

Evaluation of the ventricular functions in the obese children by tissue Doppler echocardiography

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Obese children are predisposed to left ventricular hypertrophy and cardiac dysfunction. The aim of this study was to investigate the impact of childhood obesity on ventricular functions using the conventional and tissue Doppler echocardiography.

Sixty-five obese children were examined by conventional and tissue Doppler echocardiography and compared with 35 lean controls. No differences were evident between lean and obese children in age, height, and gender ($p>0.05$). Body mass index ($30.2\pm 3.6 / 17.7\pm 1.8 \text{ kg/m}^2$) were significantly greater in the obese children ($p<0.001$). Systolic and diastolic functions by evaluated conventional echocardiography were normal in obese children. Left ventricle end-diastolic (LVd) diameter, left ventricle-posterior wall end-diastolic (LVPWd) thickness, interventricular septum end-diastolic (IVSd) thickness, left ventricle mass (LVM), left ventricle mass index (LVMI), and relative wall thickness (RWT) were significantly greater in obese children ($p<0.001$). Body mass index was correlated with the LVPWd, IVSd, LVd, LVM, LVMI and RWT ($p<0.001$, $r=0.78$, 0.76 , 0.61 , 0.79 , 0.75 , and 0.48 , respectively).

Peak late relaxation velocity determined by tissue Doppler echocardiography for the left ventricle (A_{dm} : $8.1\pm 1.8 / 7.2\pm 1.4$), interventricular septum (A_{di} : $7.2\pm 1.8 / 6.2\pm 1.2$), and right ventricle (A_{dt} : $13.2\pm 2.6 / 10.7\pm 2.5$), were significantly higher in obese group ($p<0.05$). The early to late relaxation velocity ratio for the left ventricle (E_{dm}/A_{dm} : $2.4\pm 0.6/2.9\pm 0.7$), interventricular septum (E_{di}/A_{di} : $2.2\pm 0.7/2.6\pm 0.8$), and right ventricle (E_{dt}/A_{dt} : $1.4\pm 0.2/1.8\pm 0.5$) were significantly lower in obese group compared the control group ($p<0.05$). E/E_{dm} was found to be higher in the obese group than the control group ($5.9\pm 1.5/5.1\pm 1$, $p<0.01$). We found the significantly positive correlation between the LVM and A_{dm} , E/E_{dm} ($p<0.05$, $r=0.24$, 0.22 , and 0.22 respectively). Significantly negative correlation was found between the LVM and E_{dm}/A_{dm} ($p<0.001$, $r= -0.37$).

Left ventricular hypertrophy, as evidenced by increased LV mass, was present in obese children. Higher body mass index associated with left ventricle hypertrophy. In our study, tissue Doppler echocardiography revealed subclinical changes in diastolic function of the left ventricle, interventricular septum and right ventricle. These data suggest that indexes of diastolic function, including tissue Doppler measures, was significantly impaired in obese children, and these changes were significantly correlated with LVM.