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The Relationship between Anthropometric Obesity Indices and Insulin in Children with Metabolic Syndrome

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Abstract : The number of indices developed for the evaluation of obesity both in adults and pediatric population is ever increasing. These indices are also used in cases with metabolic syndrome (MetS), mostly the ultimate form of morbid obesity. Aside from anthropometric measurements, formulas constituted using these parameters also find clinical use. These formulas can be listed as two groups; being weight-dependent and –independent. Some are extremely sophisticated equations and their clinical utility is questionable in routine clinical practice. The aim of this study is to compare presently available obesity indices and find the most practical one. Their associations with MetS components were also investigated to determine their capacities in differential diagnosis of morbid obesity with and without MetS. Children with normal body mass index (N-BMI) and morbid obesity were recruited for this study. Three groups were constituted. Age- and sex- dependent BMI percentiles for morbid obese (MO) children were above 99 according to World Health Organization tables. Of them, those with MetS findings were evaluated as MetS group. Children, whose values were between 85 and 15 were included in N-BMI group. The study protocol was approved by the Ethics Committee of the Institution. Parents filled out informed consent forms to participate in the study. Anthropometric measurements and blood pressure values were recorded. Body mass index, hip index (HI), conicity index (CI), triponderal mass index (TPMI), body adiposity index (BAI), body shape index (ABSI), body roundness index (BRI), abdominal volume index (AVI), waist-to-hip ratio (WHR) and waist circumference+hip circumference/2 ((WC+HC)/2) were the formulas examined within the scope of this study. Routine biochemical tests including fasting blood glucose (FBG), insulin (INS), triglycerides (TRG), high density lipoprotein-cholesterol (HDL-C) were performed. Statistical package program SPSS was used for the evaluation of study data. $p<0.05$ was accepted as the statistical significance degree. Hip index did not differ among the groups. A statistically significant difference was noted between N-BMI and MetS groups in terms of ABSI. All the other indices were capable of making discrimination between N-BMI-MO, N-BMI- MetS and MO-MetS groups. No correlation was found between FBG and any obesity indices in any groups. The same was true for INS in N-BMI group. Insulin was correlated with BAI, TPMI, CI, BRI, AVI and (WC+HC)/2 in MO group without MetS findings. In MetS group, the only index, which was correlated with INS was (WC+HC)/2. These findings have pointed out that complicated formulas may not be required for the evaluation of the alterations among N-BMI and various obesity groups including MetS. The simple easily computable weight-independent index, (WC+HC)/2, was unique, because it was the only index, which exhibits a valuable association with INS in MetS group. It did not exhibit any correlation with other obesity indices showing associations with INS in MO group. It was concluded that (WC+HC)/2 was pretty valuable practicable index for the discrimination of MO children with and without MetS findings.

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