

Platelet Distribution Width: A New Prognostic Marker for Patients with Acute Coronary Syndrome?

Angelo Roncalli Ramalho Sampaio¹

Universidade Federal do Cariri,¹ Juazeiro do Norte, CE – Brazil

Editorial referring to the article: Platelet Distribution Width as a Marker for Severity and Extent of Coronary Artery Disease in Acute Coronary Syndrome

The study by Polat et al.¹ published in the International Journal of Cardiovascular Sciences explored the association between platelet distribution width (PDW) and the severity and extent of coronary artery disease (CAD) in patients with acute coronary syndrome (ACS). This retrospective study involved a comprehensive analysis of clinical, angiographic, and laboratory data obtained from a consecutive cohort of 1043 patients diagnosed with ACS, stratified into two groups based on PDW values (> 11.8 fL and ≤ 11.8 fL), with the aim of investigating the association of PDW levels with the clinical severity and extent of CAD in patients diagnosed with ACS.

GRACE (Global Registry of Acute Coronary Events) score, SYNTAX score, TIMI flow grade, thrombosis grades of culprit lesions, and neutrophil-lymphocyte ratio (NLR) were calculated in patients. The associations of these with PDW were also examined.

The mean age of the patients was 60.1 ± 12.4 years, with the majority being male (78.5%). The mean PDW was 11.8 fL (range: 8.9 to 22.0). The main findings included the observation that patients with elevated PDW had higher GRACE scores (139 versus 126, $p < 0.05$), higher NLR (3.21 versus 2.13, $p < 0.05$), and poorer TIMI flow grades, suggesting greater severity of ACS. A positive correlation was observed between PDW and GRACE score ($R: 0.304$, $p = 0.01$), but not between PDW and SYNTAX score. No significant differences in TIMI thrombosis grades were identified between the two groups.

The authors concluded by suggesting that elevated PDW levels in patients with ACS were associated with more severe disease, as indicated by higher GRACE scores and reduced TIMI flow grades, stating that their study “contributes new insights into the intricate interaction between platelet indices and the clinical manifestations of ACS, emphasizing the potential of PDW as a prognostic marker and supporting future research to enhance our understanding of platelet dynamics in cardiovascular diseases.”

Platelets are essential in the pathogenesis of ACS, contributing not only to thrombus formation in areas of

atherosclerotic plaque rupture or erosion, but also to inflammation and modulation of the immune system. Their activation promotes the release of prothrombotic and inflammatory substances, contributing to arterial obstruction and the progression of atherosclerosis.² This process can lead to events such as acute myocardial infarction and unstable angina. Control of platelet activation improves prognosis and reduces risks in patients with coronary disease. Therefore, antiplatelet therapies are essential to prevent cardiovascular complications in this context.³

Platelets increase in size after being activated. Two laboratory parameters, mean platelet volume and PDW, are used to indicate platelet size as well as their activity in circulation.⁴

Previous studies have identified a relationship between coronary thrombus formation and increased platelet volume in cases of ACS.⁵ They have also shown a relationship between PDW and major adverse cardiac events, further highlighting the clinical importance of platelet parameters in this syndrome.⁶

During acute myocardial infarction, platelets activate leukocytes, release inflammatory mediators, and form aggregates. They vary in size, reflecting their reactivity, and decrease in volume in circulation.⁷ In these situations, platelet production increases, releasing larger and more active platelets, called “stress platelets,” which increase in number during ACS, indicating greater thrombopoietic activity in the bone marrow.⁸

The results of the study by Polat et al.¹ converge with the existing literature, which identifies PDW as an indicator of platelet heterogeneity and increased thrombopoietic activity in inflammatory and thrombotic states. Previous studies have shown that larger platelets, frequently observed in patients with ACS, are associated with greater reactivity and release of inflammatory mediators such as interleukin⁶, worsening patients’ cardiovascular status.^{2,8} The direct relationship between PDW and systemic inflammation, evidenced by NLR, reinforces the role of inflammatory mediators in the pathogenesis of ACS.⁹

Although the study by Polat et al.¹ identified strong associations between PDW and clinical severity (GRACE score), it did not observe a significant correlation between PDW and the extent of CAD, measured by the SYNTAX score. This finding diverges from previous studies that reported positive associations, possibly due to the analysis of different populations and the use of different tools to assess the anatomical severity of CAD.¹⁰ This discrepancy highlights the complexity of ACS and the influence of factors beyond coronary anatomy on clinical outcomes.

Keywords

Blood Platelets; Coronary Artery Disease; Acute Coronary Syndrome.

Mailing Address: Angelo Roncalli Ramalho Sampaio •

Universidade Federal do Cariri, Rua Divino Salvador, 284. Postal code:

63048-080. Juazeiro do Norte, CE – Brazil

E-mail: angelo.sampaio@aol.com

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The prognostic role of PDW has also been highlighted in studies that correlated elevated levels with major adverse cardiac events such as recurrent infarction and mortality. The association of PDW with poorer TIMI flow grades, as observed by Polat et al.,¹ is consistent with the hypothesis that larger and more reactive platelets contribute to worsening coronary flow, negatively impacting prognosis.^{6,10}

However, it is essential to recognize the study's limitations, including its retrospective and single-center design, which restrict the generalization of the results.

Prospective multicenter studies are needed to validate these findings in broader and more diverse populations.

In conclusion, PDW presents itself as a promising marker to assess the severity of ACS, reflecting the interaction between thrombosis and inflammation. Its practical applications, however, depend on integration with other diagnostic and prognostic tools. Advances in understanding platelet markers can improve ACS management and pave the way for new therapeutic approaches in the future.

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