ORIGINAL RESEARCH PAPER

Hematology

CLINICAL MANIFESTATIONS AND CAUSES OF PANCYTOPENIA: A CROSS-SECTIONAL STUDY FROM TERTIARY CARE HOSPITAL

KEY WORDS: Pancytopenia, Clinical manifestations, Etiological profiles

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ABSTRACT

Introduction: Pancytopenia is defined as the reduction below normal values of all three peripheral blood lineages: leukocytes, platelets, and erythrocytes. The diverse clinical manifestations include fatigue, infections, and bleeding tendencies. Early detection and treatment are crucial to prevent severe complications. This study aimed to evaluate patients' clinical and etiological profiles with pancytopenia in a tertiary healthcare facility. **Methodology:** A cross-sectional study was conducted over 8 months, from November 2022 to June 2023, involving 50 patients with pancytopenia admitted to a tertiary care hospital attached to Bangalore Medical College and Research Institute, Bangalore, India. Data were collected through a detailed history and clinical examination. **Results:** The study included 50 patients (34 males, 16 females) with a mean age of 45.57 ± 13.89 years. The most common clinical symptoms were generalized weakness (52%) and fatigue, followed by fever (12%). Pallor was evident in all cases, with other signs including hepatomegaly (24%), lymphadenopathy, and jaundice (15%). Chronic infections (38%) and Vitamin B-12 deficiency (32%) were the primary causes of pancytopenia. Common complications included RVD (42%) and TB (37%). **Conclusion:** Our study highlights the diverse clinical manifestations and multiple etiologies of pancytopenia, emphasizing the importance of thorough clinical and hematological evaluations for accurate diagnosis and treatment.

INTRODUCTION:

Pancytopenia, defined as the decrease below normal values of all three peripheral blood lineages- leukocytes, platelets, and erythrocytes a very common hematological problem with a wide range of causes.[1] Etiologies can be inherited, such as Fanconi anemia and Schwachman-Diamond syndrome, or acquired, including conditions like radiation exposure, drug reactions, viral infections, and bone marrow infiltration by malignancies. Notably, megaloblastic anemia, often due to vitamin B12 or folate deficiency, stands out as a significant clinical cause.[2]

The clinical manifestations of pancytopenia are diverse and include fatigue, infections, and bleeding tendencies due to the decreased levels of each blood cell type.[3] Early detection and treatment are critical in preventing severe complications. Initial diagnostic steps involve taking a detailed patient history and performing a physical examination, complete blood counts, reticulocyte count, and peripheral blood smear. If these tests do not explicate the cause, bone marrow aspiration or biopsy becomes necessary.

Bone marrow aspiration provides detailed morphological information, while biopsy offers insights into marrow cellularity and the presence of infiltrative or fibrotic processes.[4]

The nature of bone marrow involvement varies with the underlying cause. For instance, bone marrow is typically hypocellular in cases caused by primary production defects, whereas it tends to be normocellular or hypercellular in conditions involving ineffective hematopoiesis or increased peripheral destruction of blood cells.[5] Timely diagnostic evaluation, including bone marrow examination, is essential in managing pancytopenia, especially in acute and severe cases such as febrile neutropenia, symptomatic anemia, or severe thrombocytopenia, which may require urgent medical intervention.[6]

Aims And Objective Of The Study:

To evaluate patients' clinical and etiological profiles with pancytopenia in a tertiary healthcare facility.

Methodology:

A cross-sectional study was conducted for 8 months, from November 2022 to June 2023, on 50 patients with pancytopenia admitted to a tertiary care hospital attached to Bangalore Medical College and Research Institute, Bangalore, India.

Inclusion Criteria:

- Patients with age of more than 18 years diagnosed with pancytopenia.
- Patients willing to give informed consent for investigations, treatment, and surgical management.

Exclusion Criteria:

- Patients with age less than 18 years.
- Patients who are not willing to give informed consent.
- Patients with other primary hematological disorders.
- Patients undergoing chemotherapy or radiotherapy.
- Recent blood transfusion recipients (within the past 3 months).

Duration Of The Study: 8 months

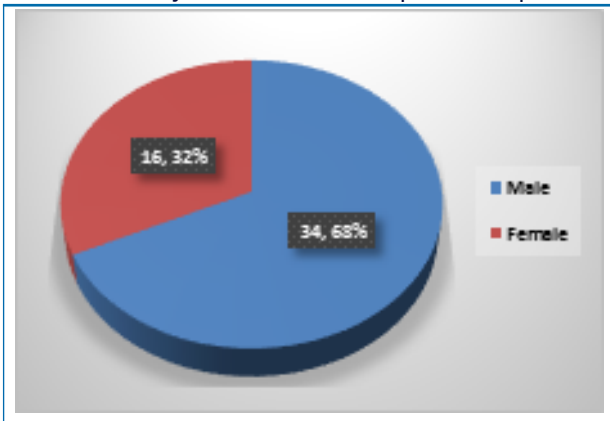
The study was conducted after obtaining the permission of the Institutional Ethics Committee and consent from patients. A detailed history, clinical examination, and investigations were done on all the patients with pancytopenia. All the collected data was coded and entered into a Microsoft Excel sheet which was re-checked and analyzed using SPSS statistical software version 26.

The frequency and percentages descriptive analysis was used to assess clinical manifestations and causes of pancytopenia.

RESULTS:

The study included 50 patients with pancytopenia in the age range of 18 to 77 years. The study included 34 male (64%) and 16 (32%) female cases.

Figure 1. Gender distribution of the study participants (n=50)



The mean age of the participants was 45.57 ± 13.89 years. Maximum patients fall under the age range of 45 to 54 years.

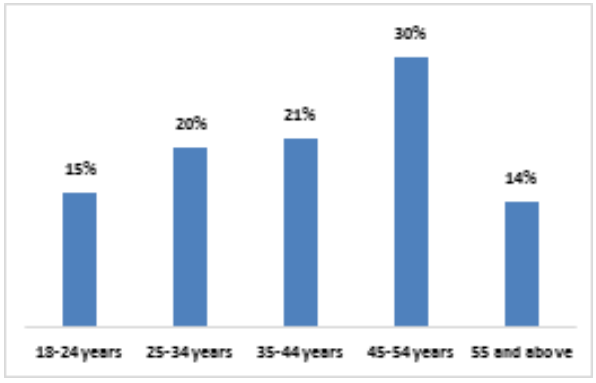


Figure 2. Age distribution of the study participants (n=50)

The most common clinical symptom was generalized weakness (52.0%) and fatigue followed by fever (12.0%).

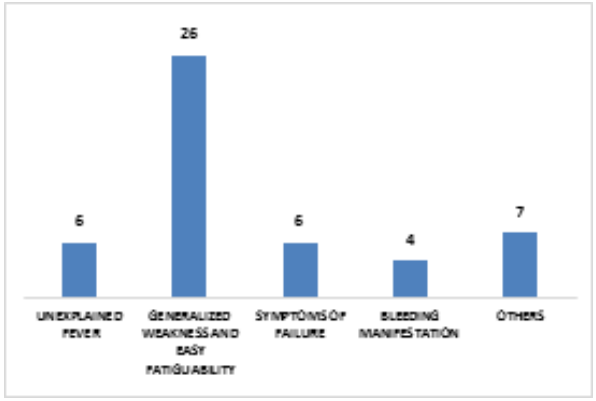


Figure 3. Clinical symptoms among the study participants (n=50)

The most observed clinical sign was pallor, which was evident in all the cases. The other observed clinical signs were hepatomegaly (24%), Lymphadenopathy, and Jaundice (15%).

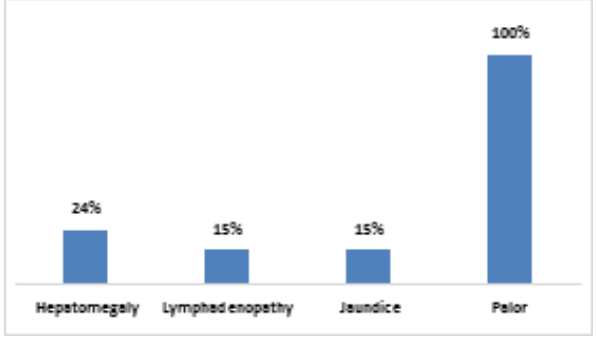


Figure 4. Clinical signs among the study participants (n=50)

The most common cause of pancytopenia in the study participants was chronic infections (38%) followed by Vitamin B-12 deficiency (32%). The other causes include folic acid deficiency, aplastic anemia, malignancy, CKD and PNH.

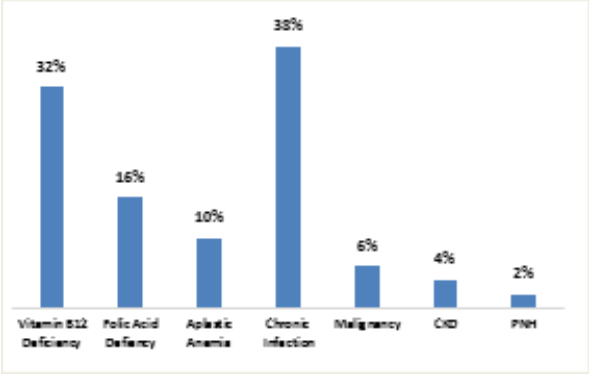


Figure 5. Causes of Pancytopenia (n=50)

The most common complications observed in the study were RVD (42%) and TB (37%).

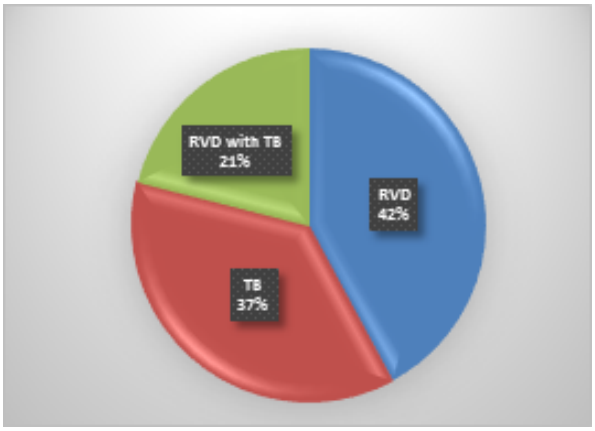


Figure 6. Complications in the study participants (n=50)

DISCUSSION:

The objective of this study was to evaluate the clinical and etiological profiles of patients with pancytopenia admitted to a tertiary healthcare facility.

Our study found that pancytopenia was most prevalent in the 45-54 age group (30%), with a higher occurrence in males (56%). This demographic trend is consistent with the findings of Srivastava et al., who also reported a significant prevalence in middle-aged males. The primary presenting complaints were generalized weakness and easy fatigability.[7] Pallor was observed in all subjects, which aligns with Jella and Jella's observation of pallor in 97% of their cases.[8] The presence of generalized weakness and pallor as common clinical manifestations is also highlighted by Jain et al. in their study on pancytopenia.[9]

The leading causes identified in our study were chronic infections (38%) and Vitamin B12 deficiency (32%). These findings are supported by Jain et al., who identified similar etiologies in their research.[9] Specifically, the high prevalence of chronic infections is echoed in studies by Keisu and Ost, which emphasize the impact of infectious diseases on hematological parameters.[10] The importance of Vitamin B12 deficiency as a cause of pancytopenia is further corroborated by research from Savage et al., who underscore the role of nutritional deficiencies in hematological disorders.[11]

Our results underscore the importance of comprehensive

clinical and hematological evaluations for accurate diagnosis and effective treatment of pancytopenia. This emphasis is in line with recommendations from Gnanaraj et al., who advocated for thorough diagnostic protocols to identify underlying etiologies and guide management strategies.[12]

CONCLUSION:

Our study reveals the complex and multifaceted nature of pancytopenia, emphasizing the need for personalized care that caters to each patient's unique clinical manifestations. The findings from this investigation provide valuable insights that can enhance diagnostic protocols and lead to more targeted and effective treatments for pancytopenia. These advancements hold great capacity for better patient outcomes and advancing our understanding of this condition.

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