



CONGENITAL CARDIOLOGY SOLUTIONS
(PEDIATRIC CARDIOLOGY AND ADULT CONGENITAL HEART DISEASE)

RELATIONSHIP OF RIGHT VENTRICULAR RESTRICTIVE PHYSIOLOGY WITH PULMONARY REGURGITATION AND AGE OF REPAIR IN PATIENTS WITH REPAIRED TETRALOGY OF FALLOT

ACC Poster Contributions

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Session Title: Right Ventricles and Single Ventricles in Adult Congenital Heart Disease

Abstract Category: Adult Congenital Heart Disease

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Background: In patients with repaired tetralogy of Fallot (rTOF), the relationship of right ventricular restrictive physiology with pulmonary regurgitation and right ventricular size is unclear.

Methods: Cardiovascular magnetic resonance results were reviewed of patients with rTOF, ≥ 14 years old, who had completed the Short Form 36, version 2, a clinically validated quality of life assessment, as part of an ongoing trial. Right ventricular inflow curves were calculated by the sum of tricuspid inflow and pulmonary regurgitation, and peak early filling rate (PEFR), peak atrial filling rate (PAFR), early filling fraction (first third of diastole) and deceleration time were measured.

Results: In 51 patients (33 ± 15 years old, 6.2 ± 7.9 years old at repair), right ventricular end-diastolic volume (RVEDV) correlated with pulmonary regurgitant fraction ($r=0.68$, $p<0.001$). RVEDV trended higher in patients with end-diastolic forward flow (EDFF) in the pulmonary artery (153 ± 50 vs. 132 ± 48 ml/m², $p=0.16$), and correlated with PEFR ($r=0.69$, $p<0.001$), PEFR/PAFR ($r=0.39$, $p=0.008$), early filling fraction ($r=0.45$, $p=0.002$), and shorter deceleration time ($r=-0.32$, $p=0.04$). These findings remained significant in patients with EDFF (31/48, 65%), suggestive of increasing restriction. In patients repaired before 1 year old, EDFF was more common (13/15 vs. 18/33, $p=0.03$), with higher PEFR (626 ± 177 vs. 453 ± 202 ml/s, $p<0.01$), PEFR/PAFR (2.7 ± 1.8 vs. 1.6 ± 1.1 , $p=0.04$), and early filling fraction ($47 \pm 13\%$ vs. $37 \pm 13\%$, $p=0.02$). These patients were younger (18 ± 2 vs. 40 ± 13 years old, $p<0.001$), symptomatic in 2/15 (13%) vs. 17/36 (47%), $p=0.10$, had higher Short Form 36 physical component summary scores (age-adjusted Z score $+0.2 \pm 0.8$ vs. -0.5 ± 1.1 , $p=0.03$), and had similar RVEDV (153 ± 41 vs. 143 ± 52 ml/m², $p=0.46$) and referral patterns, with specific clinical concerns in 5/15 (33%) vs. 19/36 (53%), $p=0.43$.

Conclusions: Patients with rTOF and higher RVEDV had evidence of more restrictive physiology, suggesting that restriction is not protective against right ventricular dilatation. Further study is needed to evaluate the importance of patients with earlier repair having evidence of more restrictive right ventricles.