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Research Article

Correlation of Platelet Indices with Thrombocytosis: A Clinicopathological Study in a Tertiary Care Hospital

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Abstract **Introduction**: Thrombocytosis, defined as a platelet count exceeding 450,000/µL, is a common hematological finding with diverse etiologies, including reactive and clonal causes. Platelet indices, such as mean platelet volume (MPV), platelet distribution width (PDW), and plateletcrit (PCT), provide insights into platelet morphology and function, aiding in the differentiation of thrombocytosis subtypes. This study aimed to evaluate the clinicopathological correlation between thrombocytosis and platelet indices in a tertiary care setting. **Materials and Methods**: A retrospective analysis was conducted on 200 patients with thrombocytosis over two years. Inclusion criteria included patients aged >18 years with persistent thrombocytosis, while exclusion criteria encompassed those with recent trauma, surgery, or pregnancy. Data on demographic details, clinical presentation, etiology, and platelet indices were collected and analyzed. **Results**: Of the 200 patients, 65% had reactive thrombocytosis, while 35% had clonal thrombocytosis. Platelet indices such as MPV and PDW were significantly higher in clonal thrombocytosis compared to reactive cases ($p<0.05$). Five tables were constructed to summarize the findings, including demographic distribution, etiological classification, and platelet index correlations. **Conclusion**: Platelet indices, particularly MPV and PDW, are valuable tools in differentiating reactive from clonal thrombocytosis. This study highlights their potential utility in clinical practice for early diagnosis and management.

Keywords: Thrombocytosis, platelet indices, mean platelet volume, platelet distribution width, reactive thrombocytosis, clonal thrombocytosis

INTRODUCTION

Thrombocytosis, characterized by an elevated platelet count, is a common hematological abnormality encountered in clinical practice. It is broadly classified into two categories: reactive (secondary) thrombocytosis, which is driven by underlying conditions such as infection, inflammation, or malignancy, and clonal (primary) thrombocytosis, which includes myeloproliferative disorders like essential thrombocythemia.[1] The differentiation between these subtypes is crucial for appropriate management, as clonal thrombocytosis carries a higher risk of thromboembolic complications.[2]Platelet indices, including mean platelet volume (MPV), platelet distribution width (PDW), and plateletcrit (PCT), have emerged as valuable biomarkers in hematology. MPV reflects the average size of platelets, while PDW indicates the variability in platelet size, and PCT represents the total platelet mass.[3] These indices provide insights into platelet production and activation, which can vary significantly between reactive and clonal thrombocytosis.[4]Reactive thrombocytosis is often associated with conditions such as chronic inflammatory diseases, iron deficiency anemia, and infections. In contrast, clonal thrombocytosis is typically linked to myeloproliferative neoplasms (MPNs), such as essential thrombocythemia, polycythemia vera, and primary myelofibrosis.[5] The distinction between these two categories is critical, as clonal thrombocytosis requires specific therapeutic interventions, including cytoreductive therapy and aspirin, to prevent thrombotic events.[6]

Despite their potential utility, platelet indices are underutilized in routine clinical practice. This study aims to bridge this gap by evaluating the correlation between thrombocytosis and platelet indices in a tertiary care hospital. By analyzing a cohort of 200 patients, we seek to establish the diagnostic and prognostic significance of these indices in differentiating thrombocytosis subtypes.[7]

MATERIALS AND METHODS

Study Design and Population:

This retrospective study included 200 patients diagnosed with thrombocytosis (platelet count >450,000/µL) over two years. Patients were recruited from the hematology outpatient department of a tertiary care hospital.

Inclusion Criteria:

- Age >18 years.

- Persistent thrombocytosis (confirmed on two consecutive tests).
- Availability of complete clinical and laboratory data.

Exclusion Criteria:

- Recent trauma or surgery within the past three months.
- Pregnancy or postpartum status.
- Patients on medications known to affect platelet counts (e.g., chemotherapy, steroids).
- Patients with a history of splenectomy.

Data Collection:

Demographic details, clinical history, laboratory parameters (including platelet count, MPV, PDW, and PCT), and etiological classification were recorded. Platelet indices were measured using an automated hematology analyzer. Statistical analysis was performed using SPSS version 25.0. Continuous variables were expressed as mean ± standard deviation (SD), and categorical variables were expressed as percentages. The student's t-test and chi-square test were used for comparisons, and $p<0.05$ was considered statistically significant.

RESULTS

The findings are summarized in five tables:

Table 1: Demographic Distribution of Patients

Age Group (Years)	Number of Patients (%)
18–30	40 (20%)
31–50	80 (40%)
>50	80 (40%)

Table 2: Etiological Classification of Thrombocytosis

Etiology	Number of Patients (%)
Reactive Thrombocytosis	130 (65%)
- Infection	50 (25%)
- Inflammation	40 (20%)
- Malignancy	20 (10%)
- Iron Deficiency Anemia	20 (10%)
Clonal Thrombocytosis	70 (35%)
- Essential Thrombocythemia	50 (25%)
- Polycythemia Vera	15 (7.5%)
- Primary Myelofibrosis	5 (2.5%)

Table 3: Comparison of Platelet Indices Between Reactive and Clonal Thrombocytosis

Platelet Index	Reactive Thrombocytosis (Mean ± SD)	Clonal Thrombocytosis (Mean ± SD)	p-value
MPV (fL)	9.5 ± 1.2	11.2 ± 1.5	<0.001
PDW (%)	12.3 ± 2.1	15.4 ± 2.8	<0.001
PCT (%)	0.35 ± 0.05	0.38 ± 0.06	0.12

Table 4: Correlation of Platelet Indices with Clinical Outcomes

Platelet Index	Thrombotic Events (%)	Bleeding Events (%)
High MPV (>11 fL)	25%	10%
High PDW (>15%)	30%	12%

Table 5: Diagnostic Accuracy of Platelet Indices in Differentiating Thrombocytosis Subtypes

Platelet Index	Sensitivity (%)	Specificity (%)	AUC (95% CI)
MPV (>11 fL)	75%	80%	0.82 (0.76–0.88)
PDW (>15%)	70%	85%	0.78 (0.72–0.84)

DISCUSSION

This study highlights the clinical utility of platelet indices in the evaluation of thrombocytosis. The significantly higher MPV and PDW in clonal thrombocytosis suggest increased platelet activation and heterogeneity, consistent with the pathophysiology of myeloproliferative disorders.8 These findings align with previous studies, which have reported similar trends in platelet indices among patients with essential thrombocythemia. 9-13Reactive thrombocytosis, on the other hand, is associated with normal or slightly elevated platelet indices, reflecting the physiological response to underlying conditions such as infection or inflammation. 14 The diagnostic accuracy of platelet indices, though moderate, highlights their potential as adjunctive tools in differentiating thrombocytosis subtypes. However, their utility should be interpreted in conjunction with clinical and laboratory findings, as overlapping values can occur. 15The correlation between high MPV and PDW with thrombotic events underscores the prognostic significance of these indices. Patients with clonal thrombocytosis and elevated platelet indices may benefit from early intervention to prevent complications. 16 Future studies with larger cohorts and longitudinal follow-up are needed to validate these findings and explore the prognostic implications of platelet indices in thrombocytosis

CONCLUSION

Platelet indices, particularly MPV and PDW, are valuable in differentiating reactive from clonal thrombocytosis. Their integration into routine clinical practice can enhance diagnostic accuracy and guide therapeutic decisions. Further research is warranted to establish their prognostic significance and optimize their use in patient management

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