Detection of right ventricular dysfunction by Pulsed Tissue Doppler Imaging in asymptomatic iron loaded beta thalassemia patients

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Introduction: Iron overload contributes to cardiac dysfunction in patients with beta thalassemia. MRI can detect cardiac iron overload early by parameter termed T2*.

Objective: to clarify the value of Tissue Doppler imaging (TDI) in early detection of global myocardial dysfunction in iron loaded thalassemia patients diagnosed by Cardiac MRI.

Patients and Methods: Two groups were included in the study; group I: 69 asymptomatic thalassemic patients (28 females, 41 males) with a mean age 18.1±7.03 years (range 6 to 39 years). Group II of 41 healthy controls with normal hearts matched for age and sex was selected. Serum Ferritin and cardiac MRI were performed for thalassemic patients to assess the degree of iron overload. Group I was further subdivided into two subgroups; Group Ia (n=26) T2* value<20msec and Group Ib (n=43) T2*>20msec. Conventional echocardiographic measures of LV dimensions and functions were obtained as well as conventional Doppler measures of the LV and RV, and pulmonary artery pressure. TDI measures included systolic and diastolic myocardial velocities (S’, E’, A’ and E’/A’) of the basal segments of septal wall, lateral LV and RV free walls.

Results: Tricuspid annular A’ was significantly higher in Group Ia compared to group Ib (16.69±5.16 cm/sec versus 12.07±4.0 cm/sec, P=0.0001). Tricuspid E’/A’ was significantly low in group Ia compared to Ib and group II (1.05±0.42, 1.47±0.43, 1.6±0.33, P=0.0001). Group Ia (T2*<20msec) had high serum ferritin level compared to group Ib (T2*>20msec) (6357±2478 microgram/L versus 2965±2289 microgram/L (P=0.0001). By univariate and multivariate analysis, Tricuspid E’/A’<1 was significantly correlating with Ferritin and T2* level.

Conclusion: Right ventricular diastolic dysfunction was evident by Tissue Doppler imaging in cardiac iron loaded asymptomatic β thalassemia patients.