

# **Title of thesis: Association between platelet volume indices and ST segment elevation myocardial infarction (STEMI)**

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**Background:** ST-elevation myocardial infarction (STEMI) is a leading causes of mortality and morbidity in Egyptian population. In this regard, different biomarkers are becoming more important in the diagnosis, assessment and risk stratification of patients with STEMI. Platelets play a crucial role in thrombus formation with increased larger platelets formation which is enzymatically and metabolically more active.

**Objectives:** Our aim is to study the association between platelet volume indices (mean platelet volume (MPV) and platelet distribution width (PDW) and STEMI patients admitted to Fayoum university hospital, and to correlate between these indices and the thrombus burden using **TIMI thrombus grade**.

**Patient and methods:** A hospital-based case-control study to compare the platelet indices of **100 STEMI patients** who underwent PPCI at Fayoum university hospital with age and gender matched 100 controls who had no history of ischemic heart disease. Blood samples were collected to EDTA bottles and analyzed using SYSMEX-500i automated analyzer. Angiographic thrombus burden scoring was done based on thrombolysis in myocardial infarction (TIMI) thrombus grades. After wiring and/or small balloon dilation, patients with thrombus burden grades 4 and 5 were defined as high thrombus burden (HTB), and patients with thrombus burden (0-3) was defined as low thrombus burden (LTB).

**Results:** We found a statistically significant increase of the mean MPV and PDW in STEMI patients compared to the control group ( $10.8 \pm 1.3$  fl vs  $9.7 \pm 1.1$  fl, P-value  $< 0.001$ ) and ( $13.1 \pm 2.4$  fl vs  $11.2 \pm 1.7$  fl, p-value  $< 0.001$ ) respectively. In the cases group, the HTB group had significantly higher admission MPV, PWD compared with the LTB group ( $11.1 \pm 1.4$  vs  $10.5 \pm 0.99$ ,  $p = 0.01$ ) ( $13.5 \pm 2.6$  vs  $12.5 \pm 1.9$ ,  $p = 0.04$ ). In a ROC analysis, the cut-off value for the prediction of HTB was 10.15 fl. A MPV  $> 10.15$  fl predicted HTB with 77% sensitivity and 41% specificity while  $PWD > 11.4$  predicted HTB with 80.3 % sensitivity and 33.3% specificity. Multivariate logistic regression analysis demonstrated MPV and hypertension were an independent predictor of large intracoronary thrombus burden with p-value 0.04, and 0.03 respectively.

**Conclusion:** MPV and PDW were significantly increased in STEMI patients than the control group. As a simple and cheap procedure, it has a potential to be used as a test to identify those that who are high-risk for myocardial infarction. Second and more important is that MPV is a potential pre-angiography independent predictor of thrombus burden in patients with STEMI undergoing primary PCI, who might require more potent antiplatelet therapy.

**Keywords:** Mean Platelet volume, Platelet width distribution, Thrombus burden, PPCI, STEMI.