Left atrial strain reservoir in monitoring heart transplant paediatric patients

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Background: In heart transplant (HT) patients, high LV filling pressure is considered a marker of rejection and predictive of increased mortality.

Purpose: Our study aims to correlate echocardiographic parameters to left-ventricular end diastolic pressure (LVEDP) at cardiac catheterization in transplant recipients.

Methods: This was a retrospective study of 50 HT patients (54% male) who underwent heart transplantation in paediatric age (0-18 years-old). The echocardiographic evaluation was performed within three weeks from the left heart cardiac catheterization. From apical view, we measured: left atrial strain (LAS) indices [atrial contraction (εac), LA filling (reservoir phase, εres), and LA passive emptying (conduit phase, εcon)], mitral doppler E/A, E/e', global longitudinal strain (LVGLS) and strain rate.

Results: Median LVEDP was 10 mmHg (IQR 8.25-12 mmHg) and had the best correlation with decreased εres (r= -0.56, p < 0.0001). The other LAS indices and mitral E/e' correlated less strongly with LVEDP (εac: r= -0.42, p = 0.004; εcon: r= -0.55, p= 0.0001; E/e': r = 0.28, p = 0.04). E/A, LVGLS and LVGLS rate did not correlate with LVEDP. By ROC analysis, εres ≤ 16.3% was predictive of elevated LVEDP with a good sensitivity (86%) and moderate specificity (57%). A multivariate analysis produced εres as the best predictor (p = 0.0001) for high LVEDP.

Conclusions: Non-invasive εres seems to be a good surrogate of invasive LVEDP. Monitoring εres may be of value in HT patients to survey for rejection and graft disfunction.

Abstract Figure. Scatter plots LVEDP-εres correlation