Oral presentation

Predicting late myocardial recovery and outcomes in the early hours of ST-elevation myocardial infarction: traditional measures compared to microvascular perfusion, salvaged myocardium, and necrosis by cardiovascular magnetic resonance

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Introduction
Earlier prediction of poor outcomes following ST-elevation myocardial infarction (STEMI) is desirable as it may allow tailored therapy at the earliest possible time when benefits may be greatest and optimized patient orientation in a managed care setting.

Purpose
Determine whether a very early imaging strategy may improve the prediction of late systolic dysfunction and poor outcomes in STEMI.

Methods
103 patients with acute STEMI were studied by contrast-enhanced cardiovascular magnetic resonance (CE-CMR) within 12 h of primary angioplasty and after infarct healing at 6 months, and followed clinically beyond 2 years. The primary endpoints were LVEF change and LV dysfunction, while poor outcomes were a key secondary endpoint.

Results
37% of patients with left ventricular dysfunction during STEMI recovered by 6 months, while 27% of those with compensated systolic function during STEMI developed late LV dysfunction. Late gadolinium enhancement (LGE) volume maintained a stronger association to LVEF change than infarct transmurality, microvascular obstruction, or myocardial salvage during STEMI (p = 0.02). Multivariable logistic regression identified LGE volume during STEMI as the best predictor of late LV dysfunction (OR 1.36, p = 0.03 adjusted for traditional predictors). An LGE ≥ 30% of LV or 18 mL/m2 during STEMI correctly classified 89% of patients for late LV dysfunction. LGE volume during STEMI provided important incremental benefit for predicting late dysfunction (AUC = 0.92) beyond infarct territory, pain-to-balloon time, maximum CKMB rise, presence of Q waves, and LVEF during STEMI (p ≤ 0.03 for each). Twenty-three patients developed poor outcomes (1 death, 2 myocardial infarctions, 5 malignant arrhythmias requiring AICD, 4 severe LV dysfunction < 35%, 11 hospitalizations for heart failure) during 2.6 ± 0.9 year follow-up; LGE volume remained a strong independent predictor of poor outcomes, whereas LGE ≥ 30% or 18 mL/m2 carried a hazard ratio of 10.1 for adverse events (p < 0.00001) Figure 1.
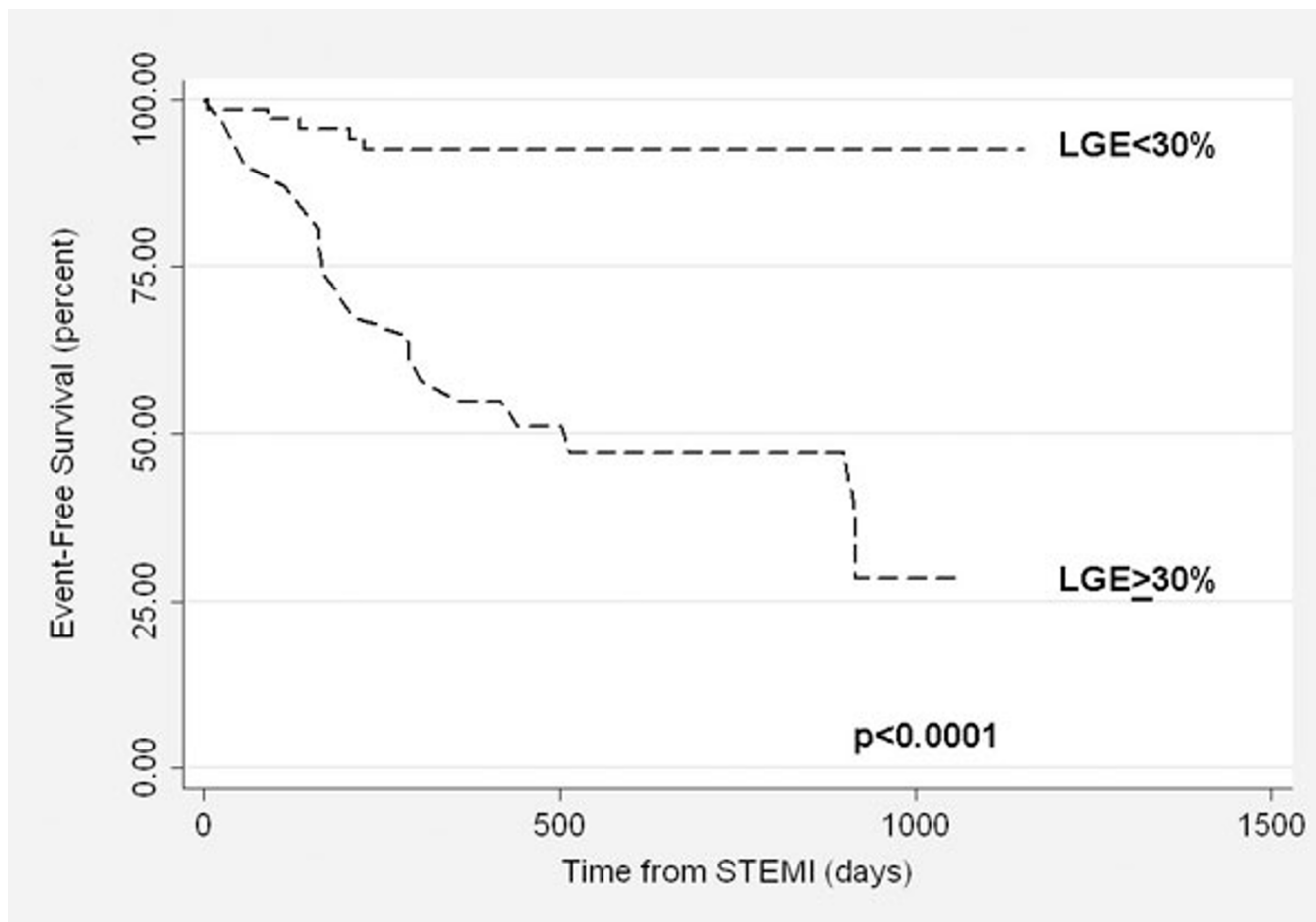
Figure 1

Conclusion

During the hyperacute phase of STEMI, LGE volume provides the strongest association and incremental predictive value for late systolic dysfunction and discerns poor late outcomes. Identifying patients at risk for heart failure or MACE very early during STEMI may allow earlier implementation of prognosis-altering therapies in those likely to benefit most and optimize patient management.