

Evaluation of Right Ventricular Function in Patients Operated for Tetralogy of Fallot by 2D Strain: Comparison with Magnetic Resonance Imaging.

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AIM: Right ventricular (RV) function is a one of the major prognostic factor in patients with operated tetralogy of Fallot (TOF). Two-dimensional speckle tracking (2DST) is a relatively new and objective echocardiographic technique to quantify myocardial strain, providing comprehensive information on ventricular myocardial contractility. In this study we aimed to evaluate RV systolic functions in patients with operated TOF by conventional, Tissue Doppler (TD) and 2DST echocardiography. We also aimed to investigate possible correlation between RV systolic functions and cardiac magnetic resonance imaging (CMRI) parameters.

METHODS: A prospective controlled study was conducted including patients operated for TOF. RV functions were evaluated in patients and controls at transthoracic echocardiogram (Echo) by measurement of RV fractional area change (RVFAC), tricuspid annular plane systolic excursion (TAPSE), velocity of S-wave (Sa) and isovolumic acceleration (IVA) at tricuspid annulus with TD. Additionally, RV global longitudinal systolic strain using 2D-STE was performed in patients and controls. Results of patients were compared to RV indexed end-diastolic volume (EDV), indexed end-systolic volume (ESV), and RV ejection fraction (EF) on CMRI.

RESULTS: Twenty-seven patients (17 male) aged 15-34 years (mean $22.7 \pm 6,7$) and twenty-seven healthy controls age and sex matched were included. Parameters of RV systolic function were significantly lower in patients compared to controls (RVFAC $37 \pm 6\%$ versus $50 \pm 8\%$, TAPSE 18.6 ± 2.4 versus 24.4 ± 2.3 mm, Sa 10.5 ± 2.6 versus 12.7 ± 2 cm/sec, IVA 1.93 ± 1.02 versus 3.75 ± 0.87 m/s², all $p < 0.05$). Mean RV EF value on CMRI is $50.6 \pm 8.7\%$. Global RV systolic strain value was significantly lower in patients compared to controls ($-17.3 \pm 3.1\%$ versus -25.68 ± 3.03). Global RV 2D strain value was correlated well with RV EF and ESV on CMRI (respectively $r = 0.60$, $p < 0.05$, $r = 0.55$, $p < 0.05$). Feasibility, intra- and inter-observer reproducibility of 2D strain was adequate.

CONCLUSIONS: Speckle tracking is a promising method to estimate RV systolic function in patients operated for TOF.