

## Associations among Fetuin A, Cortisol and Thyroid Hormones in Children with Morbid Obesity and Metabolic Syndrome

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**Abstract :** Obesity is a disease with an ever-increasing prevalence throughout the world. The metabolic network associated with obesity is very complicated. In metabolic syndrome (MetS), it becomes even more difficult to understand. Within this context, hormones, cytokines, and many others participate in this complex matrix. The collaboration among all of these parameters is a matter of great wonder. Cortisol, as a stress hormone, is closely associated with obesity. Thyroid hormones are involved in the regulation of energy as well as glucose metabolism with all of its associates. Fetuin A is known for years; however, the involvement of this parameter in obesity discussions is rather new. Recently, it has been defined as one of the new generation markers of obesity. In this study, the aim was to introduce complex interactions among all to be able to make clear comparisons, at least for a part of this complicated matter. Morbid obese (MO) children participated in the study. Two groups with 46 MO children and 43 with MetS were constituted. All children included in the study were above 99th age- and sex-adjusted body mass index (BMI) percentiles according to World Health Organization criteria. Forty-three morbid obese children in the second group had also MetS components. Informed consent forms were filled by the parents of the participants. The institutional ethics committee has given approval for the study protocol. Data as well as the findings of the study were evaluated from a statistical point of view. Two groups were matched for their age and gender compositions. Significantly higher body mass index (BMI), waist circumference, thyrotropin, and insulin values were observed in the MetS group. Triiodothyronine concentrations did not differ between the groups. Elevated levels for thyroxine, cortisol, and fetuin-A were detected in the MetS group compared to the first group ( $p > 0.05$ ). In MO MetS- group, cortisol was correlated with thyroxine and fetuin-A ( $p < 0.05$ ). In the MO MetS+ group, none of these correlations were present. Instead, a correlation between cortisol and thyrotropin was found ( $p < 0.05$ ). In conclusion, findings have shown that cortisol was the key player in severely obese children. The association of this hormone with the participants of thyroid hormone metabolism was quite important. The lack of association with fetuin A in the morbid obese MetS+ group has suggested the possible interference of MetS components in the behavior of this new generation obesity marker. The most remarkable finding of the study was the unique correlation between cortisol and thyrotropin in the morbid obese MetS+ group, suggesting that thyrotropin may serve as a target along with cortisol in the morbid obese MetS+ group. This association may deserve specific attention during the development of remedies against MetS in the pediatric population.

**Keywords :** children, cortisol, fetuin A, morbid obesity, thyrotropin

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