INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH & DEVELOPMENT

ISSN 2278 – 0211 (Online)

Etiological Profile of Pancytopenia

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Abstract:
Objectives-
1. To determine the common etiological causes of pancytopenia in Medical ICU and Wards of Gandhi Hospital Secunderabad.
2. To determine if critical analysis of peripheral smear provide clue to underlying etiology.
3. To evaluate hematological parameters including Bone Marrow Aspiration.
Methods:30 patients admitted into medical Icu and various wardsin Gandhi Hospital with following indices on hemogram, Hemoglobin<13.5gm%in males and Hb<11.5gm%in females,total leucocyte count<4000/cubic millimeter and platelet count<1,50,000/cubicmillimeter. Patients were subjected to detailed history including dietary habits ,physical examination was done.Biochemical parameters, Hemogramand Bonemarrow Aspiration were done.
Results- Out of 30 patients studied 17 are male and 13 are female.16 patients(53%) were megloblastic,3 patients(10%)had aplastic anemia ,2(6.6%) had acute promyelocytic leukemia,2(6.6%)had acute lymphoblastic leukemia,1(3%)had myelodysplastic syndrome,1(3%) had Hodgkin's lymphoma, 1(3%) had non Hodgkin's lymphoma,1 patient(3%) had HIV induced pancytopenia,1(3%) had hyper splenism, peritonitis occurred in 1 patient(3%) and 1 patient(3%) had Systemic Lupus Erythematosis with pancytopenia.
Conclusions- Nutritional Megaloblastic with concurrent iron deficiency is the commonest cause of pancytopenia in this studyas indicated by macrocytes and hypersegmented neutrophils on peripheral smear. Acute leukemias and Aplastic anemias are the conditions with pancytopenia where bone marrow exam revealed diagnosis.

1. Introduction

Pancytopenia is a disorder in which all 3 formed elements of blood (RBCs, WBCs and Platelets) are decreased than normal. It is a triad of findings resulting from a number of disease processes primarily or secondarily involving the bone marrow and the symptoms are attributable to anemia , leucopenia or thrombocytopenia. Physical findings , peripheral blood picture provide valuable information and in planning bone marrow samples which may confirm diagnosis or may give an unsuspected diagnosis. In India, causes are not well defined and hence the present study was done to evaluate various causes of pancytopenia and to correlate the peripheral blood findings with bone marrow aspirate. This data would help in planning the diagnostic and therapeutic approaches in patients with pancytopenia.

2. Material &Methods

This is a prospective study done on the patients admitted in all wards of Gandhi Hospital during the period 2012-2014.Patients with Hb<13.5gms in males,<11.5gms in females, WBC <4000/cumm^3,platelets<1,50,000/cumm^3 were included. Pancytopenic patients after starting of anti malignant therapy were excluded. Patients were subjected to detailed history, physical examination and dietary habits were enquired. Peripheral smear was examined for the morphology of RBCs, macro ovalocytes, degree of anisocytosis, poikilocytosis, atypical cells and blast cells.Bone marrow was evaluated for the features of cellularity, erythroid:myeloid ratio,megaloblasts, dysplastic cells,proportion of cells and fat spaces, abnormal fibrosis &blast cells

3. Results

Out of 30 patients,17 are male and 13 are female.46%(14/30)were in 2nd decade,26%(8/30) were in 3rd decade. Major clinical features reported are fatigue & shortness of breath

26(86%),fever21(70%),pallor30(40%),bleeding11(36%),hepatomegaly17(56%),splenomegaly18(60%),lymphadenopathy 6(20%).In this study Hb ranged from 2to 9.5gm%,wbc ranged from1500-4000cells/cumm³.

	Number of cases	%
Aetiology Megaloblastic anemia	16	53
Aplastic anemia	3	10
Acute promyelocytic leukemia	2	6.6
Acute lymphoblastic leukemia	2	6.6
Myelodysplastic syndrome	1	3
Hodgkins lymphoma	1	3
Non hodgkins lymphoma/visceral tb	1	3
HIV induced pancytopenia	1	3
Hyper splenism	1	3
Peritonitis with septicemia	1	3
Systemic lupus erythematosis	1	3

Table 1

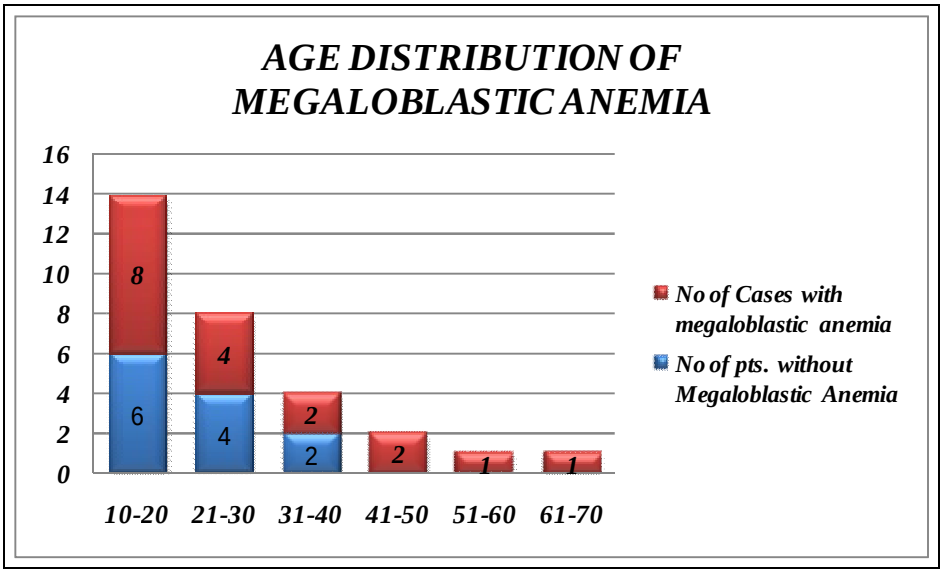

Figure 1

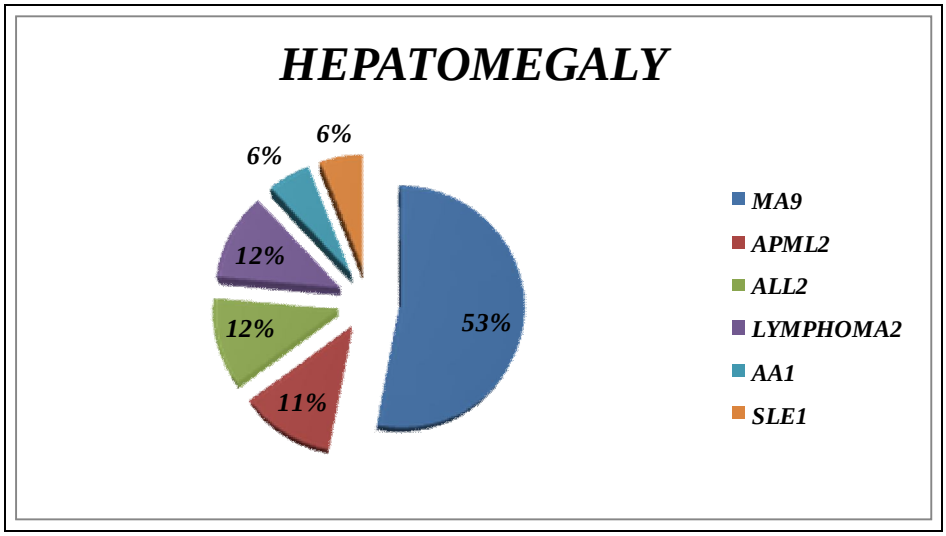

Figure 2

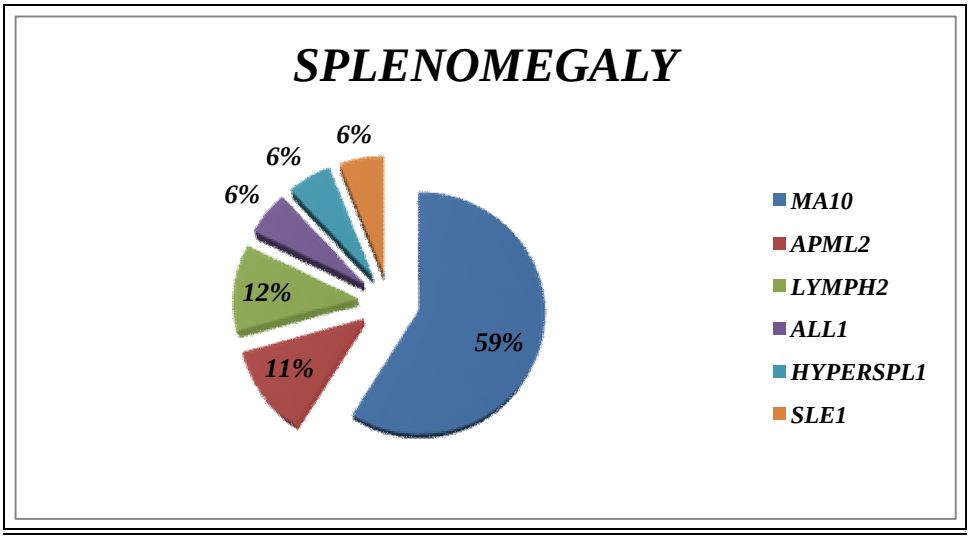

Figure 3

The spleen was palpably enlarged in18 cases of which majority belonged to megaloblastic anemia(10cases).acute promyelocytic and lymphomas accounted for 2 each and ALL,hypersplenism, SLE, aplastic anemia accounted for 1 each.

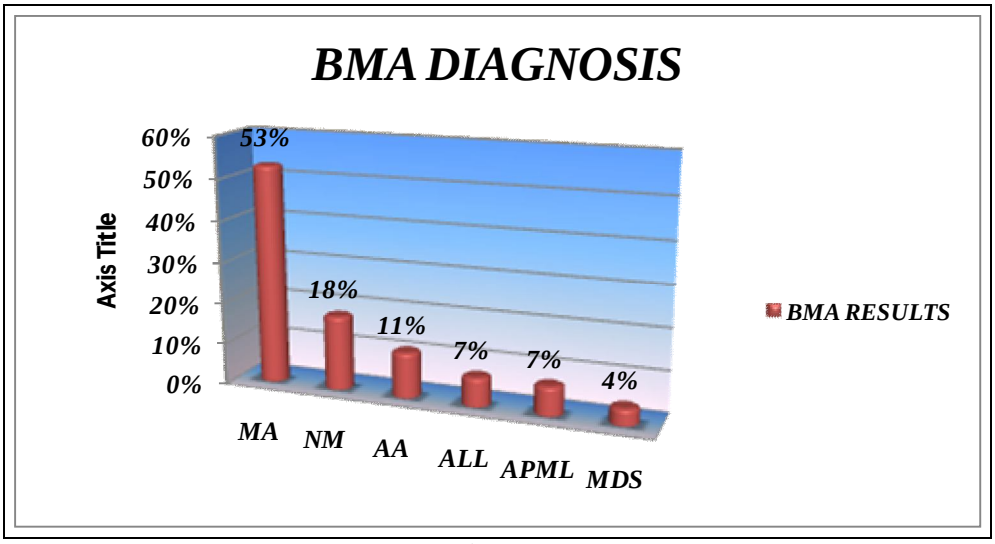

Figure 4

MA= megaloblastic anemia (53%)
NM=normoblastic anemia (18%).
AA=aplastic anemia (12%).
ALL=acute lympho blastic leukemia (7%).
APML=acute promelocytic leukemia (7%).
MDS=myelo dysplastic syndrome (4%).
Bone marrow aspiration was performed in 29pts, and it yielded diagnostic material in 27 cases.2 cases resulted in dry tap, but a repeated aspiration at different site was successful. In one case of Hodgkin's disease with pancytopenia the diagnosis was arrived at by a lymph node biopsy.

3.1. Haematological Characteristics: Hemogram Analysis
The total hemoglobin ranged from 2-9.5g%

Hb-gm %	Number	%
2-4	15	50
5-7	9	30
8-10	6	20

Table 2

The neutrophil counts were as follows in 20 patients with neutropenia.

Neutrophilic Count	Number	%
0-600	6	30
601-1200	9	45
1201-1800	5	25

Table 3

The platelet counts ranged from 20,000 to 1,20,000 and their distribution was as follows

Platelet count	Number	%
20,000-40,000	12	40
40,001-60,000	3	10
60,001-80,000	9	30
80,001-1, 00,000	5	16
1, 00,001-1, 20,000	1	3

Table 4

Eight patients had bleeding manifestations when platelet count was below 40,000 and three had bleeding when platelet count is in between 60,000-80,000.

3.2. Clinical Correlation of Hemogram Data

All the paients had pallor of mucous membrane on clinical examination and hemoglobin was in the anemic range, only 26 patients(86%) had fatigue and shortness of breath. Fever was present in 21 patients (70%) and the commonest cause was infection.

Fever / Neutropenia	Number
Fever	21
Neutropenia	20
Fever with Neutropenia	15
Fever without Neutropenia	6
Netropenia without Fever	5

Table 5

6 patients had fever though there was no neutopenia. Neutrophil dysfunction could be a contributing cause. 5 Patients had neutropenia but did not have fever.

4. Discussion

On evaluation of 30 patients, nutritional megaloblastic anemia was common cause(53%) and this is in contrast to study by Imbert etal[1] where vitamin deficiency accounted for only 7.5% of cases and myelofibrosis was seen in 31% of cases .In a study by Kumar etal[ ] aplastic anemia accounted for(29.5%) and megaloblastic anemia accounted for 22% of cases. Most of the patients in our study are seriously ill and 66%(20) had neutropenia and 75% of these developed fever due to infection and the risk is high if absolute neutrophil count is <500/micro litre.6 patients had fever without neutropenia and it could be due to neutrophil dysfunction as noted by Sarode etal[ ].55% of patients with megaloblastic anemia had hepatomegaly ,62% had splenomegaly in this study in contrast to Sarode etal´s study which was 46% &34% respectively. Bone marrow aspiration was enough to make diagnosis in all cases in our study in contrast to Imbert etal where bone marrow aspiration yielded diagnostic material in 55% of cases,biopsy in 15%, trephine bioposy provided diagnosis in 30% of cases due to high incidence of myelofibrosis in their study.Aplastic anemia accounted for 13% of cases in this study similar to the study by Imbert etal. Folate in diet is low in Madras and Hyderabad as found in a study by Babu[4].

Subnormal vitamin B12 and Folate levels are common in India and this coupled with intercurrent infections like diarrheal illness pregnancy puberty can precipitate deficiency states and this explains clustering of 50%of megaloblastic anemias in adolescent age groups.Of the 11 cases of marrow proven megaloblastic anemia,3 cases showed typical macrocytic normochromic smear s/o uncomplicated megaloblastic anemia,the other 8 showed dimorphic picture.

Our incidence of megaloblastic anemia was 53% compared to 72% as reported by Khunger Jin etal[5] and 68% by Tilak v etal[6,7].Nutritional megaloblastic anemia is commoner as suggested by microcytes ,normocytes and macrocytes in peripheral smear in concurrence with study by Pendersen etal,Tasker etal.14 out of 16 patients with megaloblastic anemia had hypersegmented neutrophils a feature of megaloblastic erythropoiesis and the same was reported by Spivak in 1982.

Thus megaloblastic anemia should be considered foremost in evaluating a case of pancytopeniaand peripheral smear should be seen for microcytes normocytes ,macrocytes and hypersegmented neutrophils.Parenteral B12 and Folate restores back the hematological abnormalities.

5. Conclusions

1. Nutritional megaloblastic anemia is the commonest cause of pancytopenia in this study.
2. Except in megaloblastic anemia no other specific features were found on peripheral smear to point out a specific diagnosis.
3. Acute leukemias and Aplastic anemia are the two other conditions to be considered during evaluation of pancytopenia.
4. Bone marrow aspiration is sufficient to diagnose underlying cause,biopsy is not routinely necessary.

6. References

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