Impaired myocardial deformation in asymptomatic patients with isolated left ventricular non-compaction

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Objective: The aim was to determine the early regional and global myocardial functional changes and whether the myocardial changes that cannot be detected by conventional echocardiography could be detected by tissue Doppler imaging (TDI) or two-dimensional speckle-tracking echocardiography (STE) in children with isolated left ventricular non-compaction (iLVNC) without symptoms.

Methods: Myocardial velocities and time intervals, longitudinal and circumferential strain (S) and strain rates (SR) determined by TDI and STE in twenty children with iLVNC aged 12.1 years was compared with those in twenty controls. All children underwent echocardiographic assessment using two-dimensional, M-mode, tissue Doppler and speckle-tracking echocardiographies. The myocardium was assessed at three segments; non-compacted (NC), neighbouring NC (NNC) and compacted (C), according to wall characteristics.

Results: According to TDI; isovolumic contraction time (100.5 vs. 69.5, 80.3 vs. 65.5 and 77.3 vs. 65.6 cm/s), isovolumic relaxation time (87.9 vs. 74, 76.7 vs. 66 and 71.9 vs. 63.5 cm/s) and myocardial performance index (0.95 vs. 0.51, 0.7 vs. 0.49 and 0.59 vs. 0.48) were significantly higher, while ejection time (198 vs. 275.8, 224.7 vs. 265.8 and 250.7 vs. 269 ms) were significantly lower in children with iLVNC, at all three segments. According to STE; longitudinal S (-14.4 vs. -23.2 and -18.1 vs. -24.9%) and SR (-0.38 vs. -0.61 and -0.43 vs. -0.83 s⁻¹) and also circumferential S (-19.1 vs. -27.8 and -24 vs. -29.3%) and SR (-0.37 vs. -0.87 and -0.47 vs. -0.85 s⁻¹) were significantly lower in children with iLVNC, in NC and NNC segments. The global longitudinal and circumferential S and SR at all three segments were significantly lower in children with iLVNC. Global longitudinal S were -18 vs. -23.8% and global longitudinal SR were -0.56 vs. -0.84 s⁻¹. Global circumferential S were -24.6 vs. -27.5% and global circumferential SR were -0.63 vs. -0.96 s⁻¹.

Conclusion: Both TDI and STE used to evaluate myocardial function and deformation could detect myocardial dysfunction and impaired deformation in children with iLVNC who are subclinic and whose left ventricular functions are normal by conventional methods.