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Acute-phase high platelet reactivity with prasugrel loading is correlated with clinical outcomes during hospitalization in acute coronary syndrome

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Background/Introduction: Although high platelet reactivity (HPR) seems to be associated with adverse cardiovascular events after percutaneous coronary intervention (PCI), the relationship between post-procedure HPR with prasugrel loading and clinical outcomes in acute coronary syndrome (ACS) is still unclear. Moreover, factors contributing to HPR in ACS with prasugrel loading are also unknown.

Purpose: This study aimed to assess the impact of post-procedure HPR with prasugrel loading on clinical outcomes in ACS during hospitalization, as well as to define appropriate cut-off values and identify factors contributing to HPR.

Methods: We performed a single-centre, retrospective observational study that enrolled 132 patients who underwent emergent PCI for ACS with prasugrel loading. The P2Y12 reaction unit (PRU) value was measured immediately after PCI with the VerifyNowR System. The primary endpoint was major adverse cardiac events (MACE, defined as the composite of death, myocardial infarction, stroke, heart failure, ventricular arrhythmia needing defibrillation).

Results: Mean patient age (standard deviation) was 70.7 (±12.5) years, 76% were male, and average time from prasugrel intake to PRU calculation was 101 (±48.8) min. During a mean hospital stay of 15.4 (±8.0) days, there were 22 (16%) MACE events and 6 (4%) deaths. The post-procedure PRU value was 241±66. HPR was significantly higher in MACE group than non-MACE group [287 (±55) vs 232 (±64), $p<0.001$]. The ROC curve analysis of PRU for discriminating significant in-hospital MACE showed a cut off value of 293 (sensitivity: 64%, specificity: 84% [AUC=0.764, $p<0.0001$]). Thus, 33 patients (25%) were found to have HPR (PRU>293) immediately after emergent PCI. Kaplan-Meier curve analysis showed MACE events occurred more frequently in the HPR group than in the non-HPR group (42% vs 8%, log rank $p<0.001$). Multiple Cox regression analysis showed that peak creatine phosphokinase >3,000 U/L and HPR were independent predictors of MACE in patients with ACS who underwent PCI (OR 4.96, 95% CI 1.86–13.26, p=0.001, and OR 7.52, 95% CI 2.73–20.7, $p<0.0001$, respectively). HPR was significantly correlated with age, female sex, and reference lumen short diameter (pre-dilation) used in PCI.

Conclusion: HPR was significantly associated with adverse event during hospitalization in ACS patients. Female patients with large culprit lesion diameter were more likely to have HPR. Appropriate cut-off value of HPR in this study was 293. HPR in early-phase of ACS with prasugrel loading is a useful predictor of adverse events during hospitalization.