

Cardiac functions, intima-media thickness and epicardial adipose tissue in obese children with nonalcoholic fatty liver disease: Echocardiographic and tissue Doppler imaging study

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Abstract

Aim: Nonalcoholic fatty liver disease (NAFLD) encompasses a range of liver histology severity and outcomes in the absence of chronic alcohol use. The recent rise in the prevalence rates of overweight and obesity likely explains the NAFLD epidemic worldwide. The aim of recent study was to evaluate the effect of obesity on systolic and diastolic cardiac functions, intima-media thickness (IMT) and epicardial adipose tissue in obese children with NAFLD.

Materials and Methods: Ninety three of 400 obese patients with NAFLD were compared with age and sex matched 150 controls. Serum lipids', cholesterol, glucose, insulin, and liver enzymes' levels were measured during the fasting state. A complete echocardiographic study including M-mode, Doppler and tissue Doppler imaging (TDI) was performed. Also, IMT was measured from common carotid artery and epicardial adipose tissue thickness was measured during end-diastole from the parasternal long axis views. The patients with NAFLD were classified into three subgroups according to ultrasonographic visualizing (Stage 0, 1 and 2).

Results: The patients with NAFLD had a significantly higher body mass index ($29,53 \pm 3,81$ vs. $18,53 \pm 2,70$ kg/m², $P < 0.001$), total adipose mass ($40,33 \pm 6,40$ vs. $18,08 \pm 5,01$ % $P < 0.001$) higher insulin ($15,19 \pm 15,96$ vs. $6,53 \pm 2,83$ mIU/ml, $P < 0.001$), and total cholesterol levels ($163,20 \pm 36,71$ vs. $150,71 \pm 24,02$ mg/dL, $P = 0.002$). Increased thickness of the intraventricular septum, posterior wall ($0,749 \pm 0,168$ vs. $0,630 \pm 0,129$, $P < 0.001$; $0,768 \pm 0,153$ vs. $0,671 \pm 0,152$ mm, $P < 0.001$), and larger LV mass and LV mass index ($129,387 \pm 43,695$ vs. $93,861 \pm 32,016$ g, $P < 0.001$ and $41,572 \pm 9,286$ vs. $30,856 \pm 8,216$ g/m^{2.7}, $P < 0.001$, respectively) were found in NAFLD group. NAFLD group had higher Tei index values on both ventricles (LV $0,397 \pm 0,062$ vs. $0,372 \pm 0,060$ $P < 0.001$, RV $0,416 \pm 0,061$ vs. $0,385 \pm 0,052$ $P < 0.001$ and septum $0,384 \pm 0,052$ vs. $0,368 \pm 0,042$ $P < 0.001$, respectively). Also, IMT of common carotid artery and epicardial adipose tissue thickness were significantly higher in NAFLD group. Only total cholesterol level, total adipose mass and mitral lateral annulus systolic motion velocity were statistically different in two stages of NAFLD.

Conclusion: In conclusion patients with NAFLD had mildly altered LV and RV functions and increased IMT and epicardial adipose tissue thickness. Also, liver steatosis was positively associated with total adipose mass percentage and interventricular septum systolic thickness.