Early vascular responses to everolimus-eluting cobalt-chromium stent for the treatment of ST-elevation acute myocardial infarction: the results of the MECHANISM-AMI study 2-week OCT follow-up cohort

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BACKGROUND Several clinical trials have indicated advantages of everolimus-eluting cobalt chromium stents (EES) for treatment of the patients with ST-segment elevation myocardial infarction (STEMI) especially in “very early phase” after implantation. However, vascular behavior during this period and underlying mechanisms remain unclear.

METHODS The MECHANISM-AMI study is designed to elucidate early vascular responses of EES for STEMI patients using optical coherence tomography (OCT). Patients were prospectively registered in either 2-week (2W) or 3-month scheduled OCT follow-up cohort. Among them, 2W cohort could be completely analyzed, that is the subject of current study. In addition to standard OCT parameters, intra-stent thrombus sequences. Average stent length was 23.6±8.0 mm. Both %uncovered struts and %malapposed struts significantly increased from post-procedure to 2W follow-up (%uncovered struts: 61.1±19.9% vs 20±13.5%, P<0.0001, %malapposed struts: 4.6±6.0%, P=0.006, respectively). Amount of intra-stent thrombus significantly decreased from post-procedure to 2W follow-up (%length: 33.3±37.7% vs 17±18%, P=0.003, average maximal area of thrombus: 0.62±0.74 mm² vs 0.11±0.23 mm², P=0.0002, respectively). Similarly, number of dissection flap greater than 200 μm also significantly decreased (0.90±1.12 vs 0.57±0.91, P=0.03, respectively).

CONCLUSIONS The MECHANISM-AMI study 2W cohort firstly elucidated very early vascular responses following EES implantation in STEMI patients. Vascular healing processes begin in such a very early stage, including covered struts of nearly 80%, improvement of strut apposition and dissection flap size, and a significant reduction of intra-stent thrombus volume within 2 weeks. These meticulous findings may potentially explain the underlying mechanisms of safety and efficacy of EES for STEMI patients, supporting the favorable outcomes observed in the previous clinical studies.

CONCLUSIONS This validation study warranted clinically acceptable quantitative precision in all systems. On the other hand, some systematic variability was observed among the systems and phantom diameters, which requires attention when using multiple imaging systems for serial examinations or comparative studies.

CATEGORIES IMAGING: Intravascular
KEYWORDS Drug-eluting stent, Optical coherence tomography, ST-segment elevation myocardial infarction, acute