

The Evaluation of Subclinical Hypothyroidism in Children with Morbid Obesity

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Abstract : Cardiovascular pathology is one of the expected consequences of excessive fat gain. The role of zinc in thyroid hormone metabolism is an important matter. The concentrations of both thyroid stimulating hormone (TSH) and zinc are subject to variation in obese individuals. Zinc exhibits protective effects on cardiovascular health and is inversely correlated with cardiovascular markers in childhood obesity. The association between subclinical hypothyroidism (SCHT) and metabolic disorders is under investigation due to its clinical importance. Underactive thyroid gland causes high TSH levels. Subclinical hypothyroidism is defined as the elevated serum TSH levels in the presence of normal free thyroxin (T4) concentrations. The aim of this study was to evaluate the associations between TSH levels and zinc concentrations in morbid obese (MO) children exhibiting SCHT. The possibility of using the probable association between these parameters was also evaluated for the discrimination of metabolic syndrome positive (MetS+) and metabolic syndrome negative (MetS-) groups. Forty-two children were present in each group. Informed consent forms were obtained. Institutional Ethics Committee approved the study protocol. Tables prepared by World Health Organization were used for the definition of MO children. Children, whose age- and sex-dependent body mass index percentile values were above 99, were defined as MO. Children with at least two MetS components were included in MOMetS+ group. Elevated systolic/diastolic blood pressure values, increased fasting blood glucose, triglycerides (TRG)/decreased high density lipoprotein-cholesterol (HDL-C) concentrations in addition to central obesity were listed as MetS components. Anthropometric measures were recorded. Routine biochemical analyses were performed. Thirteen and fifteen children had SCHT in MOMetS- and MOMetS+ groups, respectively. Statistical analyses were performed. $p < 0.05$ was accepted as statistically significant. In MOMetS- and MOMetS+ groups, TSH levels were 4.1 ± 2.9 mU/L and 4.6 ± 3.1 mU/L, respectively. Corresponding values for SCHT cases in these groups were 7.3 ± 3.1 mU/L and 8.0 ± 2.7 mU/L. Free T4 levels were within normal limits. Zinc concentrations were negatively correlated with TSH levels in both groups. The significant negative correlation calculated in MOMetS+ group ($r = -0.909$; $p < 0.001$) was much stronger than that found in MOMetS- group ($r = -0.706$; $p < 0.05$). This strong correlation ($r = -0.909$; $p < 0.001$) calculated for cases with SCHT in MOMetS+ group was much lower ($r = -0.793$; $p < 0.001$) when all MOMetS+ cases were considered. Zinc is closely related to T4 and TSH therefore, it participates in thyroid hormone metabolism. Since thyroid hormones are required for zinc absorption, hypothyroidism can lead to zinc deficiency. The presence of strong correlations between TSH and zinc in SCHT cases found in both MOMetS- and MOMetS+ groups pointed out that MO children were under the threat of cardiovascular pathologies. The detection of the much stronger correlation in MOMetS+ group in comparison with the correlation found in MOMetS- group was the indicator of greater cardiovascular risk due to the presence of MetS. In MOMetS+ group, correlation in SCHT cases found higher than correlation calculated for all cases confirmed much higher cardiovascular risk due to the contribution of SCHT.

Keywords : cardiovascular risk, children, morbid obesity, subclinical hypothyroidism, zinc

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