Plasma adrenomedullin level in children with obesity: relationship to left ventricular function

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Abstract:

Background Obese children are at increased risk for abnormal cardiac structure and function. Little is known about adrenomedullin (AM), a cytokine produced in various organs and tissues, as a biomarker of cardiac hypertrophy in obese children. This study aimed to assess the plasma AM levels in a cohort of obese children and its relationship to left ventricular (LV) functions. Methods The study included 60 obese children and 60 non-obese children matched for age and gender as control group. Blood pressure, serum lipid profile, fasting glucose, insulin and plasma AM and the homeostatic model assessment of insulin resistance (HOMA-IR) were measured. Cardiac dimensions and LV functions were assessed using conventional echocardiography. Results Compared to control subjects, obese children had higher blood pressure (P = 0.01), insulin (P = 0.001), HOMA-IR (P = 0.001), and AM (P = 0.001). Moreover, obese children had higher LV mass index (LVMI) (P = 0.001), indicating LV hypertrophy; prolonged isovolumic relaxation times (P = 0.01), prolonged mitral deceleration time (DcT) (P = 0.01) and reduced ratio of mitral E-to-mitral A-wave peak velocity (P = 0.01), indicating LV diastolic dysfunction. Laboratory abnormalities were only present in children with LV hypertrophy. In multivariate analysis in obese children with LV hypertrophy, AM levels were positively correlated with LVMI [odds ratio (OR) 1.14, 95% confidence interval (CI) 1.08–1.13, P = 0.0001] and mitral DcT (OR 2.25, 95% CI 1.15–2.05, P = 0.01) in the presence of higher blood pressure and HOMA-IR. A cut-off value of AM at 52 pg/mL could differentiate obese children with and without left ventricular hypertrophy at a sensitivity of 94.32% and specificity of 92.45%. Conclusions Plasma AM levels may be elevated in obese children particularly those with LV hypertrophy and is correlated with higher blood pressure and insulin resistance. Measurement of plasma AM levels in obese children may help to identify those at high risk of developing LV hypertrophy and dysfunction.

Keywords:

Adrenomedullin · Left ventricular function · Obesity

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