

Laboratory Indices in Late Childhood Obesity: The Importance of DONMA Indices

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Abstract : Obesity in childhood establishes a ground for adulthood obesity. Especially morbid obesity is an important problem for the children because of the associated diseases such as diabetes mellitus, cancer and cardiovascular diseases. In this study, body mass index (BMI), body fat ratios, anthropometric measurements and ratios were evaluated together with different laboratory indices upon evaluation of obesity in morbidly obese (MO) children. Children with nutritional problems participated in the study. Written informed consent was obtained from the parents. Study protocol was approved by the Ethics Committee. Sixty-two MO girls aged 129.5±35.8 months and 75 MO boys aged 120.1±26.6 months were included into the scope of the study. WHO-BMI percentiles for age-and-sex were used to assess the children with those higher than 99th as morbid obesity. Anthropometric measurements of the children were recorded after their physical examination. Bio-electrical impedance analysis was performed to measure fat distribution. Anthropometric ratios, body fat ratios, Index-I and Index-II as well as insulin sensitivity indices (ISIs) were calculated. Girls as well as boys were binary grouped according to homeostasis model assessment-insulin resistance (HOMA-IR) index of ≤ 2.5 and > 2.5, fasting glucose to insulin ratio (FGIR) of ≤ 6 and > 6 and quantitative insulin sensitivity check index (QUICKI) of ≤ 0.33 and > 0.33 as the frequently used cut-off points. They were evaluated based upon their BMIs, arms, legs, trunk, whole body fat percentages, body fat ratios such as fat mass index (FMI), trunk-to-appendicular fat ratio (TAFR), whole body fat ratio (WBFR), anthropometric measures and ratios [waist-to-hip, head-to-neck, thigh-to-arm, thigh-to-ankle, height/2-to-waist, height/2-to-hip circumference (C)]. SPSS/PASW 18 program was used for statistical analyses. $p \leq 0.05$ was accepted as statistically significance level. All of the fat percentages showed differences between below and above the specified cut-off points in girls when evaluated with HOMA-IR and QUICKI. Differences were observed only in arms fat percent for HOMA-IR and legs fat percent for QUICKI in boys ($p \leq 0.05$). FGIR was unable to detect any differences for the fat percentages of boys. Head-to-neck C was the only anthropometric ratio recommended to be used for all ISIs ($p \leq 0.001$ for both girls and boys in HOMA-IR, $p \leq 0.001$ for girls and $p \leq 0.05$ for boys in FGIR and QUICKI). Indices which are recommended for use in both genders were Index-I, Index-II, HOMA/BMI and log HOMA ($p \leq 0.001$). FMI was also a valuable index when evaluated with HOMA-IR and QUICKI ($p \leq 0.001$). The important point was the detection of the severe significance for HOMA/BMI and log HOMA while they were evaluated also with the other indices, FGIR and QUICKI ($p \leq 0.001$). These parameters along with Index-I were unique at this level of significance for all children. In conclusion, well-accepted ratios or indices may not be valid for the evaluation of both genders. This study has emphasized the limiting properties for boys. This is particularly important for the selection process of some ratios and/or indices during the clinical studies. Gender difference should be taken into consideration for the evaluation of the ratios or indices, which will be recommended to be used particularly within the scope of obesity studies.

Keywords : anthropometry, childhood obesity, gender, insulin sensitivity index

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