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Quantitative Analysis of Myocardial Scar and Edema in Patients with Clinically Suspected Myocarditis

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Background:

The utility of magnetic resonance imaging (MRI) for detecting fibrosis and for assessment of edema in patients with myocarditis is well established. However, there are limited data on the use of this modality in patients with acute myocarditis who have no detectable wall motion abnormalities of the left ventricle (LV) in echocardiography.

Methods:

Sixty eight myocardial segments in 4 patients with symptoms of acute myocarditis (mean age 28.5 ± 7, 100% men) who had no detectable echocardiographic LV abnormalities were evaluated. Two days after the onset of symptoms, three dimensional cine MRI imaging, late gadolinium enhancement and triple inversion recovery turbo spin echo sequence were acquired in short axis projection. Cine MRI imaging was visually assessed for wall motion abnormality (WMA) and late gadolinium enhancement and triple inversion recovery imaging were quantitatively assessed for fibrosis and edema, respectively.

Results:

All patients had evidence of regional fibrosis and edema without left ventricular WMA. One patient had WMA in the right ventricular free wall. Quantitative analysis revealed myocardial fibrosis of 3.8 ± 2.9g (2.9 ± 2.4% of the left ventricular mass) and myocardial edema of 7.2 ± 4.8g (5.3 ± 4% of the left ventricular mass). The left and right ventricular ejection fraction was 54 ± 4.2% and 47 ± 16%, respectively. Maximal troponin and CRP level were 29.6 ± 41.7mcg/l and 53 ± 83mg/l, respectively. ST-T changes were found in all patients in the inferior and lateral leads which correlated with MRI findings that showed myocarditis predominantly in the lateral basal free wall.

Conclusion:

The present ongoing study demonstrated myocardial fibrosis and edema despite the absence of WMA. Acute myocarditis occurs predominantly in the lateral basal free wall. The clinical implications of these findings in this population need to be further studied.