

Meeting abstract

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1019 Relationship between the data acquisition timing in the cardiac cycle and the intramural infarction extent ratio in late gadolinium-enhanced MRI

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Purpose

The intramural infarction extent ratio (contrast-enhanced region) obtained by late gadolinium-enhanced MRI is a useful index of myocardial viability in patients with myocardial infarction. In this study, the intramural infarction extent ratio in different cardiac phases was investigated.

Methods

The subjects were 15 patients in whom late enhancement due to infarction was observed in the left ventricular myocardium. Revascularization was performed for all patients 11 to 120 days after the onset of infarction. Left ventricular short-axis images were acquired over the range from the apex to the base of the heart in both the systolic phase and the diastolic phase. The acquired images were then divided into 16 segments according to the AHA classification scheme and evaluation was performed.

In these images, the thickness of infarcted myocardium in diastole (a), the thickness of noninfarcted myocardium in diastole (b), the wall thickness in diastole (c), the thickness of infarcted myocardium in systole (a'), the thickness of noninfarcted myocardium in systole (b'), and the wall thickness in systole (c') were measured.

The following equations were then formulated: intramural infarction extent ratio in diastole E_d (%) = $a/c \times 100$, intramural infarction extent ratio in systole E_s (%) = $a'/c' \times 100$, thickening factor of noninfarcted myocardium (k)

= b'/b , thickening factor of infarcted myocardium (α) = a'/a , and difference in infarction extent ratio (%) between diastole and systole = $E_s - E_d$.

Results

The measurement result showed that the thickening factor of infarcted myocardium (α) was close to 1, suggesting that the change in thickness of infarcted myocardium between diastole and systole is small. With regard to the relationship between the extent ratio in diastole (E_d) and the extent ratio difference ($E_s - E_d$), different curves were obtained for different noninfarcted myocardium thickening factors (k), while a correlation was observed between the theoretical values and the measured values. The extent ratio difference ($E_s - E_d$) was small for transmural infarction, with the largest value observed when the extent ratio was about 50%.

Conclusion

The myocardial infarction extent ratio may differ depending on the cardiac phase. Careful consideration is needed when selecting the cardiac phase to be acquired.