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Prominent Lipid Parameters Correlated with Trunk-to-Leg and Appendicular Fat Ratios in Severe Pediatric Obesity

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Abstract : The examination of both serum lipid fractions and body's lipid composition are quite informative during the evaluation of obesity stages. Within this context, alterations in lipid parameters are commonly observed. The variations in the fat distribution of the body are also noteworthy. Total cholesterol (TC), triglycerides (TRG), low density lipoprotein-cholesterol (LDL-C), high density lipoprotein-cholesterol (HDL-C) are considered as the basic lipid fractions. Fat deposited in trunk and extremities may give considerable amount of information and different messages during discrete health states. Ratios are also derived from distinct fat distribution in these areas. Trunk-to-leg fat ratio (TLFR) and trunk-to-appendicular fat ratio (TAFR) are the most recently introduced ratios. In this study, lipid fractions and TLFR, as well as TAFR, were evaluated, and the distinctions among healthy, obese (OB), and morbid obese (MO) groups were investigated. Three groups [normal body mass index (N-BMI), OB, MO] were constituted from a population aged 6 to 18 years. Ages and sexes of the groups were matched. The study protocol was approved by the Non-interventional Ethics Committee of Tekirdag Namik Kemal University. Written informed consent forms were obtained from the parents of the participants. Anthropometric measurements (height, weight, waist circumference, hip circumference, head circumference, neck circumference) were obtained and recorded during the physical examination. Body mass index values were calculated. Total, trunk, leg, and arm fat mass values were obtained by TANITA Bioelectrical Impedance Analysis. These values were used to calculate TLFR and TAFR. Systolic (SBP) and diastolic blood pressures (DBP) were measured. Routine biochemical tests including TC, TRG, LDL-C, HDL-C, and insulin were performed. Data were evaluated using SPSS software. p value smaller than 0.05 was accepted as statistically significant. There was no difference among the age values and gender ratios of the groups. Any statistically significant difference was not observed in terms of DBP, TLFR as well as serum lipid fractions. Higher SBP values were measured both in OB and MO children than those with N-BMI. TAFR showed a significant difference between N-BMI and OB groups. Statistically significant increases were detected between insulin values of N-BMI group and OB as well as MO groups. There were bivariate correlations between LDL and TLFR (r=0.396; p=0.037) as well as TAFR values (r=0.413; p=0.029) in MO group. When adjusted for SBP and DBP, partial correlations were calculated as (r=0.421; p=0.032) and (r=0.438; p=0.025) for LDL-TLFR as well as LDL-TAFR, respectively. Much stronger partial correlations were obtained for the same couples (r=0.475; p=0.019 and r=0.473; p=0.020, respectively) upon controlling for TRG and HDL-C. Much stronger partial correlations observed in MO children emphasize the potential transition from morbid obesity to metabolic syndrome. These findings have concluded that LDL-C may be suggested as a discriminating parameter between OB and MO children.

Keywords : children, lipid parameters, obesity, trunk-to-leg fat ratio, trunk-to-appendicular fat ratio
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