ATRIAL AND VENTRICULAR MECHANICS IN PATIENTS AFTER FONTAN-TYPE PROCEDURES: ATRIOPULMONARY CONNECTION VERSUS EXTRACARDIAC CONDUIT

Poster Contributions
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Background: Differences in systemic venous flow dynamics and energy losses exist in various Fontan-type procedures, which may affect atrial and ventricular filling. Fontan conversion has been advocated in patients with failing atrio pulmonary connection (APC). We tested the hypothesis that atrial and ventricular mechanics differ between two types of Fontan procedures, APC and extracardiac conduit (EC), which have distinctly different systemic venous haemodynamics.

Methods: Twenty-eight Fontan patients (13 APC, 15 EC) aged 19.8±6.5 years were studied. Atrial and systemic ventricular myocardial deformation was determined using speckle-tracking echocardiography, while ventricular volumes and systolic dyssynchrony index were assessed by three-dimensional echocardiography. The results were compared with those in 26 controls.

Results: Compared with controls, patients had significantly lower global ventricular systolic strain in all three dimensions, reduced systolic and early diastolic strain rates (SRs) in more than one dimension, lower ejection fraction, and worse ventricular dyssynchrony. For atrial deformation, patients had lower global and positive strain and conduit and reservoir SRs, and delayed electromechanical coupling. Among patients, those with APC had significantly lower ventricular longitudinal strain and early diastolic SR, worse ventricular dyssynchrony, and reduced atrial positive and negative strain and conduit and active contractile SRs. Atrial global strain (r=0.60, p =0.001) and conduit SR (r=0.49, p=0.008) correlated positively with systemic ventricular early diastolic SR.

Conclusions: Atrial and ventricular mechanics are impaired in patients after Fontan-type operation, which is worse with APC than EC. Our findings provide a mechanical basis for Fontan conversion in patients with failing APC.