

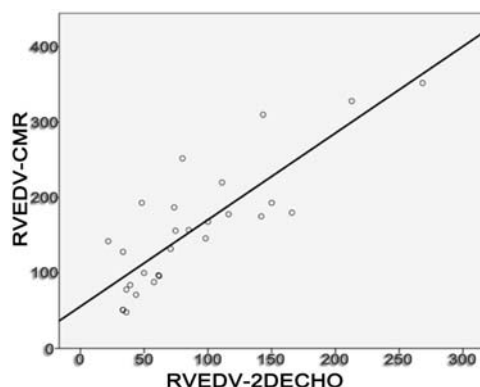
Right ventricular volume in Tetralogy of Fallot: a 2D echocardiographic method validation in comparison with cardiac magnetic resonance.

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INTRODUCTION: Quantification of right ventricular end-diastolic volume (RVEDV) is an essential parameter in the long term follow up of repaired Tetralogy of Fallot (TOF) patients. Currently Cardiac Magnetic Resonance (CMR) is the gold standard, with limitations including anaesthetic procedures in children. Previous 2D-Echocardiography (2DE) quantification has given poor results. The aim of this study is to validate a new echocardiographic method, assuming that RVEDV is composed of two geometrical elements: an ellipsoid shape (from inlet to apex) and a truncated cone shape (outlet).

METHODS: Cross-sectional study of TOF repaired patients. Analysis of the relationship between RVEDV obtained by CMR (RVEDV-CMR) and calculated by 2DE (RVEDV-2DE). Total RVEDV-2DE was obtained by the sum of the two volumes: in apical four chamber view using Simpson formula for an ellipsoid and parasternal short axis view of the right ventricular outflow tract using truncated cone formula. Statistical analysis was performed applying Pearson coefficient method and logistic regression.

RESULTS: Twenty eight repaired TOF patients, mean age 11 years (ranging from 5 to 19) were included. Mean RVEDV-2DE versus RVEDV-CMR were 87.7 versus 156 ml (ranging from 22 versus 48 ml - 268 versus 352 ml). RVEDV-2DE had significant correlation ($p < 0.0001$) with the RVEDV-CMR, Pearson Correlation Coefficient of 0.834. Linear regression model resulting in the following: $RVEDV-CMR = 25.36 + (1.68 \times RVEDV-2DE)$.



CONCLUSIONS: Quantitative assessment of RVEDV-2DE using this 2D-Echocardiographic method is feasible and correlates with RVEDV-CMR in a wide group of children and adolescents with repaired TOF. This information could be useful in patients with contraindications for Cardiac Magnetic Resonance.