



## CLINICO HEMATOLOGICAL PROFILE OF PATIENTS WITH PANCYTOPENIA- A THREE-YEAR STUDY

### Pathology

|                             |                                                                                                                                                  |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
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### ABSTRACT

**Background:** Pancytopenia is a relatively common hematological entity. It may result from relatively benign causes such as viral infections and vitamin B12/folic acid deficiency to more fatal bone marrow aplasia and leukaemias. The severity of pancytopenia and the underlying pathology determine the management and prognosis.

**Objectives:** To study the etiology and clinic-hematological profile in patients of peripheral blood pancytopenia.

**Materials And Methods:** This was a retrospective study conducted at G S Medical College, Hapur and Noida international institute of Medical Sciences Greater Noida, during the period of November 2017 to November 2020

**Results:** A total of 192 patients (103 males and 89 females) were diagnosed to have pancytopenia. Most of the patients presented with generalized weakness and fever. The commonest physical finding was pallor, followed by splenomegaly. The various causes of pancytopenia included infections (n=132), megaloblastic anaemia (MA) (n=46), drugs, aplastic anaemia and subleukaemic leukaemia. We found a significant association between megaloblastic anaemia and pancytopenia.

**Conclusion:** The present study concluded that infection and megaloblastic anaemia are the most common cause of pancytopenia. The more serious disorders affecting the bone marrow constitute only <5% of all cases of pancytopenia.

### KEYWORDS

Pancytopenia, Megaloblastic anaemia, Infections

### INTRODUCTION

Pancytopenia is an important clinico-hematological entity encountered in our day-to-day clinical practice. There are varying trends in its clinical pattern, treatment modalities and outcomes [1]. It is a disorder in which all three major formed elements (RBC, WBC and platelets) are decreased in number [2]. The causes can be many, ranging from viral fevers, megaloblastic anaemia (MA), autoimmune disorders, bone marrow failure syndrome and hematological malignancies [2,3]. The clinical pattern and outcome depends on the etiology [4,5]. The severity of pancytopenia and the underlying pathology determine the management and prognosis of the patients [5]. The present study was undertaken to study the profile of adult patients presenting with pancytopenia.

### MATERIALS AND METHODS

The present retrospective study was undertaken for a period of 3 years, from December 2017 to December 2020, at department of Hematology G S Medical College, Hapur and Noida international Institute of Medical Sciences (NIIMS), Greater Noida. All adult patients with pancytopenia were included.

Inclusion criteria were presence of all three of the following: Hemoglobin (<9gm%), total leucocyte count (TLC), <4000/l, platelet count <1,00,000/l. Two ml of EDTA (ethylene diamine tetra acetic acid) anticoagulated blood was collected and processed through Nihon Kohden automated hematology analyser and 9 hematology parameters were obtained, which included hemoglobin, RBC count, total leucocyte count, DLC, platelet count, MCV, MCH, MCHC and PCV. Peripheral smear was stained with leishman stain for all the cases and examined in detail.

### RESULT:

A total of 192 patients who presented with pancytopenia were studied. They consisted of 103 males and 89 females with a male to female ratio of 1.12:1. The mean age of the patients was 36.4 years (range 18-85 years). The presenting complaints and physical findings are shown in table 1.

**Table 1: Presenting complaints and physical findings in Pancytopenia**

|    | Sign & Symptoms      | No. of Patients |
|----|----------------------|-----------------|
| 1. | Generalized weakness | 192             |
| 2. | Fever                | 78              |

|     |                        |     |
|-----|------------------------|-----|
| 3.  | Bleeding manifestation | 07  |
| 4.  | Dyspnea                | 85  |
| 5.  | Weight loss            | 07  |
| 6.  | Chills and rigors      | 06  |
| 7.  | Pallor                 | 192 |
| 8.  | Splenomegaly           | 52  |
| 9.  | Hepatomegaly           | 41  |
| 10. | Bony tenderness        | 02  |
| 11. | Lymphadenopathy        | 01  |

The commonest mode of presentation was generalized weakness, other main symptoms were dyspnea, fever and weight loss. Pallor was noted in all cases. Splenomegaly and hepatomegaly were seen in cases of megaloblastic anaemia, followed by leukaemia and malaria. Bony tenderness was seen in multiple myeloma. Lymphadenopathy was noted in subleukaemic leukaemia.

Various causes of pancytopenia were infections (n=132[68.7%]), megaloblastic anaemia (n=46[24%]), drugs (n=09[4.7%]), aplastic anaemia (n=02[1.04%]), subleukaemic leukaemia (n=02[.04%]) and multiple myeloma (n=01[0.52%]). Table 2 depicts the various etiologies of pancytopenia in our study.

**Table 2: Distribution of various causes of Pancytopenia**

|    |                                                                                       |             |
|----|---------------------------------------------------------------------------------------|-------------|
| 1. | Infections<br>Malaria (68)<br>Dengue (21)<br>Presumed viral infection (32)<br>HIV (1) | 132 (68.7%) |
| 2. | Megaloblastic anaemia                                                                 | 46 (24%)    |
| 3. | Drugs                                                                                 | 09 (4.7%)   |
| 4. | Aplastic anaemia                                                                      | 02 (1.04%)  |
| 5. | Subleukaemic leukaemia                                                                | 02(1.04%)   |
| 6. | Multiple myeloma                                                                      | 01(0.52%)   |

The predominant blood picture was dimorphic anaemia (41.2%), followed by Macrocytic anaemia(32.7%), peripheral smear shows macro-ovalocytes with hypersegmented neutrophils [Figure 1].

Normocytic normochromic anaemia constituted 17.2% of the cases and normocytic hypochromic anaemia (8.9%).

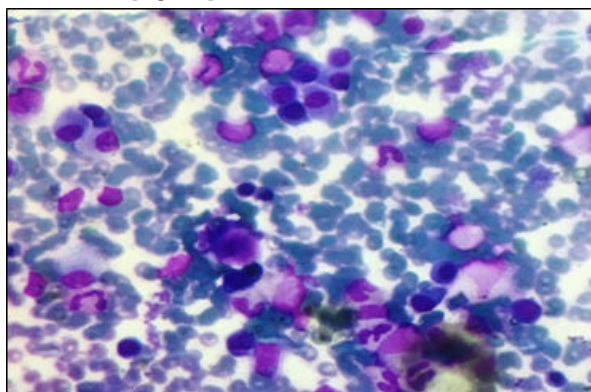
Leucopenia and thrombocytopenia were seen in all cases.



**Figure 1:** Smear showing a hypersegmented neutrophils (Leishman x40)

We have encountered 2 patients of subleukaemic leukaemia both were of AML-M2 (acute myeloblastic leukaemia). Bone marrow was hypercellular. Erythroid and megakaryocytic series were reduced. Majority of the cells were myeloblasts constituting more than 50% of cells in marrow. Bone marrow aspirate showed myeloblast with auer rods.

Malarial infestation was seen in 68 patients. Pancytopenia with schizonts of *P. Vivax* malaria in peripheral smear. The patients recovered after antimalarial treatment. A case of multiple myeloma was also noted [Figure 2].



**Figure 2:** Numerous plasma cells seen in bone marrow aspirate [Giemsa x40X].

## DISCUSSION

We studied a total of 192 cases of pancytopenia. The age of our patients ranged from 18-85 years, with a mean age of 36.4 years. Pancytopenia common in 3<sup>rd</sup> and 4<sup>th</sup> decade have been observed in other studies also<sup>[6,7,8]</sup>.

The most common cause of pancytopenia in our study was infections (68.7%). However, most of the other studies had shown megaloblastic anaemia as the most common cause. I think infection as a common cause is related to the socioeconomic status and unhygienic condition of the surrounding villages where this study was conducted.

**Table 3: Comparison Of Causes Of Pancytopenia In Various Studies**

|                  |                             |                               |
|------------------|-----------------------------|-------------------------------|
| Khunger et al[9] | Megaloblastic anaemia (72%) | Aplastic anaemia (28%)        |
| Jain et al[8]    | Hypersplenism (29.2%)       | Infections (25.6%)            |
| Tilak V et al[4] | Megaloblastic anaemia (68%) | Aplastic anaemia (7.7%)       |
| Hamid et al[10]  | Hypersplenism (45.3%)       | Megaloblastic anaemia (14.7%) |
| Present study    | Infections (68.7%)          | Megaloblastic anaemia (24%)   |

Malaria and dengue were the most common infection encountered. No serious bleeding was noted in this group of patients. We had 68 cases of malaria presented with pancytopenia. Hamid and shukry also found

malaria to be a common cause of pancytopenia<sup>[10]</sup>.

We had 32 cases of presumed viral infections which were self-limiting, and we did not do extensive diagnostic evaluation. The viral infections, other than dengue, which could cause pancytopenia are parvovirus B19, cytomegalovirus, herpes simplex virus, and Epstein bar virus<sup>[11-16]</sup>.

We had only one case of HIV who presented with pancytopenia due to HIV per se; the pancytopenia in rest of the HIV were due to drugs such as zidovudine and cotrimoxazole.

In our study, we had only 5/192 (2.6%) cases aplastic anaemia (2 cases), subleukaemic leukaemia (2 cases), and multiple myeloma (1 case) which is lower than that observed in the other studies<sup>[6,7,9,14,15,16]</sup>. This is because we had consciously excluded the already diagnosed cases of bone marrow failure, hematological malignancies and those on chemotherapeutic drugs. This has been done to evaluate the causes of pancytopenia in general clinical practice.

## CONCLUSION

The etiology of pancytopenia can be diverse with reversible and benign causes being the most common. In our study, the most common cause of pancytopenia was infection and megaloblastic anaemia, and the count recovered in most of the cases on recovery from the disease. The present study concludes that detailed primary hematological investigation in pancytopenia patients is helpful for understanding the disease process; to diagnose or to rule out the causes of pancytopenia and in planning further investigations and management of such patients.

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