STRAIN RATE CORRELATES BETTER THAN TISSUE DOPPLER VALUES IN ESTIMATING VENTRICULAR FILLING PRESSURES IN PATIENTS WITH SINGLE RIGHT VENTRICES

Poster Contributions
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Background: Increased ventricular end-diastolic pressure (VEDP) is a known risk factor for morbidity and mortality in patients with single ventricle physiology. Tissue Doppler imaging (TDI) analysis has been shown to modestly correlate with direct measurement of VEDP. Myocardial deformation imaging, also known as strain (S) and strain rate (SR) imaging, has not yet been compared to VEDP in this patient population. The goal of this study was to evaluate which of these imaging techniques correlates best with VEDP in patients with single right ventricle (RV) physiology.

Methods: Patients with single RV physiology who underwent simultaneous echocardiography and cardiac catheterization were included in this prospective study. Echocardiographic data included global SRe, global SRa, TDI e’, TDI a’ of the RV free wall, and right atrioventricular valve inflow velocities (E and A wave). E/SRe and E/e’ were calculated. VEDP was obtained from the cardiac catheterization report. Correlations of echocardiographic and catheterization variables were examined using Pearson’s correlation. Receiver operating characteristic curves were used to determine echocardiographic predictive variables for VEDP. P < 0.05 was considered significant.

Results: Twenty two patients were studied (16 hypoplastic left heart syndrome, 5 double outlet right ventricle/tetralogy of Fallot, and 1 unbalanced atrioventricular septal defect). Median age at the time of the catheterization was 11.2 months (range 0 - 132 months). Mean VEDP was 9.4 ± 2.8 mmHg. VEDP correlated significantly with E/SRe ratio (r = 0.87) and with global SRe (r = -0.43). There were no significant correlations between VEDP and TDI measurements. ROC curve analysis using an E/SRe cut off of 1.5 showed 79.2% sensitivity for a VEDP greater than 10.

Conclusions: In patients with single right ventricle physiology, VEDP correlated strongly with strain rate and not with TDI measurements. Strain rate measurements should be used to estimate VEDP in this complex patient population rather than TDI. Clinical implications of this imaging modality need to be further investigated in this population.