

Right Ventricular Evaluation by Echocardiographic Score in Repaired Tetralogy of Fallot

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Background: Cardiac magnetic resonance (CMR) has become a standard tool to evaluate the right ventricle (RV). In repaired tetralogy of Fallot (rTOF), the right ventricular volume load is considered to be one of the key criteria for the pulmonary valve replacement. The objective of this study is to develop echocardiographic score as a parameter to define the right ventricular dilatation in correlation with the CMR measurement.

Methods: Patients with rTOF underwent CMR and echocardiogram. The echocardiographic measurement of cardiac chambers including right and left ventricle (LV) was compared and correlated with the RV volume parameter obtained from CMR. The sensitivity and specificity of the echocardiographic threshold value predict the RV volume were determined. And a scoring system was established.

Results: A total of 91 patients (mean age 14 years, range 12-18, 64 male) were enrolled. The ratio of pulmonary regurgitation (PR) jet width and pulmonary valve annulus diameter (PR/PV) ≥ 0.6 had 92.9% sensitivity and 88.2% specificity to predict pulmonary valve regurgitation fraction (PRF) $\geq 25\%$. The echocardiographic measurement of RV end diastolic diameter index (RVEDdi), right ventricular outflow tract diameter index (RVOTdi) plus RVEDdi, RV/LV dimension ratio and the right atrium area index (RAi) were significantly correlated with the RV end diastolic volume index (RVEDVi) obtained by CMR. With multivariate analysis, the RV/LV ratio ≥ 0.55 and the RAi ≥ 10 ml/m² were correlated with the RVEDVi ≥ 150 mL/m² by CMR. Therefore, the scoring system was established base on the PR/PV, RV/LV ratio and RA dimension. The PR/PV ratio ≥ 0.6 and echocardiographic score ≥ 2 would determine significant PR and RV dilation with the sensitivity 79% and the specificity of 68%.

Conclusion: The rTOF score could be potentially use to assess the severity of the PR and RV dilation and predict the RVEDVi by CMR during the routine cardiology follow- up.