Intravenous cangrelor vs oral ticagrelor in patients with acute ST-segment elevation myocardial infarction undergoing primary percutaneous intervention: A randomised controlled trial

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Aims

Despite advances in ST-segment elevation myocardial infarction (STEMI) treatment, a sizeable minority of patients suffer poor outcomes even when treated with timely primary percutaneous intervention (PPCI). More potent P2Y12 inhibition improves clinical outcomes, however, oral agents have a slow onset of action in the context of PPCI timelines. We describe the first study being conducted to assess the comparative efficacy of intravenous (IV) cangrelor vs ticagrelor in a STEMI population treated with PPCI.

We aimed to investigate whether IV cangrelor, when compared with oral ticagrelor, would lead to a rapid and more effective anti-platelet effect in patients with STEMI being treated with PPCI and that this, in turn, would lead to improved indices of myocardial reperfusion. We also aimed to demonstrate the effect of IV cangrelor on initial infarct size measured by peak troponin release and final myocardial infarct size, measured by cardiac magnetic resonance (CMR) imaging.

Methods

Based on a pre-defined sample size calculation, 100 patients with first acute STEMI were randomised to oral ticagrelor (180 mg then 90 mg twice per day (bd)) or IV cangrelor (bolus then infusion). Cangrelor-treated patients received ticagrelor 180 mg 30 minutes prior to infusion end, then 90 mg bd. All patients received aspirin 300 mg. Platelet P2Y12 inhibition was assessed with the VerifyNow assay at first coronary balloon inflation, 4 and 24 hours post-drug dosing. Coronary microcirculation was assessed at the end of PPCI by calculating the index of microvascular resistance (IMR) using an intracoronary pressure wire / thermodilution technique. Electrocardiogram ST-segment resolution at 90 minutes was measured and the corrected thrombosis in myocardial infarction frame count, flow grade, and myocardial perfusion grade were calculated. Peak troponin level was measured and final infarct size was measured at 12 weeks by CMR imaging (ClinicalTrials.gov NCT02733341).

Results

At the time of first coronary balloon inflation during PPCI, P2Y12 inhibition as assessed by P2Y12 reaction units (PRU) was markedly greater in the cangrelor group (PRU 145.2 vs 248.3, p<0.0001). At 4 hours (158.1 vs 131.2, p=not significant (ns)) and 24 hours (61.0 vs 60.1, p=ns) PRU readings were similar. Despite this early more potent antiplatelet effect, no difference was seen in terms of IMR, ST-segment resolution, angiographic measures of reperfusion or final infarct size by CMR.

Conclusion

Despite more rapid and potent P2Y12 inhibition at the time of angiographic reperfusion, surrogate measures of treatment efficacy were not improved in cangrelor-treated patients. This study does not demonstrate an advantage of using IV cangrelor in place of oral ticagrelor in STEMI patients treated with PPCI. However, cangrelor can be used as a bridging therapy in the context of PPCI until the full antiplatelet effect is achieved with oral antiplatelet therapy. ■

Conflict of interest statement

None declared.

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