

An Anthropometric Index Capable of Differentiating Morbid Obesity from Obesity and Metabolic Syndrome in Children

Authors : Mustafa Metin Donma

Abstract : Circumference measurements are important because they are easily obtained values for the identification of the weight gain without determining body fat. They may give meaningful information about the varying stages of obesity. Besides, some formulas may be derived from a number of body circumference measurements to estimate body fat. Waist (WC), hip (HC) and neck (NC) circumferences are currently the most frequently used measurements. The aim of this study was to develop a formula derived from these three anthropometric measurements, each giving a valuable information independently, to question whether their combined power within a formula was capable of being helpful for the differential diagnosis of morbid obesity without metabolic syndrome (MetS) from MetS. One hundred and eighty seven children were recruited from the pediatrics outpatient clinic of Tekirdag Namik Kemal University Faculty of Medicine. The parents of the participants were informed about asked to fill and sign the consent forms. The study was carried out according to the Helsinki Declaration. The study protocol was approved by the institutional non-interventional ethics committee. The study population was divided into four groups as normal-body mass index (N-BMI), obese (OB), morbid obese (MO) and MetS, which were composed of 35, 44, 75 and 33 children, respectively. Age- and gender-adjusted BMI percentile values were used for the classification of groups. The children in MetS group were selected based upon the nature of the MetS components described as MetS criteria. Anthropometric measurements, laboratory analysis and statistical evaluation confined to study population were performed. Body mass index values were calculated. A circumference index, advanced Donma circumference index (ADCI) was introduced as $WC*HC/NC$. The statistical significance degree was chosen as p value smaller than 0.05. Body mass index values were 17.7 ± 2.8 , 24.5 ± 3.3 , 28.8 ± 5.7 , 31.4 ± 8.0 kg/m², for N-BMI, OB, MO, MetS groups, respectively. The corresponding values for ADCI were 165 ± 35 , 240 ± 42 , 270 ± 55 , and 298 ± 62 . Significant differences were obtained between BMI values of N-BMI and OB, MO, MetS groups ($p=0.001$). Obese group BMI values also differed from MO group BMI values ($p=0.001$). However, the increase in MetS group compared to MO group was not significant ($p=0.091$). For the new index, significant differences were obtained between N-BMI and OB, MO, MetS groups ($p=0.001$). Obese group ADCI values also differed from MO group ADCI values ($p=0.015$). A significant difference between MO and MetS groups was detected ($p=0.043$). The correlation coefficient value and the significance check of the correlation was found between BMI and ADCI as $r=0.0883$ and $p=0.001$ upon consideration of all participants. In conclusion, in spite of the strong correlation between BMI and ADCI values obtained when all groups were considered, ADCI, but not BMI, was the index, which was capable of differentiating cases with morbid obesity from cases with morbid obesity and MetS.

Keywords : anthropometry, body mass index, child, circumference, metabolic syndrome, obesity

Conference Title : ICO 2024 : International Conference on Obesity

Conference Location : Istanbul, Türkiye

Conference Dates : March 11-12, 2024