

Clinical Investigations

Changes in the Response of Hibernated Myocardium to Inotropic Stimulation after Angioplasty: A Doppler Myocardial Imaging Study

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Summary

Background: Angioplasty of an infarct related artery (IRA) performed several weeks or months after myocardial infarction (MI) may improve myocardial function.

Hypothesis: We hypothesized that, as Doppler myocardial imaging (DMI) allows for the quantitative assessment of the systolic movement of myocardial segments, it may be a sensitive method for assessing changes in regional myocardial contraction and contractile reserve pre and post angioplasty of the IRA.

Methods: In all, 39 patients (30 men, mean age 53.4 ± 8.3 years), 1 to 6 months after MI, who qualified for IRA angioplasty on the basis of myocardial viability in the infarcted zone as demonstrated by dobutamine stress echocardiography, were included in the study. Peak regional myocardial systolic velocities (S wave) of the infarcted segments were measured at rest and during low-dose dobutamine infusion ($15 \mu\text{g}/\text{kg}/\text{min}$) 1 day before angioplasty (Exam 1), 2 to 5 days (Exam 2), and 30 days (Exam 3) after successful angioplasty. The long-axis movement of the mitral annulus and of the basal and medial segments of the posterior (20 patients), anterior (17 patients), and lateral walls (2 patients) was evaluated.

Results: At rest, S-wave velocity of the infarcted segments increased between Exams 1 and 2, without further improvement between Exams 2 and 3 (4.9 ± 1.2 vs. 5.6 ± 1.3 cm/s, $p < 0.05$ and 5.6 ± 1.3 vs. 5.5 ± 1.3 cm/s, NS, respectively). However, S-wave velocities measured during low-dose dobutamine infusion differed significantly both between Exams 1 and 2, and 2 and 3 (7.0 ± 1.5 vs. 7.8 ± 1.8 cm/s; $p < 0.01$; 7.8 ± 1.8 vs. 8.5 ± 1.6 cm/s; $p < 0.05$).

Conclusions: Resting contractility at an infarct zone demonstrated rapid initial improvement after angioplasty of the IRA with no further change, whereas contractile reserve improved not only immediately after angioplasty but also during the next month.

Key words: Doppler myocardial imaging, contractile reserve, angioplasty, myocardial infarction

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Received: March 21, 2002

Accepted with revision: November 5, 2002