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Assessment of cardiac function in children with type 1 Diabetes Mellitus

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Introduction:
Impairment of cardiac function in patients with type1 Diabetes (T1DM) represents one of the serious complications that may affect the quality of life and prognosis of the disease.
Objective: To evaluate the cardiac function in children with T1DM by conventional and tissue Doppler echocardiography.
Patients and methods:
A prospective study included 40 T1DM patients (age between 6 and 16 years) with more than 5 years duration and 20 age and sex matched healthy children as controls. The patients were subjected to detailed history taking, thorough clinical examination and laboratory investigations including Glycosylated hemoglobin A1C, serum lipids & lipoproteins (serum total cholesterol, triglycerides, LDL cholesterol and HDL cholesterol). Conventional and tissue Doppler echocardiography were done to both patients and controls.
Results:
The study included 16 females and 24 males with mean age ± SD of 12.1 ± 2.39 years and mean duration of diabetes 6.63 ± 1.89 years. Patients had larger dimensions of the aorta (AO), left ventricular end diastolic dimension (LVIDd) and left ventricular end systolic diameter (LVIDs) (P-value 0.047, 0.009 and 0.001 respectively). The early diastolic filling velocity of the tricuspid valve (E wave), late diastolic filling velocity (A wave) and E wave velocity of the mitral valve were found significantly lower in diabetic patients than controls (P-value of 0.023, 0.006 and 0.019 respectively). Diabetic patients had significantly longer Isovolumic Relaxation time (IRT) (P-value of 0.001).
Five patients had right ventricular diastolic dysfunction and another 5 patients had left ventricular diastolic dysfunction. Only one patient had both right and left diastolic dysfynction. There were 28 patients with poor glycemic control but no significant differences between them and those with good glycemic control as regards the echocardiographic data. No significant relationship existed between the duration of DM or HbA1c and the echocardiographic parameters.
Conclusion:
Diabetic children have evidence of diastolic dysfunctions. This highlights the importance of periodic cardiac evaluation with both conventional and tissue Doppler echocardiography for early detection of this dysfunction.