

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

Authors : Mustafa M. Donma, Orkide Donma

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 B₉ is 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 \pm SEM of 92 morbid obese (MO) children and 36 with MetS were 118.3 \pm 3.8 months and 129.5 \pm 6.4 months, respectively (p > 0.05). The study was approved by Namik 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 \leq 4 mcg/L defined deficiency state. Statistical evaluations were performed by SPSSx Version 16.0. p \leq 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 B₉ and 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 B₁₂ and vitamin B₉ deficiency in MetS associated with the increased vitamin B₁₂ as well as vitamin B₉ deficiency metabolites may add to MetS parameters.

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

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