

# Infarct Resorption and Functional Recovery after Reperfused First-time Myocardial Infarction

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**Introduction:** The time course of myocardial infarct (MI) resorption after reperfused acute infarction and its relationship to recovery of global left ventricular (LV) function is not completely understood in humans. Neither is the relationship between regional MI transmural extent and time course of regional LV functional recovery. Therefore, the aim of this study was to explore the changes in hyperenhanced myocardium by delayed contrast-enhanced magnetic resonance imaging (DE-MRI) and change in global LV function and to explore the relationship between the transmural extent of hyperenhanced myocardium and recovery of regional LV function in patients with reperfused first-time MI at multiple points in time during the first year after admission.

**Methods:** Twenty-two patients with reperfused first-time MI were prospectively enrolled. Cardiac magnetic resonance imaging (MRI), including cine imaging and DE-MRI imaging for injury visualization, was performed 1, 7, 42, 182 and 365 days after admission. LV ejection fraction, end-diastolic volume and end-systolic volume were assessed from the cine images. Size, transmural extent and endocardial extent of hyperenhancement, expressed as a percentage of the total endocardial surface, were determined from the DE-MRI images. Regional wall thickening was determined in 72 LV segments (6 slices, 12 segments in each) derived from the short-axis cine images. Segments were categorized into different groups based on the transmural extent of hyperenhancement assessed by DE-MRI at day 1.

**Results:** The amount of hyperenhanced myocardium decreased, especially during the first week after MI (Fig 1A). Both transmural and endocardial extent of hyperenhancement showed an early decrease (Fig 1B). The LV ejection fraction increased gradually over time (Fig 1C), reflected by an early increase in end-diastolic volume and a gradual decrease in end-systolic volume (Fig 1D). There was a progressive decrease in wall thickening as transmural extent of hyperenhancement increased ( $P < 0.001$ ) (Fig 2). There were varying patterns of regional recovery of wall thickening depending on the localization and the initial transmural extent of hyperenhancement in the segments. Note that the remote LV segments improved significantly in wall thickening during the first week. Vertical bars indicate standard error of the mean. \* $P < 0.05$  versus Day 1; † $P < 0.05$  versus Day 7; ‡ $P < 0.05$  versus Day 42; § $P < 0.05$  versus Day 182.

**Conclusions:** The amount of hyperenhanced myocardium decreases mostly during the first week after MI in patients with reperfused first-time MI. The global LV, however, increases gradually during the first year after MI. The time course of recovery of regional LV function is dependent of transmural extent of hyperenhancement in the region, but also of the surrounding myocardium.

Figure 1

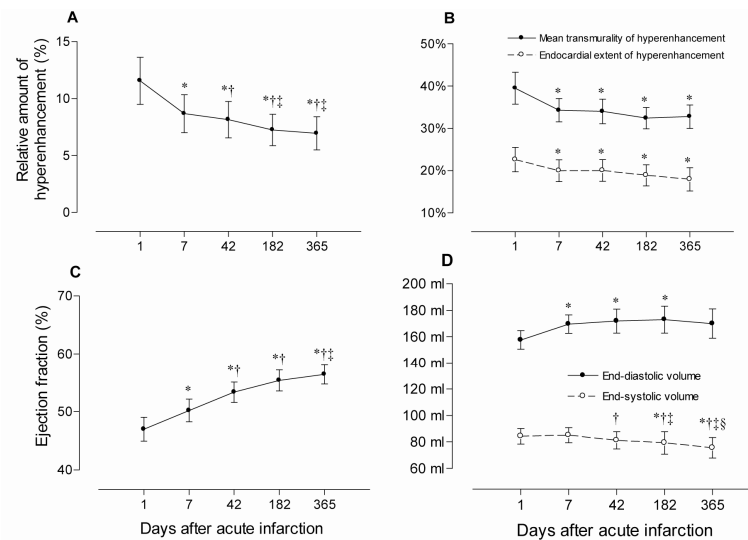


Figure 2

