Conclusions Myocardial tissues in patients with TOF indicates hypertrophic cardiomyocytes, thickening endocardium, and interstitial and perivascular fibrosis. These changes are more pronounced in older patients subjected to long-standing hypoxia and pressure overload. RV myocardial remodeling impacts inversely on ventricular systolic and diastolic function in patients with TOF.

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THE IMPACT OF RIGHT VENTRICULAR MYOCARDIAL REMODELING ON VENTRICULAR FUNCTION IN PATIENTS WITH TETRALOGY OF FALLOT

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Objective The purpose of this study was to assess the impact of right ventricular (RV) myocardial histopathologic changes on ventricular function in patients with Tetralogy of Fallot (TOF).

Methods Operatively resected crista supraventricularis muscle from 30 patients undergoing intracardiac repair of TOF were obtained for histopathologic evaluation. RV global longitudinal peak systolic strain (GLS), strain rate (GLSRs), early diastolic strain rate (GLSR_e) and late diastolic strain rate (GLSR_a) were measured by two-dimensional ultrasound speckle tracking imaging (STI) from the apical 4-chamber view.

Results (1) Histopathologic data revealed hypertrophy of the cardiomyocytes, thickening endocardium, and increased interstitial and perivascular collagen in right ventricle in patients with TOF. (2) RV Cardiomyocyte diameter, interstitial collagen volume fraction (CVF) and endocardial thickness were correlated with age ($r_1=0.703$, $P_1=0.000$; $r_2=0.593$, $P_2=0.001$; $r_2=0.549$, $P_2=0.002$). (3) In patients with TOF, RV cardiomyocyte diameter and CVF had correlation with GLSRs ($r_1=-0.614$, $P_1=0.000$; $r_2=-0.517$, $P_2=0.003$). Endocardial thickness was correlated with GLS ($r=-0.432$, $p=0.017$). CVF corresponded with GLSR_e ($r=-0.669$, $p=0.000$). (4) In patients with TOF, RV cardiomyocyte diameter was the independent predictor of RV GLSRs ($\beta=-0.596$, $p=0.002$), endocardial thickness and CVF were the independent predictor of RV GLS ($\beta_1=-0.918$, $P_1=0.001$, $\beta_2=-0.690$, $P_2=0.008$), CVF was the independent predictor of RV GLSR_e ($\beta=-0.618$, $p=0.001$).