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### **Subclinical Left Ventricular Systolic and Diastolic Dysfunction in Type 1 Diabetic Children and Adolescents with Good Metabolic Control**

*Ozgur S. (1), Yoldas T. (1), Orun U.A (1), Sagsak E. (1,2), Aycan Z. (1,2), Kaya O. (1), Ozgur S. (1), Karademir S. (1)*

*Dr. Sami Ulus Maternity and Children Research and Training Hospital, Pediatric Cardiology, Ankara - Turkey (1)Dr. Sami Ulus Maternity and Children Research and Training Hospital, Pediatric Endocrinology, Ankara - Turkey (2)*

#### **Objective:**

Cardiac dysfunction is a well-known consequence of diabetes and subclinical left ventricular diastolic and systolic dysfunction followed by overt left ventricular dysfunction and finally symptomatic heart failure. This study was designed to assess whether type 1 diabetic children and adolescents with good metabolic control have early echocardiographic signs of subclinical left ventricular dysfunction and whether diabetes duration is of influence, using conventional and non-conventional echocardiographic tools.

#### **Methods:**

A total of 100 patients with type I diabetes mellitus and 80 gender and age-matched healthy controls were included. The cases underwent standard conventional transthoracic echocardiography, tissue Doppler imaging and two dimensional speckle tracking echocardiography. None of the diabetic patients had signs of renal, retinal or neurological complications of the disease and all were good metabolic control (mean HbA<sub>1c</sub> <7.5 %).

#### **Results:**

There was no difference among groups in relation to age, sex, body mass index and blood pressure. Conventional echocardiographic parameters were similar between diabetic and nondiabetic subjects except increased mitral valve peak A wave and significantly lower mitral E/A ration in diabetics. Diabetic patients had more advanced diastolic dysfunction in TDI analysis. In diabetic group, left ventricular global longitudinal strain and strain rate, left ventricular global circumferential strain and strain rate and left ventricular radial strain and strain rate were significantly lower compared with the controls. There was a positive correlation between diabetes duration and cardiac dysfunction.

#### **Conclusion:**

The results of this study showed that the diabetic children and adolescents with good metabolic control had diastolic dysfunction when assessed with either conventional or tissue Doppler echocardiograph. In addition to diastolic dysfunction diabetic patients had subclinical LV systolic dysfunction in the longitudinal and short axis direction with a normal LVEF which can be detected with 2D speckle tracking echocardiography. Diabetic duration was the only independent predictor for the diastolic and systolic dysfunction.