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Etiology of Pancytopenia In Kashmiri Population (A Hospital Based Retrospective Study)

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Abstract

Introduction:

Pancytopenia refers to decrease in all peripheral blood lineages and is considered to be present when all three cell lineages are below normal reference range.Determining the specific etiology of pancytopenia is of immense help in management of patients with pancytopenia.

Aim:

The aim of this study was to find out the epidemiological spectrum and prevalence of pancytopenia according to age and sex along with the correlation of the clinical, haematological and bone marrow findings of such patients.

Material and Method:

The present study was conducted in the Postgraduate Department of Pathology, Government Medical College, Srinagar, India over a period of two years. A total of 352 patients were analyzed and subjected to bone marrow examination.

Results:

The commonest etiology of pancytopenia found in present study was megaloblastic anemia (47.15%) followed by dual deficiency anemia (22.44%),acute leukemia (6.53%),multiple mycloma(5.68%),aplastic anemia(5.11%),iron deficiency anemia (3.97%),hypersplenism (2.27%),anemia of chronic disease(1.98%), lymphoma(1.70%),myelodysplastic syndrome(1.42%), infections (1.42%),myeloproliferative neoplasm (0.28%).Pancytopenia was seen to be slightly more prevalent in males (51.42%) in comparison to females (48.86%)with male to female ratio of 1.046:1.

Conclusion:

Megaloblastic anemia was the commonest cause of pancytopenia found in this study.Megaloblastic anemia should always be considered in the evaluatiuon of pancytopenia in Indian settings.

Keywords: NIL

Introduction

Pancytopenia is a common condition encountered in clinical practice. Pancytopenia is not a disease by itself rather is defined as simultaneous presence of anemia, leucopenia and thrombocytopenia. Pancytopenia is the result of many hematopoietic andnon hematopoietic conditions. The underlying mechanism of pancytopenia include decrease in hematopoietic cell production, marrow replacement by abnormal cells, suppression of marrow growth and differentiation, ineffective hematopoiesis with cell death, defective cell formation which are removed from circulation, antibody mediated sequestration or destruction of cells and trapping of cells in a hypertrophied and overactive

reticuloendothelial system.[1]The presenting symptoms of pancytopenia are attributable to anemia or thrombocytopenia.[2]

Bone marrow examination is extremely helpful in evaluation of pancytopenia[3].Bone marrow aspiration is conclusive in many cases however bone marrow biopsy is essential in cases of fibrotic marrow and for complete assessment of marrow architecture, pattern of distribution and presence of any abnormal infiltrate.

Material and Methods:-

The present study was conducted for a period of 2 years starting from 2017.Patients who fulfilled following criteria were provisionally selected in the study, patients with hemoglobin level < 9 gm/dl,leucocyte count < 4x 10^9 / dl, platelet count < 140x10^9 /dl.Detailed relevant history of patients was obtained. Blood samples were collected for complete blood count and peripheral blood smear examination. The blood collected in EDTA vial was analysed with sysmex automated cell counter to obtain complete blood count.The smears were stained by leishman stain for peripheral blood smear examination.

Bone marrow aspiration and trephine biopsy were performed using Salah' sbone marrow aspiration needle and Jamshidi's needle respectively. Bone marrow aspiration smears were stained with leishmans stain. Touch imprint of biopsy specimen were made which were also stained with leishman stain. The biopsy specimens were collected in 10 % NBF. The specimens were then processed to obtain paraffin wax block. Thin sections were cut using microtome and stained with H& E stain. The Bone marrow aspiration smears were stained with leishmans and perls stain. The bone marrow aspiration smears and biopsy sections were studied in detail and relevant data were recorded, tabulated and analyzed.

Results

A total of 352 patients were studied out of which 180 patients were males and 172 were females.

Male: female ratio is 1.046:1.The age of the patient ranged from 9 years to 80 years. Most of the cases were found in the age group of 31 – 40 years followed by 61 -70 year age group.

The commonest etiology of pancytopenia found in present study was Megaloblastic anemia (166 cases) followed by Dual deficiency anemia(79cases), Acute leukemia (23 cases), Multiple mycloma(20 cases), Aplastic anemia(18 cases),Iron deficiency anemia(14 cases)Hypersplenism(8cases), Anemia of chronic disease(7cases),Lymphoma(6 cases), Myelodysplasticsyndrome (5 cases), Infections (5 cases),Myeloproliferative neoplasm (1 case).

Megaloblastic anemia was predominantly found in males (95 cases) ascompared to females(71 cases).Male predominance was also observed in Acuteleukemias, Aplastic anemia and Multiple myeloma. Dual deficiency anemia and Iron deficiency anemia were found predominantly in females.

In this study majority of pancytopenia cases had a hemoglobin level in the range between 5 to 7.5 gm %, WBC count between 2500 to 4000/ cumm and a platelet count of >50,000 /cmm.

In peripheral blood smears macrocytic picture was seen in 43.42% cases followed by normocytic normochromic picture in 37.45% cases, dimorphic picture in 9.96% cases and microcytic picture in 9.16% cases.

Peripheral blood film in megaloblastic anemia showed macrocytic picture. Hypersegmented neutrophils were present in some cases. Bone marrow examination revealed hypercellular marrow with reversal of myeloid to erythroidratio.Erythroid precursors showed megaloblasticfeatures. Gaintmetamyelocytes were also seen.

In iron deficiency anemia microcytic hypochromic picture was seen inperipheral blood film. Bone marrow examination revealed micronormoblastic picture.

Peripheral blood film in aplastic anemia showed normocytic normochromic picture. Bone marrow aspiration revealedhypocellular marrow with reduced erythropoiesis, myelopoiesis and megakaryopoiesis and relative lymphocytosis.Bone marrow biopsy shows hypocellular marrow.

Peripheral blood film in myelodysplastic syndrome showed macrocytic normochromic picture and nucleated red blood cells. Bone marrow examination

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revealed dysplastic changes affecting different cell lineages.

Table 1.Frequency of causes of pancytopenia along with sex distribution

ETIOLOGY	MALE	FEMALE	TOTAL NUMBER OF CASES	PERCENTAGE
MEGALOBLASTIC ANEMIA	95	71	166	47.15 %
DUAL DEFICIENCY ANEMIA	27	52	79	22.44 %
IRON DEFICIENCY ANEMIA	2	12	14	3.97 %
ANEMIA OF CHRONIC DISEASE	4	3	7	1.98 %
APLASTIC ANEMIA	12	6	18	5.11 %
ACUTE LEUKEMIA	16	7	23	6.53 %
MYELOPROLIFERATIVE NEOPLASM	0	1	1	0.28 %
LYMPHOMA	1	5	6	1.70 %
MULTIPLE MYELOMA	15	5	20	5.68 %
MDS	1	4	5	1.42 %
HYPERSPLENISM	4	4	8	2.27 %
INFECTIONS	3	2	5	1.42 %
TOTAL	180	172	352	

Table 2 Age incidence of pancytopenia

AGE (YEARS)	NUMBER OF CASES
0-10 YEARS	3
11 -20 YEARS	38
21 -30 YEARS	57
31- 40 YEARS	61
41 -50 YEARS	45
51- 60 YEARS	55
61-70 YEARS	59
>70 YEARS	34
TOTAL	352

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Table 3 Distribution of Hemoglobin level in pancytopenia patients

HEMOGLOBIN LEVEL (gm/dl)	NO. OF CASES
< 5	113
5-7.5	167
>7.7	72
TOTAL	352

Table 4 Distribution of WBC count in pancytopenia patients

WBC COUNT (/ cumm)	NO. OF CASES
< 1500	75
1500-2500	132
>2500	145
TOTAL	352

Table 5 Distribution of Platelet count in pancytopenia patients

PLATELET COUNT (/CUMM)	NO. OF CASES
< 2000	22
2000-50000	147
>50000	183
TOTAL	352

Discussion

The present study was carried out to find the frequency of various causes of pancytopenia, to determine the incidence of pancytopenia in relation to sex and age and to compare our findings with those of other studies from this part of world.The frequency of diseases causing pancytopenia varies in different population groups and this has been attributed to differences in methodology and stringency of diagnostic criteria, geographical area, genetic differences, nutritional status,prevalence of infection and varying exposure to myelotoxic drugs. [4]

Megaloblastic anemia is the commonest cause of pancytopenia in the present study accounting for 47.15 % of cases.Similar results were found in the study by Ahmad et al in which megaloblastic anemia comprised of 34.84% cases[2].Abdullah et al in a study found megaloblastic anemia as the commonest cause of pancytopenia accounting for 72.73% cases[5].This finding corresponded with the findings of studies done by Tilak and Jain[6],Khodke et al [7]and Manzoor et al[8], where the incidence of megaloblastic anemia was found to be at 68%, 44% and 56% respectively.Megaloblastic anemia usually results from deficiency of Vitamin B12 or Folic acid or a deficiency in their metabolism[9].

The third most common cause of pancytopenia in present study is Acute leukemia comprising of 6.53% cases. Ahmad et al reported 4.54%cases of pancytopenia in his study.The results were comparable with Khunger JMet al,who found an

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incidence of 5% of acute leukemia in the studied patients.[10]

Multiple myeloma comprised of 5.68 % cases of pancytopenia in present study. The study by Abdullah et al reported an incidence of 5.30%[5].The study by Khodke K et al reported an incidence of 4%.[7]

Aplastic anemia constituted 5.11 % cases of pancytopenia in present study.Comparable results were reported in a study by Ahmad et al [2]and Abdullah et al [5] in which aplastic anemia comprised of 7.57% and 3.03% cases respectively.The incidence of aplastic anemia was reported as 33.47% and 31.83% respectively by Dasgupta et al [11]and Kumar et al[12] in other parts of india.The reason for less incidence of aplastic anemia in our set up could be reduced pediatric admissions in our hospital.

Myelodysplastic syndrome comprised of 1.42% cases in our study.Majority of cases comprised of females and wasusually seen above the age of 50 years.The incidence of MDS was reported as 4.54% by Ahmad et al[2] and 3.03% by Abdullah et al[5]. Dasgupta et al reported an incidence of 2.42% of myelodysplastic syndrome[11].

In the present study, maximum cases of pancytopenia were found in the age group of 31 – 40 years. Similar results were observed by Abdullah et al and Sharma et al.[5,13]However Nazi et al, in their study found maximum cases of pancytopenia in the age group of 21 to 30 years[14].

In the present study males outnumbered females and the male : female ratio is1.046:1.Abdullah et al ,in a study of 132 patients on pancytopenia reported male to female ratio to be 1.3:1.In a study by Dasguptaetal[11] on 248 patients and Gayathri et al[15]on 104 patients male : female ratio was found to be1.7:1 and 1.2:1 respectively.

Conclusion

Pancytopenia is a common hematological condition for which detailed clinical history, physical examination along which hematological investigation and bone marrow aspiration biopsy are needed to evaluate and assess the cause.Determining the underlying etiology of pancytopenia helps in management and prognosis of patients.Pancytopenia in our setting is mostly due to megaloblastic anemia secondary to vitamin B12 deficiency caused mostly by dietary deficiency.Emphasis on dietary awareness and supplements wherever required may reduce the incidence of pancytopenia and related problems.

References

1. Makheja KD,Maheshwari BK, Arain S, Kumar S, Vikash.The common causes leading to pancytopenia in patients presenting to tertiary care hospital.Pak J Med Sci 2013;29 (5):1108-1111.
2. Ahmad N,Akhter N, Ahmad T.Pancytopenia-A study on clinical and etiological profile at a tertiary care institrute.Int J Sci Stud 2018;6 (1): 33-36.
3. Varma N, Das. A reappraisal of underlying pathology in adult patients presenting with pancytopenia. Trop Geogr Med 1992;44:322-7.
4. RazI,Shinar E, PolliackA.Pancytopenia with hypercellular bone marrow a possible paraneoplastic syndrome in carcinoma of lungs. A report of 3 cases.Am J Hematol 1984:16:403-8.
5. Abdullah T,Mudasir Hamid Bhat,Akhtar Amin Raina.Etiological profile of pancytopenia in a tertiary care hospital of Kashmir valley.oct2015: 4 (10).1186-1189.
6. TilakV,Jain R, Pancytopenia – a clinicohematologic analysis of 77 cases.Indian J Pathol Microbiol.1999 ; 42(4):399-404.
7. Khodke K, MarwahS,BuxiG,YadavRB,ChaturvediNK.Bone marrow examination in cases of pancytopenia.J Indian AcadClin Med2001;2:1-2.
8. Manzoor F, Karandikar MN, NimbargiRC,Pancytopenia: A clinicohematological study, Med J DY PatilVidyapeeth 2014,7:25.
9. Hesdorffer CS,Longo DL,Drug induced megaloblsticanemia.NEng J Med.2015 Oct 22;373 (17) :1649-58.doi:10.1056/ NEJMra 1508861.
10. Khunger JM,ArulselviS,SharmaU,RangaS,TalibVH.Pancytopenia a clinicohematological study of 200 cases.Indian J Pathol Miocrobiol.2002;45:375-379.

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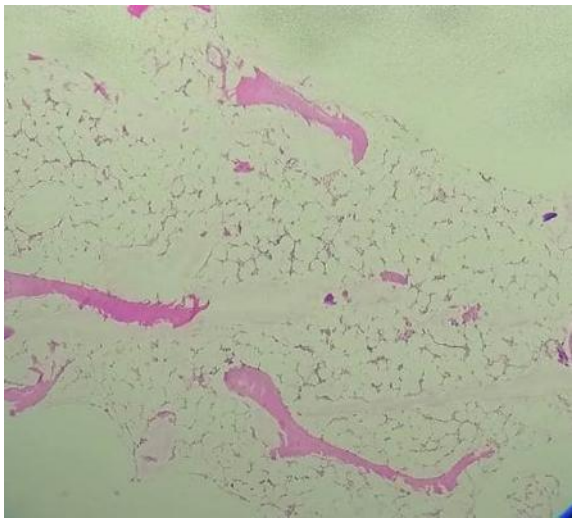
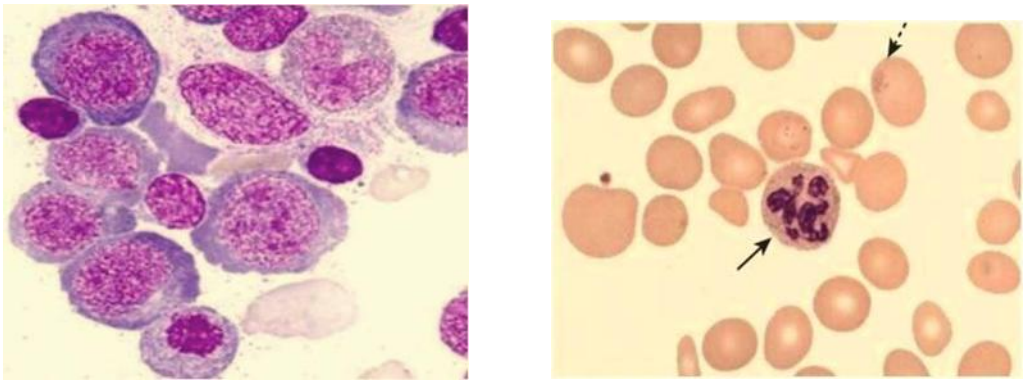
11. Dasgupta S,MandalPK,Chakrabarti S. Etiology of pancytopenia.An observation from referral medical institution of Eastern region of India.J Lab Physicians 2015;7:90-5.
12. Kumar R,KalraSP,KumarH,AnandAC,MadanH,Panc ytopenia- A six year study.JAssocPhyscians India.2001;49:1078-81.
13. Neha sharma,Puneet K Bhatia,KKKaul,Sonamsharma, ManishaSharma.Indian journal of pathology and oncology 2017;4 (4) 632-637.
14. NaziM,RaziqF.The incidence of underlying pathology in pancytopenia.JPMI 2004;18 (1):76-9.
15. GayathriBN,RaoKS.Pancytopenia: A clinicohematologicalstudy.J Lab Physicians 2011;3:15-20.

Pictures



Bone Marrow Picture in Aplastic Anemia



Megaloblastic erythropoiesis in bone marrow and hyper segmented neutrophil in peripheral blood in megaloblastic anemia

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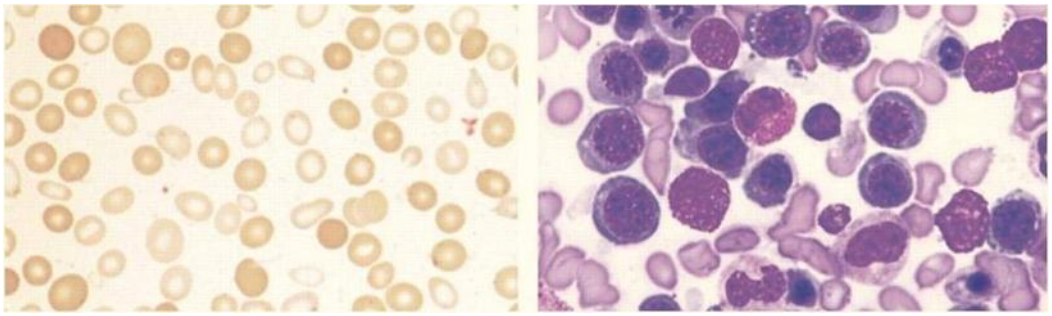
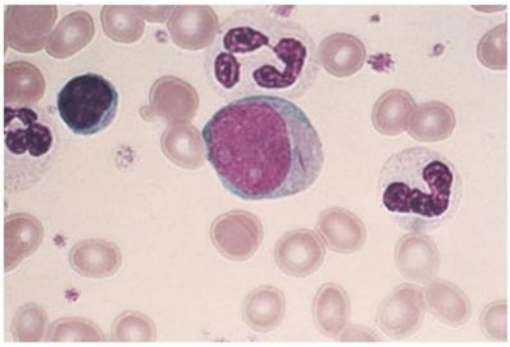
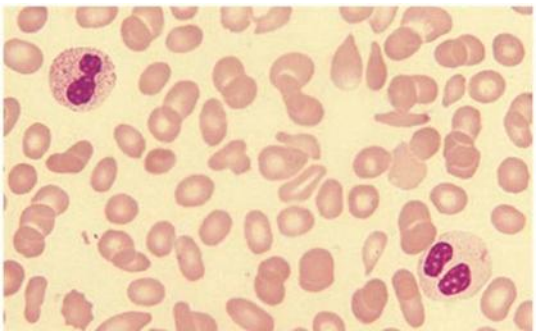


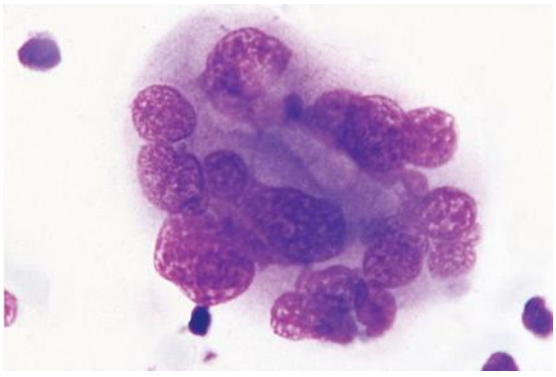
PBF and Marrow in Dual deficieny enemia



Blast with Auer rod (AML peripheral Smear)



Pseudo Pelger Huet Neutrophils in PBF in a case of MDS



Dysplastic megakarocyte in bone marrow in a case of MDS

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