Original Research Article

Clinico-hematological analysis of Pancytopenia in Pediatric patients of tertiary care hospital

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Abstract

Introduction: Pancytopenia is condition in which there is reduction of all the 3 peripheral blood lineage and must be suspected on clinical grounds when a patient presents with unexplained pallor. Careful examination of a blood film is important if reason for the pancytopenia is not apparent from the clinical history. If this does not reveal the cause, bone marrow aspiration and trephine may be needed.
Aim: To study the profile of pancytopenia in hospitalized children.
Materials and methods: This retrospective study was carried out in Dhiraj General Hospital from January 2014 to December 2014. All the Pediatric patients were included for the study. Complete blood count, peripheral smear (PS), bone marrow aspiration and bone marrow trephine biopsy were performed.
Results: Among 200 studied Pediatric cases, maximum number of patients (39%) was in the age group of 6 month to 5 years. In the present study, megaloblastic anemia (26.5%) was the most common cause of pancytopenia followed by Aplastic anemia (20.0%) while leukemia was found in 17.5% of cases. The most common symptom was pallor in 163 (81.5%) cases and fever in 130 (65%).
Conclusion: The megaloblastic anemia is most common cause of pancytopenia in our study followed by aplastic anemia and acute leukemia.

Key words

Pancytopenia, Pediatric, Clinico-hematology, Tertiary care.

Introduction

Pancytopenia is condition in which there is reduction of all the 3 peripheral blood lineage, it's not an uncommon hematological problem countered in clinical practice and must be suspected on clinical grounds when a patient presents with unexplained pallor. Leucopenia is an uncommon cause of initial presentation that if not diagnosed at an early stage, may be fatal [1]. Anemia leads to fatigue, dyspnea, and cardiac symptoms. Thrombocytopenia leads to bruising, mucosal bleeding and neutropenia to increased susceptibility to infection [2].

Pancytopenia is most often result of anticancer chemotherapy, HIV infection, bone marrow infiltration or failure. Careful examination of blood film is important if the reason for the pancytopenia is not apparent from the clinical history. If this does not reveal the cause, bone marrow aspiration and trephine biopsy may be needed [3, 4]. Identification of appropriate etiopathology of pancytopenia is crucial as the underlying pathology determines the management and prognosis of the patients.

We had conducted this study to assess etiology and clinical profile in cases of pancytopenia in Pediatric patients.

Materials and methods

The study was conducted in a tertiary care hospital in Waghodia over a period of one year (January 2014 - December 2014). Patients between 6 months and 14 years of age admitted with or pancytopenia were included in the study. Pancytopenia was defined as hemoglobin <10 g%, absolute neutrophil count (ANC) < 1,500/µl, and platelet count < 100,000/µl. Severe pancytopenia was defined as hemoglobin < 7 g%, ANC < 500/µl, platelet count < 20000/µl, and reticulocyte count < 1% [5]. A detailed history and physical examination was done at admission. Investigations at the time of admission included a complete hemogram using automated analyzer, 3-part differential counter with recording of hemoglobin, total and differential leukocyte counts, red blood indices (MCV, MCH, MCHC), and platelets. Reticulocyte counts, blood picture, bone marrow examination, and other investigations were done to reach the diagnosis. All those cases in which the diagnosis could be confirmed were included in the final analysis.

Results

Out of 9855 patients admitted to Department of Pediatrics, 200 (2.02%) patients presented with pancytopenia. Out of 200 patients, 130 (65%) were males and 70 (35%) females, with male to female ratio of 1.85:1 (**Table - 1**), their ages ranged from one month to 14 years. Maximum number of patients 78 (39%) were in the age group of 6 month to 5 years, followed by 62 (34%) in the 6 to 10 years age group while minimum number 54 (27%) were those exceeding 11 years of age (**Table - 2**), all age group had a male predominance. Considering the etiological pattern of all the 200 cases that were included in the study due to pancytopenia, megaloblastic anemia 53 (26.5%) was the most common cause of pancytopenia followed by Aplastic anemia 40 (20.0%) while leukemia was found in 35 (17.5%) of cases followed by other less common problems like idiopathic thrombocytopenic purpura 20 (10%) iron deficiency anemia 19 (9.5%), Visceral leishmaniasis 3 (1.5%), anemia of chronic disorder 3 (1.5%) and malaria was found in 7 (3.5%) of cases (**Table - 2**). The most common symptom was pallor in 163 (81.5%) cases and fever in 130 (65%) which was often prolonged for weeks, other symptoms included bruises, epistaxis, malena, petechial hemorrhages, hematuria and joint pains (**Table - 3**) A patient having more than one clinical feature is counted in each category. Hence the sum may be more than the total number of cases in the study.

Discussion

Pancytopenia is simultaneous presence of anemia, leukopenia and thrombocytopenia [6, 7]. It is generally due to decrease in hematopoietic cell production in the marrow resulting from

infections, toxins, malignant cell infiltration, chemotherapies and radiation [7]. Different studies done at different places showed variable frequency of pancytopenia [8, 9, 10]. Identification of the disease is of prime importance, since this is the key to appropriate management [8]. Diagnosis of pancytopenia requires microscopic examination of a bone marrow biopsy specimen and a marrow aspirate to assess overall cellularity and morphology [11].

Table – 1: Distribution of patient according to Gender and Age.

Age	Male (n = 130)	Female (n = 70)	Total (n = 200)
6 months - 6 years	50	28	78 (39%)
7 years - 10 years	46	22	68 (34%)
11 years - 14 years	34	20	54 (27%)
Total	130	70	200 (100%)

Table – 2: Etiological pattern of Pancytopenia at presentation (n=200)

Etiology	No. of cases (n = 200)	Percentage
Megaloblastic anemia	53	26.5
Aplastic anemia	40	20.0
Leukemia	35	17.4
ITP	20	10.0
Iron deficiency anemia	19	9.5
Visceral leishmaniasis	3	1.5
Anemia of chronic disorder	3	1.5
Hypersplenism	5	2.5
Malaria	7	3.5
Hemolytic anemia	9	4.5
Myelodisplastic syndrome	3	1.5
Gaucher disease	1	0.5
Niemen pick disease	2	1.0

Table – 3: Clinical feature of pancytopenia at presentation (n=200).

Clinical Feature	No. of cases	Percentage
Pallor	163	81.50
Fever	130	65.0
Bruises	121	60.50
Petechial hemorrhage	47	23.50
Malena	37	18.50
Hemetemesis	15	7.5
Joint/leg pain	60	30
Bleeding from gums	55	27.5
Epistaxis	57	30.0
Hematuria	28	12.5

In our study male dominated female in all the age group with male to female ratio of 1.85:1 which was comparable to other studies done by Amieleena C, et al. [12] and Goel RG, et al. [13] reported the male to female ratio of 1.64:1 and 1.76:1 respectively. it was seen that many conditions other than malignancies and aplastic anemia presented as pancytopenia, megaloblastic anemia being the commonest (31.8%) cases of pancytopenia in the present study . Gomber, et al in their study reported an incidence of 11% [14] while Mukhbi, et al. [15] had 47% cases of megaloblastic anemia presenting as pancytopenia. Ineffective erythropoiesis, leukopoiesis and thrombopoiesis resulting from programmed cell death in the absence of vitamin B12 or folic acid, and decreased survival of precursors in peripheral blood are causes of pancytopenia in megaloblastic anaemia1. Bleeding manifestations in megaloblastic anemia patients was seen in (42.5%) cases in our study in comparison to 3% and 20% in studies by Chandra, et al. [16] and Khair, et al. [17] respectively. Malignancies like ALL and aplastic anemia are more common and dangerous causes of pancytopenia. In our study, 20.0% had aplastic anemia and 17.5% had malignancies in comparison to 20 and 21% in a study by Bhatnagar, et al. [18].

7 cases of malaria had pancytopenia. 4 were caused by P. Vivax and 3 by P. falci. Hemophagocytic syndrome due to P. Vivax has been reported to cause Pancytopenia [19]. Visceral leishmaniasis (Kala azar) presenting as pancytopenia has been seen in 6 patients in the study. Hypersplenism due to enlarged spleen causes pancytopenia in these patients [20].

The most common clinical manifestation was pallor and it was present in 81.50% of the patients. This finding was comparable to the study done by Memon, et al. [10] and Khodke, et al. [21].

Conclusion

Pancytopenia is one of the important occurrences in pediatric patients. In our study, megaloblastic anemia was found to be the most common cause of pancytopenia. These patients can present with severe bleeding and pancytopenia with organomegaly mimicking conditions like acute leukemias and aplastic anemia. This benign and easily treatable condition should be kept in mind while attending to such patients when they present to the hospital before the more serious conditions like leukemias and aplastic anemia are thought of.

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