Evaluation of left ventricular function by echocardiography, tissue Doppler imaging and carotid intima-media thickness in obese adolescents with non-alcoholic fatty liver disease

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We aimed to evaluate left ventricular (LV) systolic/diastolic functions in obese adolescents with nonalcoholic fatty liver disease (NAFLD) by conventional echocardiography and pulsed-wave tissue Doppler imaging (PW-TDI) and investigate relationships between carotid intima-media thickness (CIMT) and LV function. 181 obese adolescents and 68 healthy controls were enrolled for the study. LV enddiastolic, end-systolic, left atrial (LA) diameters, left ventricular mass (LVM) were higher in both obese groups when compared with controls. By PW-Doppler echocardiography and PW-TDI, NAFLD group had normal LV systolic function, impaired diastolic functions and decreased global systolic and diastolic myocardial performance. In NAFLD patients, LVM were positively correlated with HOMA-IR and serum alanine aminotransferase (ALT). CIMT were positively correlated with HOMA-IR, ALT and LVM. By multiple stepwise regression analysis, ALT (β: 0.124; p=0.026), HOMA-IR (β: 0.243; p=0.0001), LVM (β: 0.874; p=0.0001) were found as independent parameters associated with increased CIMT. Multivariate regression analysis revealed HOMA-IR as an independent predictor of increased LVM with an odds ratio of 1.4 and BMI as an independent predictor of increased CIMT with an odds ratio of 10. In conclusion, we suggest to use PW-TDI to detect early LV dysfunction at an earlier stage in obese adolescents with NAFLD for careful monitoring of cardiovascular risk. We showed that insulin resistance have a significant independent impact on both CIMT and on LV remodelling in the absence of diabetes in NAFLD patients.