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Evaluation of Thrombocytopenia in Hematological Malignancies

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Thrombocytopenia is defined as platelet count < 1.5 lakhs/cumm. It is the commonest platelet abnormality observed in clinical practice with different clinical expression. Thrombocytopenias in hematological malignancies are clonal proliferations of the malignant hematopoietic stem cells characterized by the accumulation of blasts principally in the marrow at the cost of impaired production of normal blood cells. The aim of the present study was to evaluate thrombocytopenia in cases of hematological malignancies with study of clinical profile and laboratory parameters in patients with thrombocytopenia. The present study had maximum numbers of patients were in the age group 20-39 years (8 cases). Patients with platelet count more than 150 x 10^9/L, patients presented with massive hemorrhage, and who received massive colloid or crystalloid transfusion for volume loss are not included in our study. The maximum number of patients presenting with thrombocytopenia were males (18 cases). It was concluded that chronic lymphocytic leukemia are more common than other hematological malignancy cases.

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Keywords: Thrombocytopenia; hematological malignancies; platelet count.

1. INTRODUCTION

Thrombocytopenia is defined as platelet count < 1.5 lakhs/cumm. It is the commonest platelet abnormality observed in clinical practice with different clinical expression. It may result from either decreased production or increased sequestration/destruction of platelets [1]. Destruction of platelets can be either immune or non-immune mediated. Careful examination of the peripheral blood smear is the best means for narrowing the differential diagnosis.

Platelets, because of their small size and the limited resolution of early microscopes, escaped identification for a long time, in 1735, the German physician and poet Paul Gottlieb Werlhof provided the first detailed description of 'morbus maculosus haemorrhagicus' now known as immune thrombocytopenia (ITP), these blood cells were unknown [2,3].

If the etiology of the thrombocytopenia is unclear, a bowel movement (BM) aspirate or biopsy should be performed to rule out a primary BM disorder [4]. Thrombocytopenia in hematological malignancies are clonal proliferations of the malignant hematopoietic stem cells characterized by the accumulation of blasts principally in the marrow at the cost of impaired production of normal blood cells [5,6]. Non hematological malignancies which are commonly implicated are carcinomas of the breast, lung, and prostate. Bone Marrow trephine biopsy is preferred to detect these tumours. The aim of the present study was to evaluate thrombocytopenia in cases of hematological malignancies with study of clinical profile and laboratory parameters in patients with thrombocytopenia.

2. MATERIALS AND METHODS

This prospective study was conducted in the Sree Balaji medical college and hospital from march 2018 to October 2018. This study included 25 subjects who presented to the hematology department and medical OP departments of Sree Balaji Medical College and hospital. Patients presenting to the hematology department and medical OP departments who were found to have thrombocytopenia, with platelet count less than 150 x 10^9/L in whom complete clinical and laboratory parameters were available.

Patients with platelet count more than 150 x 10^9/L, patients presented with massive hemorrhage, and who received massive colloid or crystalloid transfusion for volume loss are not included in our study.

A detailed clinical history was taken. General and systemic examination was done in each patients who were included in the study population. Peripheral venous blood was collected for complete blood count and biochemical analysis. Slides were stained by Leishman's stain for Peripheral blood smear examination.

Bone marrow aspirate was taken from posteriosuperior iliac crest with help of 16G bone marrow aspiration needle. Smears were stained with Leishman's stain. Bone marrow trephine biopsy was performed in relevant cases and H & E stained paraffin sections were examined.

3. RESULTS

In the present study maximum number of patients were in the age group 20-39 years (8 cases, ie., 32%) (Table 1).

Table 1. Age distribution of cases of thrombocytopenia

Age (years)	No. of cases	Percentage
0 – 19	3	12 %
20 - 39	8	32%
40 – 59	7	28%
60 – 79	7	28%
Total	25	100%

In our study maximum number of patients presenting with thrombocytopenia were males (72%) (Table 2).

Table 2. Sex distribution of cases of thrombocytopenia

Sex	No. of cases	Percentage
Male	18	72%
Female	7	28%
Total	25	100%

Table 3. Diagnosis associated with thrombocytopenia

S. no	Diagnosis	No. of cases %
1	AML	5 (20%)
2	ALL	4 (16%)
3	CML	5 (20%)
4	CMML	4 (16%)
5	CLL	7 (28%)
	Total	25 (100%)

4. DISCUSSION

Thrombocytopenia is defined as platelet count < 1.5 lakhs/cumm. Our study included 5 cases of Acute myeloid leukemia (AML) (one AML-M4) and 4 cases of ALL. AML- M4 in peripheral smear showed increased number of both myeloblasts and monoblasts along with reduced number of platelets (Fig. 1) with markedly hypercellular marrow with heterogenous cells, including immature monocytes and neutrophils.

Perpheral smears of ALL showed leukoerythroblastosis, occasional reactive lymphocytes with thrombocytopenia. Bone marrow was hypercellular with infiltration by 90% lymphoblasts.

Five cases of Chronic Myeloid Leukemia (CML) Chronic Myelomonocytic Leukemia (CMML) cases were included in our study. Peripheral smear of CMML shown leucoerythroblastic picture with 15% myeloblasts (Fig. 2) and thrombocytopenia, bone marrowshowed 43% myeloblasts, with evidence of hemophagocytosis. seven cases of CLL with peripheral smear showed thrombocytopenia with 63% lymphocytes, 32% neutrophils, monocytes 3%. (Fig. 3) Bone marrow showed nodular infiltration of lymphocytes.

Patients with thrombocytopenia are often recommended to undergo a variety of tests and pathological evaluation, these tests often did not offer significant insight into the etiology of the thrombocytopenia. This is congruent with results from other studies specifically focusing on bone marrow biopsies in the workup of thrombocytopenia [3].

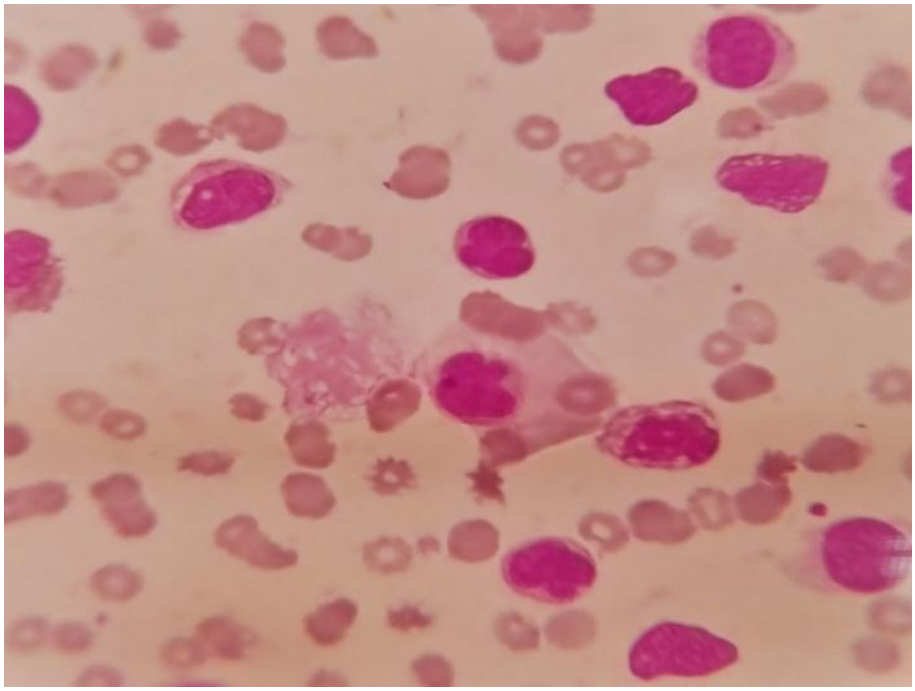

Fig. 1. Photomicrograph of peripheral blood smear showing monoblasts with abundant vacuolated cytoplasm and prominent nucleoli background showing reduced number of platelets in a case of AML-M4 (*Leishman 100x*)

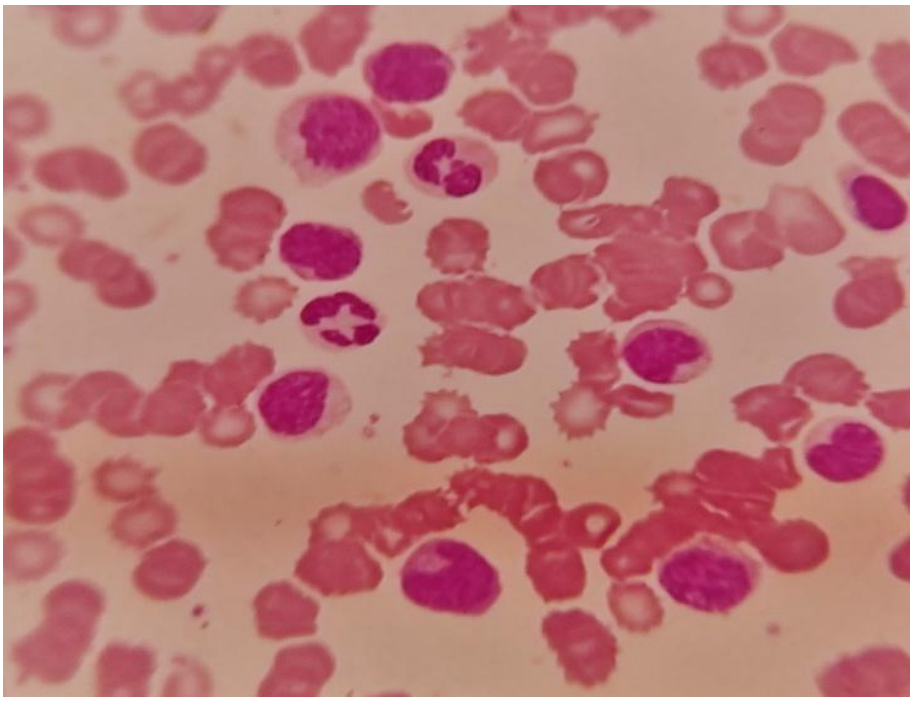

Fig. 2. Photomicrograph of peripheral blood smear in a case of CMML showing myeloblasts and monocytes (*Leishman 100x*)

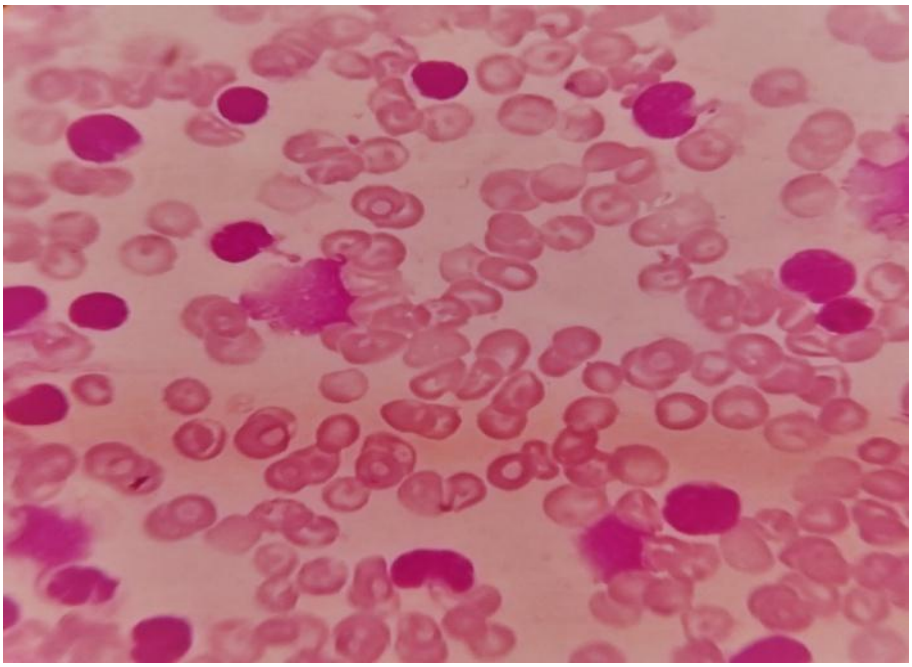

Fig. 3. Photomicrograph of peripheral blood smear showing increased number of mature lymphocytes and smudge cells background showing reduced number of platelets in a case of CLL (*Leishman 100x*)

5. CONCLUSION

Males were more commonly affected with thrombocytopenia than females in our study. After evaluating all hematological malignancy cases of thrombocytopenia, it is concluded that chronic lymphocytic leukemia are more common than other hematological malignancy cases.

Whenever thrombocytopenia is detected, further investigations has to be done for specific diagnosis in the most of the cases so that appropriate treatment can be given.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

Ethical clearance was obtained from ethical committee of Sree Balaja Medical College and Hospital.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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