Impairment of left ventricular myocardial function in children with chronic renal failure in early stage by 2D-Speckle Tracking Echocardiography

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Introduction: The patients with chronic renal failure more frequently develop left ventricular (LV) structural and functional abnormalities. The aim of this study is to evaluate the LV regional function using 2D-speckle tracking echocardiography (2D-STE) in children with chronic renal failure.

Methods: In total 28 chronic renal failure patients between 6-18 ages and 20 healthy children were included. After standard echocardiographic measurement consisting left ventricle ejection fraction (EF), shortening fraction (SF), mitral E, mitral A as well as tricuspid annular plane systolic excursion (TAPSE) values were measured and also mitral E/A ratio was calculated. Using the 2D-STE method, the strain (S) and strain rate (SRs :systolic, SRe: early diastolic, SRa : late diastolic) values belonging to the longitudinal (L), circumferential (C) and radial (R) functions of the LV have been measured. SRe/a values were also calculated.

Results: Systolic and diastolic functions of LV in both groups were similar. TAPSE values were significantly decreased in children with chronic renal failure comparing to the control group, respectively (21.4 mm and 24.5mm, p<0.05). Longitudinal, circumferential and radial SRs values of the chronic renal failure patients were significantly decreased according to the control group(-1.3±0.4 and -1.5±0.3 p<0.05; -1.6±0.4 and 1.8 ±0.4 p=0.05; 2.1±0.9 and 3.1±1.3, p=0.001 respectively). Besides, on the basis of longitudinal function, the SRe and SRe/a values decreased significantly in children with chronic renal failure (2.1±0.8 and 2.6± 0.7, p<0.05; 1.6±0.7 and 2.4±1.2, p<0.05 respectively). Although, global L,C and R strain (%) values were lower in patient group, no statistical significance was detected.

Conclusions: Although, systolic and diastolic functions of LV during standard examination were normal in children with chronic renal failure, regional LV functions using 2D-STE were impaired. 2D-STE may contribute to early identification of impaired left ventricular myocardial function in children with chronic renal failure.