

A New Index for the Differential Diagnosis of Morbid Obese Children with and without Metabolic Syndrome

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Abstract : Metabolic syndrome (MetS) is a severe health problem which is common among obese individuals. The components of MetS are rather stable in adults compared to the components discussed for children. Due to the ambiguity in this group of the population, how to diagnose MetS in morbid obese (MO) children still constitutes a matter of discussion. For this purpose, a formula, which facilitates the diagnosis of MetS in MO children, was investigated. The aim of this study was to develop a formula which was capable of discriminating MO children with and without MetS findings. Study population comprised MO children. Age and sex-dependent body mass index (BMI) percentiles of the children were above 99. Metabolic syndrome components were also determined. Elevated systolic and diastolic blood pressures (SBP and DBP), elevated fasting blood glucose (FBG), elevated triglycerides (TRG), and/or depressed high density lipoprotein cholesterol (HDL-C) in addition to central obesity were listed as MetS components for each child. Presence of at least two of these components confirmed that the case was MetS. Two groups were constituted. In the first group, there were forty-two MO children without MetS components. Second group was composed of forty-four MO children with at least two MetS components. Anthropometric measurements, including weight, height, waist, and hip circumferences, were performed following physical examination. Body mass index and homeostatic model assessment of insulin resistance values were calculated. Informed consent forms were obtained from the parents of the children. Institutional Non-Interventional Ethics Committee approved the study design. Blood pressure values were recorded. Routine biochemical analysis, including FBG, insulin (INS), TRG, HDL-C were performed. The performance and the clinical utility of the Diagnostic Obesity Notation Model Assessment Metabolic Syndrome Index (DONMA MetS index) $[(INS/FBG)/(HDL-C/TRG)*100]$ was tested. Appropriate statistical tests were applied to the study data. p value smaller than 0.05 was defined as significant. Metabolic syndrome index values were 41.6 ± 5.1 in MO group and 104.4 ± 12.8 in MetS group. Corresponding values for HDL-C values were 54.5 ± 13.2 mg/dl and 44.2 ± 11.5 mg/dl. There were statistically significant differences between the groups ($p<0.001$). Upon evaluation of the correlations between MetS index and HDL-C values, a much stronger negative correlation was found in MetS group ($r=-0.515$; $p=0.001$) in comparison with the correlation detected in MO group ($r=-0.371$; $p=0.016$). From these findings, it was concluded that the statistical significance degree of the difference between MO and MetS groups was highly acceptable for this recently introduced MetS index as expected. This was due to the involvement of all of the biochemically defined MetS components into the index. This is particularly important because each of these four parameters used in the formula is cardiac risk factor. Aside from discriminating MO children with and without MetS findings, MetS index introduced in this study is important from the cardiovascular risk point of view in MetS group of children.

Keywords : children, fasting blood glucose, high density lipoprotein cholesterol, index, insulin, metabolic syndrome, morbid obesity, triglycerides.

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