■ *Original Article*

Frequency of causes of pancytopenia in a private hospital in Kathmandu

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Abstract

Background: Pancytopenia is not a disease entity but a triad of findings that result from a number of disease processes. These disorders may affect bone marrow either primarily or secondarily, resulting in the manifestation of pancytopenia. **Objective**: To identify the various causes of pancytopenia in patients attending to Star hospital, Kathmandu, Nepal. **Methods:** Fifty two patients with pancytopenia were included in this study from June 2011 to June 2012. Complete blood count, peripheral blood smear, bone marrow aspiration and trephine biopsies were performed according to standard methods. **Results:** Out of 52 cases, there were 26 cases(50%) of aplastic anaemia, 18 cases(34.61%) of megaloblastic anaemia, 4 cases(7.69%) of acute leukemia, 2cases(3.84%) of erythroid hyperplasia, 1 case(1.92%) of metastatic tumor and 1 case(1.92%) of multiple myeloma. **Conclusion:** Aplastic anaemia and megaloblastic anaemia were the most common causes of pancytopenia in this study.

Keywords: Pancytopenia, aplastic anaemia, megaloblastic anaemia

Introduction

Pancytopenia is not a disease entity but a triad of findings that result from a number of disease processes. These disorders may affect bone marrow either primarily or secondarily, resulting in the manifestation of pancytopenia.[1] It is a disorder in which all three major formed elements of blood (red blood cells, white blood cells and platelets) are decreased in number.[2]

Pancytopenia can be due to decrease in haemopoietic cell production in the bone marrow e.g. by infections, toxins, malignant cell infiltration or suppression or can have normocellular or even hypercellular marrow, without any abnormal cells, e.g. ineffective haematopoiesis and dysplasia, maturation arrest of all cell lines and peripheral sequestration of blood cells.[3] Bone marrow aspiration and trephine biopsies are one of the most frequent and relatively safe, invasive procedures done routinely to evaluate the cause of pancytopenia. Though an invasive procedure, it can be easily performed even in the presence of severe thrombocytopenia with little risk or no risk of bleeding.[4]

The aim of this study was to identify the various causes of pancytopenia in patients attending to Star hospital, Kathmandu, Nepal.

Methods

This was a prospective study carried out for one year (June 2011 to June 2012) in the Department of Pathology, Star hospital, Kathmandu, Nepal. Pancytopenia was an indication for bone marrow examination in 52 cases. A detail relevant history and clinical examination like pallor, fever, hepatomegaly, splenomegaly and lymphadenopathy was taken. The inclusion criteria for pancytopenia were haemoglobin (Hb) less than 10gm/dl, total leucocyte count (TLC) less than 4000/cumm and platelet count less than 140000/cumm. Complete blood count, reticulocyte count and peripheral blood smear was made just prior to performing bone

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marrow aspiration. Bone marrow aspiration was performed using Salah needle, from posterior superior iliac spine in all cases and triphine biopsy was performed using Jamshidi needle, where it was necessary.

Peripheral blood smears and bone marrow aspiration smears were stained with Leishman stain. For reticulocyte count brilliant cresyl blue and for trephine biopsy H&E stain were used. When required cytochemical stains such as Myeloperoxidase and Periodic-acid Schiff stains were also used.

The data compiled were analyzed for various parameters like age, sex, clinical findings, peripheral blood and bone marrow findings and a final diagnosis was formulated.

Results

A total 52 patients who presented with pancytopenia were studied. The age of the patients ranged from 12 to 82 years with a mean age of 36.7 years. They consisted of 28 males and 24 females with a male: female ratio of 1.2: 1.

Clinical findings of patients with pancytopenia are listed in Table 1. Pallor was the predominant clinical finding in these cases.

Causes of pancytopenia found in this study are listed in Table 2. Aplastic anaemia represents the largest group 26 (50%) followed by megaloblastic anaemia 18 (34.61%), acute leukemia 4 (7.69%), erythroid hyperplasia 2 (3.84%), metastatic tumor 1 (1.92%) and multiple myeloma 1 (1.92%).

Table1: Clinical findings of patients presented with pancytopenia

Clinical findings	No. of cases	Percentage
Pallor	52	100
Fever + pallor	10	19.23
Splenomegaly + pallor	08	15.38
Hepatomegaly + pallor	06	11.38
Bleeding + pallor	02	3.84

Table2: Causes of pancytopenia

Causes	No. of cases	Percentage
Aplastic anaemia	26	50
Megaloblastic anaemia	18	34.61
Acute leukemia	04	7.69
Erythroid hyperplasia	02	3.84
Metastatic tumor	01	1.92
Multiple myeloma	01	1.92

Table3: Age, sex distribution compared to those in other studies of pancytopenia

Authors	No. of cases	Age range (yrs)	M:F
Khunger JM et al[5]	200	2-70	1.2: 1
Kumar R et al[6]	166	12-73	2.1: 1
Tilak V et al[7]	77	5-70	1.1: 1
Khodke K et al[8]	50	3-69	1.3: 1
Present study	52	12-82	1.2: 1

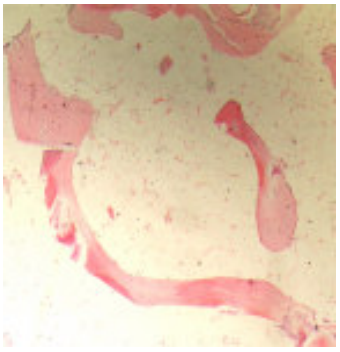

Fig 1: Triphine biopsy showing fatty marrow (H & E stain, X200)

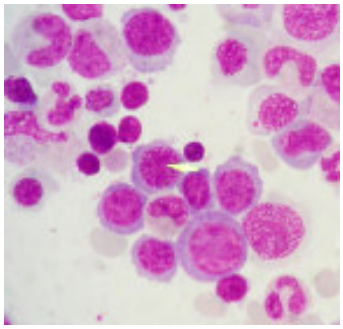

Fig 2: Bone marrow aspiration smear showing megaloblasts (Leishman stain, 1000)

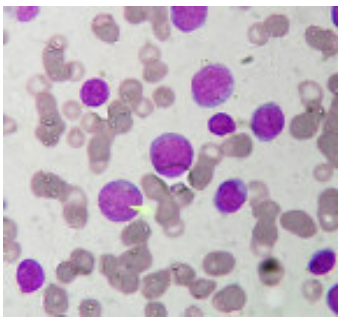

Fig 3: Bone marrow aspiration smear showing myeloblasts (Leishman stain, X1000)

Discussion

A total 52 patients with pancytopenia were studied. Age, sex, clinical findings, peripheral blood picture and bone marrow aspiration smears were studied in all cases and findings were compared with similar studies published in the literature.

In present study age of patients ranged from 12 to 82 years, with a mean age of 36.7 years. Pancytopenia was observed more in males (53.84%) than females (46.15%), with male to female ratio of 1.2:1. Different age range and male to female ratio were observed in different studies.[5,6,7,8]

In our study pallor (100%) was predominant clinical finding seen in the pancytopenic patients followed by fever (19.2%), splenomegaly (15.3%), hepatomegaly (11.38%) and bleeding (3.84%). In studies conducted by Gayathri BM et al[2], Khodke k et al[8] and Niazi M et al[9] also observed similar findings as above.

Table4: First and second most common causes of pancytopenia in different studies

Study	Cases	First cause	Second cause
Tilak V et al[7]	77	Megaloblastic anaemia (68%)	Aplastic anaemia (7.70%)
Khodke K et al[8]	50	Megaloblastic anaemia (44%)	Aplastic anaemia (14%)
Kumar R et al[6]	166	Aplastic anaemia (29.51%)	Megaloblastic anaemia (22.28%)
Niazi M et al[9]	89	Aplastic anaemia(38.27%)	Megaloblastic anaemia (24.7%)
Gupta V et al[16]	105	Aplastic anaemia (43%)	Acute leukemia(25%)
Naseem S et al[15]	571	Aplastic anaemia (43%)	Megaloblastic anaemia (13.7%)
Gayathri BM et al[2]	104	Megaloblastic anaemia (74%)	Aplastic anaemia (18.26%)
Khunger JM et al[5]	100	Megaloblastic anaemia (72%)	Aplastic anaemia (14%)
Present study	52	Aplastic anaemia (50%)	Megaloblastic anaemia (34.61%)

Pancytopenia is usually caused by bone marrow replacement or failure but is sometimes the consequence of splenic pooling or peripheral destruction of mature cells. In hospital practice, pancytopenia is often consequence of cytotoxic or immunosuppressive drug therapy.[10,11] There are many causes of pancytopenia. The commonest cause of pancytopenia in present study was aplastic anaemia (50%) where as in other studies it varies from 7.7 to 43%.[7,15] The increase incidence may be related to environmental factors such as increased exposure to toxic chemicals rather than genetic factors.[12]

The second most common cause of pancytopenia in this study is megaloblastic anaemia (30.76%) while in other studies it varies from 0.8to 68%.[7,9]

Gayathri BM et al[2] and Khunger JM et al[5] found the incidence of megaloblastic anaemia to be 72% and 74% as the most common cause of pancytopenia. The high number of megaloblastic anaemia seem to reflect higher a prevalence of nutritional deficiency in country. Chronically ill patients have been reported to have folic acid deficiency resulting in florid megaloblastic changes in the marrow precipitating into pancytopenia.

Acute leukemia accounted for 4 cases (7.69%) which was third common cause of pancytopenia in present study; similar with the studies done by Savage DG et al[13] and Varma N et al.[14]

Conclusion

The commonest cause of pancytopenia in the present study was aplastic anaemia followed by megaloblastic anaemia and acute leukemia. A wide variety of disorders can cause pancytopenia, although the frequency with which each condition is associated with pancytopenia differs considerably. The prognosis depends on the severity of the pancytopenia and on the nature of underlying condition.

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