Original Article

Indian Journal of Public Health Research & Development
Volume 13 Issue 3 July-September 2022
DOI: http://dx.doi.org/xxxxx/ijphrd.xxxx.13221.1

Clinicohematological profile of patients with Pancytopenia

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How to cite this article: Vineet Chaturvedi, Jasvinder Kumar, Roopak Aggawal, Granth Kumar, Pinki Pandey et al. Clinicohematological profile of patients with Pancytopenia. Volume 13 Issue 3 July-September 2022

Abstract

Background: Pancytopenia is common and important clinico-hematological problem encountered in our daily clinical practice. The pattern of diseases leading to Pancytopenia is expected to varying in different population groups with difference in age pattern, nutritional status, and prevalence of infective disorders. The severity of pancytopenia and the underlying pathology determine the management and prognosis

Objectives: To study the etiology and clinic-hematological profile in patients of peripheral blood pancytopenia

Materials and Methods: This was a prospective study conducted at Uttar Pradesh University of medical sciences, Saifai, Etawah during the period of January 2019 to June 2021.

Results: A total of 202 patients (108 males and 94 females) were diagnosed to have pancytopenia. Most of the patients presented with generalized weakness and fever. The commonest physical finding was pallor, followed by spleenomegaly. The various causes of pancytopenia included infections(n=138), megaloblastic anaemia (MA)(n=44), drugs, aplastic anaemia and subleukaemic leukaemia. We found a significant association between megaloblastic anaemia and pancytopenia

Conclusion: The present study concluded that infection and megaloblastic anaemia are the most common cause of pancytopenia.

Keywords: Pancytopenia, Megaloblastic anaemia, infections

Introduction

Pancytopenia is an important clinicohematological entity encountered in our day-to-day clinical practice. [1]. It is a disorder in which all three major formed elements (RBC, WBC, and platelets) are decreased in number [2]. Till 1919 Pancytopenia was not separate entity this term was used for Hypoplastic anemia which was most common cause of Pancytopenia in Western countries [3]. The causes can be many ranging from viral fevers, megaloblastic anaemia (MA), autoimmune disorders, bone marrow failure

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syndrome and hematological malignancies [2,4]. Most common cause of pancytopenia and bicytopenia as in various studies was megaloblastic anemia[5]. Pancytopenia and bicytopenia incidence have a bi-modal presentation seen in children and adults mainly in the 3rd and 4th decades. Male to female predominance is 1.4 and 2.6 to 1 seen in the literature. While conditions such as multiple myeloma and myelodysplastic syndrome are more prevalent in older patients, acute leukemia and parvovirus B19 infection are more common in younger patients [6]. Geographic and socio-cultural influences determine the major causes of pancytopenia, especially for megaloblastic anemia. The clinical pattern and outcome depend on the etiology [3,4]. The severity of pancytopenia and the underlying pathology determine the management and prognosis of the patients [4]. The present study was undertaken to study the profile of adult patients presenting with pancytopenia

Materials and methods

The present prospective study was undertaken for a period of 2.6 years, conducted at Uttar Pradesh University of medical sciences, Saifai, Etawah during the period of January 2019 to June 2021. All adult patients with pancytopenia were included Inclusion criteria were presence of all three of the following: Hemoglobin (<9gm%), total leucocyte count (TLC), <4000/ul, platelet count <1,00,000/ul. Two ml of EDTA (ethylene diamine tetraacetic acid) anticoagulated blood was collected and processed through sysmex automated hematology analyser and 9 hematology parameters were obtained, which included hemoglobin, RBC count, total leucocyte count, DLC, platelet count, MCV, MCH, MCHC and PCV. Peripheral smear was stained with leishman stain for all the cases and examined in detail.

Result

A total of 202 patients who presented with pancytopenia were studied. They consisted of 108 males and 94 females with a male to female ratio of 1.15:1. The mean age of the patients was 36.4 years (range 18-85 years). Presenting complaints and physical findings are shown in table 1

Table 1: Presenting complaints and physical findings in Pancytopenia

1.	Generalized weakness	202
2.	Fever	72
3.	Bleeding manifestation	06
4.	Dyspnea	82
5.	Weight loss	11
6.	Chills and rigors	08
7.	Pallor	202
8.	Spleenomegaly	48
9.	Hepatomegaly	32
10.	Bony tenderness	02
11.	Lymphadenopathy	01

The commonest mode of presentation was generalized weakness, other main symptoms were dyspnea, fever and weight loss. Pallor was noted in all cases. Splenomegaly and hepatomegaly were seen in cases of megaloblastic anaemia, followed by leukemia and malaria. Bony tenderness was seen in multiple myeloma. Lymphadenopathy was noted in sub leukemic leukemia.

Various causes of pancytopenia were infections (n=137[68.7%]), megaloblastc anaemia (n=52[24%]), drugs (n=07[4.7%]), aplastic anaemia (n=03[1.04%]), subleukemic leukemia (n=02[.04%]) and multiple myeloma (n=01[0.52%]). Table 2 depicts the various etiologies of pancytopenia in our study.

Table 2: Distribution of various causes of Pancytopenia

1.	Infections Malaria (73) Dengue (31) Presumed viral infection (32) HIV (1)	137 (67.8%)
2.	Megaloblastic anaemia	52 (25.7%)
3.	Drugs	07 (3.4%)
4.	Aplastic anaemia	03 (1.48%)
5.	Subleukaemic leukaemia	02 (1%)
6.	Multiple myeloma	01(0.5%)

The predominant blood picture was dimorphic anaemia (47.52 %), followed by Macrocytic anaemia(30.69%), peripheral smear shows macro-ovalocytes [fig 1]

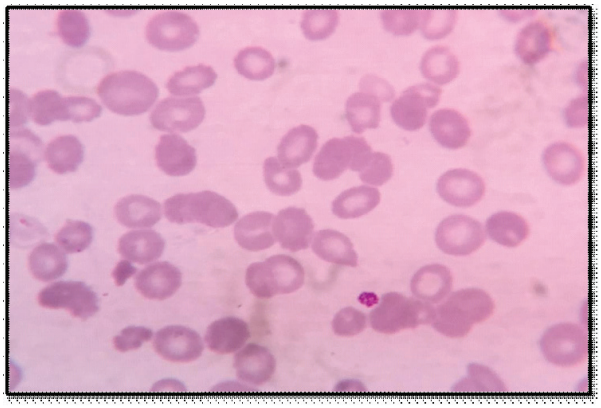

Figure 1: Megaloblastic anaemia. Peripheral smear showing macroovalocytes. Leishman's stain. (1000x)

Normocytic normochromic anaemia constituted 14.35% of the cases and Microcytic hypochromic anaemia (7.42 %). Leucopenia and thrombocytopenia were seen in all cases.

We have encountered 2 patients of subleukaemic leukaemia both were of AML (acute myeloblastic leukaemia). Bone marrow was hypercellular. Erythroid and megakaryocytic series were reduced. Majority of the cells were myeloblasts constituting more than 50% of cells in marrow. Bone marrow aspirate showed myeloblast with auer rods [fig 2].

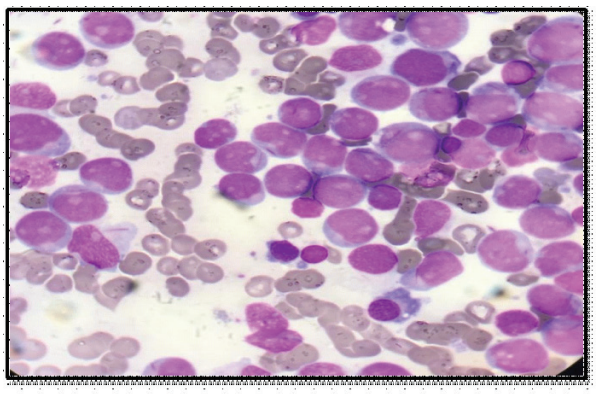

Figure 2: AML. Bone marrow aspiration showing myoblasts and promyelocyte showing Aur rods. Giemsa stain. (1000x)

Malarial infestation was seen in 73 patients. Pancytopenia with schizonts of P. Vivax malaria in peripheral smear [fig 3]. The patients recovered after antimalarial treatment.

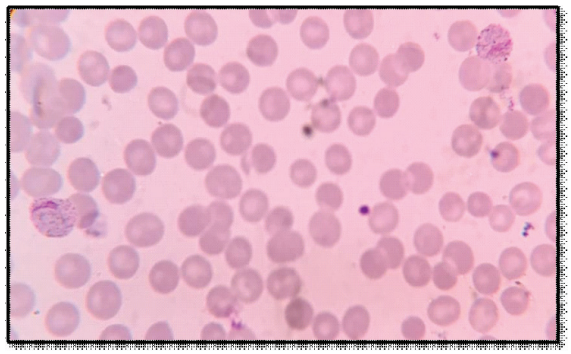

Fig. 3: Peripheral smear showing Plasmodium vivax schizonts. Leishman's stain. (1000x)

Discussion

We studied a total of 202 cases of pancytopenia. The age of our patients ranged from 18-83 years, with a mean age of 35.6 years. Pancytopenia common in 3rd and 4th decade have been observed in other studies also [7,8,9].

The most common cause of pancytopenia in our study was infections (67.8%). However, most of the other studies had shown megaloblastic anaemia as the most common cause. I think infection as a common cause is related to the socioeconomic status and unhygienic condition of the surrounding villages where I work.

Comparison of causes of pancytopenia in various studies

Khunger et al[10]	Megaloblastic anaemia (72%)	Aplastic anaemia (28%)
Jain et al[9]	Hyperspleenism (29.2%)	Infections (25.6%)
Tilak V et al[3]	Megaloblastic anaemia (68%)	Aplastic anaemia (7.7%)
Akhtar Munir et al.[11]	Malignant hematological disorders (33.1%)	Megaloblastic anemia (18.2%)
Pooja et al.[12]	Megaloblastic Anemia (37.5%)	Aplastic anemia (20%)
Neelema Bahal et.al[13]	Megaloblastic Anemia (39.61%)	Aplastic anemia (22.2%)
Present study	Infections (67.8%)	Megaloblastic anaemia (25.7%)

Malaria and dengue were the most common infection encountered. No serious bleed was noted in this group of patients. We had 73 cases of malaria presented with pancytopenia. Hamid and shukry also found malaria to be a common cause of pancytopenia [14]

We had 32 cases of presumed viral infections which were self-limiting, and we did not do extensive diagnostic evaluation. The viral infections, other than dengue, which could cause pancytopenia are parvovirus B19, cytomegalovirus, herpes simplex virus, and Epstein bar virus [15-17]

We had only one case of HIV who presented with pancytopenia due to HIV per se; the pancytopenia in rest of the HIV were due to drugs such as zidovudine and cotrimoxazole.

In our study, we had only 6/202 (2.6%) cases aplastic anaemia (3 cases), subleukaemic leukaemia (2 cases), and multiple myeloma (1 case) which is lower than that observed in the other studies [7,8,10,18,19]. This is because we had consciously excluded the already diagnosed cases of bone marrow failure, hematological malignancies, and those on chemotherapeutic drugs. This has been done to evaluate the causes of pancytopenia in general clinical practice

Conclusion

The etiology of pancytopenia can be diverse with reversible and benign causes being the most common. In our study, the most common cause of pancytopenia was infection and megaloblastic anaemia, and the count recovered in most cases on recovery from the disease. This study indicates the higher incidence of nutritional deficiency in young age group. The main reason for this can be due to low socio-economic status, inadequate nutrition, poor hygiene, and lifestyle modification. So, this age group should be main target for education regarding the factors described above and medication which reduce the clinical burden of megaloblastic anemia in our country

Ethical Clearance - Taken from institutional ethical committee

Source of funding - Self

Conflict of interest - None

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