A study of the clinicohaematological profile of the patients presenting with thrombocytopenia in tertiary care hospital

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***Abstract*—Background: Thrombocytopenia is a common finding in patients admitted in tertiary care centre and its etiology is diverse.**

Aim: To study the clinicohaematological profile of the patients presenting with thrombocytopenia in tertiary care hospital.

Materials and Methods: This study was a prospective study conducted over the period of two years conducted at MGM Medical College Aurangabad.With the relevant clinical and investigatory findings all patients with a platelet count of less than 1,50,000 were included in the study.

Result: The study included 80 patients, with the majority being males (62.50%) and a significant proportion aged between 18-30 years (40.00%).Platelet count analysis showed that 45.00% of the patients had counts below 50,000 per cubic millimeter, indicating severe thrombocytopenia.Etiological analysis revealed that febrile illnesses, particularly dengue fever (53.75%), were the most common cause of thrombocytopenia, followed by haematological disorders (33.75%) mainly megaloblastic anemia, haematological malignancy, aplastic anemia idiopathic thrombocytopenic purpura, hypoplastic anemia, thalassemia and iron deficiency anemia and liver pathologies (12.50%) mainly chronic liver disease, hepatocellular carcinoma, extrahepatic portal vein obstruction.

Conclusion: Dengue fever as the most common cause of thrombocytopenia. Other common etiologies were megaloblastic anemia and other haematological diseases followed by chronic liver disease. Bleeding tendencies can be seen in many patients with severe thrombocytopenia thus, prompt diagnosis and immediate treatment of the underlying etiology is necessary.

***Index Terms*—Thrombocytopenia, clinicohaematoligical, etiology.**

I. INTRODUCTION

Thrombocytopenia is characterized by a platelet count of less than 150 × 10^9/L, although patients typically remain asymptomatic if their count exceeds 50 × 10^9/L. Severe spontaneous bleeding is uncommon with thrombocytopenia but becomes more likely when the platelet count drops below 20 × 10^9/L, and especially when it falls below 10 × 10^9/L. Low platelet levels can result from decreased production in the bone marrow, increased destruction in the bloodstream (due to coagulopathic consumption, autoantibodies, vasculopathy, or inflammation), hemodilution, or splenic sequestration. [1]

The disease affects roughly 2 to 10 out of every 100,000 adults each year, with a prevalence ranging from 9 to 20 per 100,000 adults. It is more frequently observed in women of childbearing age than in men of the same age group. However, the incidence peaks in adults over 60 years old, affecting men and women equally at that age. [2]

The incidence of immune thrombocytopenia (ITP) in adults is estimated to be between 1.6 and 3.9 cases per 100,000 adults annually in the United States, the United Kingdom, and Japan. [3] Also, from the previous study, the overall prevalence of thrombocytopenia were noted to be 14.9%. [4]

Severe thrombocytopenia (platelet count <50,000/μL) can lead to significant morbidity and often complicates the medical management of patients with advanced liver disease, cancer, immune thrombocytopenic purpura (ITP), chronic hepatitis C virus (HCV) infection, and0 other conditions. Approximately 1% of patients with severe thrombocytopenia require platelet transfusions. While mild to moderate thrombocytopenia rarely causes spontaneous bleeding during invasive procedures such as liver biopsy and liver transplantation and severe thrombocytopenia can considerably increase the risk of bleeding. Though rare, cerebral haemorrhage or gastrointestinal (GI)

bleeding can occur and may be fatal. [5]

Individuals with thrombocytopenia may experience various conditions, including acute bleeding, sepsis, acute respiratory distress syndrome (ARDS), drug-induced thrombocytopenia, and disseminated intravascular coagulation (DIC). Thrombosis can occur in conditions such as heparin-induced thrombocytopenia (HIT), leading to arterial and venous thrombosis, which can manifest as deep venous thrombosis, pulmonary embolism, cerebrovascular accident, and myocardial infarction. Other associated conditions include antiphospholipid antibody syndrome (APS), thrombotic microangiopathy (TMA), paroxysmal nocturnal haemoglobinuria (PNH), and thrombotic thrombocytopenic purpura (TTP). [6]

The primary challenge lies in swiftly identifying the underlying cause and initiating appropriate treatment. While the ideal approach involves tailoring treatment based on the etiology, practical constraints may limit the gathering of comprehensive information, especially when a patient presents with active bleeding. Recognizing the distinctive signs and symptoms associated with these entities is therefore paramount for accurate diagnosis and appropriate management. [7]

Hence, we conducted this study to investigate the common causes of thrombocytopenia in our region and explore the relationship between the severity of thrombocytopenia and the patient's outcome.

II. AIM AND OBJECTIVE

AIM:To study the clinicohaematological profile of the patients presenting with thrombocytopenia in tertiary care hospital.

OBJECTIVES:

To find the etiologies of the thrombocytopenia.

III. MATERIAL AND METHODS

Study Type: The study was a prospective observational study.

Study Centre: The study was conducted at MGM Medical College Aurangabad, a tertiary care hospital.

Duration of Study: The study was conducted over the period of two years, from September 2022 to June 2024.

Ethical Consideration: Approval from the Institutional Ethics Committee (IEC) was sought, and a waiver of informed consent was requested based on the non-interventional nature of the study and the complete anonymization of patient data.

Inclusion Criteria:

All patients above 18 years of age admitted to the Department of Medicine with thrombocytopenia (platelet count <150,000/cumm) or those who developed thrombocytopenia during their hospital stay were included in the study.

Exclusion Criteria:

- Patients with pseudo thrombocytopenia.
- Pregnant females.
- Patients who did not undergo adequate evaluation for thrombocytopenia.

Methodology

The age and gender distribution of the cases, the relevant clinical findings like mode of presentation of the patients, associated bleeding manifestations and other relevant investigatory findings needed to arrive at the exact etiological diagnosis were collected including peripheral smear for confirming platelet count and Malarial cases, Bone marrow aspirates, serology for HIV, WIDAL, and other infectious diseases were collected.

IV. OBSERVATION AND RESULT

Table 1- Age and sex distribution in thrombocytopenia patients.

Variable	Values
Age (mean ± SD)	(38.5 ± 16.56)
Age 18-30 years 30-50 years >50 years	 n (%) 32(40.00%) 32(40.00%) 16(20.00%)

Gender Male Female	n (%) 50(62.50%) 30(37.50%)

The table 1 shows age and gender distribution in our study involving 80 patients, the mean age was 38.5 years, with standard deviation of ± 16.56 years. The age distribution among the patients show 32 patients i.e 40% were aged between 18 and 30 years, another 32 patients i.e. 40% were between 30 and 50 years, and the remaining 16 patients i.e. 20% were over 50 years old. In our study 50 patients i.e. 62.5% were male, while 30patients i.e. 37.5% were female.

Table 2- Severity of thrombocytopenia among patients.

Variables	Values
Severity of thrombocytopenia <50000 cells/µL n (%) 50000-100000 cells/µL n (%) 100000-150000 cells/µL n (%)	 36(45.00%) 30(37.50%) 14(17.50%)

The table 2 shows the severity of thrombocytopenia among patients who were categorized into three groups:36patients (45%) had platelet counts below 50,000 cells/µL i.e. severe thrombocytopenia, 30 (37.5%) patients had counts between 50,000 and 100,000 cells/µL i.e. moderate thrombocytopenia, and 14 (17.5%) patients had counts between 100,000 and 150,000 cells/µL i.e. mild thrombocytopenia.

Table-3: Showing frequency of clinical symptoms in patients with thrombocytopenia.

Symptom	Number of cases	Percentage
Easy Fatiguability	37	46.25%
Myalgia & Arthralgia	11	13.75%
Breathlessness	16	20%
Bleeding Tendency	24	30%
Jaundice	9	11.25%
Fever	51	63.75%
Other	6	7.50%

The table 3 showing among 80 patients in the study group the fever was the most common symptom in 51 (63.75%) patients, followed by Easy Fatiguability 37 (38.75%) patients, Bleeding Tendency in 24 (30%) patients, Breathlessness in 16 (20%) patients. Myalgia & Arthralgia was the symptom in 11 (13.75%) patients, and Jaundice in 9 (11.25%) patients. A small number of patients i.e. 6 (7.50%), reported other symptoms.

Table-4: Showing severity of thrombocytopenia with bleeding tendency.

Thrombocytopenia	Number of patients with Bleeding.
Mild Thrombocytopenia (Platelet count 100000 to 150000 cells/µL)	2
Moderate Thrombocytopenia (Platelet count 50000 to 100000 cells/µL)	8
Severe Thrombocytopenia (Platelet count <50000 cells/µL)	14
Total	24

The Table 6 shows relation of platelet count with the bleeding tendency. Among the total 24 cases out of 80 showing bleeding manifestation 2 cases had mild thrombocytopenia i.e. platelets 100000 to 150000 cells/µL, 8 cases had moderate thrombocytopenia i.e. platelets 50000 to 100000 cells/µL and 14 cases had severe thrombocytopenia i.e. platelet count <50000 cells/µL.

Table-5: Distribution according to Etiological Diagnosis

Etiological diagnosis	Name of disease	No. of cases	Percentage
Haematological Disorder	Acute myeloid leukemia	2	27 (33.75%)
	Aplastic anemia	3	
	Chronic lymphoproliferative disorder.	2	
	Hypoplastic anemia.	1	
	Megaloblastic anemia.	14	
	Plasma cell dyscariasis with acquired factor VIII and IX deficiency.	1	
	Thalassemia	1	
	Iron deficiency anemia	1	
	Idiopathic thrombocytopenic purpura.	2	
Liver pathology	Chronic liver disease.	7	10 (12.50%)
	Extrahepatic portal vein obstruction.	1	
	Hepatocellular carcinoma.	1	
	Congenital liver fibrosis	1	
Febrile illness	Dengue fever	41	43 (53.75%)
	P. Vivax malaria	1	
	Septicemia	1	

Table 8 In our study 43 (53.75%) patients out of 80 had febrile illness, out of which maximum patients were of Dengue fever constituting 41 out of 43 cases. Rest malaria and septicemia being 1 each.27 (33.75%) patients had Haematological disorders. More than half of the patients in Haematological cases are of megaloblastic anemia i.e. 14 cases followed by aplastic anemia 3. Acute myeloid leukemia, chronic lymphoproliferative disorder, and idiopathic thrombocytopenic purpura constituted of 2 cases each. Rest Haematological disorders like hypoplastic anemia, plasma cell dyscariasis, thalassemia, iron deficiency anemia was 1 case each. 10 (12.50%) patients had liver pathology out of which 7 cases had chronic liver disease. Extrahepatic portal vein obstruction, hepatocellular carcinoma, congenital liver fibrosis was found in 1 case each.

V. DISCUSSION

The study examines the clinical haematological profile of patients presenting with thrombocytopenia. Thrombocytopenia, characterized by abnormally low platelet counts, can arise from various etiologies and manifests with diverse clinical features. Understanding these profiles is crucial for effective diagnosis and management.

In our study (Table 1) out of 80 patients 32(40.00%) were aged between 18-30 years and 32(40.00%) were between age 30-50 years followed by those over 50 years were 16(20%). This indicates that thrombocytopenia affects a wide age range with maximum number of cases in 20-50 years of age. In a study by, Patne SV et al.[8] observed that the maximum number of cases were seen in the 21-30 years age group (32.5%), followed by the 31-40 years group (25.8%). Similarly, Verma D et al.[9] reported a wide range of age distribution, with a peak in the 11-20 years age group. The mean age in my population is 38.48 years with a standard deviation of ±16.56 reflecting the diverse age profile.

50(62.50%) patients in our study were males while

females accounted for 30(37.50%). The study done by, Patne SV et al.[8]reported 60.0% of their cases were males and 40.0% were females. Similarly, Verma D et al.[9] included 251 cases in their study, with 57.37% males and 42.63% females, indicating a male preponderance. These studies consistently show a higher incidence of thrombocytopenia in males, supporting the gender distribution observed in the present study.

Cases were divided according to severity of thrombocytopenia, platelets <50000 per cubic millimeter was considered severe thrombocytopenia, 50,000 to 100,000 per cubic millimeter moderate and 100,000 to 150,000 per cubic millimeter as mild thrombocytopenia. In our study 36(45.00%) had severe thrombocytopenia, 30(37.50%) had moderate and 14(17.50%) had mild thrombocytopenia. Patne SV et al.[8]reported that the maximum number of patients had platelet counts less than 20,000/mm³, categorizing patients with low platelet counts into mild (50,000/mm³ - 100,000/mm³), moderate (20,000/mm³ - 50,000/mm³), and severe (<20,000/mm³) categories. Similarly, Vimal M et al.[10] found that 20% of their study population presented with a platelet count of less than 50,000. The majority of the patients (54.2%) presented with platelet counts between 50,000 - 100,000, and 25.8% had counts between 100,000 - 150,000. These findings align with the present study showing maximum cases of moderate and severe thrombocytopenia. Total 24 patients had bleeding complications in our study with malena being the most common site seen in 6(25.00%) cases. Out of the 24 patients 14 had severe thrombocytopenia, 8 had moderate thrombocytopenia and 2 had mild thrombocytopenia. Mild thrombocytopenia causing bleeding was mainly due to increased INR as seen in patients with decompensated liver disease with portal hypertension. In moderate thrombocytopenia category also, majority were of decompensated liver disease with portal hypertension along with one patient of plasma cell dyscariasis with acquired haemophilia. (table 2,4). The study by Raman Sharma et al.[11] found that 36 (36%) of thrombocytopenia cases presented with bleeding manifestations. Incidence of bleeding manifestation was found highest in severe thrombocytopenia followed by moderate thrombocytopenia and least in cases of mild thrombocytopenia.

Fever was the most prevalent symptom, observed in 51(63.75%) of the patients, indicating a potential link between febrile illnesses and thrombocytopenia. Easy fatiguability 37(46.25%), bleeding tendency 24(30%), breathlessness 16(20%) were also common. Lower majority of cases had symptoms including myalgia and arthralgia 11(13.75%), jaundice 9(11.25%), and other nonspecific symptoms 6(7.50%).(Table 3)

In our study (table 5) shows the etiological analysis revealed that febrile illnesses 43(53.75%) cases, were the most common cause of thrombocytopenia, followed by Haematological disorders 27(33.75%) and liver pathologies 10(12.50%) cases. Dengue 41 cases were the most prevalent febrile disorder causing thrombocytopenia followed by p. vivax malaria and septicemia. The mechanisms behind the pathophysiologic changes in dengue fever are not yet fully understood, but it appears that multiple factors contribute to the severity of the disease.[12] Dengue virus (DENV) may directly or indirectly impact bone marrow progenitor cells, inhibiting their function[13] and reducing the proliferative capacity of hematopoietic cells.[14] There is evidence that DENV can cause bone marrow hypoplasia during the acute phase of the disease.[15] In addition to affecting platelet counts, DENV disrupts the function of these cells, leading to significant deregulation of the plasma kinin system and contributing to the immunopathogenesis of dengue.[16] Furthermore, DENV infection induces platelet consumption through disseminated intravascular coagulation (DIC), increases platelet destruction via apoptosis and lysis by the complement system, and involves antiplatelet antibodies..[17-19] Megaloblastic anemia was the most prevalent Haematological disorder seen in 14 out of 27, reflecting nutritional deficiency. Other haematological disorders were 3 cases of aplastic anemia, 2 cases of acute myeloid leukemia, 2 cases of chronic lymphoproliferative disease,2 cases of idiopathic thrombocytopenic purpura.1 cases each are of hypoplastic anemia, plasma cell dyscariasis, thalassemia, iron deficiency anemia. Iron deficiency anemia is mostly associated with thrombocytosis but rarely can have thrombocytopenia. Eisa MS et al.[20] states usually IDA is often associated with normal or elevated platelet counts. However, in rare cases, it can cause low platelet counts (thrombocytopenia). Fortunately, treating the iron deficiency usually resolves the low platelet count as well. Chronic liver disease was the predominant liver pathology 7 out of

the 10 cases, indicating the role of hepatic dysfunction along with splenic sequestration is responsible for development of thrombocytopenia. Other liver pathologies being extrahepatic portal vein obstruction, hepatocellular carcinoma, and congenital liver fibrosis consisting 1 case each. Liver disease often leads to low platelet counts. This is primarily due to portal hypertension, which causes the spleen to enlarge and trap platelets. Additionally, the liver's reduced production of thrombopoietin, a hormone that stimulates platelet formation, contributes to the problem.[21]

Patne SV et al.[8]identified infections as the most common cause of thrombocytopenia, with dengue (30%), malaria (20.83%), enteric fever (5%), and HIV (4.16%) being prevalent, followed by megaloblastic anemia (21.66%). The study by Modi T et al.[22] identified the most common causes of thrombocytopenia as megaloblastic anemia (19%), dengue fever (15%), malaria (11%), enteric fever (9%), idiopathic thrombocytopenic purpura (ITP) (8%), and leukemia (7%). Less common causes included leptospirosis (5%), septicemia (5%), chronic liver disease (4%), drug-induced thrombocytopenia (4%), disseminated intravascular coagulation (DIC) (3%), chronic kidney disease (3%), hypersplenism (2%), aplastic anemia (2%), iron deficiency anemia (2%), and rheumatoid arthritis (1%).

VI. SUMMARY

- The study was conducted in the department of medicine in MGM Medical College and hospital Aurangabad, from September 2022 till June 2024.
- The study included 80 patients, with the majority being males (62.50%) and a significant proportion aged between 18-30 years (40.00%).
- Platelet count analysis showed that 45.00% of the patients had counts below 50,000 per cubic millimeter, indicating severe thrombocytopenia.
- Fever was the most prevalent symptom, observed in 38.75% of the patients, followed by easy fatiguability (22.50%) and bleeding tendency (12.50%).
- Among clinical signs, being febrile was the most frequently reported (41.25%), with notable incidences of raised jugular venous pressure (15.00%) and pallor (12.50%).
- Bleeding tendencies were observed in 24 cases, with malena being the most common site of bleeding (25.00%).
- Etiological analysis revealed that febrile illnesses, particularly dengue fever (53.75%), were the most common cause of thrombocytopenia, followed by haematological disorders (33.75%) mainly megaloblastic anemia, haematological malignancy, aplastic anemia idiopathic thrombocytopenic purpura, hypoplastic anemia, thalassemia and iron deficiency anemia and liver pathologies (12.50%) mainly chronic liver disease, hepatocellular carcinoma, extrahepatic portal vein obstruction.

VII. CONCLUSION

In our study severe thrombocytopenia was observed in a significant proportion of patients. Fever emerged as the most common symptom, while dengue fever as the most common cause of thrombocytopenia. Other common etiologies were megaloblastic anemia and other haematological diseases followed by chronic liver disease. Bleeding tendencies can be seen in many patients with severe thrombocytopenia thus, prompt diagnosis and immediate treatment of the underlying etiology are necessary

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