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Original Research Article

Clinicopathological study of patients with pancytopenia

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ABSTRACT

Background: Pancytopenia is due to bone marrow failure characterized by anemia, leukopenia, and thrombocytopenia. It a common hematological disorder. Low blood counts in the bone marrow failure disease result from deficient hematopoiesis. Marrow damage and dysfunction also may be secondary to infection, inflammation, or cancer. Pancytopenia has an extensive differential diagnosis and it can result from damage to bone marrow destruction of preformed blood cells peripherally with increased reticulocyte count. Aim of the study were to study the different etiological conditions and clinical features of pancytopenia in rural medical college.
Methods: This study has been conducted in the department of general medicine in association with the pathology department and between March 2019 to February 2020, 45 patients were included in this study. males were 27 and females were 18. The age group is between 20 years and 60 years. 2 ml of anticoagulant blood send for HB% total count, platelet count, packed cell volume, and RBC indices.
Results: The total no. of patients included in this study were 45 among these 45 patients, males were 27, and females were 18. The common age group is between 20 and 60 years and the common causes of aplastic anemia in our study are megaloblastic anemia.
Conclusions: Pancytopenia is a common hematological problem in India. In our study megaloblastic anemia is the most common cause of pancytopenia females are affected during pregnancy. So, periodical clinically examined and investigations may reduce the incidence. of further research with a large sample size and meticulous investigations required to replicate the finding of the study.

Keywords: Pancytopenia, Megaloblastic anemia, Pallar, Hemoglobin

INTRODUCTION

Pancytopenia is a common hematological disorder. it affects all the age group pancytopenia is itself not a disease in fact results from several diseases involving the bone marrow. The disorder in which production of one or more types of blood cells reduces than normal levels termed as cytopenia on the other hand the disorder in which all the three (major types of blood cells) Red blood cells, White blood cells, and platelets, reduced are called as pancytopenia.[1]

The blood cells begin their lives in the bone marrow from a single type of cell called the pluripotential hematopoietic stem cell, from which all the cells of circulating blood cells are eventually derived. The different committed blood cells which grow in culture will produce colonies of specific types called a colony-forming unit-erythrocytes. the leucocytes are also called white blood cells. they are formed partially in the bone marrow (granulocytes and monocytes few lymphocytes) and partially in the lymph nodes (lymphocytes and plasma cells).[2]

Six types of white blood cells are normally present in the blood are polymorphonuclear neutrophils polymorpho-nuclear eosinophils, polymorphonuclear basophils, monocytes, lymphocytes plasma cells. Besides, there is a large no. of platelets. 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 performed blood cells peripherally with increased reticulocyte count.[3]

The common clinical features include general weakness, fatigue, dyspnea, bleeding manifestations fever is also can be seen. Leucopenia is a serious life-threatening problem. The causes of pancytopenia can be divided as bone marrow disorder which includes aplastic anemia, myelodysplastic acute leukemia, idiopathic myelofibrosis, and infiltrative disease like lymphoma, myeloma, carcinoma, and non-bone marrow disorder include megaloblastic anemia, hypersplenism infections like hepatitis, HIV, and drugs and radiation.[4]

Bone marrow examination and biopsy are simple and safe invasive procedures with only moderate discomfort which can be performed easily but the ideal diagnostic approach to the pancytopenia is not established so far.[5]

Pancytopenia is very common hematological disorder which needs regular follow-up of the patients and investigations we observed common causes of pancytopenia are infectious and drugs.

METHODS

This is study is conducted in the department of general medicine in association with the pathology dept. in Mahaswara medical college and general hospital, Hyderabad from March 2019 to February 2020.

The total no. of patients included in this study is 45 patients of these 45, males were 27 and females were 18 the age group included in from 20 years to 60 years common age group is 20 years to 30 years. Informed consent has been obtained from all the patients in the local language and ethical committee approval has been taken from the college committee. 2 ml of anticoagulant blood has been sent for analysis investigation includes HB% complete blood picture, total count platelet count, and red blood cells indices and bone marrow aspiration, vit B_{12} estimation also done complete history taking and clinical examination was done. Entire data were collected systematically and analyzed by using Microsoft excel. Inclusion criteria for the study includes the patients with anemia which are not responding to routine treatment and routine investigations. The patient already diagnosed pancytopenia are excluded from this study. It is a clinical oriented observation study which was conducted in Maheshwara general hospital attached to medical college.

Data collection

2 ml of blood with an anticoagulant has been sent for a hemogram. Peripheral smear examination was done after staining with wright's stain. The patients of all age groups with a hematological diagnosis of pancytopenia on peripheral smear and followed by bone marrow aspiration were included in this study. The other inclusion criteria were the presence of all 3 of the following: total leucocyte count<4000 mm/count, HB<10 gr/%; platelet count <100,000/cum. The study period was 2019 March to February 2020 for 1 year

RESULTS

In our study, we have included 45 no. patients. Males were 28 and females were 17. The age group included is between 30 years and 60 years. The common age group involved in between 20 to 29 years (26.89% cases) and 30 to 39 years (35.52% cases) our results towards age group are almost similar to studies conducted by Kumar et al.[5]

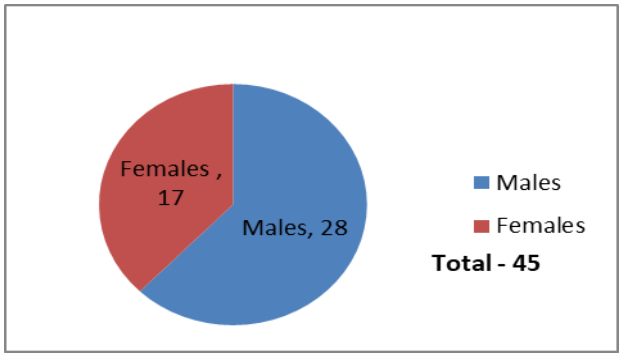

Figure 1: Sex differentiation.

Table 1: Age wise differentiation.

Age (Year)	No. of cases	Percentage (%)
20-29	13	28.88
30-39	16	35.52
40-49	9	20.0
50-60	7	15.56
Total	45	100

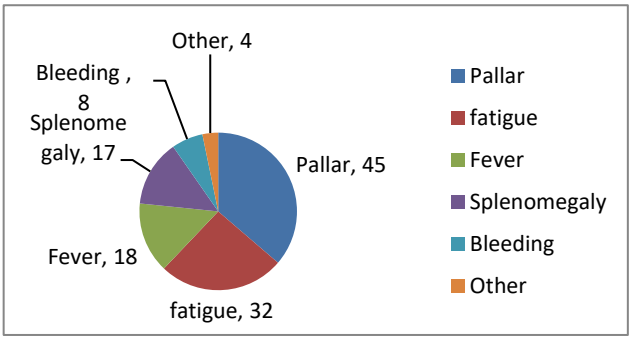

Figure 2: Age wise distribution.

Table 2: Different clinical features.

Clinical features	No. of cases (%)
Pallar	45 (100)
Fatigue	32 (71.11)
Fever	18 (40.50)
Splenomegaly	17 (38.35)
Bleeding	8 (17.65)
Others	4 (8.45)

During a 1-year study, the total no. of hemograms was done 29,238, and bone marrow aspiration was done in 302, and pancytopenia was found in 45 patients. The common causes included in our study were 1 megaloblastic anemia (no. of patients 29 (64.6%)) followed by aplastic anemia 6 patients (13.35%), leukemias 6 patients (6.65%); MDS-1 (2.75%) hyperspheres, radiation, drugs, occasion 1 each.

Table 3: Different HB%, leucocyte and platelet count.

HB% level (gm%)	leucocyte/cumm^3	Plateletcount/cumm^3
9 to 10	3800	80,000 to 89000
8 to 10	3000 to 3800	70,000 to 80,000
6 to 8	2500 to 3000	50,000 to 70,000
4 to 6	2000 to 2500	30,000 to 70,000
2.5 to 4	1100 to 2000	22000 to 30,000

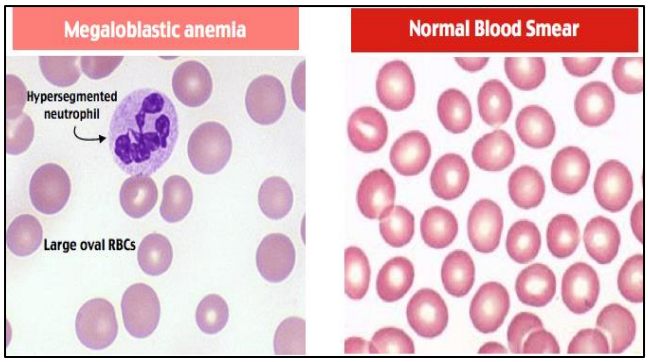

Figure 3: Megaloblastic anaemia.

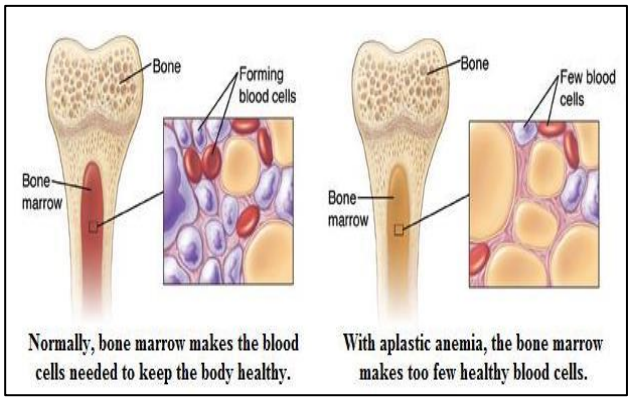

Figure 4: Aplastic anaemia.

Table 4: Different causes of pancytonepemia.

Cases	No. of patients (%)
Megaloblastic anemia	29 (64.45)
Aplastic anemia	6 (13.35)
Leukemias	3 (6.65)
MDS	1 (2.75)
Hypersplenism	1 (2.75)
Radiation	1 (2.75)
Drugs	1 (2.75)
Falciparum malaria	1 (2.75)

DISCUSSION

Pancytopenia is a common hematological disorder hematopoiesis increase according to the increased demand. Mature blood cells derived from pluripotent stem cells are released into circulation. The studies have shows leukemia and aplastic anemia are the most common causes of pancytopenia in children.[6]

The common cases in adults are megaloblastic anemia MDS, Drugs, and Infections like HIV, hepatitis. The maximum incidence of pancytopenia was found in our study is between 20 years to 30 years and 30 years to 40 years-25.85 and 35.52% respectively. The studies conducted by Mussarath et al show similar results.[8]

The incidence of megaloblastic anemia in our study was (29 patients: %) whereas the incidenceof megaloblastic anemia was 72% was noted in the studies conducted by Khunger et al.[9]

The megaloblastic anemia in India is mainly due to nutritional, pregnancy, parasitic infestations. Vit B_{12} belongs to the family of cobalamine and serves as a cofactor for 2 important reactions in humans. As methylene cobalamin, it is a cofactor for methionine synthetase. In the conversion of homocysteineto methionine and as adenosyl cobomine for the conversion of methylemabonly coeryzne A to succinyl CoA. Vit B_{12} comes from the diet and is present in all foods of animal origin. The daily absorption of vit B_{12} is 5 mcg.[9]

The incidence of megaloblastic anemia by other authors are, 68% by Tilak et al.[11] And studies conducted by Rangaswamy et al show 49% and 62% by Kadusi et al.[12,13]

Most of these studies conducted in India and the estimation of folic acid and vitamin B_{12} level are not routinely available in most centers Thus the exact deficiency is usually not available. The hemoglobin percentage level is varied from 2.8 to 9.2 gm%; the total WBC count was varied from 1100 to 3800 cents/cumm^3. And platelet count was varied from 2200 to 89000/cum^3. The studies conducted by Jha et al show a similar picture. Whereas the results found by Kumar and Raghupath are little different.[13]

Out of these 45 cases, 29 cases are due to megaloblastic anemia on peripheral smear examination in which macrocytosis and anisopoilocytosis. And in 19 cases hyper segmented neutrophils were seen whereas the study conducted by Prabhu et al shows macro ovalocylosis with anisopoikilocytosis in call cases. 14 MCV was 100 ft in more than 81% of cases.

Limitation of study is the number of patients are included are 45 only. Because the hospital is in rural areas, the investigation factilities were not avaliable and patients are very poor and unable to get the higher investigations.

CONCLUSION

Pancytopenia is a common hematological problem countered in clinical practices. It should be suspected, when a patient comes with fever, anemia, and bleeding with peripheral smear examination we can come to the conclusion that pts are having pancytopenia.

In India especially in rural area nutrition, pregnancy isa common cause of megaloblastic anemia. Accurate diagnosis and timely intervention may be life-saving for pancytopenia patients as more number of cases are remediable and reversible.

A comprehensive. Clinical, hematological study of patients with pancytopenia will generally help in identifying the underlying cause.

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