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Abstract

Background: The aim of this study was to employ T1 mapping to measure the native T1 relaxation (T1) time of the left ventricle by cardiac magnetic resonance (CMR) to determine the presence and severity of diffuse myocardial fibrosis, and to identify factors independently associated with high T1 time in Asian adults with post-repaired tetralogy of Fallot (rTOF).

Method: Eighty-six rTOF patients who underwent T1 mapping on a 3-T CMR scanner during 2018 to 2020 were included in this retrospective single-center study. The average T1 time was determined using the modified Look Locker inversion recovery (MOLLI) technique, and that value was compared to the reference value for normal population at our center.

Results: The average T1 time was $1,275 \pm 47.5$ milliseconds. Twenty-six patients (30%) who had a T1 time higher than the normal value were assigned to the high T1 group. The median age at CMR was 26 years (range: 9-62), and the median age at TOF repair was 4.8 years (range: 0.4-32.7). Thirty-nine patients required redo pulmonary valve replacement (redo-PVR), and 8 patients developed non-fatal new-onset arrhythmia after CMR. Multivariate analysis revealed smaller body surface area (BSA), longer aortic cross-clamp (AoX) time, and required redo-PVR to be independently associated with a high T1 value. Older age at repair and female gender were not found to independently predict high T1.

Conclusion: Diffuse myocardial fibrosis was identified in 30% of Asian adult rTOF patients. Smaller BSA, longer AoX time, and required redo-PVR were the factors found to independently predict increased native T1 time.

Keywords: native T1 relaxation (T1) time, diffuse myocardial fibrosis, post-repaired tetralogy of Fallot

