

## A Study of Clinical, Hematological and Etiological Profile of Pancytopenia at a Tertiary Care Center in Andhra Pradesh, India.

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### Abstract

**Background:** Pancytopenia is a triad of anemia, leucopenia and thrombocytopenia. The initial symptom would be generalized weakness. Etiology ranges from benign to malignant conditions. Accurate workup is essential for the appropriate management.

**Aim:** To study the clinical presentation, bone marrow picture and the causes of pancytopenia.

**Materials and methods:** This study is carried out in Government General Hospital, Kakinada which is a tertiary care center. All the patients with pancytopenia admitted in the Department of General Medicine were considered in the present study. 50 cases presented with pancytopenia were analyzed. The clinical findings, blood investigations and bone marrow examination findings were recorded. The various causes of pancytopenia were tabulated and analyzed.

**Results:** The commonest symptom present in all cases was generalized weakness (100%) followed by fever (42%). Pallor was the most common clinical feature seen in all 50 cases (100%). Splenomegaly was seen in 36% of cases, hepatomegaly in 24%, jaundice in 8%, bony tenderness in 4% and lymphadenopathy in 6%. The commonest cause of pancytopenia was megaloblastic anemia due to vitamin B12 deficiency seen in 40% of cases, followed by aplastic anemia seen in 28% of cases.

**Conclusion:** Pancytopenia is a common hematological entity encountered in routine clinical practice and accurate subclassification is needed. When detected early, good therapeutic response can be achieved.

**Key Words:** anemia, bone marrow examination, pancytopenia, splenomegaly.

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### I. Introduction

Pancytopenia is a common hematological disorder encountered in routine clinical practice. The causes range from treatable causes to complete failure of bone marrow. Pancytopenia is defined as a decrease in all the three elements of blood i.e. red blood cells, white blood cells and platelets<sup>[1]</sup>. The presenting symptoms are usually attributable to the anemia or the thrombocytopenia. Leucopenia is an uncommon cause of initial presentation of the patient, but it can become the most serious threat to life during the subsequent course of the disorder<sup>[2]</sup>. Identifying the appropriate cause is useful in treatment.

### II. Aims and Objectives

- 1) To study the clinical presentation of pancytopenia.
- 2) To study the bone marrow examination in pancytopenia.
- 3) To study the etiology of pancytopenia.

### III. Materials and Methods

It is a hospital based prospective observational study for a period of 2 years from December 2016 to November 2018 carried out at Government General Hospital, Kakinada in the Department of General Medicine. All the age groups and both sexes were included in the study. All the cases with a diagnosis of pancytopenia were included in the study. Patients on therapy were excluded from the study. Case selection was based on the clinical features and laboratory reports of pancytopenia (Hb < 9 gm%, WBC count < 4000/cumm and platelet count < 1,00,000/cumm). Bone marrow aspiration was done in all the cases of pancytopenia. Bone marrow biopsy was done in cases where there was a dry tap and inadequate material on bone marrow aspiration. Relevant

investigations were done according to the requirement. Serum vitamin B12 levels were done to confirm the cause of pancytopenia in megaloblastic anemia. Hypersplenism was diagnosed as the cause in some cases after exclusion of other causes of splenomegaly by performing investigations like ultrasound abdomen to exclude cirrhosis of liver, portal vein thrombosis etc. Results were tabulated and analyzed.

#### IV. Results

A total of 50 cases of pancytopenia were considered in the present study. 27 cases were male and 23 cases were female.

**TABLE 1** Presenting complaints in cases of Pancytopenia

Presenting complaint	Number of cases	Percentage (%)
Generalized weakness	50	100%
Fever	21	42%
Bleeding manifestations	8	16%

All 50 cases(100%) presented with generalized weakness, 21 cases(42%) had fever and 8 cases (16%) had bleeding manifestations. [Table 1]

**TABLE 2:** Physical examination findings in cases of Pancytopenia

Physical examination	Number of cases	Percentage(%)
Pallor	50	100%
Splenomegaly	18	36%
Hepatomegaly	12	24%
Jaundice	4	8%
Bony tenderness	2	4%
Lymphadenopathy	3	6%

On clinical examination, all 50 cases (100%) had pallor, splenomegaly was seen in 18 cases (36%), hepatomegaly in 12 cases (24%), jaundice in 4 cases (8%), bony tenderness in 2 cases (4%) and lymphadenopathy in 3 cases (6%). [Table 2]

**TABLE 3:** Causes of pancytopenia

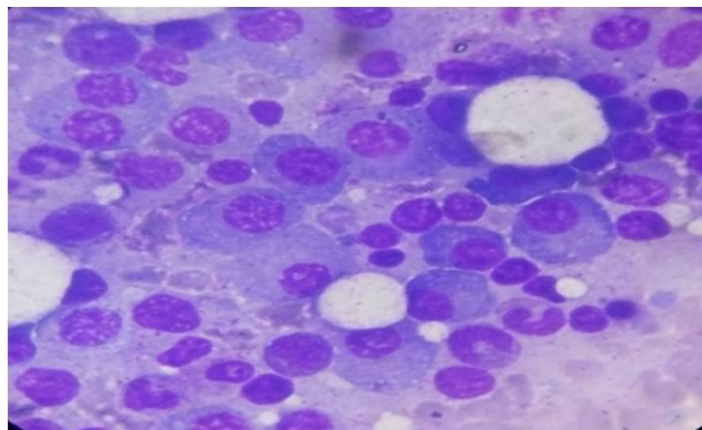
Cause	Number of cases(n=50)	Percentage (%)
Megaloblastic anemia(Vitamin B12 deficiency)	20	40%
Macrocytic anemia due to alcoholism	4	8%
Hypersplenism	5	10%
Myelodysplastic syndrome	2	4%
Subleukemic leukemia	4	8%
Multiple myeloma	1	2%
Aplastic anemia	14	28%
TOTAL	50	100%

The commonest cause of pancytopenia was megaloblastic anemia due to vitamin B12 deficiency seen in 20 cases (40%)[Fig 1], followed by aplastic anemia seen in 14 cases (28%)[Fig 3]. The cause of aplastic anemia in the present study was drug abuse in 8 cases, Fanconi's anemia in 2 cases, and aplastic crisis in 4 cases secondary to sickle cell anemia. Hypersplenism was seen in 5 cases (10%) [Fig2] and macrocytic anemia due to alcoholism was seen in 4 cases (8%). [Table 3]

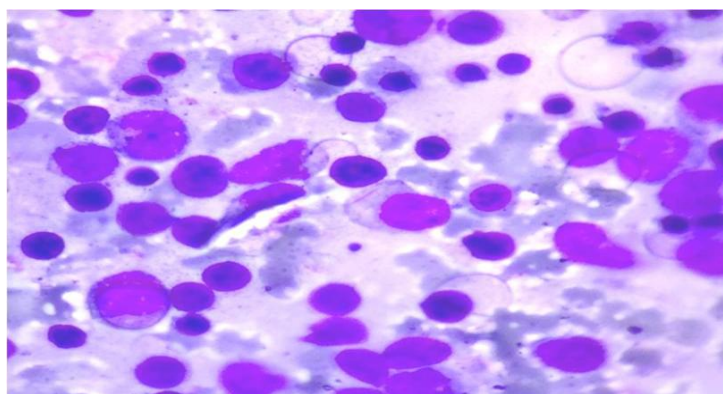
**TABLE 4:** Hematological parameters in the common causes of pancytopenia

Hematological parameters	Megaloblastic anemia	Aplastic anemia	Hypersplenism
Hemoglobin(gm/dl)	2.8-8	3-5.5	3-6
Total Leucocyte count(cumm)	1,000-3,800	700-2,800	1,000-3,000
Platelets(cumm)	10,000-80,000	12,000-75,000	25,000-90,000

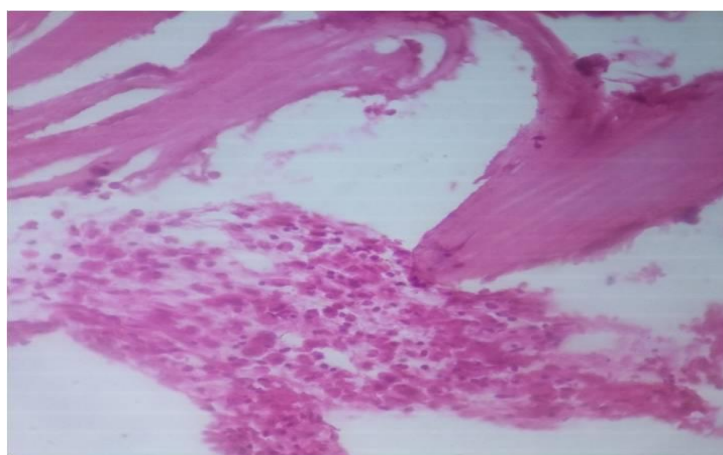
The predominant feature on peripheral smear examination in cases of pancytopenia was dimorphic anemia seen in 18% of cases, followed by macrocytic anemia. Macrovalocytes and hypersegmented polymorphs were seen in 15 % of cases. Malarial parasites were seen in 2% of cases with hypersplenism. Myeloblasts (4%), lymphoblasts, (4%) and neutrophils with hypogranularity(4%) were seen on peripheral smear examination. [Table 4]



**Fig 1:** Megaloblastic anemia: shows megaloblasts(MGG,1000X)



**Fig 2:** Hypersplenism: Erythroid hyperplasia (MGG,1000X)



**Fig 3:** Aplastic anemia: Bone marrow biopsy shows bony trabeculae with decreased marrow elements and fibrosis(H&E,100X)

### V. Discussion

A total of 50 cases of pancytopenia were analyzed. The age groups and sex were compared with other studies.

**TABLE 5:**Age and sex distribution compared with other studies.

Authors	No of cases	Age distribution(yrs)	Male:Female
Khunger JM et al.[3]	200	2-70	1.2:1
Kumar et al.[4]	166	12-73	2.1:1
Khodke et al.[5]	50	3-69	1.3:1
B.N. Gayathri et al.[6]	104	2-80	1.2:1
The present study	50	12-80	1.2:1

In the study by B. N. Gayathri et al [6], the commonest presenting complaint was generalized weakness. The commonest physical finding was pallor(100%) followed by splenomegaly(35.57%) and hepatomegaly(26.92%). In the study by Mahaswetha Mallik et al [7], the commonest complaint was fever and clinical findings were pallor and hepatomegaly. In the present study, clinical features were similar to the study by B. N. Gayathri et al.

**TABLE 6:** Megaloblastic anemia as a cause of pancytopenia (Comparison with other studies)

Study	Percentage(%)
Mahaswetha Mallik et al.[7]	31.9%
Khungeretal.[3]	72%
Rajesh para et al.[8]	46.6%
Kumar R et al.[4]	22%
Tilak V et al.[11]	44%
Khodke K et al.[5]	12.3%
Rajendra Kumar Nigam et al.[9]	43.22%
Y Subramanyam et al.[10]	26.42%
The present study	40%

In the present study, 40% of causes of pancytopenia were megaloblastic anemia due to vitamin B12 deficiency similar to studies by Rajesh para et al, Tilak V et al, Rajendra kumarnigam et al.

**TABLE 7:** Aplastic anemia and Hypersplenism as a cause of pancytopenia (Comparison with other studies)

Study	Aplastic anemia (%)	Hypersplenism (%)
Mahaswetha Mallik et al.[7]	29.9%	-
Khungeretal.[3]	14%	-
Rajesh para et al.[8]	8.6%	-
Rajendra kumarnigametal.[9]	2.58%	3.22%
Y Subramanyam et al.[10]	13.2%	24.53%
The present study	28%	10%

Aplastic anemia as a cause of pancytopenia in the present study is similar to the study by Mahaswetha Mallik et al.

**TABLE 8:** Commonest cause of pancytopenia in different places of India (various studies)

S.No	Study	Place in India	Number of cases	Commonest cause	Percentage
1	Kale.Petal.[12]	Mumbai	65	Megaloblastic anemia	25.40%
2	Tilak.Vetal.[11]	Chandigarh	77	Megaloblastic anemia	68.83%
3	Mohanty Bijayaetal.[13]	Jamshedpur	100	Megaloblastic anemia	44%
4	Kumar et al.[4]	New Delhi	166	Aplastic anemia	29.52%
5	Khunger JM et al.[3]	New Delhi	200	Megaloblastic anemia	22.29%
6	Y.Subramanyam et al.[10]	Kadapa,AP	106	Megaloblastic anemia	26.41%
7	Present study	Kakinada,AP	50	Megaloblastic anemia	40%

The commonest cause of pancytopenia in various places in India is megaloblastic anemia which has good response to therapy. India is a developing country and many of the patients in the study belong to a low socioeconomic status. So, megaloblastic anemia due to vitamin B12 deficiency due to poor nutritional status was the most common cause of pancytopenia in various studies including the present study.

## VI. Conclusion

Pancytopenia is a common hematological entity encountered in routine clinical practice and accurate subclassification is needed. When detected early, good therapeutic response can be achieved. There is a change in trend from aplastic anemia to megaloblastic anemia over the years. In most of the states in India, megaloblastic anemia is the most common cause of pancytopenia. However, a complete work up of pancytopenia should be done keeping in mind the other causes of pancytopenia for appropriate treatment.

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