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CLINICOHEMATOLOGICAL PROFILE OF PANCYTOPENIA IN A TERTIARY CARE CENTRE

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ABSTRACT

Background: Pancytopenia is a clinical complication of numerous pathological disorders, including infections, hypersplenism, hemolysis, bone marrow infiltration, bone marrow suppression and haematological cancers. As a result, it accounts for the majority of drug-induced (chemotherapy) suppression of bone marrow cases. A rapid workup will help to settle many diagnoses since the majority of these individuals first go to their primary care doctors and may also point to a potentially fatal disease. **Aim:** The aim of the present study is to analyze the various clinical presentations in pancytopenia and to evaluate various hematological parameters. **Materials and Method:** The present study was a Cross sectional observational study conducted in department of General Medicine, Sree Mookambika Institute of Medical Sciences, Kulasekharam for a period of one year (January 2022 to December 2022). All patients presenting with pancytopenia who were willing to participate in the present study were included. Patients who got recent blood or blood product transfusion, Patients on chemotherapy/ radiotherapy and patients who were not willing to participate in the study were excluded. A total of 52 patients were included in the present study. Results were analysed using SPSS 20.0 version and the association was tested using Chi square test. **Results:** Most common presenting complaint among those presented with pancytopenia was tiredness which was seen in 49(94.23%) patients. Pallor was seen in all patients. Aplastic anemia was the most common bone marrow finding 11(31.42%) followed by erythroid hyperplasia 9(25.71%), acute leukemia 6 (17.14%), multiple myeloma 5 (14.28%), megaloblastic anemia3(8.57%) and metastatic tumor 1 (2.85%). **Conclusion:** Aplastic anemia was the most typical cause of pancytopenia in the current investigation. Pancytopenia can result from a wide range of illnesses, while the likelihood that any one disorder will also result in pancytopenia varies greatly. The degree of the pancytopenia and the type of underlying disease will determine the prognosis.

KEYWORDS : Anemia, Aplastic anemia, Bone Marrow, Hemoglobin, Pancytopenia.

INTRODUCTION:

Pancytopenia is a significant clinico-haematological phenomenon that physicians deal with on daily basis in routine clinical work. Different patterns can be seen in its clinical presentation, treatment methods, and results. Pancytopenia is characterized as a reduction in all peripheral blood lineages.[1]

Pancytopenia can result from a variety of conditions, including infections, the invasion of cancer cells, or the effects of toxins. It can also result from ineffective erythropoiesis accompanied by normocellular or hypercellular marrow, lacking any abnormal cells (for example, ineffective erythropoiesis and dysplasia), from an arrest in cell maturation, or from the sequestration of blood cells in the peripheral circulation.[2]

The most frequent cause is drug-induced bone marrow suppression, particularly chemotherapy.[3] Ineffective haematopoiesis, marrow infiltration, destruction of blood cell, aplasia, and sequestration are further factors. Rare causes include waldenstrom's macroglobulinemia, storage illnesses, congenital abnormalities, and hemophagocytic lymphohistiocytosis (HLH). Geographic location, socioeconomic level, socio dietary status, and endemic diseases may all have an impact on how it presents itself. In India, vitamin B12 deficiency as well as aplastic anemia remain the two most frequent causes of pancytopenia if drug-induced bone marrow suppression is excluded.[4]

Pancytopenia is a haematological finding that results from an underlying disorder; it is not a disease entity.[5] Therefore, the clinical presentation relies on the underlying etiology, the degree of pancytopenia, and the cell line that is more commonly affected. Lethargy, malaise, fever, petechiae, and purpura are typical symptoms. Diagnosis relies heavily on a thorough history and examination. It is crucial to know the correct medical history, including when symptoms started and progressed, any medications used, and any harmful substance exposure.[6]

The fundamental workup entails a complete blood count, a peripheral smear, a reticulocyte count, a bone marrow aspiration as well as biopsy. Knowing the cause is crucial since many patients can be treated with inexpensive and practical solutions. The morbidity of patients can be reduced with timely, cost-effective evaluation and treatment. Physicians can treat patients properly or refer them based on the results of the primary workup.[6,7]

The causes of pancytopenia in India are not well understood, thus this study was conducted to examine the different causes and link their peripheral blood findings with other haematological markers in order to make a specific diagnosis.

AIMS AND OBJECTIVES:

To study the various clinical presentations in pancytopenia and to evaluate various hematological parameters.

MATERIALS AND METHODS:

The present study was a Cross sectional observational study conducted in department of General Medicine Sree Mookambika Institute of Medical Sciences, Kulasekharam for a period of one year (January 2022 to December 2022. All patients presenting with pancytopenia who were willing to participate in the present study were included. Patients who

got recent blood or blood product transfusion, Patients on chemotherapy/ radiotherapy and patients who were not willing to participate in the study were excluded. A total of 52 patients were included in the present study.

Detailed history and examination were done for all patients. Patients underwent investigations including complete blood count, coagulation profile (where indicated), peripheral smear examination, bone marrow aspiration and biopsy (where indicated). Bone marrow aspiration and biopsy was done with Jamshidi needle after taking consent. Data entered in excel sheet. Statistical Analysis was carried out using SPSS 20.0 version.

OBSERVATION AND RESULTS:

A total of 52 patients were recruited in the study. In the present study most common age group was 31 to 50 years seen in 22(42.30%) patients. The age of the patients ranged from 23 to 78 years with a mean age of 38.6 years. Females formed majority of patients accounting for 29(55.77%) while men were 23(44.23%) of the patients who presented with pancytopenia. Chief presenting complaint among those presented with pancytopenia was tiredness in 49(94.23%) patients followed by fever in 19(36.53%) patients. On examination, common findings were pallor which was present in all 52(100%) patients, followed by splenomegaly in 25(48.07%), purpuric rash in 15(28.84%), hepatomegaly in 12(23%), hepatosplenomegaly in 8(15.38%) and lymphadenopathy in 6(11.53%) patients. Hemoglobin, Red blood cell (RBC) count, White blood cell (WBC) count and platelet counts were given in table 1.

Table 1: Hemoglobin, Red Blood Cell (RBC) Count, While Blood Cell (WBC) Count And Platelet Counts

		No. of patients	Percentage
Hemoglobin (gm%)	<4	18	25%
	4 – 7	25	48.08%
	>7	14	26.92%
RBC count (million/mm^3)	<2	21	40.4%
	2 – 4	28	53.84%
	4 – 5.5	3	5.76%
WBC count (cell/mm^3)	>3000	21	40.38%
	1000-3000	30	57.7%
	<1000	1	1.92%
Platelet count (cell/mm^3)	> 50,000	18	34.61%
	10,000- 50,000	29	55.77%
	<10,000	5	9.62%

Dimorphic anemia was found to be the predominant peripheral blood picture followed by microcytic hypochromic anemia seen in 26(50%) and 15(28.84%) respectively. Among the 52 patients 35 patients had undergone bone marrow study. Aplastic anemia was the most common bone marrow finding 11(31.42%) followed by erythroid hyperplasia 9(25.71%), acute leukemia 6 (17.14%), multiple myeloma 5 (14.28%), megaloblastic anemia3(8.57%) and metastatic tumor 1 (2.85%).

DISCUSSION:

Pancytopenia refers to a clinico-haematological phenomenon observed in daily practice in which the three main formed elements of blood (RBCs, WBCs, and platelets) are reduced in number.[8] Its clinical pattern, therapeutic options, and outcome all follow different trajectories. There were 52 pancytopenia cases examined in this current study. Final pancytopenia diagnosis was reached after evaluation of various clinical and haematological markers.

In the present study females were more affected compared to males. The most common presenting complaint was tiredness followed by fever. Pallor was seen in all patients. In the study conducted by Bhushan D et al.[9] 40 patients were males while 33 were females (M: F: 1.2: 1). The mean age of the study population was 46.97 years. Fatigue along with lethargy, fever and weight loss, were the most frequent presenting complaints. All patients (100%) showed pallor upon examination, which was followed by splenomegaly in 35 patients (47.9%), rash in 15 patients (20.5%), as well as lymphadenopathy in 7 patients (9.5%).

Similar findings were made by Mangal S et al.[10] who reported that generalised weakness (68.1%), bleeding symptoms (52.7%), as well as fever (47.3%) were the other prevalent presenting characteristics. Increasing pallor (80.2%) was the most frequent clinical feature.

Pancytopenia is typically brought on by bone marrow failure or replacement, although it can also be brought on by splenic pooling or the loss of mature cells in the periphery. Pancytopenia is frequently a side effect of chemotherapeutic or immunosuppressive medication therapy in hospital settings.[11]

The most typical bone marrow biopsy finding in the current investigation was aplastic anemia. This study was similar to a study by Niazi M. et al.[12] Similarly to Reshma ST et al.[13] found that myelodysplastic syndrome (18%), megaloblastic anemia (8%), visceral leishmaniasis (12%), acute leukaemia (6%), multiple myeloma (4%), myelofibrosis (4%), hypersplenism (4%), and malaria (2%), were the most common causes of pancytopenia. In contrast, Khodkeet al.[14] observed that 14% of instances of aplastic anemia were documented, compared to 44% of cases of megaloblastic anemia.

Instead of hereditary causes, the increased prevalence may be linked to environmental variables such greater exposure to harmful chemicals. Viral infections, autoimmune damage, and either acquired or inherited clonal/genetic abnormalities are significant causes of aplastic anemia. Bone marrow analysis, which reveals hypocellular marrow that is packed with fat and stromal cells, is used to confirm the diagnosis.[15] Pancytopenia may also be caused by hematopoietic malignancies such as lymphoma, acute leukemia, and hemophagocytic syndrome. These are identified through bone marrow assays and peripheral smears.[16]

The underlying etiology of pancytopenia affects the mortality rate. Patients with infections, vitamin deficiencies, and autoimmune ill nesses typically have positive prognoses, but patients with aplastic anemia and haematological malignancies have a bad prognosis.[17]

CONCLUSION:

Pancytopenia is a disorder that is frequently observed in clinical settings. Pancytopenia has a wide range of etiologies. Many studies including the current investigation, identified aplastic anemia as the primary cause of pancytopenia. The initial assessment of pancytopenia patients typically starts with a physical examination and a peripheral blood test.

However, a confirmative diagnosis requires specific testing like bone marrow examination (aspiration and biopsy) because the peripheral blood picture reveals substantial similarity in the typical causes of pancytopenia. A detailed follow-up research can be conducted to investigate the etiologies of pancytopenia over a sufficiently long period of time to allow for more accurate analysis and hypothesis development.

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CONFLICTS OF INTEREST:

There are no conflicts of interest

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