

CMR feature tracking remote myocardial strain analyses for optimized risk prediction following acute myocardial infarction

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Funding Acknowledgements: Type of funding sources: None.

Background: Cardiac magnetic resonance myocardial feature tracking (CMR-FT) derived global strain assessments provide incremental prognostic information in patients following acute myocardial infarction (AMI). Functional analyses of the remote myocardium (RM) are scarce and whether they provide an additional prognostic value in these patients is unknown.

Methods: 1052 patients following acute myocardial infarction were included. CMR imaging and strain analyses as well as scar size quantification were performed after reperfusion by primary percutaneous coronary intervention. The occurrence of major adverse cardiac events (MACE) within 12 months after the index event was defined as primary clinical endpoint.

Results: Patients with MACE had significantly lower RM circumferential strain (CS) compared to those without MACE. A cut-off value for RM CS of -25.8% best identified high-risk patients ($p < 0.001$ on log-rank testing) and impaired RM CS was a strong predictor of MACE (HR 1.05, 95% CI 1.07-1.14, $p = 0.003$). RM CS provided further risk stratification amongst patients considered at risk according to established CMR parameters for 1.) patients with reduced left ventricular ejection fraction (LVEF) $\leq 35\%$ ($p = 0.002$ on log-rank testing), 2.) patients with reduced global circumferential strain (GCS) $> -18.3\%$ ($p = 0.015$ on log-rank testing), and 3.) patients with large microvascular obstruction $\geq 1.46\%$ ($p = 0.038$ on log-rank testing).

Conclusion: CMR-FT derived RM CS is a useful parameter to characterize the response of RM and allows improved stratification following AMI beyond commonly used parameters, especially of high-risk patients.