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Determinants and Frequency of Left Ventricular Funktion and Remodelling in Patients with corrected Tetralogy of Fallot.

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Objectives: The aim of this study was to identify in asymptomatic Tetralogy of Fallot (ToF) patients after repair the prevalence and determinants of impaired left-sided cardiac function and adverse ventricular remodeling, and the relation of LV dysfunction and remodeling with exercise tolerance.

Methods: In a cross sectional study, 103 ToF patients (median age 16.3 years) in NYHA class I, with surgical repair at a median age of 1.1 years, and 63 age-matched controls were studied. LV, RV function and geometry, LV myocardial extracellular volume (ECV), and left atrial (LA) function were quantified with cardiac magnetic resonance. Peak oxygen consumption (pVO2) was measured by standardized cardio-pulmonary exercise test.

Results: ToF patients had lower LV ejection fraction (EF) ($p=0.001$; 49% below age-adjusted 5th percentile for controls), lower LV mass index ($p=0.003$), lower LV mass-to-volume ratio ($p<0.01$), and impaired LA function. RV mass-to-volume was the best predictor for LV systolic dysfunction and for a lower LV mass-to-volume ratio. LV ECV was higher ($p<0.001$), particularly in females, and associated with subnormal pVO2 ($p=0.037$). A pVO2 below the 3rd percentile reference level was more likely with decreasing LV EF ($p=0.008$), and LV mass-index ($p=0.024$), but independent of RV EF.

Conclusions: In NYHA class I ToF patients, frequent impaired systolic and diastolic LV function, LV remodeling with LV atrophy, a decreased mass-to-volume, and extracellular matrix expansion suggest cardiomyopathic changes. The best predictor for LV systolic dysfunction was the RV mass-to-volume ratio. The subnormal peak oxygen consumption indicates that monitoring of LV status is important for long-term prognosis.