

Significance of platelet volume indices in coronary artery diseases

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Automated blood cell counters are available in most clinical laboratories even in resource poor settings. The platelet parameters obtained on these counters, i.e., platelet volume indices (PVI) include: platelet count (PC), mean platelet volume (MPV), platelet distribution width (PDW) and platelet large cell ratio (P-LCR). In the current millennium, coronary artery disease (CAD) and its related morbidity and mortality has attained the epidemic proportions, not only in developed countries but also in developing nations. Although endogenous and exogenous risk factors like; smoking, diabetes mellitus, dyslipidemia hypertension, mental stress, metabolic syndrome and obesity – are implicated singly or in combination as causative factors. It must be noted that PVI have been studied in recent past as an easy to obtain and significant parameter in CAD. Our research group had studied platelet volume indices (PVI) in the spectrum of ischemic heart diseases. This included subjects with unstable angina (UA), acute myocardial infarction (AMI) and those with stable coronary artery disease (stable CAD). The results indicated that, MPV co-relates with the prethrombotic state in acute ischemic episodes and that larger platelets may play significant role in infarction. Larger platelets are easily identified during routine haematological studies and these subjects with P-LCR could benefit from timely intervention and preventive treatment (1). A group of workers investigated 2 hypotheses: 1. a correlation between platelet indices and stable coronary artery disease (CAD) and ST-segment elevation in acute myocardial infarction (STEMI) and 2. significance of platelet indices at the time of admission and thrombolysis outcomes in those with STEMI. It was observed that, the WBC count and platelet distribution width (PDW) were increased in subjects with STEMI (P for both <0.001). White blood cell and PDW were found to be independent markers of acute STEMI. Mean platelet volume (MPV) and PDW were higher in the thrombolysis failure group when compared to successful thrombolysis group. Group with acute STEMI showed higher PDW when compared with patients with stable CAD. In addition, higher PDW and MPV correlated well with thrombolysis failure in subjects with STEMI (2). A systematic review and meta-analysis study observed larger MPV was associated with CAD and therefore it might be helpful in risk stratification, when combined with other risk factors (3). Prognostic significance of mean platelet volume on short- and long-term results among patients with non-ST-segment elevation myocardial infarction (NSTEMI) who were treated with percutaneous coronary intervention (PCI) analysed. It was found that, in patients with NSTEMI treated with PCI, the higher MPV was associated with a significantly increased occurrence of long-term adverse outcomes, especially for all-cause mortality (4). In another group, consecutive subjects with MI admitted to a tertiary-care hospital were observed to have higher PVI. During this study, MPV was noted at admission and at third month. These were followed up for 1-year primary composite results of cardiovascular death, cerebrovascular accidents, fatal or non-fatal MI and heart failure. Patients were grouped according to tertile of baseline MPV. Increased MPV was associated with bad outcome with acute MI (5). In the other study the platelet parameters were studied in a subgroup of patients with coronary total occlusion (CTO). This study highlighted significance of Platelet distribution width (PDW) which measures the variability in platelet size and is a marker of platelet activation. A PDW value of more than 15.7% was observed with sensitivity of 64% and the specificity was 66%. They concluded that, the PDW is a simple platelet parameter that may predict the

occurrence of CTO (6). This particular facet of PVI needs further studies to substantiate their observation. It is important to note that, some studies have highlighted the importance of determining local reference values, as populations, chemical reagents and instruments may alter from published reference values. These reference values may guide the clinicians to apply these indices while investigating disease states (7). In diabetes mellitus platelet activation is attributed to cardiovascular disease (CVD), which is the frequent complication of adult type, i.e., type 2 diabetes mellitus (T2DM) so also pre-diabetic conditions. Mean platelet volume is an easy marker for evaluation in these cases. A group of researchers studied platelet count mean, platelet volume and platelet distribution width in patients with T2DM, along with impaired fasting glucose (IFG), impaired glucose tolerance (IGT), and metabolic syndrome. The results indicated that T2DM subjects tend to have higher mean platelet volume and platelet distribution width values however had non different platelet count when compared with subjects without T2DM. Whether and how these changes contribute to CVD of T2DM or can they be used as CVD biomarker needs further investigation (8). On account of its easy availability, affordable cost and scientific evidence that PVI are significant in risk assessment and play an important role as diagnostic adjunct in coronary artery diseases, it is hoped that PVI are used in day to day clinical practice.

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