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General Medicine

A STUDY OF ETIOLOGICAL AND CLINICAL PROFILE OF PANCYTOPENIA IN A TERTIARY CARE HOSPITAL

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ABSTRACT Pancytopenia is a disorder in which all three cellular elements of blood are decreased. It leads to the triad of findings, which includes anemia, leucopenia, and thrombocytopenia. It can be due to a reduction in hematopoietic cell production in the bone marrow due to infections, parasitic infestation, chemotherapy, etc. The severity and the underlying pathology of pancytopenia guides the management and prognosis of the patients. Thus, the identification of the exact cause will help in implementing appropriate therapy.

Aims and Objectives: 1. To assess the frequency of etiological causes of pancytopenia in patients attending Government General Hospital, Kurnool.

2. To study clinical presentations in pancytopenia due to various causes.

Material and Methods: Seventy-eight pancytopenic patients were evaluated clinically, along with hematological parameters and bone marrow examination in the Department of General Medicine, Kurnool Medical College, Kurnool, from October 2017 to September 2019.

Results and Conclusion: Among 78 cases studied, the age of the study population ranged from 17 years to 72 years with a mean age of 37.8 years and a median age of 34.5 years.

The majority of the population was in the age group of 30 – 39 years. The sex distribution is 43 males and 35 females with a male to female ratio of 1.22: 1. The most frequent physical finding was pallor. In most of the patients, hemoglobin ranged between 5.0-7.5 g/dl, and Total leucocyte count ranged between 1000-2500/mm^3, and Platelet count ranged in < 50,000/mm^3. The commonest cause for pancytopenia was megaloblastic anemia (55.12%), followed by hypersplenism (11.53%) and aplastic anemia (8.97%). In our study, the most common bone marrow finding was hypercellular, 79.5%.

KEYWORDS : Pancytopenia, Megaloblastic anaemia, Aplatic anaemia, Vit B12.

AIMS AND OBJECTIVES OF THE STUDY

1. To assess the frequency of etiological causes of pancytopenia in patients attending Government General Hospital, Kurnool.
2. To study clinical presentations in pancytopenia due to various causes.

MATERIALS AND METHODS

This is a cross-sectional descriptive study done in the Department of General Medicine, Government General Hospital, Kurnool, with the help of the Department of Pathology, Kurnool Medical College, Kurnool.

All the patients with pancytopenia seen in hemogram will be evaluated for the cause of Pancytopenia and clinical history, required tests available in our institution will be done as per proforma.

A total of 78 cases of pancytopenia, as seen in hemogram, are studied.

INCLUSION CRITERIA:

1. Patients aged more than or equal to 14 years of both sexes diagnosed with pancytopenia on hemogram
2. Hemoglobin levels less than 10 g/dL
3. Total Leukocyte count less than 3.5 x 10^9/L
4. Platelet Count less than 1.0x10^9/L

EXCLUSION CRITERIA:

1. Patients aged 13 years and less
2. Diagnosed case of Pancytopenia
3. Patients who received Chemotherapy or Radiotherapy

METHODOLOGY:

An informed consent was obtained from all the patients. All the patients were subjected to thorough clinical and physical examination. A pre- designed proforma was used to record history, examination details, and investigation reports.

Blood samples were collected in EDTA tubes for complete blood analysis and plain tubes for biochemical tests, and a peripheral blood smear was taken. The complete blood analysis was performed on an automated Haematology analyzer and rechecked by a peripheral smear examination. Bone marrow aspiration was done in available cases. Aspirated smears were stained with Leishman or Giemsa and Perl's stain to demonstrate hemosiderin. Special stains like PAS, reticulin were done whenever necessary.

STATISTICAL ANALYSIS

Data obtained was entered in Microsoft Excel worksheet Office 365. Descriptive statistical analysis has been carried out in the present study. Analysis of clinical features, Hemogram, and Bone marrow aspiration in comparison with other studies.

OBSERVATION AND RESULTS

Demographics of the study population

The age of this study population ranged from 17 years to 72 years with a mean age of 37.8 years and a median age of 34.5 years. The majority of the population was in the age group of 30 – 39 years.

The sex distribution of the study population is 43 males and 35 females. There is a significant male preponderance in the distribution of disease, more in males than females. The male to female ratio was 1.22: 1 in the present study

Aetiological distribution

The common etiologies of pancytopenia in the studied patients were

megaloblastic anemia (55.12%) followed by hypersplenism (11.53%), aplastic anemia (8.97%), leukemia (5.12%), and lymphomas (3.84). The results are shown in Table.

Table 1: Etiological distribution of Pancytopenia in the Present Study

Etiology	No of cases	Percentage
Aplastic anemia	7	8.97
Enteric fever	1	1.28
HIV	2	2.56
Hypersplenism	9	11.53
Leukemia	4	5.12
Lymphoma	3	3.84
Malaria	2	2.56
Megaloblastic anemia	43	55.12
Multiple myeloma	1	1.28
Myelodysplastic syndrome	1	1.28
Pregnancy-induced pancytopenia	1	1.28
Systemic Lupus Erythematosis	2	2.56
Tuberculosis	2	2.56
Grand Total	78	

Symptoms

The commonest presentation in the patients presenting with pancytopenia was easy fatiguability, which was in 75 (96.15%) cases; other main symptoms were fever, bleeding manifestations in the form of epistaxis, menorrhagia, and melaena, bone pains and purpuric rash.

Table 2 : Frequency of Symptoms at The Time of Presentation

Symptom	No of patients	Percentage
Fatigue	75	96.15
Fever	64	82.05
Bleeding	15	19.2
Bone Pain	4	5.12
Purpuric rash	2	2.56

Signs

The common physical findings were pallor, icterus, splenomegaly, lymphadenopathy, and pedal edema in a few cases. The most common symptom in our study is pallor, which was seen in all cases, followed by splenomegaly in 19 (24.3%) cases.

Table 3: Frequency of Physical Signs at the time of Presentation

Signs	No of cases	Percentage
Pallor	78	100
Icterus	14	17.9
Lymphadenopathy	6	7.7
Pedal edema	3	3.8
Splenomegaly	19	24.3
Hepatomegaly	9	11.5

Peripheral smear findings

The majority of peripheral smear readings showed macrocytic picture in 28 cases (36%) followed by normocytic in 24 cases (31%), dimorphic in 21 (27%), and microcytic in 5 (6%).

Table 4: Peripheral Smear Findings in Cases of Pancytopenia

Peripheral smear finding	No. of cases	Percentage
Normocytic	24	30.7
Microcytic	5	6.4
Macrocytic	28	35.9
Dimorphic	21	26.9

Bone marrow cellularity

Erythroid hyperplasia dominates the bone marrow aspiration cytology with 43 cases (55%), followed by hypercellular in 19 (24%), hypocellular in 13 (17%), and normocellular in 3 (4%).

Table 5: Cellularity of Bone Marrow in Cases of Pancytopenia

Bone marrow cellularity	No. of cases	Percentage
Normocellular	3	4%
Hypocellular	13	17%
Hypercellular	62	79.5%

DISCUSSION

Pancytopenia is not a disease condition by itself, but many severe and life- threatening conditions can manifest with pancytopenia. It has many aetiologies, with a variation in the frequency of different diseases leading to pancytopenia in different population groups. Differences in methods, strict diagnostic criteria, age groups under study, the period of observation, and exposure to chemicals and myelosuppressive drugs are the reasons influencing this variation. The definition of pancytopenia itself is very vague as the cut-off values varied in various institutions.

In the present study of 78 patients, definite male predominance observed with a male to female (M: F) ratio of 1.22:1 and a mean age of 37.8 years. In a similar study of 104 patients by Gayathri et al [(1)], the male to female ratio was 1.2:1, and the mean age was 41 years. The most common age group of the presentation was the 3rd decade of life in our study (27 cases), which correlated with other studies like Arvind Jain et al.[(5)], Khunger et al.[(3)], and Khodke et al[4]. The third and fourth decade is reported as the most prevalent age group of presentations in other studies.

List of Studies in India with The Most Common and Second Most Common Cause

Study	Year	No of cases	Most common cause	The second most common cause
Khodke et al[(4)]	2000	50	Megaloblastic anemia (44%)	Aplastic anemia (14%)
Kumar et al[(7)]	2001	166	Aplastic anemia (28.5%)	Megaloblastic anemia (23%)
Khunger et al[(3)]	2002	248	Megaloblastic anemia (72%)	Aplastic anemia (28%)
Premkumar et al[(5)]	2006	140	Megaloblastic anemia 60.7%	Leukemia (9%)
Sinha et al[(8)]	2010	111	Aplastic anemia (29.5%)	Hypersplenism (11%)
Gayathri et al[(1)]	2011	104	Megaloblastic anemia (71.04%)	Aplastic anemia (10.2%)
Rashmi Kushwaha et al[(11)]	2012	60	Aplastic anemia (28.6%)	Megaloblastic anemia (21.7%)
Manzoor et al[(12)]	2012	50	Megaloblastic anemia (56%)	Aplastic anemia (14%)
Rangeswamy et al[(13)]	2012	100	Megaloblastic anemia (49%)	Aplastic anemia (14%)
Javalgi and Dwarkala et al[(14)]	2013	106	Megaloblastic anemia (72.6%)	Iron deficiency anemia (12.2%)
Swala et al[(24)]	2014	100	Megaloblastic anemia (68%)	Aplastic anemia (10%)
Dahake et al[(15)]	2014	94	Megaloblastic anemia (34%)	Aplastic anemia (28%)
Subrahmanyam and Padma[(16)]	2016	106	Megaloblastic anemia (36.42%)	Hypersplenism (24.53%)

In the present study, the commonest cause of pancytopenia is Megaloblastic Anaemia, with 43 cases (55.12%). The next common causes were Hypersplenism with 9 cases (11.53%) and Aplastic anemia with 7 cases (8.97%).

Vitamin B12 deficiency and infective causes are common in underdeveloped and developing countries, while malignant causes predominate in developed countries. An emphasis about not to overlook megaloblastic anemia should be made because it is a treatable cause of pancytopenia The first most common cause in our study was Megaloblastic Anemia, which is in agreement with many studies from India such as Khodke et al.[(4)], Khunger et al.[(3)], Premkumar et al.[(5)], Gayathri et al.[(1)],Goli et al.,

Myelodysplastic syndrome is diagnosed by the presence of dysplastic cells and Auer rods in the bone marrow. This is seen in one case (1.28%) in the present study. Gupta et al[8]. reported that 1.73% of the cases to be MDS. International agranulocytosis and aplastic anemia study group reported MDS in 4.5% cases, making it the 2nd most common cause.

The most common symptom seen in the present study is fatigue (96.15%), followed by fever (80.05%). A most common sign is pallor (100%), followed by splenomegaly (23.4%).

Tejeswini et al. had fever as the most common symptom, which is seen in 30.66% of cases. Gupta et al[8]. had fever as the most common symptom, which was seen in 64.28%, fatigue was seen in only 34.28%. The predominant peripheral smear picture was macrocytic seen in 28 cases and followed by normocytic picture in 24 cases. Twenty-one cases had Normocytic picture, and 5 cases had microcytic picture in peripheral smear. Gupta et al. found dimorphic anemia in 35.7% cases, Normocytic picture in 34% cases, Microcytic in 28.57%, and macrocytic in 1.43%.

The most commonly seen bone marrow aspiration picture in the present study is Erythroid hyperplasia[9]. Gupta et al. had hypocellularity as the most common finding. Swapna Kumari et al. had hyper cellularity as the most common finding in the study

CONCLUSION

- In the present study, the most common etiology of pancytopenia was megaloblastic anemia, followed by hypersplenism and aplastic anemia.
- In the Indian scenario, Megaloblastic anemia should be considered first when evaluating a patient of pancytopenia, and careful examination of peripheral smear for features of megaloblastic anemia is necessary.
- Alcoholic liver cirrhosis and infections like tuberculosis and HIV are on the rise in tropical countries like India, which results in hypersplenism and hence should be kept in mind as causes for pancytopenic presentation.
- Early diagnosis of benign, easily treatable, and reversible causes of pancytopenia such as enteric fever, malaria, tuberculosis, megaloblastic anemia is essential to prevent further complications and have a good prognosis.
- As a considerable proportion of causes for pancytopenia are treatable and reversible, accurate diagnoses and timely intervention may be lifesaving and will undoubtedly have an effect on the morbidity and mortality in patients. Specific and timely treatment and prognostication need an evaluation of the exact etiology of pancytopenia. In the present study, the majority of the cases had a treatable cause and so carried a better prognosis.

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