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Objectives: We aimed to evaluate the safety and efficacy of loading dose of ticagrelor versus clopidogrel in preventing periprocedural myocardial infarction (PMI) in patients with acute coronary syndrome (ACS) undergoing selective percutaneous coronary intervention (PCI). **Methods:** A total of 114 patients with ACS who underwent selective PCI were randomly assigned to clopidogrel group (n=57, the loading and maintenance doses were 300mg and 75mg Qd for clopidogrel, and 300mg and 100mg Qd for aspirin), or ticagrelor group (n=57, the loading and maintenance doses were 180mg and 90mg Bid for ticagrelor, and 300mg and 100mg Qd for aspirin). The cardiac troponin I (cTnI), creatine kinase-MB (CK-MB) and high-sensitive C-reactive protein (hs-CRP) were determined before, and 8, 24 hours after PCI. **Results:** Baseline clinical, angiographic and PCI procedural characteristics were similar between the two groups. The overall incidence of PMI was 37.7%. Ticagrelor group showed a significantly lower incidence of PMI compared to clopidogrel group (28.1% vs 47.4%, p=0.034). The levels of hs-CRP before and after PCI were similar between the comparing groups. Multivariable logistic analysis showed that the use of ticagrelor [hazard ratio (HR): 0.35; 95% confidence interval (CI): 0.15-0.82; p=0.016] was an independent predictor of PMI. **Conclusions:** Pretreatment with the loading dose of ticagrelor can significantly lower the incidence of PCI related PMI in patients with ACS undergoing selective PCI as compared with clopidogrel. Further study with larger study population is needed to get definite conclusions.