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A STUDY OF ETIOLOGICAL PROFILE OF PANCYTOPENIA IN PATIENTS IN WESTERN RAJASTHAN

Medicine

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ABSTRACT

Background: Pancytopenia is a hematological entity characterized by anemia, leucopenia and thrombocytopenia simultaneously. The causes of pancytopenia are diverse. The spectrum of different etiologies leading to pancytopenia vary globally, as well as within different geographical regions of the same country like India.

Aims and objectives: To assess the etiological profile of Pancytopenia on the Basis of hemato-serological and Bone Marrow Studies in western Rajasthan, India.

Material and Methods: This was a cross-sectional observational study which includes randomly selected 120 patients of Pancytopenia. The patients were selected from the medical outpatient and indoor of M.D.M. Hospital, Dr S.N. Medical College, Jodhpur.

Results: Out of 120 cases analysed, 63 patients were male and 57 patients were female. Megaloblastic anemia (66.67%) was the most common cause of pancytopenia. The next common cause were acute Leukemias(14.16%),Hypersplenism(5.00%), Aplastic Anemia(3.33%), secondary to systemic infections(3.33%), Myelodysplastic Syndrome(3.33%), Myelofibrosis(1.66%), chronic myeloid leukemia(0.83%), PNH(0.83%), and SLE(0.83%).

Conclusion: Megaloblastic anemia is commonest cause of pancytopenia, followed by acute leukaemia and aplastic anemia.

KEYWORDS

Pancytopenia, Megaloblastic Anemia, Leukemia, Aplastic Anemia.

1.INTRODUCTION

Pancytopenia is a disorder in which all three major formed elements of blood (red blood cells, white blood cells and platelets) are decreased than normal[1].

Pancytopenia is defined as Hb < 11gm%, leucocyte count < 4 x 10^9/L and platelet count < 150 x 10^9/L[2]. Manifestations of pancytopenia are due to a wide variety of disorders which primarily or secondarily affect the bone marrow[3]. The presenting symptoms are usually attributable to anemia, thrombocytopenia and rarely leucopenia[4].

The etiologies of pancytopenia range from simple drug induced bone marrow failure to fatal leukemias. Different mechanisms lead to development of pancytopenia like diminished production as in aplastic anemia, ineffective hematopoiesis in megaloblastic anemia, sequestration by overactive reticuloendothelial system as in hypersplenism, and bone marrow infiltration by cancer or abnormal cells as in glycogen storage diseases[5]. Since underlying pathology and severity of pancytopenia define the management and prognosis of the patients, and so it is imperative to find underlying cause of pancytopenia. Studies in this regard have shown variation as regarding spectrum of etiologies from different regions of India[2,3,6,7,8]. Similar studies from this region are lacking, so the present study was undertaken to evaluate various causes of pancytopenia, their distribution and various clinical features among study subjects.

2.MATERIAL AND METHODS

This was a cross-sectional observational study which includes randomly selected 120 patients of Pancytopenia on the basis of information based on clinical features & supported by laboratory evidences which included hemoglobin, leucocyte & platelet count, peripheral blood smear and bone marrow aspiration examination. The data was analyzed and presented as frequencies and Percentages. The patients were selected from the medical outpatient and indoor of M.D.M. Hospital, Dr S.N. Medical College, Jodhpur.

Inclusion Criteria:

1. Both male a female patients aged more than 15 years presenting with clinical and hematological findings as following.
- Hemoglobin <11.0g/dl in male or 10.0gm/dl in female.
- Leucocyte count<4000/cu.mm.
- Platelet count <150000/cu.mm.
- 2.Bicytopenic patients

Exclusions criteria:

1. Patients on myelotoxic chemotherapy
2. Patients on radiotherapy

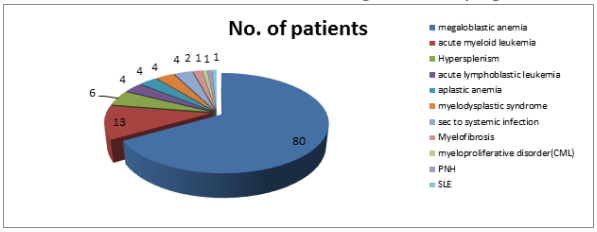
In each individual patient detailed medical history including age, sex, smoking, alcohol intake, history of drug intake, toxic chemical or radiation exposure was asked. Particular attention was given to presence of easy fatigability, fever, bone pains, weight loss, anorexia, recurrent infections, easy bruising. A detailed physical examination was contemplated in every patient for pallor, jaundice, hepato-splenomegaly, lymphadenopathy, sternal tenderness and gum hypertrophy. In all patients complete blood counts and peripheral smear, liver function tests, kidney function tests, ultrasonography, X-ray chest were done. Additional investigations were done, if found necessary dictated by the patients clinical scenario which included erythrocyte sedimentation rate (ESR), urine and stool examination, liver serological investigations for enteric fever, malaria, blood culture, ELISA for HIV, hepatitis B and C viruses, coagulogram, skull and lumbar radiographs, urinary and serum electrophoresis. Vitamin B12 and folic acid levels were also done. Blood count samples were collected in ethylene diamine tetra acetic acid (EDTA) vials and reported by semiautomatic cell counter (sysmex 5-part differential hematology analyzer). Peripheral blood smears were stained by Leishman's stain and counts cross checked manually. Bone marrow aspiration and trephine biopsy was done in posterior iliac spine in all patients after taking aseptic precautions and adequate anaesthesia using Salah and Jamshidi needles, respectively. All the patients in the study were investigated in a systematic manner, cause of pancytopenia was ascertained and the required data analysis done.

3.RESULT

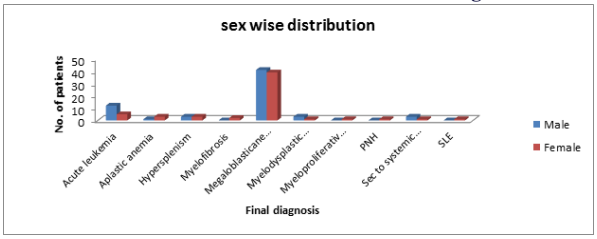
A total of 120 pancytopenia patients were studied. Males outnumbered females, with 63 males (52.50%) and 57 females (47.50%). Male to female ratio in the study was 1.12: 1. Most of the cases were within the age group of 16-30 years, comprising a total of 60 patients (50%). The age of the patients ranged from 16 – 80 years with a mean age of 38.71years. The commonest presenting complaint was easy fatigability and weakness (85%), dyspnea (75.83%), followed by fever (60%). Pallor (100%), splenomegaly (54.17%) and hepatomegaly (10.83%) were the common physical examination findings. The commonest etiologies of pancytopenia in the studied patients were megaloblastic anemia (66.67%) followed by acute leukemia (14.16%), hypersplenism (5.00%) aplastic anemia (3.33%), myelodysplastic syndrome (3.33%), systemic infections (3.33%) and myelofibrosis (1.67%). The results are shown in

graph-1. Megaloblastic Anemia accounted for 80 cases whose age ranged from 16 – 80 years (mean age of 38.71 years). Males comprised 41 cases (51.25%) while 39 (48.75%) were females. Gender and age wise wise distribution of various etiologies of pancytopenia are shown in graph-2 and graph-3 respectively. Of the total 120 cases of pancytopenia, 17 patients were having acute leukemia, with 4 patients of acute lymphoblastic leukemia (ALL) and 13 of acute myeloid leukemia (AML). We encountered 6 cases of hypersplenism in the study with presenting complaint of fever in patients. There were 4 cases of aplastic anemia, 4 cases of myelodysplastic syndrome and 4 cases due to systemic infections. Lastly, 2 patients were diagnosed with myelofibrosis and 1 case each of chronic myeloid leukemia, PNH and SLE.

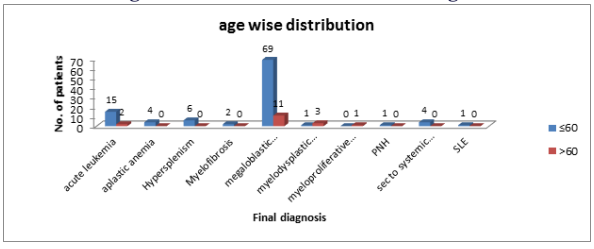
GRAPH 1: Distribution of various etiologies of Pancytopenia



GRAPH 2: Gender wise distribution of various etiologies



GRAPH 3: Age wise distribution of various etiologies



4.DISCUSSION

Pancytopenia is not a disease itself, but many serious and life threatening conditions can manifest with pancytopenia. It has different etiologies, with a variation in frequency of different diseases leading to pancytopenia in different population groups. Differences in methods, strict diagnostic criteria, period of observation, age groups under study and exposure to chemicals and myelosuppressive drugs are the reasons ascribed for this variation[2]. In the present study of 120 patients, definite male predominance was observed with a male to female (M:F) ratio of 1.12:1 and a mean age of 38.71 years. In a similar study of 104 patients by Gayathri et al., the male to female ratio was 1.2:1 and mean age was 41 years[6]. Most common age group of presentation was 2nd and 3rd decade of life in our study, as shown in GRAPH-3. Megaloblastic anemia was commonest cause of pancytopenia in the present study, accounting for 80 patients (66.67% of total patients). Khunger JM et al., found megaloblastic anemia in 72% of cases[3]. Similar results was found in studies by Tilak V et al. in which megaloblastic anemia incidence was 68%[9]. All the above studies have been done in India, and they stress the importance of megaloblastic anemia being the major cause of pancytopenia. It is a rapidly correctable disorder and should be promptly notified. The incidence of acute leukemia varies between 1.61% - 14.5 % in different Indian studies[8,10]. Acute leukemia being the second commonest etiology in the present study, was present in 17 patients (14.16%) of total patients. The results were comparable with Kumar et al., who found an incidence of 12.6% of acute leukemia in the studied patients[2].

We had only four patients (3.33% of total patients) of aplastic anemia, which has been reported as commonest etiology of pancytopenia in different studies. Etiological comparison of various studies on pancytopenia done in India is shown in Table 1.

5.CONCLUSION

In the present study, the commonest etiology of pancytopenia was Megaloblastic Anemia followed by acute leukemia and Aplastic Anemia. In Indian scenario while evaluating etiology of pancytopenia, megaloblastic anemia should always be kept in mind and responds well to treatment. All these studies seem to reflect the higher prevalence of nutritional anemia in Indian subjects. Thus, present study concludes that with detailed clinical history, physical examination and necessary hematological investigations including bone marrow in pancytopenia patients, helps in understanding disease process, to diagnose or to rule out the various etiologies and further laboratory testing and necessary treatment of these patients.

6. AUTHORS' STATEMENT

The authors have no conflicts of interest to disclose.

TABLE 1: Etiological comparison of various studies on pancytopenia

Causes	Khunger J M et al[4] (2002) n=200	Kumar R et al[3] (2001) n=166	Khodke et al[30] (2001) n=50	Tilak V et al[6] (1999) n=77	Present study n=120
Megaloblastic anemia	144	37	22	53	80
Aplastic anemia	28	49	7	6	4
Leukemia	10	20	1	1	17
Lymphoma	2	10	-	2	-
Hyperplenism	4	19	-	-	6
MDS	4	6	1	-	4
MPN	-	-	-	-	1
Sec. to systemic infection	3	10	1	1	4

REFERENCES

1. Ryan DH, Cohen HJ. Bone marrow aspiration and morphology. In: Hoffman R, Benz EJ, Shathil SJ, Furie B, Cohoen HJ, Silberstein LE et al,. Haematology basic principles and practice, 3rd ed. Philadelphia: Churchill Livingstone 2002;p. 2460-248.
2. Kumar R, Kalra SP, Kumar H, Anand AC, Madan M. Pancytopenia-A six year study. JAPI 2001; 49:1079-81.
3. Khunger JM, Arulselvi S, Sharma U, Ranga S, Talib VH. Pancytopenia-a clinic-haematological study of 200 cases. Indian J PatholMicrobiol 2002; 45:375-9.
4. Guinan EC, Shimamura A. Acquired and inherited aplastic anemia syndromes In: Greer JP, Foerster J, Lukens JN, Rodgers GM, Paraskevas F, Glader B edts, Wintrobe's Clinical Hematology, 12th edn, Philadelphia :Lippincott Williams and Wilkins 2009:p.1173-1195.
5. Das Makheja K, Kumar Maheshwari B, Arain S, Kumar S, Kumari S, Vikash. The common causes leading to pancytopenia in patients presenting to tertiary care hospital. Pak J Med Sci 2013;29:1108-11.
6. Gayathri BN, Rao KS. Pancytopenia: A clinico hematological study. J Lab Physicians 2011;3:15-20.
7. Jain A, Naniwadekar M. An etiological reappraisal of pancytopenia – Largest series reported to date from a single tertiary care teaching hospital. BMC Hematol 2013;13:10.
8. Das gupta S, Mandal PK, Chakrabarti S. Etiology of Pancytopenia: An observation from a referral medical institution of Eastern Region of India . J Lab Physicians 2015;7:90-5.
9. Tilak V, Jain R. Pancytopenia – A clinico-hematologic analysis of 77 cases. Indian J Pathol Microbiol 1999;42:399-404.
10. Kale P, Shah M, Sharma YB, et al: Pancytopenia with cellular marrow – a clinical study. J Assoc Physicians India 1991, 39:826.