Thrombin generation and endothelial progenitor cell function among patients with acute myocardial infarction treated with prasugrel versus ticagrelor

M. Wiessman¹, M. Kheifetz¹, N. Schamroth Pravda¹, D. Leshem Lev², E. Ziv², R. Kornowski¹, G. Spectre³, L. Perl¹

¹Rabin Medical Center, Department of Cardiology, Petah Tikva, Israel; ²Felsenstein Medical Research Center, Petah Tikva, Israel; ³Rabin Medical Center, Institute of Hematology, Davidoff Cancer Center, Petah Tikva, Israel

Funding Acknowledgement: Type of funding sources: None.

Objectives: To compare the effects of prasugrel and ticagrelor on thrombin generation (TG) and circulating endothelial progenitor cells (EPCs) in the acute phase of ST-segment elevation myocardial infarction (STEMI).

Background: TG, platelet function and EPCs have an important role in the pathophysiology of coronary artery disease (CAD). To date, the effect of novel P2Y12 inhibitors on these coagulation mediators has only been studied in the sub-acute phase following acute myocardial infarction.

Methods: Patients presenting with STEMI undergoing primary percutaneous coronary intervention (PPCI) were randomized to either ticagrelor or prasugrel treatment. TG, platelet reactivity and EPC were tested prior to P2Y12 inhibitor loading dose (T0), and 24 hours following PPCI (T1).

Results: Between December 2018 and July 2021, 83 consecutive STEMI patients were randomized to ticagrelor (N=42) or prasugrel (N=41) treatment. No differences were observed at T0 for all measurements. At T1, prasugrel was found to be a more potent TG inhibitor: lower thrombin peak levels (319.5±237.7 nmol/L vs. 433.5±264.3 nmol/L, p=0.06), longer time to peak (14.1±12.6 min vs. 8.3±9.7 min, p=0.03), longer lag time to TG initiation (7.7±7.5 min vs. 3.9±2.1 min, p<0.01) and a smaller AUC (2186.1±1123.1 vs. 3362.5±2108.5, p<0.01). Furthermore, levels of CD34 (2.6±4.1 vs. 1.1±1.1, p=0.01), CD133 (2.3±1.8 vs. 1.4±1.5, p=0.01) and CFUs (2.1±1.5 vs. 1.1±1.0, p<0.01) were significantly higher in the prasugrel group, as compared to the ticagrelor group.

Conclusion: Among STEMI patients treated with PPCI, treatment with prasugrel as compared to ticagrelor was associated with more potent inhibition of TG and improved EPCs count and function.