	1.1 to 2	5	25

Table 4: Bone marrow cellularity

Bone marrow cellularity	Number of patients	Percentage of patients
Hypercellular	16	80
Hypocellular	3	15
Normocellular	1	5
Total	20	100

Table 5: Causes of pancytopenia

Causes of pancytopenia	Number of patients	Percentage of patients
Megaloblastic anaemia	12	60
Aplastic anaemia	3	15
Sepsis	2	10
Malaria	2	10
Multiple myeloma	1	5
Total	20	100

## Discussion

Pancytopenia is a hematological condition which is characterized by decreases in all three cellular elements: RBC, WBC, and platelets. It is defined as hemoglobin less than 13.5 g/dl in males or 11.5 g/dl in females, leucocyte count less than  $4.5 \times 10^9/L$ , and platelet count less than  $15 \times 10^9/L$ . Pancytopenia can be life threatening and may evolve insidiously in some cases. The causes of pancytopenia vary widely in different studies.<sup>6-8</sup>

It is a common hematological problem encountered in clinical practice, which has multiple causes and the underlying pathology determines the management and prognosis of the

patients. The evaluation of the cause of pancytopenia starts from history, physical examination and various laboratory investigations including basic hematological, biochemical, radiological, and histopathological investigations.<sup>9</sup> Hence; the present study was undertaken for assessing the profile of patients with pancytopenia.

A total of 20 patients were analysed. Mean age of the patients was 40.3 years. 60 percent of the patients were males while the remaining were females. Generalized weakness and pallor was seen in 100 percent of the patients while fever and bleeding was seen in 60 percent and 15 percent of the patients. Hepatomegaly, splenomegaly and lymphadenopathy were seen in 35 percent, 40 percent and 40 percent of the patients respectively. Haemoglobin concentration was between 1.8 gm% to 5 gm% in 20 percent of the patients while it was between 5.01 gm% to 8 gm% and more than 8 gm% in 50 and 30 percent of the patients respectively. Mandli L in 2019 assessed the clinical profile and etiological causes of pancytopenia. Demographic details were collected from all the patients and physical examination was done. The patients were asked to undergo biochemical investigations, chest X rays and USG of abdomen. Smears were taken from peripheral blood as well as bone marrow biopsy and stained. Invasive procedure such as bone marrow biopsy is done if needed. A predominance of males was seen over females and 11-30 years age group was the most affected. The most common cause was megaloblastic anemia followed by aplastic anemia and tuberculosis. The most common symptom was fatigue, dyspnea, fever and bleeding. Early identification of this disease would help in early planning for management thereby improving the survival rates.<sup>10</sup>

In the present study, reticulocyte count was  $\leq 0.5\%$ , 0.6 to 1% and 1.1 to 2% in 25 percent, 50 percent and 25 percent of the patients respectively. Hypercellular bone marrow, Hypocellular bone marrow and Normocellular bone marrow was seen in 80 percent, 15 percent and 5 percent of the patients respectively. Megaloblastic anaemia was the cause of pancytopenia in 60 percent of the patients while aplastic anaemia and sepsis was the cause in 15 percent and 10 percent of the patients respectively. Dhooria HPS et al in 2020 etiological spectrum and clinical profile of admitted patients presenting with pancytopenia were studied. Mean age of the patients was  $45.69 \pm 17.05$  years with maximum number of patients (23%) in the age group of 51-60 years and 119 patients were males and 81 patients were females. Most common physical finding was pallor (95%), followed by splenomegaly (22%) and hepatomegaly (17%). Total of 107 patients were vegetarians (53.5%) and 93 patients (46.5%) were non-vegetarians. Mean hemoglobin was  $7.16 \pm 2.04$  g/dl, mean total leucocyte count was  $2.51 \pm 1.02 \times 10^3$ /cu. mm, mean platelet count was  $54885.37 \times 10^3$ /ul  $\pm 40320.96$  and mean the absolute neutrophil count was  $1.59 \times 10^3$  /cu.mm  $\pm 0.84$ . Ten patients of pancytopenia were because of tropical fever which included 4 cases of dengue, 3 cases of malaria, 2 cases of enteric fever and 1 case of mixed infection (malaria + scrub typhus). Viral markers were positive in 14 out of the 63 patients tested. Out of these 14 patients, 4 were HBsAg reactive, 7 were HCV +ve and 3 were HIV +ve. Most common red blood cell picture on peripheral blood film was normocytic normochromic (34.5%), followed by mixed morphology (33.5%). Macrocytic and microcytic morphology was seen in 19.5% and 12.5% of the patients respectively. Hypercellular marrow was seen in 82 patients (42.9%), normocellular marrow was seen in 58 patients (30.3%) and hypocellular marrow was seen in

51 patients (26.7%). The most common cause of pancytopenia in their study was megaloblastic anemia in 59 patients (29.5%), the 2nd common cause was leukemias in 28 patients (14%) and the 3rd cause was aplastic anemia in 22 patients (11%). Drug induced pancytopenia was seen in 21 patients (10.5%) and hypersplenism in 9 cases (4.5%). This study has helped in knowing the various etiologies of pancytopenia in this hospital. Megaloblastic anemia was the most common etiology in this study followed by leukemias and aplastic anemia.<sup>11</sup>

In the present study, total leukocyte count was between 500 to 1000 cells/mm<sup>3</sup>, between 1001 to 2500 cells/mm<sup>3</sup> and between 2501 to 4000 cells/mm<sup>3</sup> in 5 percent, 30 percent and 65 percent of the patients respectively. Platelet count was between 10000 to 50000 cells/mm<sup>3</sup>, between 50001 to 100000 cells/mm<sup>3</sup> and between 100001 to 150000 cells/mm<sup>3</sup> in 35 percent, 35 percent and 30 percent of the patients respectively. Yadav RK et al in 2020 assessed the clinico-hematological profile of pancytopenia. Total 125 patients who attended department of medicine were screened for study. After exclusion 94 patients were studied prospectively. Out of 94 patients 59 were males, and 35 females in the study group. Male to female ratio was 1.6:1. Maximum patients were between 20 years to 35 years of age group. Pallor and weakness were most common clinical feature in this study group. Out of various etiological causes vitamin B12 deficiency was the commonest in our study. 48(51%) patients had megaloblastic anemia due to vitamin B12 deficiency. Second most common etiological factor was hypoplastic/aplastic anemia. Other etiological abnormalities were hypersplenism, dengue, malaria, sepsis, myelodysplastic syndrome and multiple myeloma. Bone marrow examinations, aspiration cytology or biopsy are important tools for diagnosis of pancytopenia. Underlying cause and severity of disease determine the outcome of pancytopenia.<sup>12</sup>

### Conclusion

Bone marrow examinations, aspiration cytology or biopsy are important tools for diagnosis of pancytopenia. Underlying cause and severity of disease determine the outcome of pancytopenia.

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