Right ventricle behavior over time in repaired Tetralogy of Fallot patients

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Background: The progression of right ventricle (RV) dilation, mainly due to pulmonary regurgitation (PR) after Tetralogy of Fallot repair (rToF) with transannular (TP) or infundibular (IP) patch, varies among patients. The onset of RV dysfunction, due to its progressive dilation, is still difficult to predict. Pulmonary valve replacement (PVR) does not seem to affect RV function, if already impaired. Understanding the rate of progression of RV dilation over time could help identify the right timing for PVR in order to prevent RV dysfunction.

Methods: 118 rToF patients (mean age 19.7±10.8 years, 59% men) with TP or IP underwent repeated cardiac magnetic resonance (CMR) exams at two centers in Italy between March 2008 and March 2014. Data regarding date of surgery and type of correction were collected, in addition to CMR parameters (RV/LV dimension and function, pulmonary trunk/arteries stenosis, tricuspid regurgitation and restrictive pattern flow in the pulmonary artery).

Results: In the whole population RV volume barely increased over time, paired with a slight RV ejection fraction reduction. TP patients (86% of whole population) showed a significantly higher rate (p=0.002) of RV dilation (36%) compared to IP ones (19%) and a lower rate of RV reduction (3% vs 25%). RV dilation was not significantly correlated with the type of first surgery (palliative shunt vs repair) or the time elapsed from surgery. Eventually pulmonary trunk/arteries stenosis or restrictive pattern did not significantly influence RV changes over time.

Conclusion: RV dilation did not progress consistently in the majority of our rToF patients, being nearly stable over time. Significant increase in RV dimensions and concurrent impairment in function was observed in a subgroup of patients mainly composed of TP correction, regardless of the presence of a palliative shunt. The mild reduction in RV volume over time occurred in a small subgroup, without any significant correlation with RV restrictive physiology pattern.