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EVALUATION OF PANCYTOPENIA IN ADULTS PATIENTS OF BIHAR

Pathology

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ABSTRACT

INTRODUCTION– Pancytopenia usually indicates presence of serious underlying disease. Determining the etiology of pancytopenia is important for appropriate management of the patients.

AIMS AND OBJECTIVES- This study was undertaken to identify the etiological factors leading to pancytopenia in a tertiary care hospital of Bihar.

MATERIAL AND METHODS– This was a prospective study conducted over 12 months in the department of pathology, Nalanda medical college, Patna. The study included adult patients (>18yrs) who had pancytopenia in complete blood count. Relevant blood tests and bone marrow aspiration (BMA) and bone marrow biopsy (BMB) were done to delineate the etiology of pancytopenia.

RESULTS– The commonest cause of pancytopenia in our study was aplastic anemia (46.67%) followed by megaloblastic anemia (23.33%) and hematological malignancies (acute leukemia and lymphoma- 15%). Other causes include infective diseases (kala-azar, malaria and tuberculosis), hypersplenism and hemophagocytosis.

CONCLUSION- Determination of etiology of pancytopenia needs detailed clinical history and physical examination, and appropriate hematological tests and bone marrow examination.

KEYWORDS

Pancytopenia, megaloblastic anemia, malignancy

INTRODUCTION-

Pancytopenia is defined as decrease in all the three formed elements of blood. It can be caused by both the hematological as well as non-hematological conditions. The incidence of various disorders causing pancytopenia varies according to geographical distribution and genetic disturbances. The causes of pancytopenia can vary from simple deficiency states like megaloblastic anaemia and infectious diseases to malignant conditions such as leukaemia, lymphoma and myeloma [1].

Presenting symptoms of pancytopenia may be attributable to anemia, leucopenia, and/or thrombocytopenia. As platelets have the shortest half life, platelet count is first to be affected leading to thrombocytopenia. Patients with thrombocytopenia may present with mucocutaneous bleeding or bruising. Anaemia develops slowly because RBC has longest half life. Anaemia may present with fatigue, weakness, breathlessness, and cardiac symptoms. Neutropenia may present with febrile illness due to increased susceptibility to infections. Pancytopenia should be suspected on clinical grounds in any patient presenting with unexplained anaemia, prolonged fever and bleeding tendency. The severity of pancytopenia and underlying etiology determine the management and prognosis [2].

The present study was done to evaluate the clinical presentation and identify the different causes of pancytopenia in adult patients of Bihar.

MATERIALS AND METHODS

The present study was done in the department of pathology, Nalanda medical college, Patna, Bihar over a period of 12 months from Jan 2019 to Dec 2019. We studied the adult patients (>18 years) who presented with pancytopenia. A total of 60 patients were included in the study

INCLUSION CRITERIA - presence of all of the three [3]

- Anemia (Hb <10gm/dl)
- Leucopenia (WBC<4x10^9/l)
- Thrombocytopenia (Platelets <1,50,000/mm^3).

EXCLUSION CRITERIA-

- Patients aged < 18 years and pregnant women
- Patients on chemotherapy or radiotherapy

Thorough clinical history, along with family history, drug history, dietary history & any past illnesses were noted and complete physical examination done. All the patients were subjected to complete blood count (CBC) along with reticulocyte count and peripheral blood smear (PBS) examination. Bone marrow aspirations (BMA) and bone marrow biopsies (BMB) were taken from posterior superior iliac spine after taking consent from the patients. Depending on the positive findings from clinical history and examination and above mentioned tests other tests were done as relevant which included serum vitamin B_{12} level, serum folic acid level, serum lactate dehydrogenase (LDH), liver function test, thyroid hormonal assay with TSH, malaria antigen test, rK39, viral serology (e.g. HBV, HIV, HCV) etc.

Table 1- symptoms and signs in patients with pancytopenia

Symptom/sign	Number of patients	Percentage
Pallor	60	100%
Fever	50	83.33%
Weakness	45	75%
Weight loss	34	56.67%
Nausea & vomiting	22	36.67%
Body ache	20	33.33%
Bleeding manifestations	15	25%
Cough	14	23.33%
Hepatomegaly	14	23.33%
Diarrhoea	10	16.67%
Splenomegaly	10	16.67%
Lymphadenopathy	8	13.33%
Edema	6	10%
Sternal tenderness	4	6.67%
Jaundice	3	5%

Table 2- causes of pancytopenia

Causes	Number of patients			Percentage (of total 60 cases)
	Total	Males	Females	
Aplastic anemia	28	16	12	46.67%
Megaloblastic anemia	14	6	8	23.33%
Acute Leukemia	6	3	3	10%
Lymphoma	3	2	1	5%
Kala azar	3	2	1	5%
Hypersplenism	2	2	0	3.33%
Malaria	2	1	1	3.33%
Tuberculosis	1	1	0	1.67%
Hemophagocytic syndrome	1	1	0	1.67%
Total	60	34	26	100%

RESULTS

A total of 60 patients with pancytopenia who met the inclusion criteria were studied. There were 34 males and 26 females with male to female ratio 1.3:1. Age of the patients ranged from 18 years to 78 years with mean age 40 years. The most common symptoms were fever (83%) followed by weakness (75%). Other prominent presenting complains in decreasing frequencies were weight loss, nausea/vomiting, bleeding manifestations, cough and body swelling.

The commonest signs were pallor (100%) followed by hepatomegaly (23.3%). Other findings included splenomegaly, lymphadenopathy, edema, sternal tenderness and icterus.

The most common cause of pancytopenia in our study was aplastic anemia accounting for 46.67% cases. There were 16 males and 12 females. Most patients presented with fever and hemorrhagic manifestations. Hemorrhagic manifestations included purpura, menorrhagia, epistaxis etc. Haemoglobin ranged from 3.4gm/dl to 7.1gm/dl, platelets count 5000/µl to 78000/µl and leukocytes count 700/µl to 3900/µl. Bone marrow examination was done in all of these cases. BMA was dry tap in 4 cases. Aspiration was hypocellular in all other cases. BMB also showed hypocellularity and increased adipose tissues.

Megaloblastic anemia presented as pancytopenia in 14 patients in our study including 6 males and 8 females. The physical signs in patients with megaloblastic anemia included pallor, hepatomegaly, splenomegaly and icterus. They had high mean corpuscular volume (MCV) values, the average level was 112±9.2fl. Serum LDH varied from 775 to 1620 units/lit with an average of 983 units/lit. PBS showed pancytopenia, macrocytic and ovalocytic red cells in most of the cases and hypersegmented neutrophils. BMA and BMB showed hypercellularity with characteristic megaloblastic erythropoiesis. Serum vitamin B_{12} and folic acid levels were diagnostic.

Acute leukemia and lymphoma were the next common causes of pancytopenia in our study. There were 6 cases of acute leukemia including 4 cases of acute lymphoblastic leukemia and 2 cases of acute myeloid leukemia. They presented with fever, weakness and bleeding manifestations. Signs included pallor, hepatomegaly, splenomegaly, lymphadenopathy and sternal tenderness. PBS showed pancytopenia in all patients and blasts were seen in 5 patients. One patient had aleukemic leukemia. BMA and BMB showed hypercellularity with blasts and suppression of normal hematopoietic cells.

There were 3 cases of non Hodgkin lymphoma which presented as pancytopenia. They had similar presentation as leukemia. Bone marrow examination showed infiltration by lymphoma cells with suppression of normal hematopoiesis.

Infectious causes were next common group comprising of 3 cases of kala azar, 2 cases of malaria and 1 case of disseminated tuberculosis. There were 2 cases of hypersplenism, both caused by portal hypertension due to cirrhosis of liver. One case of pancytopenia was due to hemophagocytic syndrome in our study.

DISCUSSION

Different mechanisms are responsible for the picture of pancytopenia including bone marrow suppression, bone marrow infiltration, peripheral destruction, bone marrow fibrosis or ineffective hematopoiesis. In our study aplastic anemia was the commonest cause of pancytopenia seen in 28 patients (46.67%). Many studies have reported aplastic anemia as a common cause of pancytopenia with variable proportion in different studies ranging from less than 10% to more than 50%[1][3][4][5]. Kumar R et al have reported 49 cases (29.5%) of aplastic anemia, the commonest cause of pancytopenia in their study [4]. Mohanti P et al have observed 62 cases (51%) of pancytopenia due to aplastic anemia in their study which correlates best with our observation [5]. Jyoti SK et al have reported 23 cases of aplastic anemia out of 166 cases i.e. 13.8% [1]. Sharma Anjana et al have observed only 10 cases of aplastic anemia out of 132 patients with pancytopenia i.e. 7.6% [3].

Megaloblastic anemia was the second commonest cause of pancytopenia in our study accounting for 14 (23.33%) cases. Kumar et al have observed megaloblastic anemia in 23.2% of patients as the second commonest cause of pancytopenia [4]. Many authors have found megaloblastic anemia as the most common cause of pancytopenia. Sharma Anjana et al have observed megaloblastic anemia in 50.7% cases of pancytopenia [3]. Khunger JM et al [7] and Tilak V et al [8] have observed megaloblastic anemia in 72% and 68% of cases of aplastic anemia respectively.

Hematological malignancies (acute leukemia [10%] and lymphoma [5%]) were the third commonest cause of pancytopenia in our study accounting for 9 (15%) cases. Sharma Anjana et al [3] have observed 9% cases; Mohanty P et al [5] reported 11.5% cases and Graham S et al [6] reported 16.6% cases of pancytopenia due to acute leukemia in their respective studies.

Infective cases accounted for 6 cases (10%) of pancytopenia in our study including 3, 2 and 1 case of kala azar, malaria and disseminated tuberculosis respectively. Mohanti et al [5] reported malaria in 2 cases (1.6%) and disseminated tuberculosis in 1 case (0.8%). Dasgupta S et al [9] have observed 34 cases (13.71%) of Kala azar and 12 cases (4.84%) of tuberculosis. Bone marrow studies showed granuloma, malaria parasite and amastigote form of Leishmania donovani (LD Bodies) in case of tuberculosis, malaria and Kala azar respectively. Serological tests were also positive in malaria and kala azar.

Hypersplenism was observed in 2 cases (3.33%) in our study. Mohanti et al [5] have reported 2 cases (1.6%). In hypersplenism, there is peripheral pooling or trapping and destruction in an enlarged spleen resulting in cytopenias. Bone marrow examination showed hypercellular marrow with trilineage hyperplasia.

Hemophagocytosis was seen in one case (1.67%) in our study. Hemophagocytosis is an uncommon cause of pancytopenia which has been reported by Mohanti et al [5] in 2 cases (1.6%) and Jyoti SK et al [1] in 2 cases (1.2%).

CONCLUSION

Our study showed the common causes of pancytopenia as aplastic anemia and megaloblastic anemia followed by hematological malignancies and infectious causes. Different authors have reported different proportion of various etiologies. These differences in the etiology of pancytopenia are due to differences in population characteristics such as, age pattern, nutritional status, socioeconomic parameters, and prevalence of infection in a geographic region. Bone marrow examination was the most important investigation for detecting the cause of pancytopenia in our study. Identification of the cause of pancytopenia is the most important aspect of the management as it depends on treatment of underlying etiology.

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REFERENCES-

[1]. Jyoti SK, Badhe BA, Dutta TK, Sajjan J. Clinicopathological Study of Adult Pancytopenia with Special Reference to Bone Marrow Biopsy. Int J Blood Dis Dis. 2019; 3(1): 008-013.
[2]. Garg AK, Agarwal AK, Sharma GD. Pancytopenia: Clinical approach; Chapter 95:450-454. Available at: www.apiindia.org/pdf/medicine_update_2017/mu_095.
[3]. Sharma Anjana, Ravindranath M, Maheep B. Pancytopenia- A clinicpathological analysis of 132 cases. *Int J Med Res Rev* 2016;4(8):1376 1386. doi: 10. 17511/ ijmrr. 2016. i08.16.
[4]. Kumar R, Kalra SP, Kumar H, Anand AC, Madan H. Pancytopenia--a six year study. J Assoc Physicians India. 2001 Nov;49:1078-81
[5]. Mohanty P, Swain R, Sahoo SR, Sethy S- Bone Marrow Biopsy Evaluation in Cases of Pancytopenia-An Institutional Experience. J Blood Disord Transfus, Vol. 11 Iss. 4 No: 435
[6]. Graham S, Marla NJ, Fernandes H, Jayaprakash CS. A clinicohematological evaluation of pancytopenia in a tertiary care hospital in South India. Muller J Med Sci Res 2015;6:5-9.
[7]. Pancytopenia--a clinico haematological study of 200 cases. Khunger JM, Arulselvi S, Sharma U, Ranga S, Talib VH.Indian J Pathol Microbiol. 2002 Jul;45(3):375-9
[8]. Pancytopenia--a clinico-hematologic analysis of 77 cases. Tilak V, Jain R.Indian J Pathol Microbiol. 1999 Oct;42(4):399-404.
[9]. Dasgupta S, Mandal PK, Chakrabarti S. Etiology of Pancytopenia: An observation from a referral medical institution of Eastern Region of India. J Lab Physicians. 2015;7:90-95