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A STUDY OF CLINICAL AND HEMOCYTOLOGICAL PROFILE OF PANCYTOPENIA

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ABSTRACT

This is prospective study on clinical and hemocytological profile of pancytopenia studied in Department of Medicine,VIMS/PAWAPURI, NALANDA, BIHAR.100 patients of age more than 14 year presenting with pancytopenia were evaluated.A combined evaluation of physical findings, haematological investigations and bone marrow aspiration were done in all patients. In 100 cases male accounted for 64% and female 36% with M:F ratio 1.7:1.The commonest presenting complaint was generalized weakness and fever,commonest physical finding was pallor followed by splenomegaly and hepatomegaly. The commonest cause of pancytopenia was kala-azar(41%) followed by megaloblastic anemia(37%),subleukemic leukemia(10%),malaria(04%),drug induced(03%),disseminated TB(02%),multiple myeloma (02%) and MDS (2%). In the present study of 100 cases,34 cases had normocytic normochromic anaemia,32 cases had dimorphic anaemia,macrocytic anaemia was found in 24 cases,normocytic hypochromic constituted rest 10 cases. Lowest haemoglobin percentage 1.8gm/dl,lowest ANC 200 cells/mm3 and lowest platelet count 10,000 cells/mm3 were noted in different cases of megaloblastic anaemia. Bone marrow aspiration showed overall hypercellularity in 95 cases and megaloblastic erythroid hyperplasia in 41 cases. The commonest cause of hypercellularity was kala-azar(43%) followed by megaloblastic anaemia(37%),leukemia(10%) and malaria(04%).

Introduction-

Pancytopenia is a quantitative decrease in the formed elements of the blood- erythrocytes,leukocytes and platelets.Thus,it refers to the combination of anemia, leucopenia and thrombocytopenia . Pancytopenia is not a disease but a triad of findings that may result from a number of disease processes. These disorder may affect bone marrow either primarily or secondarily resulting in the manifestation of pancytopenia.

Pancytopenia may be due to

(a) Bone maroow depression (hypoplastic/aplastic anemia, idiopathic , viral,drugs)
(b) Bone marrow infiltration (secondaries, fibrosis,acute leukemia)
© Dyserythropoiesis (megaloblastic anemia, myelodysplastic syndrome)
d) Infection(HIV,tuberculosis,kala-azar,malaria,fungal infection, other viral infection)
e) Hypersplenism (kala-azar,malaria,portal hypertension,felty's syndrome)

The optimal diagnostic approach to pancytopenia remains undefined.Careful assessment of of the blood element is often the first step in assessment of haematologic function and diagnosis of disease.Physical finding and peripheral blood picture provide valuable information in the work of pancytopenia patient and help in planning investigations on bone marrow samples.In india the causes of pancytopenia are not well defined.Previous studies done in india,stress the importance of either megaloblastic anemia or aplastic anemia as the major cause of pancytopenia.

So,the present study has been undertaken to evaluate the clinical presentation,etiological causes and to study the peripheral blood findings and bone marrow aspirate/biopsy as and when required.There by this study would help in planning the diagnostic and therapeutic approach in patients with pancytopenia.

Aims And Objectives:

This study undertaken with following aims and objectives:

1. Observation on clinical features/presentations of pancytopenia
2. To know various haematological parameters associated with pancytopenia
3. To know different etiological factors of pancytopenia

Material And Methods:

The present single centre prospective study "A STUDY OF CLINICAL AND HEMOCYTOLOGICAL PROFILE OF PANCYTOPENIA" was undertaken in the Department of Medicine , VARDHMAN INSTITUTE OF MEDICAL SCIENCES, PAWAPURI, NALANDA,BIHAR.The indoor patient of the hospital formed the material for the study.Total 100 patients of pancytopenia of age above 14 years were selected for this study.

Inclusion Criteria

1. Hemoglobin value<10 g/dl
2. Neutrophil count <1.3 x10^9
3. Platelet count of < 70 x 10^9
4. Above 14 year of age and either sex
5. Those who will give informed consent for study

Exclusion Criteria

1. Those who were already diagnosed by bone marrow examination
2. Patients receiving chemotherapy or radiotherapy

Evaluation Of Patient Done As Follows:

1. Patient's details and their proper consent taken
2. Detailed relevant history and physical examination(to look for pallor,icterus,lymphadenopathy,hepatomegaly,splenomegaly,bony tenderness along with vital parameters)were carried out.
3. Following investigation done-
   a. CBC
   b. Platelet count(manual)
   c. Reticulocytes count
   d. Peripheral blood film examination
   e. Serum bilirubin –direct and indirect
   f. SGOT & SGPT
   g. HBsAg/ELISA for HIV/anti rk39 antibody for kala-azar/rapid test for malaria/IgM for Typhoid
   h. Serum RA factor/Anti-ccp antibody/ANA
   I. Blood culture
   j. Bone marrow smear examination
   k. chest x-ray PA view/USG abdomen

10 ml blood was drawn in EDTA and sterile vial with complete antiseptic & aseptic measures for examination.

Haematology & biochemistry tests were done by the automated analyzer and manually in the Department of Pathology using following principals.

CBC estimation was done by electronic resistance and light scattering principal.

The peripheral smear was studied after staining with Leishman's stain.

Liver function tests were done by enzymatic assay and flow cytometry.

Various serological tests were carried out as per standard instruction Bone marrow aspiration was performed in all the patients using salah needle after obtaining written consent for the procedure either from the patient or the guardian.

OBSERVATION:

100 patients who presented with pancytopenia were studied. Detailed history,physical examination,routine haematological procedures,peripheral blood smears examination and bone marrow examination were carried out in all 100 patients.Following results were recorded and analyzed.

Age incidence:

Pancytopenia showed its highest incidence in the age group of 41-50 years and its occurrence was less frequent in the age group of 61-70 years.

Incidence Of Pancytopenia In Different Age Groups

Age group(years)	No. of cases	percentage
15-20	08	08
21-30	22	22
31-40	25	25
41-50	35	35
51-60	08	08
61-70	02	02
Total	100	100

Sex Incidence:

The incidence of pancytopenia showed slight preponderance among males.Approximately male to female ratio was 1.7:1.

Incidence Of Pancytopenia In Different Sex

SEX	Frequency	Percentage
Male	64	64
Female	36	36

Causes And Presenting Complaint In Case Of Pancytopenia:

The commonest mode of presentation was generalized weakness, which was present in all patients constituting 100%. Other main symptoms were fever(50%),dyspnoea,wight loss(06%),bleeding manifestation(06%),chills & rigor(04%).

Distribution Of Various Causes Of Pancytopenia-

Causes	NO of cases	Percentage
Kala-azar	41	41
Megaloblastic anemia	37	37
Subleukemic leukemia	10	10
Malaria	04	04
Drug induced	03	03
TB	02	02
Multiple Myeloma	02	02
Myelodysplastic syndrome	01	01
TOTAL	100	100

Presenting Complaints In Pancytopenia:

Presenting Complaint	No of Patient	Percentage
Generalized weakness	100	100
Fever	50	50
Dyspnoea	20	20
Weight loss	06	06
Bleeding manifestation	06	06
Chills and rigor	04	04

Physical Findings In Pancytopenia:

Physical findings	No of Patients	Percentage
Pallor	100	100
Splenomegaly	73	73
Hepatomegaly	54	54
Lymphadenopathy	04	04
Bony tenderness	02	02
Jaundice	02	02

Hematological Parameters In Cases Of Pancytopenia:

Parameter	Range	No of cases	Percentage
Haemoglobin (gm%)	1.8-5.0 5.1-8.0 8.1-9.2	40 44 16	40 44 16
Absolute Neutrophil Count(cells/mm^3)	200-500 501-900 901-1300	04 36 60	04 36 60
Platelet Count (cells/mm^3)	10,000-30,000 31,000-60,000 61,000-75,000	10 12 78	10 12 78
	TOTAL	100	100

Peripheral Blood Picture In Pancytipenic Patient:

Blood picture	No of cases	Percentage
Dimorphic anaemia	32	32
Macrocytic anaemia	24	24
Normocytic hypochromic	10	10
Normocytic normochromic	34	34
TOTAL	100	100

Bone Marrow Picture:

Bone marrow aspirations in present study of pancytopenia showed three distinct types of cellularity-hypercellularity,hypocellularity and normocellularity.Pancytopenia with hypercellular marrow was observed in 95 patients.

In present study of pancytopenia,kala-azar was seen in 41 cases constituting 41% of total cases of pancytopenia and 43.15% of total cases of pancytopenia with hypercellular bone marrow.Hypocellular marrow was noted in four patients and the commonest cause was drug induced.Normocellular was seen in a single patient in case of megaloblastic anaemia.

Cellularity Of Bone Marrow:

Type of cellularity	No of pateints	Percentage
Hypercellularity	95	95
Hypocellularity	04	04
Normocellularity	01	01

Causes Of Hypercellular Marrow Associated With Pancytopenia:

Aetiology	No. of Cases	Percentage
Kala-azar	41	43.15
Megaloblastic anaemia	36	37.89
Subleukemic leukemia	10	10.52
Malaria	04	4.2
Multiple myeloma	02	2.1
TB	02	2.1
TOTAL	95	100

DISCUSSION:

100 cases of pancytopenia were studied.Statistical data of age,sex,presenting complaints,various causes of pancytopenias, peripheral smear and bone marrow aspiration smears were studied. The age of the patients ranged from 15 years to 70 years with a mean age of 38 years.Pancytopenias were observed more in males(64%) than females(36%) with M:F ratio of 1.7:1.

The most common presenting complaint in our study was generalised weakness(100%) and fever(50%).The most common physical finding waspallor(100%) followed by splenomegaly(73%) and hepatomegaly(54%).The presenting symptoms were usually attributed to anaemia,thrombocytopenia. Leucopenia was an uncommon cause of the initial presentation of the patient but can become the most serious threat to life during course of disorder.

The commonest cause of pancytopenia reported from various studies throughout the world has been aplastic anaemia in contrast to most Indian studies which revealed megaloblastic anaemia to be the commonest cause.But present study differs in sharp contrast to all these studies regarding most common cause of pancytopenia as kala-azar.The high incidence of kala-azar in this study may be attributed to the higher incidence and prevalence of kala-azar in North Bihar.

In the present study of 100 cases,34 cases had normocytic normochromic anaemia,32 cases had dimorphic anaemia,macrocytic anaemia was found in 24 cases,normocytic hypochromic constituted rest 10 cases.The incidence of megaloblastic anaemia varied from 0.8 to 32.26% of all pancytopenic patients.In this study,incidence of megaloblastic anaemia was 37%.Most studies done in india,stress the importance of megaloblastic anaemia being the major cause of pancytopenia.It is rapidly correctable disorder and should be promptly notified.

Bone marrow aspiration showed overall hypercellularity in 94 cases and megaloblastic erythroid hyperplasia in 41 cases.So much high incidence of marrow cellularity was attributed to high incidence of kal-azar in this study.The diagnosis of kala-azar based on clinical feature(febrile splenomegaly +/- hepatomegaly) positivity of rk39 rapid diagnostic test and demonstration of amastigotes(LD bodies) in bone marrow or splenic smear examination. Diagnosis of kala-azar was confirmed by marrow examination in 29 patients,rest were confirmedby splenic smear examination.Demonstration of amastigotes in smears of tissue aspirates is the gold standard for diagnosis of kala-azar.

Incidence of aplastic anaemia varies from 10 to 52% among pancytopenic patients.In present study,incidence of hypoplastic anaemia was 03%.History of drug intake was seen in all 3 cases.Marrow aspirates in all were hypocellular with fragment composed largely of fat.Normoblastic erythropoiesis was seen with normal M:E ratio and there was mild increase in lymphocytes and plasma cells.

We encountered 4 cases of malaria in our study constituting 4% of total cases.They presented with fever,chills,rigor,vomiting and headache. Clinical examination revealed pallor and hepatosplenomegaly.Peripheral smear showed normocytic hypochromic anaemia with marked anisopoikilocytosis, neutropenia,thrombocytopenia and gametocyte of plasmodium falciparum were seen in both cases.Disseminated TB with pancytopenia noted in this present study in 2% cases,the diagnosis was based on clinical feature and chest x-ray.

We encountered 2 cases of multiple myeloma constituting 2% cases. Patient in present study presented with generalized weakness,fever and bony tenderness.ESR was 92 mm at the end of one hour.BM showed plasma cells constituting >40%.Plasmablasts with increased N:C ratio,multinuclearity and nuclear lobulation were seen in our patient.

CONCLUSION:

This is prospective study on clinical and hemocytological profile of pancytopenia studied in Department of Medicine,DMCH.100 patients of age more than 14 year presenting with pancytopenia were evaluated.A combined evaluation of physical findings,primary haematological investigations and bone marrow aspiration were done in all patients. In 100 cases male accounted for 64% and female 36% with M:F ratio 1.7:1.The commonest presenting complaint was generalized weakness and fever,commonest physical finding was pallor followed by splenomegaly and hepatomegaly.

The commonest cause of pancytopenia was kala-azar(41%) followed by megaloblastic anemia(37%),subleukemic leukemia(10%),malaria(04%),drug induced(03%),disseminated TB(02%),multiple myeloma (02%) and MDS (2%). Lowest haemoglobin percentage 1.8gm/dl,lowest ANC 200 cells/mm^3 and lowest platelet count 10,000 cells/mm^3 were noted in different cases of megaloblastic anaemia.Normocytic normochromic anaemia(34%) was predominant blood picture in pancytopenic patients.

Hypercellular marrow was noted in 95 patients and common cause was kala-azar followed by megaloblastic anaemia,leukemia and malaria. Hypocellular marrow was noted in four patients and the commonest cause was drug induced.Lymphocytosis and plasmacytosis was the predominant feature in hypoplastic anaemia.Normocellular marrow was seen in a single patient in case of megaloblastic anaemia.

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