

## Relationship between Hepatokines and Insulin Resistance in Childhood Obesity

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**Abstract :** Childhood obesity is an important clinical problem because it may lead to chronic diseases during the adulthood period of the individual. Obesity is a metabolic disease associated with low-grade inflammation. The liver occurs at the center of metabolic pathways. Adropin, fibroblast growth factor-21 (FGF-21), and fetuin-A are hepatokines. Due to the immense participation of the liver in glucose metabolism, these liver-derived factors may be associated with insulin resistance (IR), which is a phenomenon discussed within the scope of obesity problems. The aim of this study is to determine the concentrations of adropin, FGF-21, and fetuin-A in childhood obesity, to point out possible differences between the obesity groups, and to investigate possible associations among these three hepatokines in obese and morbidly obese children. A total of one hundred and thirty-two children were included in the study. Two obese groups were constituted. The groups were matched in terms of mean  $\pm$  SD values of ages. Body mass index values of obese and morbidly obese groups were  $25.0 \pm 3.5$  kg/m<sup>2</sup> and  $29.8 \pm 5.7$  kg/m<sup>2</sup>, respectively. Anthropometric measurements including waist circumference, hip circumference, head circumference, and neck circumference were recorded. Informed consent forms were taken from the parents of the participants. The ethics committee of the institution approved the study protocol. Blood samples were obtained after overnight fasting. Routine biochemical tests, including glucose- and lipid-related parameters, were performed. Concentrations of the hepatokines (adropin, FGF-21, fetuin A) were determined by enzyme-linked immunosorbent assay. Insulin resistance indices such as homeostasis model assessment for IR (HOMA-IR), alanine transaminase-to aspartate transaminase ratio (ALT/AST), diagnostic obesity notation model assessment laboratory index, diagnostic obesity notation model assessment metabolic syndrome index as well as obesity indices such as diagnostic obesity notation model assessment-II index, and fat mass index were calculated using the previously derived formulas. Statistical evaluation of the study data as well as findings of the study was performed by SPSS for Windows. Statistical difference was accepted significant when p is smaller than 0.05. Statistically significant differences were found for insulin, triglyceride, high-density lipoprotein cholesterol levels of the groups. A significant increase was observed for FGF-21 concentrations in the morbidly obese group. Higher adropin and fetuin-A concentrations were observed in the same group in comparison with the values detected in the obese group ( $p > 0.05$ ). There was no statistically significant difference between the ALT/AST values of the groups. In all of the remaining IR and obesity indices, significantly increased values were calculated for morbidly obese children. Significant correlations were detected between HOMA-IR and each of the hepatokines. The highest one was the association with fetuin-A ( $r=0.373$ ,  $p=0.001$ ). In conclusion, increased levels observed in adropin, FGF-21, and fetuin-A have shown that these hepatokines possess increasing potential going from obese to morbid obese state. Out of the correlations found with the IR index, the most affected hepatokine was fetuin-A, the parameter possibly used as the indicator of the advanced obesity stage.

**Keywords :** adropin, fetuin A, fibroblast growth factor-21, insulin resistance, pediatric obesity

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