EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 5
Issue: 5
408-410
Year: 2018

PANCYTOPENIA: A CLINICO HEMATOLOGICAL STUDY

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Article Received on 14/03/2018 **Article Revised on 04/04/2018** **Article Accepted on 24/04/2018**

ABSTRACT

Background: Pancytopenia is the simultaneous presence of anemia, leucopenia, and thrombocytopenia. It is usually a manifestation of bone marrow disorder either primary or secondary. The presenting symptoms are usually attributable to anemia, leucopenia, or thrombocytopenia. The severity of the pancytopenia and the underlying pathology determine the management and prognosis. Thus identification of the correct cause will help in implementing appropriate therapy. **Method:** This study was carried out between July 2014 to june 2016 in the Department of Medicine, SRMSIMS, Bareilly. After a detailed history and medical examination basic hematological investigations like complete blood count, reticulocyte count, and peripheral smear examination were performed in each case. Bone marrow aspiration was subsequently carried out. Clinico-pathological correlation was done in all cases before reaching a definitive diagnosis. **Results:** A total 54 patients of pancytopenia were included in our study. Out of 54 cases 32 (59.25%) were male and 22 (40.74%) were female. The age ranged from 14 to 72 years and mean age was 37.7 years. The commonest mode of presentation was generalized weakness (100%) and most common physical finding was pallor (100%). The predominant blood picture was macrocytic anemia and most common cause was megaloblastic anemia (57.40%). **Conclusion:** Pancytopenia should be suspected on clinical grounds when a patient presents with unexplained anemia, prolonged fever and tendency to bleed. Many of causes of pancytopenia are completely curable while others are managable. This will help to reduce patients suffering, improves quality of life and prolongs survival.

KEYWORDS: Pancytopenia, Bone marrow aspiration, Megaloblastic anemia.

INTRODUCTION

Peripheral pancytopenia is reduction in all three major formed elements of blood to levels below their lower normal limit leading to simultaneous presence of anemia, leucopenia, and thrombocytopenia; therefore it exists when hemoglobin (Hb) is less than 13.5 gm/dl in male or 11.5 gm/dl in female, the leucocyte count is less than 4000/mm^3 and platelet count is less than 1.5 lakh/mm^3.[1] Thus it is not a disease entity by itself, but rather a triad of findings. Pancytopenia may be a manifestation of a wide variety of disorder which primarily or secondarily affect the bone marrow.[2] It occurs either due to decrease in hematopoietic cell production as in aplastic anemia, trapping of normal cells in hypertrophied and overactive reticulo-endothelial system as in hypersplenism, ineffective hematopoiesis in megaloblastic anemia, or malignant tissue in bone marrow, defective cell production, antibody mediated sequestration or destruction of cells.[1] The severity of pancytopenia and the underlying pathology determine the management and prognosis.[3] Thus identification of the correct cause will help in implementing appropriate therapy.

MATERIAL AND METHODS

The study was carried out between july 2014 to june 2016 in the department of General Medicine Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly. We included patients of both sexes having age 14 years and above. Inclusion criteria were presence of all three of the following, based on the criteria defined by deGruchy: hemoglobin<13.5g/dL for male and 11.5 gm/dl for female, total leukocyte count (TLC) <4,000/µL, platelet count <150,000/ µL^1.

In all patients, a complete relevant medical history including age, sex, smoking status, alcohol intake, history of any treatment, intake of or exposure to potentially toxic chemicals, agents or drugs, radiation exposure, history of symptoms such as bone pains, fever, night sweats, malaise, weight loss and pruritus were taken. A detailed meticulous physical examination of every patient was done for pallor, jaundice, hepato-spleenomegaly, lymphadenopathy, sternal tenderness and gum hypertrophy. Basic hematological investigations like complete blood count, reticulocyte count, and peripheral smear examination were performed in each

case. Bone marrow aspiration was subsequently carried out using salah bone-marrow aspiration needle, under aseptic precaution.

All the patients thus selected were investigated in a systematic manner, cause of pancytopenia was ascertained and the data was analyzed on the basis of etiology, clinical and haematological findings. Clinico-pathological correlation was done in all cases before reaching a definitive diagnosis.

OBSERVATION AND RESULTS

Total 54 patients were included in the study. Out of 54 patients, 32 (59.25%) were male and 22 (40.74%) were female. Male to female ratio was 1.45:1. The age ranged from 14 to 72 years with mean age was 37.7 years. The majority of patients were of third decade of life.

Table 1: Sex distribution.

Gender	n=	%
Male	32	59.25%
Female	22	40.74%

The commonest mode of presentation was generalized weakness seen in 54 (100%) patients, other symptoms were breathlessness, fever, and weight loss seen in 53.70%, 42.59%, 14.81% respectively.

Table 2: Presenting complaints in pancytopenia.

S.No	Presenting Complaints	n=	%
1.	Generalized weakness	54	100%
2.	Breathlessness	29	53.70%
3.	Fever	23	42.59%
4.	Weight loss	8	14.81%
5.	Bleeding manifestation	6	11.11%

The most common physical finding was pallor present in 100% of cases, followed by splenomegaly and hepatomegaly seen in 44.44% and 31.48% respectively.

Table 3: Physical findings in pancytopenia.

S.No	Physical findings	n=	%
1.	Pallor	54	100%
2.	Spleenomegaly	24	44.44%
3.	Hepatomegaly	17	31.48%
4.	Jaundice	5	9.26 %
5.	Lymphadenopathy	3	5.56%

The predominant blood picture was macrocytic anemia, followed by dimorphic anemia. Peripheral smear showed macrocytes followed by normocytic normochromic anemia and normocytic hypochromic anemia. Leucopenia and thrombocytopenia were seen in all cases.

The most common cause was megaloblastic anemia seen in 31 cases (57.40%) followed by aplastic anemia (18.52%) and hypersplenism (9.26%). Megaloblastic anemia was observed in 21 male and 10 female. Aplastic anemia was seen in 7 male and 3 female patients.

Table 4: Distribution of various causes of pancytopenia.

S.No.	Cause	n=	%
1.	Megaloblasticanemia	31	57.40%
2.	Aplastic anemia	10	18.52%
3.	Hypersplenism	5	9.26%
4.	Ac.Leukemia	3	5.56%
5.	MDS	1	1.9%
6.	Malaria	2	3.7%
7.	Lymphoma	1	1.9%
8.	Kala azar	1	1.9%

DISCUSSION

There are limited number of studies on the frequency of various causes of pancytopenia. The variation of frequency of various causes of pancytopenia are due to the difference in geographic area, nutritional status, prevalence of infective disorder, genetic difference, period of observation, and methodology.

The incidence of megaloblastic anemia varies from 0.8% to 32.26% of all pancytopenic patients.[4,5,6] Our study showed the incidence of megaloblastic anemia was 57.40%. Our study were supported by the study of Tilak et al[3], Kumar et al[7], Khunnger JM et al[8] the incidence of megaloblastic anemia was 68%,37%,72% respectively.

The incidence of aplastic anemia varies from 10.0% to 52.7% of all pancytopenic patients.[9,10] Our study show incidence of aplastic anemia was 18.52% which correlated with the study done by Khunger JM et al.[8]

The commonest cause of pancytopenia reported from various studies throughout the world has been aplastic anemia.[3] This is in contrast with the result of our study in which the commonest cause of pancytopenia was megaloblastic anemia. This seems to reflect the higher prevalence of nutritional anemia in Indian subjects.

Hypersplenism was the cause of pancytopenia in 5 cases (9.26%) of our study. In hypersplenism there is peripheral pooling or trapping and destruction of cells in an enlarged spleen resulting in cytopenia. Increasing

severity of the condition causes pancytopenia, as is seen in patients with chronic liver disease and thus hypersplenism may come out to be a common cause for pancytopenia.[11,12]

In our study there was 5.56% incidence of leukemia. This is supported by the study of Khunger JM et al[8], that showed 5% incidence. Kumar R et al.[7] reported 12% incidence of leukemia.

Out of 54 cases, 2 cases (3.7%) were due to malaria. Our study was supported by Khunger JM et al[8], Tilak V et al[3], Kumar R et al[7] who reported the incidence of 1%, 3.9%, and 3% respectively. Cannard et al[13] and Aouba et al[14] reported malaria related pancytopenia. In our study 1 case (1.9%) is due to kala-azar. Leishmanai donovani bodies seen in the bone marrow aspirate was diagnostic of kala-azar. Tilak et al[3] reported a similar kala-azar related pancytopenia.

In our study pancytopenia due to the MDS noted in 1 case(1.9%). Hypercellularity of bone marrow with abnormal cells confirmed the diagnosis. Pancytopenia due to lymphoma was noted in 1 case(1.9%) in our study. Ma et al[15] has also described pancytopenia in a case of lymphoma.

Bone marrow examination is extremely helpful in evaluation of pancytopenia. This allows complete assessment of marrow architecture and the pattern of distribution of any abnormal infiltrate and for the detection of focal bone marrow lesion. Megaloblastic anemia has typical megaloblasts, hypoplasia of marrow was noted in aplastic anemia, hypercellular marrow was noted in cases of MDS, leukemia and in inflammatory condition, dysplastic cells were noted in MDS.

CONCLUSION

Pancytopenia should be suspected on clinical grounds when a patient presents with unexplained anemia, prolonged fever and tendency to bleed. The present study concludes that detailed primary hematological investigations along with bone marrow aspiration in cytopenic patients are helpful for understanding disease process and to diagnose or to rule out the causes of cytopenia. These are also helpful in planning further investigations and management. Megaloblastic anemia and aplastic anemia are the major causes of pancytopenia. Severe pancytopenia has significant relation with the clinical outcome and can be used as a prognostic indicator. Many of causes of pancytopenia are completely curable while others are manageable. This will help to reduce patients suffering, improves quality of life and prolong survival.

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