Assessment of Right Ventricular Myocardial Systolic Activation In Children With Pulmonary Hypertension Using Tissue Doppler Imaging

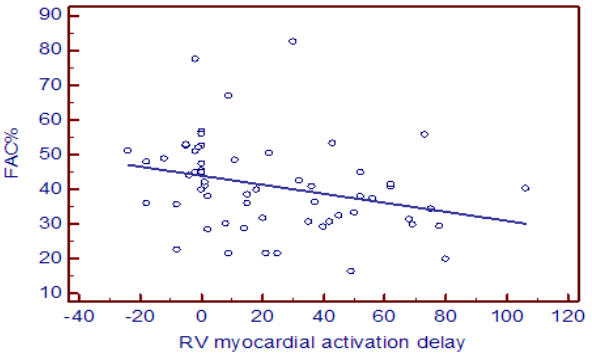
Gomaa W, El sayed M, El shahid G, Roushdy A.
Cardiology department - faculty of medicine, Ain shams university, Cairo, Egypt.

Background: Tissue Doppler imaging (TDI) has provided an objective means to quantify global and regional ventricular functions with improved accuracy and greater reproducibility than conventional echocardiography. This study was conducted to assess right ventricular (RV) myocardial systolic activation by TDI in children with pulmonary arterial hypertension (PAH).
Study Design: Patients and methods:Forty pediatric patients with PAH and 20 healthy controls, underwent standard echocardiogram and TDI. In the apical 4 chamber view the following regional parameters were evaluated in three different myocardial segments (RV basal lateral, basal septal and LV basal lateral): systolic (Sm), early- and late-diastolic (Em and Am) peak velocities. RV myocardial systolic activation delay was defined as the difference in time to peak TDI systolic velocities between the RV basal lateral wall and basal septal. In addition, RV end-diastolic and end-systolic areas were measured to calculate RV fractional area change (FAC).

variables	GROUP TYPE						Paired T test	
	Study group with impaired FAC			Control group			t	P
FAC%	27.616	±	5.225	47.973	±	5.327	12.040	<0.0001
LV. Act. T	151.579	±	40.827	172.55	±	29.253	1.851	0.0721
LV myocardial activation delay	16.842	±	27.425	17.800	±	27.831	-3.913	0.0004
RV . Act.T in msec	172.737	±	48.093	179.30	±	27.166	0.528	0.6005
RV myocardial activation delay	38.000	±	27.333	3.950	±	8.121	-6.569	<0.0001

Comparison between study group with impaired FAC and control group as regard to FAC, LV&RV act T and myocardial delay respectively.

Results: Compared with the control group, pediatric patients with PAH showed reduced RV FAC; 37.6±14% versus 48±5% (P＜0.0024). The patients group showed lower myocardial peak velocities and a significant activation delay compared with controls (P＜0.0001). There was a significant negative correlation between RV myocardial systolic activation delay and RV FAC. RV myocardial systolic activation delay was even present in a subset of patients with normal FAC.



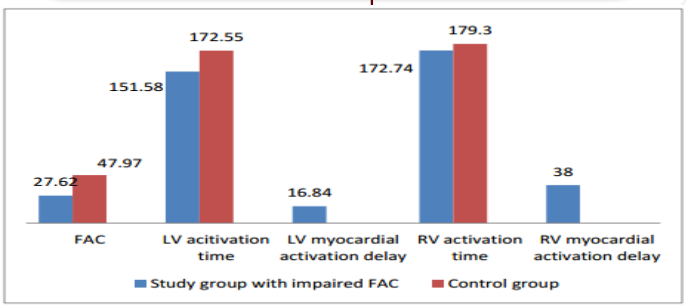


Fig. 46. Study group with impaired FAC and control group as regard to FAC and LV & RV act. T and myocardial delay respectively.

Conclusion: In PAH, RV myocardial systolic activation was markedly delayed and showed significant negative correlation with the RV FAC. RV myocardial systolic activation delay could offer a unique approach to predict early RV dysfunction before the decline in RV FAC is evident.