Assessment of Ventricular Functions of Patients with Pulmonary Hypertension by Standard and Pulsed Wave (PW) Tissue Doppler Echocardiography: Before and After Medical Treatment

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AIM: Our aim is to evaluate right and left ventricular myocardial functions by Standard and pulsed wave tissue Doppler echocardiography (TDE) before and after medical treatment of patients with pulmonary arterial hypertension (PAH).

METHOD: The study included 23 patients with Eisenmenger syndrome associated with congenital heart disease (13 with ventricular septal defect (VSD), 3 with patent ductus arteriosus (PDA) and atrial septal defect (ASD), 2 with atrioventricular septal defect (AVSD), 2 with ASD and VSD, 2 double outlet right ventricle (DORV), 1 with ASD) and 20 healthy control subjects. All patients underwent standard and tissue Doppler echocardiography. Regional parameters were evaluated by the measurement of three different myocard segment (basal lateral wall of right and left ventricle and basal septum) apical four chamber view with PW tissue Doppler. Patients World Health Organization (WHO) functional class, 6-minute walk distance (6MWD), and systemic arterial oxygen saturations (SaO2) and echocardiographic parameters of all patients were measured before treatment and during the treatment course.

RESULTS: Before treatment patients with PAH had significantly greater right ventricular end diastolic diameter, pulmonary artery diameter, mean pulmonary artery pressure, Tricuspid annular plane systolic excursion (TAPSE) and right ventricular ejection fraction were significantly decreased when compared with the control group (3.78±0.98 versus 2.78±0.31 cm, 2.9±0.37 versus 2.4±0.15 cm, 63.2±11.6 versus 14.5±2.8 mm Hg, 1.68±0.18 versus 2.0±0.1 cm, % 31.4±9.8 versus % 56.3±4.7 respectively; all p<0.05).

Isovolumetric relaxation time (IVRT) and myocardial performance index (MPI) were higher in patients with PAH compared with controls (79.1±18.7 versus 48.5±7.2 sn, 0.62±0.9 versus 0.32±0.01 respectively; all p<0.05). After treatment functional capacity and 6MWD were significantly higher and MPI were significantly lower at 6th and 9th months (448±92.4 and 445±62.2 to 361±113 m, 0.52±0.08 to 0.49±0.08 respectively; all p<0.05)

CONCLUSIONS: Right and left ventricular myocardial diastolic function was significantly decreased in patients with severe PAH. Short time after treatment functional capacity, 6MWD and MPI of both ventricles improved significantly. This study suggests that TDE may be useful for estimating prognosis and subclinical changes according to severity of PAH.