THE CORRELATION OF FUNCTIONAL ECHO PARAMETERS OF RIGHT VENTRICLE AND RIGHT ATRIUM WITH BIOCHEMICAL AND INVASIVE HEMODYNAMIC PARAMETERS AND THE UTILITY OF SPECKLE TRACKING IMAGING TO PREDICT SHORT AND MID-TERM OUTCOMES AFTER REVERSE POTTS SHUNT IN PATIENTS WITH IDIOPATHIC PULMONARY ARTERIAL HYPERTENSION

Shatabdi Giri[1], Prashant Bobhate[2], Santosh Wadile[1]

[1] Kokilaben Dhirubhai Ambani Hospital; Children Heart Centre, [2] Kokilaben Dhirubhai Ambani Hospital and Medical Research Institute, Mumbai, India.; Kokilaben Dhirubhai Ambani Hospital; Children Heart Centre

Correspondence: Prashant Bobhate, prashantbobhate@gmail.com

Background:

Potts shunt has been suggested as effective palliative therapy and a bridge to heart-lung transplant for patients with Idiopathic pulmonary artery hypertension (PAH) not associated with congenital heart disease. However, not all patients may benefit from this high-risk procedure.

Objectives:

Correlation of functional parameters of right atrium and ventricle with invasive hemodynamics and lab parameters. 2. Utility of functional parameters to assess outcomes after reverse Potts shunt.

Methods:

This is a prospective single-center study from April 2015- Ovtober 2020. All patients with PAH on maximal medical therapy and functional class IV or clinical deterioration were included and Patients with significant intra/extra-cardiac shunt were excluded. The primary end point was:- all cause mortality. Correlation was done between RV functional parameters and hemodynamic and biochemical parameters. RV functional parameters were also compared between patients who benefited from physiological Potts shunt and expired patients. Statistical analyses was done using SPSS 20 software and a p value of <0.05 was considered significant. ROC curve analysis with equal importance to sensitivity and specificity was done and Youden's index was calculated as maximum distance from line of equality.

Results:

Our study included 19 patients (14 females and 5 males) with PAH and no intra- or extra-cardiac shunt undergoing Potts shunt (16 surgical Potts shunt and 3 PDA Stent) at a single tertiary care center. The Median follow-up was 38 (range 5-53 months). Right atrial (RA) strain correlated negatively with mean RA pressure ($r2= -0.78$, p value= 0.001) and NT pro-BNP ($r2=-0.62$, p value = 0.01) while right ventricular global longitudinal strain (RVGLS) correlated with cardiac index ($r2= -0.52$, p value= 0.03), Pulmonary vascular resistance index (PVRi) ($r2= 0.6$, p value= 0.01), and NT Pro-BNP ($r2=0.65$, p value= 0.003). RV free wall strain (RVFWS) correlated with cardiac index ($r2= -0.53$, p value= 0.03), PVRi ($r2=0.6$, p value= 0.01) and NT pro-BNP ($r2=0.57$, p value= 0.01). Eight patients died and eleven patients showed sustained clinical and echocardiographic improvement. The patients showing benefit after Potts shunt had significantly lower preoperative RV GLS (-11.35% versus -2.85%, p value:0.002) and pooled RV FWS (-14.8% versus -2.2, p value:0.004) and significantly higher right ventricular fractional area change (FAC) (30.45% versus 7.39%, p value:0.001) than the patients who did not benefit from the procedure.

Conclusion:

Functional ECHO parameters and speckle tracking imaging correlates well with invasive hemodynamic and laboratory parameters and can be helpful in predicting short and midterm outcomes after Potts shunt in patients with Idiopathic pulmonary hypertension.