

Clinical Evaluation of Regional Myocardial Viability and Segmental Strain in Adults with Repaired Tetralogy of Fallot

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Background: Myocardial fibrosis detected by late gadolinium enhancement (LGE) using cardiovascular magnetic resonance imaging (CMR) was often present in adults with repaired tetralogy of Fallot (TOF). The purpose of this study was to evaluate regional myocardial viability and segmental strain in repaired TOF patients.

Method: Thirty-one repaired TOF patients (20 males, 11 females, 17.0 ± 6.3 years of age) were examined. Ventricular volumes were measured by cine MRI, and blood flow were quantified by phase-contrast cine MRI. Myocardial viability was evaluated using LGE. Regional myocardial performances in left ventricle were measured by peak systolic radial and circumferential strains using tagged MRI. All patients examined blood samplings including plasma brain natriuretic peptide (BNP).

Results: LGE lesions were detected in 11 patients. All LGE lesions were in medial inferior septal wall. Patients with LGE were significantly older than without (20.3 ± 9.3 vs. 15.1 ± 2.8 years of age, $p = 0.006$). Patients with LGE had lower left ventricular peak radial strain at inferior septal wall than without (1.3 ± 0.7 vs. $3.5 \pm 2.6\%$, $P = 0.026$). Patients with LGE had significantly higher plasma BNP levels than without (35.8 ± 23.2 vs. 19.6 ± 14.9 pg/mL, $P = 0.012$). Left and right ventricular volumes, ejection fraction, pulmonary regurgitant fraction and left ventricular peak circumferential strain, there were no significant differences between patients with LGE and without.

Conclusions: LGE lesions detected in adult patients with repaired TOF could be associated with lower peak radial strain and higher plasma BNP level. There would be good relationships between regional myocardial viability and segmental strain.