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A Pathological Study on Pancytopenia.

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ABSTRACT

Background: Pancytopenia is a common hematological problem. It has an extensive differential diagnosis and it can result from damage to bone marrow as proved by the low reticulocyte count, or increased destruction of preformed blood cells peripherally with increased reticulocyte count. **Methods:** This study conducted in the Department of Pathology Pinnamaneni Siddhartha Medical College. About 2 ml anticoagulated blood sent for complete hemogram by the respective departments was run on a coulter counter for the following results: Hemoglobin, total count, platelet count, packed cell volume, and red blood cell indices. **Results:** In the present study, 23 males & 17 females were included out of 40 total no. of cases with pancytopenia. Most of the cases were belongs to 21-30 (27.5%) age group followed by other group. In this study, so many clinical sign we were found like pallor , fatigue, fever, splenomegaly, dyspnea etc. of pancytopenia. **Conclusion:** Pancytopenia is a common hematological problem encountered in clinical practice. It should be suspected on clinical grounds when a patient comes with unexplained anemia, prolonged fever and tendency to bleed.

Keywords: Pancytopenia, Megaloblastic Anemia, Splenomegaly, Anticoagulated blood.

INTRODUCTION

It is a well-known fact that normal hematopoiesis occurs within a specialized microenvironment, where humoral factors also play a significant role. Hematopoiesis increases according to the increased demands. Mature blood cells derived from pluripotent stem cells are released into circulation. The disorder in which production of one or more types of blood cells stops or significantly reduces than normal levels is termed as Cytopenia.[1] On the other hand, the disorder in which all three major types blood cells (red blood cells, platelets, and white blood cells) are decreased is known as Pancytopenia.[2] Pancytopenia is not itself a disease, but in fact results from a number of diseases involving the bone marrow. The presenting symptoms such as weakness, fatigue, dyspnea, bleeding manifestations, and fever can be attributed to the presence of anemia, thrombocytopenia, or leucopenia.[3] Leucopenia is rarely present initially but usually it causes the most serious threats to life during the course of disorder.

Pancytopenia is a common hematological problem. It has an extensive differential diagnosis and it can result from damage to bone marrow as proved by the low reticulocyte count, or increased destruction of preformed blood cells peripherally with increased reticulocyte count.[4] Many severe and lethal illnesses ranging from drug induced bone marrow hypoplasia, megaloblastic anemia to fatal bone marrow aplasia and leukemias present with pancytopenia.[5] Bone marrow examination and biopsy are simple and safe invasive procedures with only a moderate discomfort which can be performed easily. It is extremely important for assessing the cause of pancytopenia and plan further investigations and treatment but the ideal diagnostic approach to pancytopenia is not well defined so far.[6]

In pancytopenia, the marrow can be both hypocellular or hypercellular. The hypoplastic marrow, present in 2% of pediatric ALL patients, might be diagnosed as aplastic anemia. Studies have shown leukemia to be the second most common cause of pancytopenia in pediatric patients, while aplastic anemia being the most common.[7]

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MATERIALS AND METHODS

Study population

Forty total number of cases were involved in this study, out of these 23 males & 17 females.

Study Area

This study conducted in the Department of Pathology Pinnamaneni Siddhartha Medical College.

Study Duration

Duration of study was two year.

Data Collection

About 2 ml anticoagulated blood sent for complete hemogram by the respective departments was run on a coulter counter for the following results: Hemoglobin, total count, platelet count, packed cell volume, and red blood cell indices. Peripheral smear was studied after staining with Wright's stain.

The patients of all age groups with hematological diagnosis of pancytopenia on peripheral smear and followed by bone marrow aspiration were included in the study. The other inclusion criteria were presence of all 3 of the following: Hemoglobin, ≤10 g/dl; total leukocyte count, ≤4000/mm3; platelet count, ≤100,000/mm3. Relevant clinical data were collected.

Data Analysis

Data were analyzed by using Microsoft excel.

RESULTS

Table 1: Distribution of cases according to age

Age	Number of cases	Percentages
< 10	3	7.5%
11-20	5	12.5%
21-30	11	27.5%
31-40	6	15%
41-50	6	15%
>50	9	22.5%
Total	40	100%

Table 2: Distribution of cases according to gender

Gender	Number of cases	Percentages
Male	23	57.5%
Female	17	42.5%
Total	40	100%

Table 3: Distribution of pancytopenia cases according to clinical features

Clinical Sign	Number of cases	Percentages
Pallor	40	100%
Fatigue	15	37.5%
Fever	14	35%
Splenomegaly	13	32.5%
Dyspnea	12	30%
Weight Loss	7	17.5%
Bleeding	6	15%
Hepatomegaly	8	20%
Abnormal pain	3	7.5%
Lymphadenopathy	3	7.5%
Jaundice	4	10%
Pedal edema	2	5%
Rash	1	2.5%
Ascites	1	2.5%
Sore tongue	1	2.5%

In the present study, 23 males & 17 females were included out of 40 total no. of cases with pancytopenia. Most of the cases were belongs to 21-30 (27.5%) age group followed by other group. In this study, so many clinical sign we were found like pallor, fatigue, fever, splenomegaly, dyspnea etc. of pancytopenia which showed in table number 3.We suggested different types of etiological causes like megaloblastic anemia, Aplastic anemia, MDS, Hypersplenism etc. of pancytopenia which showed in [Table 4].

Table 4: Distribution of pancytopenia cases according to etiology

Etiology	Number of cases	Percentages
Megaloblastic Anemia	24	60%
Aplastic Anemia	4	10%
Sub leukemic Leukemia	4	10%
MDS	3	7.5%
Hypersplenism	3	7.5%
Paroxysmal Nocturnal Hematuria	1	2.5%
Mastocytosis	1	2.5%
Falciparum malaria	1	2.5%
Hemophagocytosis syndrome	1	2.5%

DISCUSSION

The present study has been done at the Department of Pathology Pinnamaneni Siddhartha Medical College over a period of 2 years. In this study the total number of hemograms were 31,349 and bone marrow aspirations sent was 382, pancytopenia was found in 40 cases.

The age of pancytopenia patients was ranged from 8 to 81 years in this study. Studies by Tilak and Jain4 Tariq et al., Mussarrat et al., Qamar and Aijaz Khodke et al., and Gayathri and Rao also reported the same age range of patients.[8-12] The highest incidence of pancytopenia was found in the age group of 21-30 years which was similar to the studies by Mussarrat et al. and Qamar and Aijaz.[9-10] Aplastic anemia has been the most common cause of pancytopenia in several studies worldwide. In contrast, the present study was found that the most common cause of pancytopenia was megaloblastic anemia. These results reflect the higher prevalence of nutritional anemia in Indian subjects as well as in other developing countries.[13]

The incidence of megaloblastic anemia was observed 60% in this study. Whereas in other studies incidence of megaloblastic anemia- 72% was reported by Khunger et al.,[14] 68% by Tilak and Jain,[15] and 74% by Gayathri and Rao,[12] 49% by Rangaswamy et al.,[16] 62% by Khanduri and Sharma,[17] 72.6% by Javalgi and Dombale,[18] and 26.42% by Subrahmanyam and Padma.[19] These studies have been done in India, and revealed the importance of megaloblastic anemia as the major cause of pancytopenia. In India, the facilities for estimating folic acid and Vitamin B12 levels are not routinely available in most centers. Thus, the exact deficiency is usually not identified.[20]The percentage of hemoglobin varied from 1.6 to 9.9, the total leukocyte count was in the range of 1000-3900 cells/mm3 and the range of platelet count varied

from 20,000 to 90,000/mm3. These observations are supported by Jha et al.,[21] Kumar and Raghupathi,[22] and Rangaswamy et al.[16]

21 of 48 cases were found to be pure megaloblastic anemia on peripheral smear where macro ovalocytosis with anisopoikilocytosis (seen in all cases) and hypersegmented neutrophils (17/21, 81%) were found to be the main features. Prabhu et al.[18] also found macro ovalocytosis with anisopoikilocytosis in all cases. Tilak and Jain,[15] in 51/53 cases. Khodke et al.[11] found hypersegmented neutrophils in 20/22 cases (91%), Gayathri and Rao,[12] in 51.35% cases. 62% (13/21) reported relative lymphocytosis comparable to Tilak and Jain,[15] (50%), Gayathri and Rao,[12] (52.63%) and Khunger et al.[14]

Mean corpuscular volume was found to be more than 100 fl in 70% of our cases as compared to Prabhu et al.[18] in 57.5% cases.

CONCLUSION

Pancytopenia is a common hematological problem encountered in clinical practice. It should be suspected on clinical grounds when a patient comes with unexplained anemia, prolonged fever and tendency to bleed.

Physical findings and peripheral blood picture provide valuable information in the workup of cytopenic patients.

Bone marrow aspiration is a crucial diagnostic tool in hematology. It helps to evaluate various causes of cytopenia and to plan further investigations and management of the patients.

Accurate diagnoses and timely intervention may be lifesaving for pancytopenia patients as a large number of causes are remediable and reversible. It will definitely have a significant influence on the morbidity and mortality in pancytopenia patients. The early detection of the underlying conditions would also help to enhance the prognosis of a patient with pancytopenia.

Therefore, a comprehensive, clinical, and hematological study of patients with pancytopenia will generally help in identifying the underlying cause. Further research with a larger sample size is required to replicate the findings of this study.

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