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Cobalamin, Folate and Metabolic Syndrome Parameters in Pediatric Morbid Obesity and Metabolic Syndrome

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Abstract : Obesity is known to be associated with many clinically important diseases including metabolic syndrome (MetS). Vitamin B₁₂ plays essential roles in fat and protein metabolisms and its cooperation with vitamin B₉is well-known. The aim of this study is to investigate the possible contributions as well as associations of these micronutrients upon obesity and MetS during childhood. A total of 128 children admitted to Namik Kemal University, Medical Faculty, Department of Pediatrics Outpatient Clinics were included into the scope of this study. The mean age±SEM of 92 morbid obese (MO) children and 36 with MetS were 118.3±3.8 months and 129.5±6.4 months, respectively (p > 0.05). The study was approved by Namık Kemal University, Medical Faculty Ethics Committee. Written informed consent forms were obtained from the parents. Demographic features and anthropometric measurements were recorded. WHO BMI-for age percentiles were used. The values above 99 percentile were defined as MO. Components of MetS [waist circumference (WC), fasting blood glucose (FBG), triacylglycerol (TRG), high density lipoprotein cholesterol (HDL-Chol), systolic pressure (SP), diastolic pressure (DP)] were determined. Routine laboratory tests were performed. Serum vitamin B₁₂ concentrations were measured using electrochemiluminescence immunoassay. Vitamin B₉ was analyzed by an immunoassay analyzer. Values for vitamin B₁₂ < 148 pmol/L, 148-221 pmol/L, > 221 pmol/L were accepted as low, borderline and normal, respectively. Vitamin B₉ levels ≤ 4 mcg/L defined deficiency state. Statistical evaluations were performed by SPSSx Version 16.0. p≤0.05 was accepted as statistical significance level. Statistically higher body mass index (BMI), WC, hip circumference (C) and neck C were calculated in MetS group compared to children with MO. No difference was noted for head C. All MetS components differed between the groups (SP, DP p < 0.001; WC, FBG, TRG p < 0.01; HDL-Chol p < 0.05). Significantly decreased vitamin B₉ and vitamin B₁₂ levels were detected (p < 0.05) in children with MetS. In both groups percentage of folate deficiency was 5.5%. No cases were below < 148 pmol/L. However, in MO group 14.3% and in MetS group 22.2% of the cases were of borderline status. In MO group B₁₂ levels were negatively correlated with BMI, WC, hip C and head C, but not with neck C. WC, hip C, head C and neck C were all negatively correlated with HDL-Chol. None of these correlations were observed in the group of children with MetS. Strong positive correlation between FBG and insulin as well as strong negative correlation between TRG and HDL-Chol detected in MO children were lost in MetS group. Deficiency state end-products of both B₉and B₁₂ may interfere with the expected profiles of MetS components. In this study, the alterations in MetS components affected vitamin B₁₂ metabolism and also its associations with anthropometric body measurements. Further increases in vitamin B₁₂and vitamin B₉deficiency in MetS associated with the increased vitamin B₁₂as well as vitamin B₉ deficiency metabolites may add to MetS parameters.

Keywords : children, cobalamin, folate, metabolic syndrome, obesity
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