

Evaluation of Cardiovascular Disease Risk in Children with Type 1 Diabetes Mellitus by Oscillometric Method and Echocardiography

Statistical analysis

All analyses were carried using SPSS 25.0 (IBM, USA). The findings of the study are expressed as frequency and percentages. Normality test was conducted using the Kolmogorov-Smirnov test. Non-normally distributed variables were presented as the median and interquartile range (IQR) with 25th–75th percentiles, while variables with normal distribution are expressed as mean \pm standard deviation. Categorical variables were compared using the Chi-square test. Fischer's exact test was applied according to the percentage of expected counts. Numerical variables with and without normal distribution were compared using the independent samples t-test and Mann–Whitney U, respectively. The Kruskal–Wallis test was used to compare numerical variables without normal distribution between more than two groups. Spearman correlation analysis was performed to determine the variables associated with EFT, cIMT, AIx@75, and PWV scores and $p < 0.05$ was considered as a statistically significant value. Multivariable logistic regression analysis was performed to detect associated factors with PWV and AIx@75.

Study Protocol

Participants of this cross-sectional, single-center study were recruited from Pediatric Endocrinology department. T1DM patients with a body mass index (BMI) between the 5th and 85th percentile according to age and gender, having this diagnosis for at least 2 years and ages 8–18 years, were consecutively included in the study. Exclusion criteria for the patient were determined to be having any chronic diseases other than T1DM and presence of a congenital and/or acquired heart disease, hypertension etc. Healthy adolescents were recruited from those who applied to the pediatric clinic for annual routine child health check-ups and were healthy. The control group consisted of 87 sex, age and BMI matched healthy children. Exclusion

criteria for the control group were determined to be having any chronic diseases and presence of a congenital and/or acquired heart disease, hypertension etc. Each subjects weight, height measurements were done and BMI was estimated.

In our study, cuff-based validated oscillometric Mobil-O-Graph device (I.E.M., GmbH, Aachen, Germany) was used to PWA. Measurements were taken from the left arm in a room after a minimum rest of 5 minutes. The cuff size was chosen based on the circumference of the middle upper arm.

Echocardiographic examinations were performed by using an ultrasound system (iE33, Philips, The Netherlands, Eindhoven), equipped with a broadband (1-5 MHz) X5-1 transducer. Echocardiographic examinations were obtained by a single experienced pediatric cardiologist blind to diabetes status of participants. Epicardial fat was identified as the echo-free space between the outer wall of the myocardium and the visceral layer of pericardium.

Measurement of cIMT was performed by the same experienced pediatric cardiologist by using Vivid E95 echocardiography machine (GE Vingmed, Horten, Norway) equipped with 9L linear probe (2,4-10 Mhz). cIMT is defined as the distance between the first echogenic line (lumen–intima interface) and the second echogenic line (media–adventitia interface) of the far wall.