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PATTERNS AND ETIOLOGY OF THROMBOCYTOPENIA: A TWO-YEAR RETROSPECTIVE STUDY IN A TERTIARY CARE HOSPITAL

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ABSTRACT **Background:** Thrombocytopenia is a common hematological abnormality with varied causes. **Objectives:** To determine the incidence, causes, and clinical patterns of thrombocytopenia in a tertiary care hospital. Methods: A retrospective study was conducted from June 2021 to June 2023 at the Department of Pathology, Goa Medical College. Samples with low platelet counts were confirmed on peripheral smears. Clinical features and causes were analyzed. **Results:** Of 64,944 samples, 1158 (1.78%) showed thrombocytopenia: 44% mild, 47.6% moderate, and 8.5% severe. Infections were the leading cause (49.3%), predominantly dengue (65%) and malaria (17.6%). Other causes included miscellaneous (13.6%), alcoholism (11.7%), anemia (8%), hematological malignancies (7.7%), immune thrombocytopenic purpura (5.3%), bone marrow disorders (1.4%), and others. Fever (48.1%) and pallor (9.5%) were the commonest presenting features. **Conclusion:** Infections, particularly dengue, were the predominant cause of thrombocytopenia in our region.

KEYWORDS : Thrombocytopenia, Dengue, Hematology, Platelet Count

INTRODUCTION

Thrombocytopenia, defined as a platelet count below 150×10^9/L,(1) is a frequent hematological finding with varied etiologies ranging from infections to bone marrow disorders(2). Prompt identification of the underlying cause is essential for proper treatment. This study evaluates the incidence, causes, and clinical features of thrombocytopenia in a tertiary care hospital and compares findings with previous studies.

MATERIALS AND METHODS

Design: Retrospective study (June2021– June2023).
Setting: Hematology section, Department of Pathology, Goa Medical College.

All blood samples with thrombocytopenia on automated counts were confirmed by Wright-stained smears. Clinical data including age, sex, and presentation were recorded and results were analyzed.

RESULTS

Table 1: Causes of Thrombocytopenia

Cause	Cases	%
Infections	572	49.3%
Miscellaneous	158	13.6%
Alcoholism	136	11.7%
Anemia	93	8.0%
Hematological malignancy	90	7.7%
ITP	62	5.3%
Bone marrow disorders	16	1.4%
Drugs	14	1.2%
DIC	8	0.6%
Pregnancy	7	0.6%
Liver disease	1	0.08%
PNH	1	0.08%

Table 2: Infections Causing Thrombocytopenia

Infection	Cases	%
Dengue	372	65.0
Malaria	101	17.6
Sepsis	48	8.4
Viral syndrome	20	4.9
HIV	15	2.6
PUI	14	2.4
Enteric fever	2	0.3

Table 3: Comparison of Causes of Thrombocytopenia with Similar Studies

Cause / Disease	Present study (2024)	Erkurt et al (2014)	K F Magdalene et al (2016)	Das et al (2016)
Infections	49.3%	16.1%	21%	29.2%
Miscellaneous	13.6%	5.8%	0%	4%
Alcoholism	11.7%	3.2%	3%	10%
Leukemia	6.0%	16.8%	8%	12%
Immune thrombocytopenic purpura	5.3%	14.9%	27.5%	12%
Megaloblastic anemia	5.0%	5.0%	9.5%	1.8%
Drugs	1.2%	9.1%	6%	Not mentioned
Multiple myeloma	1.0%	1.4%	0.5%	2.5%
Aplastic anemia	0.9%	1.4%	8%	0.8%
Autoimmune hemolytic anemia	0.9%	1.3%	0%	0.8%
Dimorphic anemia	0.8%	0%	0%	0%
DIC	0.6%	0%	0.5%	0%
Myelodysplastic syndrome	0.6%	1.2%	1%	0.8%
Lymphoma	0.6%	1.2%	1%	0%
Pregnancy	0.6%	2.5%	1%	4%
Bone marrow metastasis	0.3%	2.3%	0%	0%
Myelofibrosis	0.3%	0.6%	0%	0.8%
Iron deficiency anemia	0.2%	1.1%	0.5%	2.5%
Liver disease	0.08%	0%	0%	0%
Paroxysmal nocturnal hemoglobinuria	0.08%	0.6%	1.5%	0%

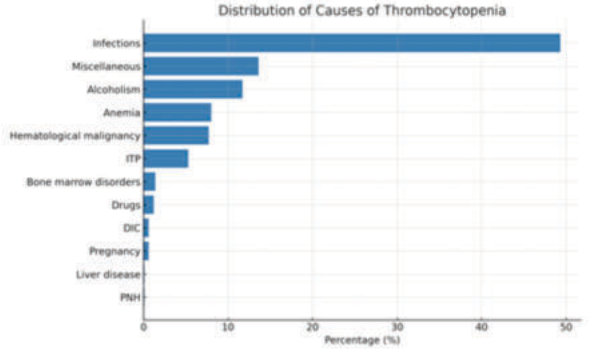

Figure 1: Distribution of Causes of Thrombocytopenia.

DISCUSSION

This study analysed 64,944 samples over a two-year period and found thrombocytopenia in 1.78% of cases.

Our results demonstrate that infections are the predominant cause of thrombocytopenia in our setting, with dengue and malaria being the leading contributors, followed by other conditions such as alcoholism, anaemia, haematological malignancies, immune thrombocytopenic purpura (ITP), drug-induced causes, and bone marrow disorders. (Refer Table 1)

The incidence and causes observed in this study align closely with other Indian data but differ significantly from Western studies. Western research often reports haematological malignancies, autoimmune conditions, and drug-induced causes as the predominant etiologies of thrombocytopenia (Erkurt et al., 2014)(3). In contrast, our study highlights infection-related thrombocytopenia (49.3%) as the major contributor, reflecting the endemic nature of vector-borne and tropical infections in India.

Infection-Related Thrombocytopenia: Among infections, dengue accounted for 65%, followed by malaria (17.6%) and sepsis (8.4%) (Refer Table 2). The mechanisms underlying dengue-related thrombocytopenia include bone marrow suppression, immune-mediated destruction, and increased peripheral consumption due to endothelial injury and capillary leak. In malaria, thrombocytopenia results from bone marrow suppression, splenic sequestration, and immune-mediated platelet destruction. Fever was the most common presenting symptom (48.1%), with mucocutaneous bleeding, petechiae, and gastrointestinal bleeds observed primarily in severe thrombocytopenia. These findings underscore the need for routine platelet monitoring in febrile illnesses, especially during dengue and malaria outbreaks.(4)

Alcoholism: Alcoholism was the second most common cause (11.7%). Mechanisms include bone marrow suppression, nutritional deficiencies, and hypersplenism secondary to liver disease. Almost all alcohol-related cases were in men (94%), reflecting lifestyle factors in this region. Alcohol-related cytopenias represent a preventable cause of morbidity and could be addressed through counselling and public health programs.

Anemia and Bone Marrow Disorders: Anemia accounted for 8% of cases, with megaloblastic anemia being the most frequent subtype. Nutritional deficiency impairs DNA synthesis in hematopoietic precursors, resulting in ineffective thrombopoiesis.

Bone marrow disorders, including myelodysplastic syndrome, myelofibrosis, and marrow metastases, were seen in 1.4% of cases. These disorders emphasize the need for bone marrow evaluation in persistent or unexplained thrombocytopenia.

Haematological Malignancies: Haematological malignancies constituted 7.7% of cases. Acute myeloid leukaemia (AML) was the most frequent, with others including ALL, CML, and lymphomas. Thrombocytopenia in these cases is caused by marrow infiltration and suppression of normal haematopoiesis. Early recognition and bone marrow studies are essential for diagnosis and treatment planning.

Immune Thrombocytopenic Purpura (ITP): ITP was identified in 5.3% of cases. This autoimmune disorder involves the production of platelet autoantibodies, leading to increased peripheral destruction and impaired platelet production.

Our study observed a female-to-male ratio of 2:1, with peak incidence between 21 and 40 years, in line with global patterns. This ratio correlates with the study done by Stasi R et al which reported an incidence of 2-3: 1 in chronic ITP patients(5).Most of the patients presented with bleeding manifestations such as petechiae and gum bleeding.

Drug-Induced Thrombocytopenia: Drug-induced thrombocytopenia was found in 1.2% of patients, primarily due to chemotherapy drugs. Other known culprits include heparin, quinidine, and certain antibiotics. Clinicians should maintain a high index of suspicion for this etiology, particularly in hospitalized patients receiving multiple medications.

Pregnancy-Related Thrombocytopenia: Pregnancy-associated thrombocytopenia accounted for 0.6% of cases and included HELLP syndrome, acute fatty liver of pregnancy, and atypical hemolytic uremic syndrome. These conditions require early recognition due to significant maternal and fetal risks.

Comparison with Other Indian Studies

Similar to other Indian studies (e.g., Das et al., Magdalene et al.),(6,7) this study confirms that infections are the leading cause of thrombocytopenia in India(Table 3). However, a higher proportion of dengue-related cases was observed in our series, reflecting the specific epidemiology of Goa and surrounding regions.

Clinical Implications

This study emphasizes the importance of early identification and monitoring of thrombocytopenia in febrile patients, especially during the monsoon when vector-borne diseases peak. Local clinicians can use the findings to develop region-specific protocols for differential diagnosis.

Furthermore, the study demonstrates that infections, particularly dengue and malaria, continue to dominate as the main causes of thrombocytopenia in India, which differs substantially from Western trends.

CONCLUSION

Infections, particularly dengue and malaria, remain the primary cause of thrombocytopenia in this region. Regular surveillance and early recognition of these etiologies will aid in better clinical management and prevention of complications.

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