The Immediate Antiplatelet Effect of Prasugrel Versus Clopidogrel in STEMI Patients

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Background: Prior small retrospective studies have suggested clinical benefits of clopidogrel pre-treatment in STEMI patients undergoing PPCI. However, the anti-platelet effect of both clopidogrel and prasugrel during the narrow door-to-balloon period has not been evaluated. Our aim was to evaluate the immediate anti-platelet effect of thienopyridine pre-treatment in ST-segment elevation myocardial infarction (STEMI) patients undergoing primary percutaneous coronary intervention (PPCI).

Methods: Sixty STEMI patients undergoing PPCI were prospectively evaluated. Patients were treated with 600mg clopidogrel (N=45) or 60 mg prasugrel (N=15) loading upon admission. ADP-induced platelet aggregation (PA) was determined by light transmission aggregometry prior to thienopyridine loading, at PPCI and after 72 hours. TIMI flow prior to PPCI along with TIMI myocardial perfusion (TMP), and TIMI frame count (TFC) immediately post PPCI were determined.

Results: The two study groups were similar regarding baseline characteristics including door-to-balloon time which was 48±23 vs. 46±16 minutes (p=0.7) for the clopidogrel and the prasugrel groups respectively. Pre-loading ADP-induced PA was comparable (79±10 VS. 79±8, P=0.8), but was reduced by clopidogrel to 73±15% vs. 63±16% with prasugrel (p<0.01) at PPCI. ADP-induced PA was further reduced by clopidogrel to 47±18% vs. 27±14% with prasugrel (p<0.001) after 72 hours. Patients treated with prasugrel had better TMP (2.75±0.9 vs. 1.63±1.4, p=0.013) and better TFR count (9.8±4.1 vs. 14±7, p=0.027).

Conclusions: In STEMI patients undergoing PPCI, prasugrel compared to clopidogrel pre-treatment was associated with a more rapid and potent reduction in ADP-induced PA both at PPCI and after 72 hours. Patients treated with prasugrel had better TMP than those treated with clopidogrel suggesting better myocardial re-perfusion at PPCI.