The Relationship between Blood Pressure Variability and Left Ventricular Mass Index in Children with Primary Hypertension

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Introduction: Increased blood pressure variability (BPV) is related to subclinical target organ damage and greater incidence of cardiovascular events in adults. There has been limited data on its influence in children. The aim of this study was to investigate the relationship between 24-hour ambulatory blood pressure monitoring (ABPM) indices of BPV and the presence of left ventricular hypertrophy (LVH) in children and adolescents with primary hypertension.

Methods: A total of 85 children and adolescents aged 7-20 years (mean 14.99 ± 2.4) with office hypertension were evaluated. All patients underwent ABPM (Schiller MT-300) as well as standard echocardiographic examination (Vivid 9, GE). BPV was measured as weighted standard deviation (wBPSD) and average real variability (ARV). We also calculated average 24-hour systolic and diastolic blood pressure (aSBP, aDBP) and 24-hour SBP load. Left ventricular mass index (LVMI) was assessed as an indicator of LVH. Data were analyzed using SPSS 17.0 statistical package.

Results: Of the total number of patients 18% was overweight, 39% obese. Ambulatory prehypertension was found in 30.6% of patients, ambulatory hypertension in 54.1%, white coat hypertension in 15.3%, LVH was found in 36 patients (42.4%), and 7 (8.2%) of them had severe LVH. LVMI significantly correlates with body mass index (BMI) (r=0.359; p=0.001). There was no significant correlation between BMI and 24-hour systolic wBPSD (r=0.025; p=0.821), and 24-hour systolic ARV (r=0.024; p=0.83). We found significant correlation between LVMI and BPV indices: 24-hour systolic ARV (r=0.356; p<0.001) and 24-hour systolic wBPSD (r=0.391; p<0.001). LVMI significantly correlated with aSBP (r=0.275; p=0.001) and 24-hour SBP load (r=0.264; p=0.015). By using multiple regression analysis with LVMI as dependent variable and aSBP, 24-hour SBP load, 24-hour systolic wBPSD, 24-hour systolic ARV and BMI as independent variables, only BMI represented an independent predictor of LVMI (p<0.001).

Conclusions: Blood pressure variability indices significantly correlate with LVMI, but they do not represent reliable parameters for identification of patients with LVH. The main independent predictor of LVH in children and adolescents with primary hypertension was BMI. Overweight children with greater blood pressure variability need closer evaluation for LVH.