# [Determinants of Left Ventricular Dysfunction and Remodeling in Patients With Corrected Tetralogy of Fallot.](https://www.ncbi.nlm.nih.gov/pubmed/31474177)

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**Take-Home Points:**

* Both impaired systolic and diastolic dysfunction of the LV, adverse remodeling with ECM expansion, myocardial atrophy and a reduced mass/volume ratio are seen in asymptomatic (NYHA I) with rTOF.
* These markers of LV systolic dysfunction are associated with reduced peak oxygen consumption during CPET and thus a predictor of poorer outcome in rTOF.



***Commentary from Dr. Blanche Cupido (Cape Town, South Africa), section editor of ACHD Journal Watch:*** In patients with repaired Tetralogy of Fallot (rTOF), pulmonary regurgitation and RV dilatation and function is usually the focus at clinical follow-up. LV dysfunction too has been found to be a predictor of death and sustained ventricular tachycardia in rTOF. This is a cross-sectional study aiming to assess the prevalence of LV dysfunction in asymptomatic (NYHA I) patients with rTOF and to identify the associations between right heart markers of pathologic remodeling and LV remodeling. Furthermore, in a subset of patients, cardiopulmonary exercise testing was done and the effect of LV remodeling and dysfunction on age-and sex-adjusted peak exercise parameters were assessed.

This was a prospective cross-sectional study at a tertiary center in Sao Paulo, Brazil. One hundred and three consecutive patients with rTOF and NYHA I were enrolled between January 2012 and August 2016. Baseline characteristics are displayed in Table1 below.



Of the 103 patients enrolled with rTOF, 43 were female. Patients were studied at 15.1±8.7 years after surgical repair. Twenty patients had initial shunt implantations, 49% (n=51) had a transannular patch repair. Furthermore, 24% (n=25) had re-operations for mainly PR. There were no differences in age, weight, height, BSA and blood pressure between patients and healthy controls.



Referring to table 2 above, RV mass index, indexed RV end-systolic and end-diastolic volumes as well as RV mass/volume ratios were significantly higher in rTOF patients compared to healthy controls. In patients with rTOF, LV EF, LV mass index, LV mass/volume ratio and LV/RV mass ratio were markedly reduced compared to healthy controls. LVEDVi however did not differ between subjects and controls but correlated with RVEDVi (r=0.36, p<0;.001). LA volumes and function were also decreased compared to controls.



Table 3 shows, for each LV parameter, the proportion of patients with rTOF with values falling out of the corresponding age related 95% CI’s. In patients with rTOF, LVEF correlated with RVEF (p=0.41, p<0.001; 95%CI 0.26-0.54) and RV mass/volume ratio (p=0.33, P<0.001). In total, 23% had moderate LVEF impairment (EF 35%-45%) and 41% had mild dysfunction (EF 45-55%), 36% had normal LVEF.



Figure 2 A above shows that LV systolic dysfunction is associated with remodeling of the RV, as per RV mass-to-volume-ratio. This remained significant in a multivariate module. LV systolic dysfunction is also associated with RVESVi.

Figure 4 shows that 28% of all patients with rTOF had LV mass / volume ratio below the age-specific 5th percentile level in healthy controls.



Figure 4A

Late Gadolinium enhancement (LGE) was performed in 65 of the cohort. In 95% of these patients, the site was the ventricular septum, 46% showed LGE in the RVOT and 13.8% in other areas of the heart but not the free wall.

Cardiopulmonary testing results (CPET) were available in 70 patients with rTOF. VO2max was less than the 3rd centile in 29% of patients.