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## Pancytopenia-An Evaluation

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### Abstract

**Objectives:** A prospective study, to evaluation and establish the underlying cause of pancytopenia.

**Materials and Methods:** A total of 12 cases of pancytopenia were analyzed over a period of six months. All patients who presented with pallor, fever, generalized weakness, and exertional breathlessness were subjected to complete hemogram and were included in the study based upon the laboratory results. Pancytopenia refers to the combination of anaemia, leucopenia and thrombocytopenia. It may be due to reduced production of blood cells as a consequence of bone marrow suppression or infiltration, or there may be peripheral destruction or splenic pooling of mature cells Pancytopenia is a reduction in all the three cellular elements of blood; exists in adult when the hemoglobin level is less than 10g/dL, total leukocyte count is less than  $4 \times 10^9 /L$ , and platelet count is less than  $150 \times 10^9 /L$  [1]. A detailed history and clinical examination was carried out in each case and the relevant information was noted in a proforma. Bone marrow aspiration was performed using Salah's bone marrow aspiration needle from the iliac crest or sternum. A full blood count was done, peripheral smear and reticulocyte count was also performed in each case. Bone marrow smears were stained with Leishman, Giemsa and iron stain wherever necessary.

**Results:** All patients presented with pallor. Other complaints are fever, generalized weakness, and breathlessness in descending order. The youngest patient being 15yrs old and the oldest patient 60yr old. M: F ratio being 3:2 showing the higher prevalence of the disease in male than in female. Majority of the patients fall in the middle class of socioeconomic group. The most common cause of pancytopenia as revealed by bone marrow was Megaloblastic anemia.

**Conclusion:** Megaloblastic anemia and Aplastic anemia are the common causes of pancytopenia. M: F ratio being 2:3. Majority of the patients fall under the age group of 26-35yrs and in the middle class of socioeconomic group.

**Keywords:** Pancytopenia, Megaloblastic anemia, Aplastic anemia, Bone marrow, Hemogram.

### 1. Introduction

Pancytopenia is not a disease entity but a triad of findings that may result from a number of disease processes. These disorders may affect bone marrow either primarily or secondarily, resulting in the manifestation of pancytopenia [2].

Presenting symptoms are usually attributable to anemia, leucopenia or thrombocytopenia. Anemia leads to fatigue, dyspnea and cardiac symptoms. Thrombocytopenia leads to bruising, mucosal bleeding and neutropenia to sharply increased susceptibility to infection [3]

### 2. Materials and Methods

This prospective study was carried out for One month from Aug to January in Department of Medicine collaboration with Pathology, Kurnool medical college Kurnool. All patients who presented with pallor, fever, generalized weakness, and Breathlessness were subjected to complete hemogram and were included in the study based upon the laboratory results.

**Criteria for inclusion:** Hb < 10g/dl, TLC < 4000/cumm and Platelet count < 1, 50, 000/cumm.

**Criteria for exclusion:** A detailed history and clinical examination was carried out in each case and the relevant information was noted in a proforma. Bone marrow aspiration was performed using Salah's bone marrow aspiration needle from iliac crest or sternum. A full blood count was done, peripheral smear and reticulocyte count was also performed in

eachcase. Bone marrow smears were stained with Leishman, Giemsa and iron stain wherever necessary.

**3. Results**

Total 12 adult patients who presented with pancytopenia were studied during the period from Aug to January. Out of a total of 12 patients we studied, 60% were male and 40% were female (male-to-female ratio 3:2) (table 1). The mean age of the patients was 42.9 (range 13–55) years. Age incidence of different causes of pancytopenia.

The most common clinical feature in our study was pallor (100%), followed by weakness (78%) fever (60%), and respiratory distress (28%). Splenomegaly (12%), hepatomegaly (10%) and lymphadenopathy (03%) were noted. Bleeding from various sites was encountered by 10% of the patients. Most common physical finding was pallor which was present in all the patients. Least common physical finding was lymphadenopathy.

**Pancytopenia Associated with Megaloblastic Anemia**

Out of 12cases, 6 cases were of megaloblastic anemia, the commonest age group affected was 20-30 years. Females (30%) affected more than Males (20%). Majority of cases were having Hb in the range of 5-8gm%, TLC: 2,500-3,900cumm and platelet count 50000-100,000cumm. Peripheral study had dimorphic picture in most cases.

**Pancytopenia Associated with other causes**

Malaria, Aplastic anemia, Tuberculosis, Acute lymphoid leukaemia were noted with commonest age group affecting 10-50 years and Male show preponderance, with male: female 4:1. In present study, malarial infestation was seen in 20% of cases. They presented with fever, chills, rigor, vomiting and headache. Clinical examination revealed pallor and hepato-splenomegaly.

PS showed macrocytic hypochromic anaemia with neutropenia, thrombocytopenia and gametocytes of Plasmodium falciparum were seen in all cases. In 10% of cases aplastic anemia, gross Pallor noted on physical examination. Peripheral smear was microcytic hypochromic picture. Bone marrow aspirate had scanty material and reported as hypoplastic bone marrow. In present study single (1) case, 14 years old male were diagnosed as Gauchers disease.

**4. Discussion**

Pancytopenia is not an uncommon hematological problem in clinical practice.

The variation in the frequency of various conditions causing pancytopenia has been attributed to difference in methodology and diagnostic criteria employed, geographic area, period of observation, genetic differences and varying exposure to myelotoxic agents etc.

The commonest cause of pancytopenia in the present study was megaloblastic anemia, accounting for 50% of the cases. In most of the sub continental studies megaloblastic anemia was found to be either the commenst or the second most

common cause of pancytopenia.

Hence findings of the present study correlates well with other reports from India and other subcontinent. The incidence of megaloblastic anemia in our study was 40% whereas in other studies it varies from 1%-68% [4-8].

The high incidence of megaloblastic anemia correlates with high prevalence of nutritional anemia in the subcontinent [9]. This group of patients respond very well to the appropriate vitamin b12 therapy. Most of the patients presented with history of weakness and fever.

Pallor is the most common finding in all patients with megaloblastic anemia. All cases of megaloblastic anemia in the present study showed presence of macrocytes and macroovalocytes on peripheral smear. Hypersegmented neutrophils were also noted in majority of smears.Circulating megaloblast is also seen in few cases.

Bone marrow aspiration and biopsy were hypercellular in all cases of megaloblastic anemia. Marked erythroid hyperplasia is present in almost all cases of megaloblastic anemia.

Malaria was the second most common cause of pancytopenia in our study. Malaria accounts for 20% of cases in our study which is also one of the commonest causes in India. As Malaria is endemic in our south east area, once the diagnosis of malaria is established the clinician treat the acute illness without advising bone marrow examination.

Hypersplenism was the third most common cause in present study.

Aplstic anemia was the fourth common cause in our study as was the majority of other Indianstudies. Aplastic anemia accounts for 10% of cases of pancytopenia in the present series, while range of 10 to 25% was reported in most western studies [4-8].

Tb accounts for one case of pancytopenia in our studies.

Present study also found a case of acute lymphoid leukemia. Pancytopenia can be seen inapproximately 30% cases of acute leukemia at time of presentation. Immature cells can be seen in the peripheral smears or smears made from buffy coat.

Bone marrow aspiration establishes the diagnosis however if the tap is dry then bone marrow biopsy becomes mandatory for diagnosis [9].

**Sex distribution of different causes of pancytopenia (Table 1)**

Diagnosis	Male %	Female %	Total%
Megaloblastic anemia	20%	30%	50%
Malaria	20%	-	20%
Aplastic anemia	-	10%	10%
Tuberculosis	10%	-	10%
Acute lymphoid leukaemia	10%	-	10%

**Age incidence of different causes of pancytopenia (table 2)**

Diagnosis	10 - 20yrs	20 - 30yrs	30 - 40yrs	40 - 50yrs	50 - 60yrs
Megaloblastic anemia		03		01	01
Malaria	02			01	
Aplastic anemia		02			
Tuberculosis			01		
Acute lymphoid leukaemia	01				

## 5. Conclusion

Bone marrow aspiration is an important diagnostic tool in haematology which helps to evaluate various cases of Pancytopenia. Bone marrow aspiration is sufficient to make a diagnosis in cases of nutritional anaemia and initial diagnosis of leukemia.

Tuberculosis being highly prevalent and endemic in India, it is essential to be aware of its manifestation as pancytopenia.

Present study concludes that detailed primary haematological investigations along with bone marrow aspiration in cytopenic patients is helpful for understanding of the disease process, to diagnose or to rule out the causes of Pancytopenia and helpful in planning further investigations and management of Pancytopenic patients.

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