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Levels of endothelial progenitor cells in children and adolescents with type 1 diabetes; an early marker for detection of cardiovascular complications

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Abstract

Background: Type 1 Diabetes Mellitus (T1D) is a chronic metabolic disorder characterized by chronic hyperglycemia. T1D in children and adolescents is considered a high risk factor for the development of cardiovascular disease afterwards in adulthood. Endothelial progenitor cells (EPCs) number and function were found to influence endothelial function and vessels repair. Carotid intima medial thickness (CIMT) measurement has been a method to detect subclinical cardiovascular changes in children and adolescents with T1D, along with lipid profile and markers of glycemic control.

Methods: Sixty children and adolescents with T1D with disease duration exceeding 5 years were recruited from Diabetes clinic Ain Shams University Hospitals. They were compared to 60 age and sex matched healthy controls attending the outpatients' clinics. All subjects were subjected to history taking, examination and blood sample withdrawal for: EPCs, lipid profile; total cholesterol, Triglycerides, high density lipoprotein (HDL) cholesterol, low density lipoprotein (LDL) cholesterol, as well as mean random blood sugar (RBS) and mean HBA1c. Also early morning samples of urine were collected for microalbumin, measurement of carotid intema media thickness was done and nerve conduction velocity study was performed to all patients as well as fundus examination.

Results: EPCs number and percentage were significantly lower in patients' group (P = 0.001). The mean CIMT in patients' group was significantly higher in patients' group compared to control group (P = 0.003). Moreover, patients' group had significantly higher levels of total serum cholesterol (p = 0.001) and LDL-cholesterol (0.015), and lower levels of HDL-cholesterol (p = 0.003) than the control group. There was a statistically significant negative correlation between EPCs percentage and mean RBS (p = 0.022), mean HbA1c% (p = 0.013), the presence of diabetic retinopathy (P = 0.001) but not with diabetic nephropathy or diabetic neuropathy, total serum cholesterol (0.003), LDL cholesterol (p = 0.015) and mean CIMT (P = 0.021).

Conclusion: EPCs percentage is a good predictor for increased CIMT in children with T1D. Yet, further longitudinal studies are needed to confirm this relationship. Children and adolescents with T1D are at increased risk for atherosclerosis and macrovascular complications supported by the increased levels of harmful lipids (total serum cholesterol, triglycerides, LDL cholesterol) and increased mean CIMT. This may contribute to new strategies for early detection of diabetes related complications and intervention to prevent macrovascular complications.

Keywords: diabetes complications, type 1 diabetes, endothelial progenitor cells, carotid intima media thickness, cardiovascular risk.

Biography

Rasha Eladawy was born in 1983. She was granted the Medical doctorate (MD) in 2015 from Ain Shams University, Cairo, Egypt. She a member in the Royal College of Pediatrics and Child Health in London (MRCPCH). She is a lecturer in Faculty of Medicine Ain Shams University in Cairo Egypt Pediatrics Diabetes and Endocrinology Unit. She has 4 international publications. She is the founder for Elag Foundation for management of Diabetic children in Egypt (Charity Organization).

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