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The Relationship between Body Fat Percent and Metabolic Syndrome Indices in Childhood Morbid Obesity

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Abstract : Metabolic syndrome (MetS) is characterized by a series of biochemical, physiological and anthropometric indicators and is a life-threatening health problem due to its close association with chronic diseases such as diabetes mellitus, hypertension, cancer and cardiovascular diseases. The syndrome deserves great interest both in adults and children. Central obesity is the indispensable component of MetS. Particularly, children, who are morbidly obese have a great tendency to develop the disease, because they are under the threat in their future lives. Preventive measures at this stage should be considered. For this, investigators seek for an informative scale or an index for the purpose. So far, several, but not many suggestions come into the stage. However, the diagnostic decision is not so easy and may not be complete particularly in the pediatric population. The aim of the study was to develop a MetS index capable of predicting MetS, while children are at the morbid obesity stage. This study was performed on morbid obese (MO) children, which were divided into two groups. Morbid obese children, who do not possess MetS criteria comprised the first group (n=44). The second group was composed of children (n=42) with MetS diagnosis. Parents were informed about the signed consent forms, which are required for the participation of their children in the study. The approval of the study protocol was taken from the institutional ethics committee of Tekirdag Namik Kemal University. Helsinki Declaration was accepted prior to and during the study. Anthropometric measurements including weight, height, waist circumference (WC), hip C, head C, neck C, biochemical tests including fasting blood glucose (FBG), insulin (INS), triglycerides (TRG), high density lipoprotein cholesterol (HDL-C) and blood pressure measurements (systolic (SBP) and diastolic (DBP)) were performed. Body fat percentage (BFP) values were determined by TANITA's Bioelectrical Impedance Analysis technology. Body mass index and MetS indices were calculated. The equations for MetS index (MetSI) and advanced Donma MetS index (ADMI) were [(INS/FBG)/(HDL-C/TRG)]*100 and MetSI*[(SBP+DBP/Height)], respectively. Descriptive statistics including median values, compare means tests, correlation-regression analysis were performed within the scope of data evaluation using the statistical package program, SPSS. Statistically significant mean differences were determined by a p value smaller than 0.05. Median values for MetSI and ADMI in MO (MetS-) and MO (MetS+) groups were calculated as (25.9 and 36.5) and (74.0 and 106.1), respectively. Corresponding mean±SD values for BFPs were 35.9±7.1 and 38.2±7.7 in groups. Correlation analysis of these two indices with corresponding general BFP values exhibited significant association with ADMI, close to significance with MetSI in MO group. Any significant correlation was found with neither of the indices in MetS group. In conclusion, important associations observed with MetS indices in MO group were quite meaningful. The presence of these associations in MO group was important for showing the tendency towards the development of MetS in MO (MetS-) participants. The other index, ADMI, was more helpful for predictive purpose.

Keywords : body fat percentage, child, index, metabolic syndrome, obesity
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