ORIGINAL RESEARCH

Study of Pancytopenia in Peripheral Blood Smears

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ABSTRACT

Background:Pancytopenia is decrease in all the cellular constituents of the peripheral blood resulting in anaemia, leukopenia, and thrombocytopenia. Pancytopenia is characterised by anaemia, bleeding, and infection. The causes of pancytopenia vary widely. Hence, the present study was conducted to assess the profile of pancytopenia and its various causes.

Materials and Methods: The present cross-sectional observational study was conducted in Department of Pathology of a medical college hospital. A total of 40 cases of anaemia suffering from pancytopenia were included. Detailed history, clinical examination and investigations were done to determine the cause of pancytopenia.

Results: Most of the patients belonged to the age group of 21-30 years (37.5%). 57.5% were males. Megaloblastic anaemia was seen in 57.5% cases, hypoplastic/aplastic anaemia in 17.5% and hyersplenism in 7.5%.

Conclusion: Megaloblastic anaemia and aplastic anaemia were major causes of pancytopenia. Proper investigation is must in patients of pancytopenia.

Keywords: Bone marrow examination, cross-sectional study, pancytopenia, peripheral blood smear.

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INTRODUCTION

Pancytopenia is distinguished by a decrease in all three cellular constituents of the peripheral blood, including red and white blood cells, and platelets, resulting in anaemia, leukopenia, and thrombocytopenia.[1] It's a common haematological condition seen in medical practice. Pancytopenia is characterised by anaemia, bleeding, and infection. The earliest presenting symptoms are generally caused by anaemia or thrombocytopenia, but leukopenia becomes the major risk to life as the condition progresses.[2,3]

Bone marrow biopsy is important in understanding the aetiology of pancytopenia. Radiological, biochemical, and microbiological examinations are relevant in a few other cases. Management and prognosis are determined by the degree of pancytopenia and the underlying cause. As a result, determining the exact reason will aid in proper management.[4,5] Various researchers have found that the causes of pancytopenia vary widely in different parts, necessitating a need for local understanding of the condition's aetiology.[6-9] Hence, the present study was conducted to know the local pattern.

Aims and objectives

The present observational study was conducted to assess the clinico- haematological profile of pancytopenia and its various causes in this part.

MATERIALS & METHODS

The present cross-sectional observational study was conducted in Department of Pathology of a medical college hospital. A total of 40 cases of anaemia who were diagnosed to be suffering from pancytopenia in the peripheral blood smears were included.

Inclusion Criteria:

Patients of all ages and both sexes suffering from pancytopenia. The criteria for pancytopenia were haemoglobin level less than 13.5 g/dL in males or 11.5 g/dL in females; WBC < 4,000/cmm, and platelets < 100,000/cmm.

Exclusion Criteria:

Cases of chemotherapy induced pancytopenia.

Detailed history, clinical examination and investigations were done. CBC, peripheral blood smear examination, LFT, KFT, USG and bone marrow examination were done. Cause of pancytopenia was determined. They were apprised about the importance of the study and confidentiality of data. Data was entered in MS Excel 2019 and analysed using SPSS. Informed consent was obtained from all the patients.

RESULTS

A total of 40 cases of pancytopenia were included in the present study. Most of the patients belonged to the age group of 21-30 years (37.5%). 57.5% were males with male:female ratio of 1.32:1.

Table1 showing various causes of pancytopenia (n=40)

Causes	Number	Percentage
Megaloblastic anemia	23	57.5
Aplastic anemia	7	17.5
Post viral	2	5
Sepsis	2	5
Hypersplenism	3	7.5
Myelodysplastic syndrome	1	2.5
Myelofibrosis	1	2.5
Others	1	2.5

[Table1] shows various causes of pancytopenia. Megaloblastic anaemia was seen in 57.5% cases, hypoplastic/aplastic anaemia in 17.5% and hyersplenism in 7.5%. Myelofibrosis and myelodysplastic syndrome were seen in 5% each.

DISCUSSION

The present study included a total of 40 cases of pancytopenia. Most common age group was 21-30 years (37.5%). 57.5% were males with male:female ratio of 1.32:1. Megaloblastic anaemia was seen in 57.5% cases, hypoplastic/aplastic anaemia in 17.5% and hyersplenism in 7.5%. Myelofibrosis and myelodysplastic syndrome were seen in 5% each. Two cases each of viral illness and sepsis were responsible for pancytopenia.

Porwal et al (2021) observed 100 patients suffering from pancytopenia. They found that 64.0% were men. 88% of the cases suffered from generalized weakness. Pallor (94.0%), followed by splenomegaly (40.0%) and hepatomegaly (30.0%) were the common clinical findings. Megaloblastic anaemia (58%), aplastic anaemia (12%), cirrhosis (8%) and leukaemia (6%). 28.0% of the cases had normocellular bone marrow were causative factors.[10]

In the study done by Gandhi et al (2019), age was between 5 days to 82 years with a mean of 38.1 years. Female preponderance was seen. Patients presented with generalized weakness and fever. Commonest blood picture was dimorphic anaemia. Bone marrow examination showed hypercellularity with megaloblastic erythropoiesis in majority of the cases.[11]
Suryareshmi et al (2018) examined 2813 blood smears in a rural medical college. 2.16% smears showed pancytopenia. 46 patients who fulfilled the selection criteria were studied. Chronic liver disease (37%), dengue fever (19.6%) and haematological malignancies (8.7%) were the common causes of pancytopenia. The common symptoms were weakness and fatigue (76.1%) & fever (56.6%). Pallor (19.6), splenomegaly (15.2%), and hepatomegaly (13%) were the common signs seen.[12]
Chandra et al (2019) found the common causes of pancytopenia to be megaloblastic anaemia (25%), aleukemic leukaemia (19.1%) and aplastic anaemia (19.1%). Kala-azar was seen in 11.7% cases. They concluded that if the clinicians are aware of etiopathogenesis of pancytopenia, delay in diagnosis and management can be avoided.[13]
Sharma et al (2016) found the average age of patients of pancytopenia was 38.10 years with male predominance. Megaloblastic anaemia (50.7%), followed by hypersplenism (10.6.%), malaria (9.8%), leukaemia (9.0%) and aplastic anaemia (7.5%) were the common causes. Pallor (96.9%) and fever (59.8%) were frequent signs. The prevalent peripheral blood picture was dimorphic with macrocytic anaemia. The frequent finding on bone marrow examination was hypercellularity megaloblastic erythropoiesis. They opined that detailed clinical examination and examination of peripheral smear & bone marrow aspirate can help in proper management of these cases.[14]
Dubey et al (2016) also reported that megaloblastic anaemia was commonly responsible (41.4%) followed by aplastic anaemia (22.9%), hypersplenism (15.7%) and leukaemia (14.2%). Bone marrow examination is most effective investigation as opined by them.[15]
Manzoor et al (2014) observed that megaloblastic anaemia (56%), aplastic anaemia (14%), hypersplenism (8%) and post viral illness (6%) were responsible for pancytopenia. They commented that megaloblastic anaemia is common in Indians.[16]
Age of pancytopenia cases ranged from 2 to 80 years (mean-41 years) with a male predominance in the study done by Gayathri et al (2011). Generalized weakness, fever, pallor, splenomegaly and hepatomegaly were common clinical features. The predominant blood picture was dimorphic anaemia. The commonest finding in bone marrow examination was hypercellularity with megaloblastic erythropoiesis. Megaloblastic anaemia (74.04%) and aplastic anaemia (18.26%) were major causes of pancytopenia.[17]
The above discussion indicates that the findings of the present study are similar to the observations made by other researchers. Megaloblastic anaemia is still major factor in this part. Bone marrow examination is very useful in adequate management of these cases.

CONCLUSION

Proper examination and investigation are must in patients presenting with pancytopenia. The cause needs to be identified to adequately treat the underlying cause. Reversible causes include megaloblastic anaemia and infections.

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