

Understanding the Nature of Blood Pressure as Metabolic Syndrome Component in Children

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Abstract : Pediatric overweight and obesity need attention because they may cause morbid obesity, which may develop metabolic syndrome (MetS). Criteria used for the definition of adult MetS cannot be applied for pediatric MetS. Dynamic physiological changes that occur during childhood and adolescence require the evaluation of each parameter based upon age intervals. The aim of this study is to investigate the distribution of blood pressure (BP) values within diverse pediatric age intervals and the possible use and clinical utility of a recently introduced Diagnostic Obesity Notation Model Assessment Tension (DONMA tense) Index derived from systolic BP (SBP) and diastolic BP (DBP) $[SBP+DBP/200]$. Such a formula may enable a more integrative picture for the assessment of pediatric obesity and MetS due to the use of both SBP and DBP. 554 children, whose ages were between 6-16 years participated in the study; the study population was divided into two groups based upon their ages. The first group comprises 280 cases aged 6-10 years (72-120 months), while those aged 10-16 years (121-192 months) constituted the second group. The values of SBP, DBP and the formula $(SBP+DBP/200)$ covering both were evaluated. Each group was divided into seven subgroups with varying degrees of obesity and MetS criteria. Two clinical definitions of MetS have been described. These groups were MetS3 (children with three major components), and MetS2 (children with two major components). The other groups were morbid obese (MO), obese (OB), overweight (OW), normal (N) and underweight (UW). The children were included into the groups according to the age- and sex-based body mass index (BMI) percentile values tabulated by WHO. Data were evaluated by SPSS version 16 with $p < 0.05$ as the statistical significance degree. Tension index was evaluated in the groups above and below 10 years of age. This index differed significantly between N and MetS as well as OW and MetS groups ($p = 0.001$) above 120 months. However, below 120 months, significant differences existed between MetS3 and MetS2 ($p = 0.003$) as well as MetS3 and MO ($p = 0.001$). In comparison with the SBP and DBP values, tension index values have enabled more clear-cut separation between the groups. It has been detected that the tension index was capable of discriminating MetS3 from MetS2 in the group, which was composed of children aged 6-10 years. This was not possible in the older group of children. This index was more informative for the first group. This study also confirmed that 130 mm Hg and 85 mm Hg cut-off points for SBP and DBP, respectively, are too high for serving as MetS criteria in children because the mean value for tension index was calculated as 1.00 among MetS children. This finding has shown that much lower cut-off points must be set for SBP and DBP for the diagnosis of pediatric MetS, especially for children under-10 years of age. This index may be recommended to discriminate MO, MetS2 and MetS3 among the 6-10 years of age group, whose MetS diagnosis is problematic.

Keywords : blood pressure, children, index, metabolic syndrome, obesity

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