Original Research Article

Pancytopenia: Basic investigation to study common and uncommon etiology

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Abstract

Introduction: Pancytopenia is condition in which there is reduction of all 3 peripheral blood lineage. It's common hematological problem in day to day clinical practice and must be suspected on clinical grounds when a patient presents with unexplained pallor, prolonged fever and a tendency to bleed. One cannot say pancytopenia as a disease entity but it's a triad of findings that may result from a number of disease processes which primarily or secondarily involving the bone marrow. Megaloblastic anemia, parasitic infestation, hypersplenism and Aplastic anemia are major causes of pancytopenia in developing countries like India. Hematological investigations play vital role in the management of patients with pancytopenia and therefore needs detailed study.

Aim: To study the profile of pancytopenia with its frequency and common clinical presentation in the tertiary care hospital.

Materials and methods: This retrospective study was carried out in the tertiary care Hospital. All the adult patients were included for the study. Case selection was based on clinical features and supported by laboratory evidence. Complete blood count, peripheral smear (PS), reticulocyte count, bone marrow aspiration and bone marrow trephine biopsy were performed.

Results: The most common clinical features in our study were pallor (100%), followed by weakness (97%). Splenomegaly (23%) and hepatomegaly (17%) were also noted. Mean hemoglobin concentration was 6.2 g/dl. Mean Total leukocyte count and platelet count was 2450 and 43500 /cmm and of blood respectively.

Conclusion: In our study, commonest cause of pancytopenia is Megaloblastic anemia followed by Malaria. Other causes are Dengue, Aplastic anemia, Iron deficiency anemia and leukemia. This

benign and easily treatable condition should be kept in mind while attending to patients in day to day practice.

Key words

Pancytopenia, Megaloblastic anemia, Malaria, Complete blood count.

Introduction

Routine medical practice shows pancytopenia as frequent clinico-hematological entity. Pancytopenia is a situation where there is a decrease in red blood cells (RBCs), white blood cells (WBCs) and platelets [1]. It's a common hematological problem in day to day clinical practice and must be suspected on clinical grounds when a patient presents with unexplained pallor, prolonged fever and a tendency to bleed. There are varying trends in its clinical patterns, hematological changes, treatment modalities and outcome [2]. It is a manifestation of many serious and life threatening diseases with an extensive differential diagnosis. There are various etiological factors of pancytopenia and they vary in different population too. One cannot say pancytopenia as a disease entity but it's a triad of findings that may result from a number of disease processes which primarily or secondarily involving the bone marrow [3]. The severity of pancytopenia and underlying pathology determine the management and prognosis of the patients [4]. Major causes of pancytopenia in developing countries are megaloblastic anemia, parasitic infestation, hypersplenism and aplastic anemia. The presenting symptoms are often attributable to anemia or thrombocytopenia. Leucopenia is an uncommon cause of initial presentation but can become the most serious threat to life during the course of disorder. Hematological investigations are vital in the management of patients with pancytopenia and therefore needs detailed study. Careful examination of blood film is important if the reason for the pancytopenia is not apparent from the clinical history [5]. Here, we studied the profile of pancytopenia with its frequency and common clinical presentation.

Materials and methods

This retrospective study was carried out in the tertiary care Hospital. Total 100 adult patients from the Department of Medicine, Surgery, Obstetrics and Gynecology were included for the study. Case selection was based on clinical features and supported by laboratory evidence. The Inclusion Criteria in Our study were the patients with Hemoglobin <9gm/dl, Total Leukocyte Count (TLC) <4000/micro L and Platelet Count <150000/micro L. We had excluded the patients who have already been diagnosed with pancytopenia and who recently received blood transfusions. A detailed clinical history and physical examination were performed in each case. Complete blood count (Hb, Total Count, Differential Count, Platelet count) by automated hematology analyzer – Abbott cell-dyn-1700, peripheral smears, reticulocyte count and bone marrow aspiration/biopsy were performed wherever needed. All those cases in which the diagnosis could be confirmed were included in the final analysis. Data was collected and statistical analysis was done.

Results

Out of total 100 patients, 63 were male and 37 were female (male to female ratio 1.7:1). The mean age of the patients ranged from 02 to 90 years with a mean age of 43.5 years (**Table – 1**). The most common clinical features in our study were pallor (100%), followed by weakness (97%). Other common features were fever (70%) and respiratory distress (32%) (**Table – 2**). Splenomegaly (23%) and hepatomegaly (17%) were also noted.In hematological parameters we had found that hemoglobin range was 3.1-8.9 g/dl. Mean hemoglobin concentration was 6.2 g/dl. Total leukocyte count was 600-4000 /cmm of blood with mean 2450 /cmm. The platelet count was 5000-149000 /cmm of blood with

mean 43500/cmm. In our study commonest cause of pancytopenia is megaloblastic anemia (47%) and second most common cause is Malaria (31%). Other causes are Dengue, Aplastic anemia, Iron deficiency anemia and leukemia (**Table – 3**).

Table – 1: Distribution of cases according to age.

Age group (Years)	No. of cases	Percentages
0-10	08	08
11-20	20	20
21-30	18	18
31-40	14	14
41-50	14	14
51-60	07	07
61-70	12	12
71-80	04	04
81-90	03	03
Total	100	100

Table – 2: Clinical presentation of patients in Pancytopenia.

Presenting Complaints	No. of cases	Percentages
Fever	70	70
Weakness	97	97
Weight loss	38	38
Dyspnoea	32	32
Bleeding	20	20

Table – 3: Proportion of various disorders presenting with pancytopenia.

Diagnosis	No. of cases	%
Megaloblastic Anemia	47	47
Malaria	31	31
Dengue	11	11
Aplastic Anemia	04	04
Iron Deficiency Anemia	03	03
Leukemia	04	04
Total	100	100

Discussion

Pancytopenia is simultaneous presence of anemia, leukopenia and thrombocytopenia [6, 7]. It is not an uncommon hematological problem in clinical practice; however there are limited numbers of studies available from Indian subcontinent on the frequency of various causes of pancytopenia. Identification of the disease is of prime importance, since this is the key to appropriate management [8]. Diagnosis of pancytopenia requires microscopic examination of a bone marrow biopsy specimen and a marrow aspirate to assess overall cellularity and morphology [9].

In our study male dominated female in all the age group with male to female ratio of 1.70:1 which was comparable to other studies done by Amieleena C, et al. [10] and Goel RG, et al. [11] reported the male to female ratio of 1.64:1 and 1.76:1 respectively.

It was seen that many conditions other than malignancies and aplastic anemia presented as pancytopenia, megaloblastic anemia being the commonest, 47% cases of pancytopenia in the present study. Gomber, et al. in their study reported an incidence of 11% [12] while Mukhbi, et al. [13] had 47% cases of megaloblastic anemia presenting as pancytopenia. Ineffective erythropoiesis, leukopoiesis and thrombopoiesis resulting from programmed cell death in the absence of vitamin B12 or folic acid and decreased survival of precursors in peripheral blood are causes of pancytopenia in megaloblastic anemia.

Malignancies like ALL and aplastic anemia are more common and dangerous causes of pancytopenia. In our study, 4.0% had aplastic anemia and 4.0% had malignancies in comparison to 20 and 21% in a study by Bhatnagar, et al. [14].

31% cases of malaria had pancytopenia. 24 were caused by P. Vivax and 7 by P. falciparum. Hemophagocytic syndrome due to P. Vivax has been reported to cause Pancytopenia [15]. 11% cases of Dengue infection were presented with

pancytopenia in our study. The main effect of viral infections is bone marrow suppression which ultimately leads to pancytopenia.

Conclusion

Pancytopenia is one of the important occurrences in patients of day-to-day OPD. In our study, megaloblastic anemia was found to be the most common cause of pancytopenia. This benign and easily treatable condition should be kept in mind while attending to such patients when they present to the hospital before the more serious conditions like leukemias and aplastic anemia are thought of.

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