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Left ventricular thrombus formation after ST-elevation myocardial infarction: a prospective observational CMR study

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Background: Left ventricular (LV) thrombus formation is a severe complication after acute ST-segment elevation myocardial infarction (STEMI). The incidence and determinants of LV thrombus formation are still a matter of controversy.

Purpose: We aimed to assess the incidence as detected by cardiac magnetic resonance (CMR) imaging as well as the determinants of LV thrombus formation in contemporary reperfused STEMI patients.

Methods: This prospective observational study included 530 consecutive STEMI patients treated with primary percutaneous coronary intervention (PCI). Comprehensive CMR was performed at a median of 3 days (interquartile range 2–4 days) after symptom onset for the evaluation of LV thrombus formation as well as LV function and infarct severity.

Results: LV thrombi were detected in 17 patients (3.2% of the overall cohort). The incidence of LV thrombi in anterior STEMI patients (n=247) was 6.9%. In all patients presenting with LV thrombus left anterior descending artery (LAD) was identified as culprit lesion. The occurrence of thrombi was significantly associated with reduced LV ejection fraction (LVEF) (p<0.001), larger LV end-diastolic volume (p<0.001) and LV end-systolic volume (p<0.001), larger areas of microvascular obstruction (MVO) (p=0.003) and larger infarct size (IS) (p<0.001). Furthermore, increased levels of peak high sensitivity cardiac Troponin T (p<0.001) and hyperlipidaemia (p=0.038) were significantly related to LV thrombi. In multivariable analysis including IS, LVEF and MVO, only LVEF (odds ratio: 0.91 (95% confidence interval: 0.87–0.96); p=0.001) emerged as independent predictor of LV thrombus formation.

Conclusion: The risk of LV thrombus formation remains considerable in contemporary treated STEMI patients, especially in those with LAD as culprit lesion. Among CMR parameters of LV dysfunction and infarct severity, only baseline LVEF, but not IS or MVO, independently predicted LV thrombus formation after STEMI.