

# **Left ventricular thrombus formation after reperfused ST-segment elevation myocardial infarction: Insights from cardiac magnetic resonance imaging**

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## **Interims report**

In the context of acute ST-elevation myocardial infarction (STEMI) and contemporary management, occurrence of left ventricular (LV) thrombus is well described with an incidence of approximately 6% in the early phase after infarction (1). Presence of LV thrombus after STEMI is independently associated with adverse cardiovascular events (2, 3). In particular, it may result in stroke and systemic thromboembolisms that is potentially preventable through early LV thrombus recognition and appropriate treatment (4). Cardiac magnetic resonance (CMR) is the reference standard for LV thrombus detection in patients with acute ST-elevation myocardial infarction (STEMI). However, routine CMR imaging is currently not recommended post-STEMI.

The present project aims to (a) assess the prevalence of LV thrombus formation in contemporary reperfused STEMI patients as detected by cardiac magnetic resonance (CMR) imaging, (b) evaluate the determinants of LV thrombus formation, (c) compare the diagnostic accuracy of CMR versus transthoracic echocardiography, and (d) investigate the time course of LV thrombi in this setting.

So far, 558 consecutive acute STEMI patients were screened for study inclusion. In interim analysis, 504 patients with complete CMR and transthoracic echocardiography at 3 [IQR: 2-4] days after primary percutaneous coronary intervention (PCI) for acute

STEMI were included. The median age of the population was 57 [50-66] years and 82% were males. Cardiovascular risk factor distribution (hypertension [53%], diabetes mellitus [11%], hyperlipidemia [61%], smoking [54%]) is well comparable with current literature. The right coronary artery was the culprit lesion in 39% of cases, the left anterior descending artery was the culprit lesion in 47% of cases, the left circumflex artery was the culprit lesion in 13% of cases and the ramus intermedius was the culprit lesion in 1% of cases. A LV thrombus was visualized in 12 patients (2.4%) using TTE and in 20 patients (4%) using CMR. A weighted risk score including multivariable associates of LV thrombus formation (LV ejection fraction by TTE, peak high-sensitivity cardiac troponin T and peak high-sensitivity C-reactive protein) and left anterior descending coronary artery as culprit vessel, with a range of 0 to 9 points (median risk score: 3 points) showed a strong and significantly higher area under the curve (0.94 (95% CI 0.89 – 0.98)) for LV thrombus prediction than each individual risk factors alone ( $p < 0.001$ ). The incidence of LV thrombi was 0% in the low risk group (0 to 2 points,  $n=239$ ), 0.6% in the intermediate risk group (3 to 4 points,  $n=155$ ) and 17.3% in the high risk group (5 to 9 points,  $n=110$ ). Ninety-five percent of all LV thrombi occurred in the high risk group (number needed to scan to detect one LV thrombus=6).

All patients have been recruited. Currently, final data entry for complete study population characterization is ongoing. Thereafter, we plan a final statistical analysis and drafting of a research manuscript.

Taken together, the present study will provide novel insights into the prevalence, determinants and time course of LV thrombus formation after contemporary reperfused STEMI. Furthermore, it will provide data on the diagnostic accuracy of CMR imaging and echocardiography.

## References

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