

# Frequency Distribution of Causes and Severity of Thrombocytopenia in Patients of All Age Groups

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## ABSTRACT

**Objective:** The present study was planned to see the frequency distribution of causes and severity of thrombocytopenia in thrombocytopenic patients of all the age groups.

**Study Design:** Descriptive cross sectional study

**Place and Duration of Study:** This study was conducted at the Department of Pathology, Ayub Medical College Abbottabad from July 2018 to April 2021.

**Materials and Methods:** As much as 120 patients with blood reports showing thrombocytopenia were studied. Their blood counts were repeated with sodium citrate based anticoagulant followed by peripheral blood film examination for platelet clumps aggregates.

**Results:** A total of 120 patients had thrombocytopenia on initial testing. Screening by sodium citrate and blood film method revealed nine patients with pseudo thrombocytopenia. They were excluded from the study. The remaining 111 patients had true thrombocytopenia with 45% male & 55 % female, male to female ratio being 0.82:1. 20 patients aged < 25 years, 70 were 25 - 50 years & 30 were > 50 years old, with mean age 42±12 years.

**Conclusion:** Primary ITP & acute infection was the most frequent cause of thrombocytopenia (2/3<sup>rd</sup>), followed by acute leukemia and secondary ITP (1/3<sup>rd</sup>). Mild thrombocytopenia was the most frequent finding (2/3<sup>rd</sup>), followed by moderate & severe thrombocytopenia (1/3<sup>rd</sup> each).

**Key Words:** Thrombocytopenia, Immune thrombocytopenia, Pseudo thrombocytopenia

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## INTRODUCTION

Thrombocytopenia is defined as platelets count <150×10<sup>3</sup>/μl in peripheral blood. It may be caused by decreased platelet production, increased platelet destruction, abnormal platelet distribution or platelet sequestration<sup>1</sup>. Thrombocytopenia in adults is mostly due to immune mediated destruction of platelets (Idiopathic or immune thrombocytopenia abbreviated as ITP). ITP is defined as platelets <100×10<sup>3</sup>/μl with other causes of thrombocytopenia excluded. Pseudo-thrombocytopenia is a term used for a spuriously low platelet count when complete blood count is performed on an automated haematology analyzer, while in fact the platelet count is within the normal range<sup>2</sup>.

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It has no actual clinical significance but the uncertainty created by the abnormal report may lead to unnecessary investigations, wastage of time and financial resource.

Thrombocytopenia has been studied extensively from different angles by researchers the world over. Immune thrombocytopenia, previously called idiopathic thrombocytopenic purpura (ITP) is the commonest type of thrombocytopenia in all the age groups involving immune mediated peripheral destruction of platelets. A change in the descriptive terminology for ITP has been suggested by an international working group<sup>3</sup>. It may be primary or secondary. In primary ITP the immune attack is mainly directed against the platelets while in the secondary ITP there is some immune mediated disease mainly against other cells or systems of the body, thrombocytopenia being part of it<sup>4</sup>. Other causes of thrombocytopenia include acute and chronic infections, chronic liver disease, disseminated intravascular coagulation, gestational thrombocytopenia, haematologic disorders, heparin therapy, drugs, complications of pregnancy, internal malignancies, disorders of bone marrow and parasitic infections, chemotherapy or radiotherapy. The diagnostic workup includes history, examination and appropriate investigations for the exact cause of thrombocytopenia<sup>1</sup>.

The present study aimed at determining the frequency of causes and severity of thrombocytopenia in

symptomatic and asymptomatic outdoor patients at a tertiary health care facility.

## MATERIALS AND METHODS

It was a descriptive cross sectional study conducted at a tertiary care hospital on 120 consecutive outdoor patients presenting with low isolated thrombocytopenia on machine generated complete blood count report. As much as 35 patients were symptomatic too, 23 with severe and 12 with moderate thrombocytopenia. The commonest symptoms were red colour spots on limbs & trunk, nose and gum bleeds. The patients were enrolled in the study by purposive sampling. The test was performed on a six part automated haematology analyzer (Mindray). Moreover, asymptomatic patients whose complete blood count were done on their request, and were found with low platelet count, also participated in the study. An informed written consent was obtained from every patient at the time of enrolment in the study and approval of institutional ethical review committee was also obtained. The patients with reports showing isolated thrombocytopenia on EDTA blood sample were screened initially by examining giemsa stained blood films. Detailed history was taken from every participant followed by a thorough clinical examination for the common manifestations of conditions presenting with thrombocytopenia. Present or past history of any bleeding episodes, or using any medicines affecting platelets in the past two months, was also recorded from each patient. Those with platelets clumps on blood film examination were labeled as pseudo thrombocytopenia and were evaluated further on the same day by (a). Repeat blood count on citrated blood sample (b). Manual platelet counts by ammonium oxalate method for confirmation. Manual platelet counting, repeat blood counting by citrate method and blood film examination was done by an experienced pathologist. Blood samples were kept at 37C° while performing platelet count by different methods. The patients with true thrombocytopenia were investigated further for the cause of thrombocytopenia, including septic screen, viral studies, coexisting autoimmune diseases, thick and thin blood film for malarial parasite and bone marrow examination. Those with spuriously low platelet count were excluded from the study. The results were recorded on a Performa designed for this purpose. Thrombocytopenia was classified as mild moderate or severe on the basis of platelet count  $100-149 \times 10^3/\mu\text{l}$ ,  $50-99 \times 10^3/\mu\text{l}$  and  $<50 \times 10^3/\mu\text{l}$  respectively<sup>1,5</sup>.

## RESULTS

A total of 120 patients had thrombocytopenia by using EDTA based complete blood count. After initial screening by sodium citrate and blood film method, nine had pseudo thrombocytopenia and all of them were asymptomatic. They were excluded from the study. The

remaining 111 patients had true thrombocytopenia. Gender wise, 50/111 (45%) patients were male and 61/111 (55 %) female, male to female ratio being 0.82:1 (table 1). Age wise, 20 patients were less than twenty-five years old, 70 were 25 to 50 years and 30 patients aged more than 50 years. Mean age of the patients was  $42 \pm 12$  years (Table.2). As much as 22 /111 (19.8%) had mild, 66/111 (59.5%) moderate and the remaining 23/111 (20.7%) had severe thrombocytopenia (table 3). Primary ITP & acute infection was the commonest cause of thrombocytopenia, followed by acute leukemia and secondary ITP.

**Table No.1: Gender of patients (n=111)**

No		%	Male : Female 0.82:1
Male	50	45	
Female	61	55	

**Table No.2: Age of patients (n=111)**

Age			Mean age (years)
years	No	%	
<25	20	18	42±12
25-50	66	59.5	
>50	25	22.5	

**Table No.3: Causes and severity of thrombocytopenia (n=111)**

Cause	Mild		Moderate		Severe		Total
	No	%	No	%	No	%	
Primary ITP	06	16.2	28	75.7	03	08.1	37 33.3
Acute infection	05	22.7	13	59.0	04	18.0	22 19.7
Acute leukemia	02	18.0	01	09.0	08	73.0	11 11.0
Secondary ITP	02	18.2	07	63.6	02	18.2	11 11.0
Pregnancy	01	12.5	05	62.5	02	25.0	08 07.2
Drugs	02	28.6	04	57.1	01	14.3	07 06.3
COVID- 19	01	20.0	03	60.0	01	40.0	05 04.5
Malaria	02	50.0	01	25.0	01	25.0	04 03.5
Heparin	01	25.0	02	50.0	01	25.0	04 03.5
Alcohol	00	00.0	02	100	00	00.0	02 100
Total	22		66		23		111

## DISCUSSION

Platelet count, like other blood cells may not remain constant and keep on varying within normal limits in different physiological conditions<sup>6-9</sup>. In pathological conditions platelets may fall below the reference range. If platelets fall below  $50 \times 10^3/\mu\text{l}$ , the chances of spontaneous bleeding increase. At times the actual platelet count is within the normal limits but the report of blood complete picture by hematology analyzer shows low platelet count. This condition (also called pseudo thrombocytopenia), may cause anxiety and lead

to unnecessary investigations or therapeutic interventions<sup>10</sup>.

Different aspects of thrombocytopenia have been studied by the researchers in the past few years. These include thrombocytopenia in patients with chronic active hepatitis<sup>11</sup>, drug induced thrombocytopenia due to linazolid<sup>12</sup>, frequency of ITP in isolated thrombocytopenia<sup>13</sup>, thrombocytopenia in patients with malaria<sup>14,15</sup>, thrombocytopenia in neonatal sepsis<sup>16</sup> and thrombocytopenia in hospitalized medical patients<sup>17</sup>. These studies have provided useful information for the better diagnosis and management of thrombocytopenia due to different factors. Covid-19 is the latest addition in this list. Thrombocytopenia was seen in 33.33% critical and 12.85 % noncritical patients with this condition<sup>18,19</sup>.

In the present study, thrombocytopenia was seen in five patients with Covid -19, one was symptomatic and four asymptomatic. Primary ITP was the commonest cause of thrombocytopenia, affecting as much as 1/3rd of the patients. Out of them 92 % patients had mild or moderate thrombocytopenia while 8 % patients were diagnosed with severe thrombocytopenia. This is contrary to the findings of an earlier study in which acute leukemia was the commonest cause of thrombocytopenia and ITP was seen in 10 percent patients only<sup>20</sup>. The study focused on hematological causes of thrombocytopenia, while in the present study the main focus was frequency of thrombocytopenia due to all causes. Acute infection was the second common cause of thrombocytopenia in our study, followed by acute leukemia and secondary ITP, each contributing equally.

Regarding the frequency of severity of thrombocytopenia, as much as 22 /111 (19.8%) had mild, 66/111 (59.5%) moderate and the remaining 23/111 (20.2%) had severe thrombocytopenia (table 3). A recent study focused on interpretation of laboratory and clinical findings in thrombocytopenic patients caused by different factors concluded that thrombocytopenia in patients with aplastic anaemia had higher bleeding score compared to those with ITP and TTP<sup>21</sup>. High incidence of thrombocytopenia was seen in a study conducted on cardiac patients<sup>22</sup>. In our study no patient with cardiac surgery participated. In a study conducted on children, 59.9 and 51.3 % children with malaria had thrombocytopenia<sup>23</sup>. Another recent research revealed that thrombocytopenia was the commonest haematological finding in malarial patients<sup>24</sup>. In the present study, malaria was seen in four patients out of whom 2 had mild, one had moderate while one patient had severe thrombocytopenia. Significant correlation of pre-eclampsia was noted with thrombocytopenia in pregnant females in a study conducted on pregnant females<sup>25</sup>. Eight pregnant females participated in the present study. Five of them had moderate thrombocytopenia and mild or severe

thrombocytopenia was noted one in each. Another study on paediatric newly diagnosed ITP in a tertiary care hospital concluded that majority of the patients had severe disease<sup>26</sup>. This is not in accordance with the findings of present study. A study on thrombocytopenia in cirrhotic patients revealed that thrombocytopenia can be a predictor of esophageal varices in cirrhotic patients<sup>27</sup>. No patient with chronic liver disease participated in the present study.

## CONCLUSION

Primary ITP & acute infection were the most frequent cause of thrombocytopenia (2/3<sup>rd</sup>), followed by acute leukemia and secondary ITP (1/3<sup>rd</sup>). Mild thrombocytopenia was the most frequent finding (2/3<sup>rd</sup>), followed by moderate & severe thrombocytopenia (1/3<sup>rd</sup> each).

**Recommendations:** Further studies on thrombocytopenia are recommended on large sample size. Pseudo thrombocytopenia should always be excluded in asymptomatic thrombocytopenic patients.

### Author's Contribution:

Concept & Design of Study: Muhammad Idris  
 Drafting: Jamila Farid, Mumtaz Ahmad Khan  
 Data Analysis: Mumtaz Ahmad Khan, Nasreen Gul and Shazia Moeen  
 Revisiting Critically: Muhammad Idris, Jamila Farid  
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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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