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ETIOLOGICAL SPECTRUM OF THROMBOCYTOPENIA IN A TERTIARY CARE TEACHING HOSPITAL: A PROSPECTIVE OBSERVATIONAL STUDY

Pathology

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ABSTRACT

Background: Thrombocytopenia is a common hematological abnormality encountered in clinical practice with varied etiologies ranging from benign self-limiting disorders to life-threatening hematological malignancies. Accurate etiological diagnosis is crucial for appropriate management. **Objective:** To evaluate the etiological spectrum of thrombocytopenia in patients attending a tertiary care teaching hospital. **Materials and Methods:** This prospective observational study was conducted over a period of 22 months from 1st June, 2024 to 31st March 2026. Seventy cases with platelet count <150,000/µL were included. Detailed clinical history, physical examination, complete blood count, peripheral smear examination, and bone marrow aspiration/biopsy where indicated were performed. Data were analyzed descriptively. **Results:** Out of 70 cases, the most common cause was Immune Thrombocytopenic Purpura (ITP) (28.6%), followed by Megaloblastic anemia (21.4%), Aplastic anemia (17.1%), Acute leukemia (14.3%), Hypersplenism (8.6%), Myelodysplastic syndrome (7.1%), and other causes (2.9%). Bone marrow examination was essential in 60% of cases for definitive diagnosis. **Conclusion:** ITP and nutritional anemia constituted major causes of thrombocytopenia in our setting. Bone marrow evaluation remains a key diagnostic tool in unexplained or persistent thrombocytopenia.

KEYWORDS

Thrombocytopenia, ITP, Aplastic Anemia, Megaloblastic Anemia, Acute Leukemia, MDS

INTRODUCTION

Thrombocytopenia, defined as a reduction in circulating platelet count below the normal reference range (typically <150 × 10^9/L), is a frequent hematological finding with diverse etiologies and clinical implications[1]. It may result from decreased platelet production, increased platelet destruction, splenic sequestration, dilutional causes. The etiological spectrum varies depending on geographic, nutritional, and demographic factors. In tertiary care settings, bone marrow disorders and immune-mediated conditions form a significant proportion[2].

Platelets, derived from megakaryocytes in the bone marrow, are crucial for primary hemostasis and maintaining vascular integrity[3]. Consequently, morphological evaluation of megakaryocytes through bone marrow aspiration and biopsy has become an indispensable tool in elucidating the pathophysiology of thrombocytopenic disorders[4]. A nuanced understanding of megakaryocyte morphology not only aids in distinguishing peripheral platelet destruction from defective production but also serves as a critical diagnostic and prognostic indicator in various hematological conditions[5,6].

This study was undertaken to analyze the etiological distribution of thrombocytopenia in a tertiary care teaching hospital.

MATERIALS AND METHODS

The study was conducted in the Post Graduate Department of Pathology in Acharya Shri Chander College of Medical Sciences and Hospital Sidhra, Jammu after obtaining clearance from the Institutional Ethics Committee.

The present study assessed etiological spectrum of thrombocytopenia in a tertiary care teaching hospital.

Study Duration

The study was conducted for a period of twenty two months from 1" June 2024 to 31 March 2026.

Study Design

The study is an observational cross- sectional study.

Study Unit

The study subjects included patients with platelet count less than 1,50,000 per microliter of blood referred to the department of Pathology in Acharya Shri Chander College of Medical Sciences & Hospital, Jammu.

Sampling Method

Simple Random Sampling Technique was used for sample collection for patients visiting the Department of Pathology and fulfilling the inclusion and exclusion criteria.

Selection Criteria of Patients

Inclusion Criteria

Patients of all genders with a platelet count of less than 1,50,000 per microliter of blood.

Exclusion Criteria

Patients on antiplatelet drugs and other medications causing thrombocytopenia will be excluded. > Patients who have been transfused with platelet concentrate or whole blood in the previous 9 days. > Inadequate bone marrow aspirate.

Each patient's clinical details including history and physical findings were documented. Complete blood count, peripheral smears and relevant laboratory investigations were performed.

Collection of Blood Sample

Under all aseptic precautions, venous blood was collected for the study with Ethylene Diamine Tetra Acetic Acid (EDTA) used as an anticoagulant.

Complete blood count, Platelet counts were done using automated cell counter. Platelet count was reconfirmed by its respective manual method, wherever needed.

Automated cell counter, MS4(S) five- part differential was used which works on the principal of impedance method, whereby it counts and sizes cells by detecting and measuring changes in the electrical impedance when a particle in a conductive liquid media passes through a small aperture.

Bone Marrow Aspiration

Bone marrow aspiration was done from posterior superior iliac spine and sternum. The posterior superior iliac crest was typically selected sampling site due to patient comfort. The anterior superior iliac crest was also used in patients who had a large amount of adipose tissue.

Statistical Analysis

The statistical analysis was done and the results are expressed as percentages and other appropriate statistical methods were applied whenever necessary.

The results are expressed with appropriate charts and diagrams.

OBSERVATION AND RESULTS

The present study was cross-sectional in nature and was carried out in the Post Graduate Department of Pathology , Acharya Shri Chander

College of Medical Sciences and Hospital , Sidhra , Jammu over a period of 22 months from 1st June , 2024 to 31st March , 2026.

During this study, a total of 70 patients with Thrombocytopenia were examined as per proforma , after obtaining their written Consent.

1. Etiological Distribution of Thrombocytopenia

Table 1: Etiological Distribution of Thrombocytopenia (n = 70)

Diagnosis	No. of Cases	Percentage
Immune Thrombocytopenic Purpura (ITP)	20	28.6
Aplastic Anemia	12	17.1
Megaloblastic Anemia	15	21.4
Acute Leukemia	10	14.3
Myelodysplastic Syndrome (MDS)	5	7.1
Hypersplenism	6	8.6
Others (Dengue)	2	2.9
Total	70	100

Among the thrombocytopenic patients, immune thrombocytopenic purpura (ITP) was the most frequent diagnosis, observed in 20 cases (28.5%). Megaloblastic anemia was the second most common etiology with 15 cases (21.43%), followed by aplastic anemia in 12 cases (17.14%). Acute leukemia accounted for 10 cases (14.2%), while hypersplenism was identified in 6 cases (8.57%). Myelodysplastic syndrome (MDS) constituted 5 cases (7.14%), and other causes were seen in 2 cases (2.86%). Thus, immune-mediated and hematinic deficiency disorders together comprised a major proportion of thrombocytopenia, whereas clonal marrow disorders formed a smaller subset of cases.

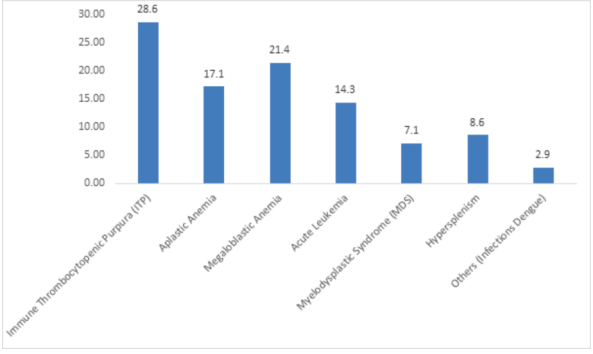

Fig 1: Histogram Showing Etiological Distribution of Thrombocytopenia

DISCUSSION

The etiological distribution in the present study demonstrated that immune thrombocytopenic purpura (ITP) was the most frequent cause among thrombocytopenic disorders, accounting for 29% of cases. This was followed by megaloblastic anemia (21%) and aplastic anemia (17%), both representing significant marrow-related causes of thrombocytopenia[7,8]. Acute leukemia constituted 14% of cases, while hypersplenism (9%) and myelodysplastic syndrome (7%) contributed smaller proportions. A minority of cases fell under other etiologies (3%). Thus, thrombocytopenia in the present cohort reflected a heterogeneous spectrum of mechanisms including peripheral platelet destruction, ineffective hematopoiesis, marrow failure, and marrow infiltration[9,10].

The present study included patients with thrombocytopenia. Among thrombocytopenic patients, severe thrombocytopenia was the largest subset (32 %), followed by moderate (28%) and mild (10%) categories. The predominance of moderate-to-severe thrombocytopenia indicates that most patients presented at clinically significant platelet levels where risk of bleeding and need for etiological evaluation are substantial[11]. Similar hospital-based studies have emphasized that clinically meaningful thrombocytopenia requires prompt etiological stratification to guide management and prevent complications [12,13].

The present study highlights that immune-mediated destruction and nutritional deficiencies are major contributors to thrombocytopenia in our tertiary care setting[11]. ITP (28.6%) was the most frequent etiology, consistent with several Indian studies[12]. Nutritional anemia (21.4%) reflects the high prevalence of Vitamin B12 deficiency in the region[14].
Bone marrow examination was indispensable in: Pancytopenia, Suspected marrow failure, Suspected hematological malignancy[15,16]. Aplastic anemia and acute leukemia together accounted for 31.4% of cases, emphasizing the importance of early marrow evaluation[17].

CONCLUSION

ITP is the leading cause of thrombocytopenia in our study.

Megaloblastic anemia remains a significant reversible cause.

Bone marrow examination is essential for definitive diagnosis in unexplained thrombocytopenia.

Early identification of malignant causes improves patient outcomes.

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