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The Effect of Albumin:Creatinine Ratio on Standard Echocardiographic Parameters in Adolescent Type 1 Diabetes.

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Introduction: Adolescents with type 1 diabetes (T1D) are at increased risk of early adult-onset cardiovascular disease. This study compared standard echocardiographic parameters in patients screened for the Adolescent Type 1 Diabetes Cardio-Renal Intervention Trial (AddIT) with healthy controls.

Methods: Standard M-mode, B-mode and Doppler echocardiography was performed in all subjects. In subgroup analysis, T1D separated into tertiles according to urinary albumin:creatinine ratio as per the AddIT protocol, were compared with the subgroup of healthy controls that underwent the same baseline clinical assessment including glycaemic measures and serum lipids. Between groups comparisons were performed using Student's t-tests, with p-values <0.05 considered significant.

Results: 188 T1D patients (M:F 93:95; age 14.4±2.1 years; disease duration 7.0 [1.7-15.0] years) and 178 controls (M:F 84:94; age 14.5±1.6 years) were studied. Sex, age and height were similar, but T1D were heavier. T1D had increased systolic (114±10 vs. 110±9 mmHg; p=0.0001) and diastolic blood pressures (62±7 vs. 58±7 mmHg; <0.0001), but decreased resting heart rates (65±9 vs. 68±12 beats per minute; p=0.0312). Left ventricular (LV) dimensions along with indexed LV mass were all similar, except for posterior wall thickness which was increased in T1D (0.66±0.11 vs. 0.64±0.11cm; p=0.0258), as has been previously reported. Systolic function indices, ejection fraction (68±5 vs. 66±5 %; p=0.0020) and mean velocity of circumferential shortening (1.18±0.18 vs. 1.14±0.16 circ/sec; p=0.0161), were increased in T1D. Diastolic function indices, mitral valve E, A and E/A were all similar, but deceleration (154±17 vs. 149±20 msec; p=0.0235) and isovolumetric relaxation times (74±17 vs. 76±8 msec; p=0.0070) were increased. In sub-group analysis, comparing 53 high-risk, 71 medium-risk and 64 low-risk T1D vs. 59 controls, as expected all T1D had increased fasting blood glucose and HbA1c, and also HDL cholesterol. Total and LDL cholesterol and triglycerides were similar. Only LV posterior wall thickness remained increased when comparing the T1D subgroups vs. controls (0.67±0.11 high-risk, 0.66±0.11 medium-risk, 0.67±0.13 low-risk vs. 0.62±0.10 cm controls; p=0.0172, p=0.0327, p=0.0182, respectively).

Conclusions: Adolescent T1D of short to intermediate disease duration, have early suggestion of blood pressure, diastolic dysfunction and left ventricular geometric changes, which may contribute to increased risk of early adult-onset cardiovascular disease