Evaluation of Fetuin-A level and related factors in obese adolescents

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Introduction:

Fetuin-A is a glycoprotein mainly derived from the liver. Fetuin-A has many different functions due to its complex structural properties and its ability to bind to different toll-like receptors in different tissues. In adult studies, Fetuin-A has been associated with many diseases such as infections, renal diseases, cardiovascular diseases, cirrhosis, cancer, insulin resistance and metabolic syndrome.

Objectives:

Working in different disease groups will contribute to our understanding of the pathophysiology of multifunctional protein Fetuin-A. In this study, we aimed to evaluate Fetuin-A levels in obese adolescents and to evaluate the relationship between Fetuin-A and anthropometric data, insulin levels and high sensitivity CRP (HSCRP).

Material and Methods:

The study included obese adolescents with BMI-SDS> = 2 and healthy adolescents with similar age and gender. Anthropometric measurements, fasting glucose and insulin, HSCRP and Fetuin-A levels were evaluated. Obesity comorbidity scans of obese patients were obtained from hospital data. In all cases and gender subgroups; the status of the parameters and their relation with the controls were analyzed by appropriate statistical methods.

Results:

The study included 41 obese and 30 healthy adolescents;

- In obese cases**, SGOT-SGPT elevation** in two subjects, **hipercholesterolemia** in eight, **hypertriglyceridemia** in 15, LDL elevation in eight, low HDL in 20, **hypertension** in 15 (with 24-hour blood pressure monitoring).
- **Hepatosteatosis** in 33 patients (Grade 1; 11 cases, Grade 2; 13 cases; Grade 3; 9 cases) were found to be present.
- In OGTT; at 0 min, glucose was 88.2 ± 7.7 (72-106) mg / dl and at 120th minute it was 116.7 ± 25.6 (75-205) mg / dl. **Glucose intolerance** was detected in 4 cases and diabetes mellitus in one patient.
- Insulin, HOMA-IR and HSCRP levels of obese subjects were significantly higher and Fetuin-A levels were similar.
- The Fetuin-A levels of hypertensive patients in 24-hour blood pressure monitoring were 480.0 ± 230.0 (239.3-1112.1) ng / ml, and it was 432.9 ± 185.5 (206.5-950.0) ng / ml in normotansive patients and there was no significant difference between hyper and normotansive subjects (p = 0.643).
- Fetuin-A levels in patients with fatty liver was found to be 446.4 ± 185.3 (239.3-1112.1) ng / ml; and Fetuin-A levels of those without fatty liver was 496.4 ± 290.7 (206.5-950) ng / ml and there was no significant difference between the two groups (p = 0.967).
- According to gender, patients with and without insulin resistance according to HOMA-IR [when IR limits were accepted as 3, 82 for girls and 5, 22 for boys (3)]; fetuin-A levels were similar (p = 0.231).
- When we evaluated the correlation between Fetuin-A levels and OGTT results in 0-30-60-90-120 minutes, we found that there was no significant relation (The values and statistical significance in each minute were found to be; r=-0,02; p=0,88; r=0,16, p=0,36; r=0,15, p=0,39; r=0,19, p=0,28; r=-0,06, p=0,71, respectively.).
- No significant correlation was found between fetuin-A and HSCRP in obese and control groups.

Conclusions:

Although the Fetuin-A levels were found to be high in obese subjects in children and adult studies; in this study, no difference was found in serum Fetuin-A levels in obese and healthy subjects in adolescent age group. This result was thought to be related to homogenization of selected cases to adolescents with physiological differences. We believe that our study will shed light on further studies.

Table 1: Data of cases and comparison of healthy subjects

	Obese (N:41)	Control (N:30)	p
Gender	27 K,14E	22 K, 8 E	
Age (year)	15,3±2,1 (10,5-18)	14,3±2,1 (10,3-17,8)	0,063
Height sds	0,33±1,4 (-1,9- (+4,3))	-0,14±0,7 (-1,6-(1,1))	0,073
BMI (kg/m²)	33,1±4,2 (26,4-42,9)	21,5±2,2 (17-25)	0,000
BMI sds	2,8±0,55 (2-4,5)	0,4±0,7 (-1,3- (+1,4))	0,000
Fasting glucose (mg/dl)	94,7±8,8 (76-115)	91,2±7,9 (71-106)	0,087
Fasting ınsulin (µIU/ml)	27,2±15,4 (8,7-81,5)	13,4±7,2 (4,6-30,8)	0,000
HOMA-IR	6,3±3,7 (1,7-17,5)	3,1±1,8 (1,0-7,2)	0,000
Fetuin-A (ng/ml)	453±200,2 (206,6-1112,1)	484,2±160,7(114,1-923,9)	0,481
hsCRP (mg/dl)	0,3±0,2 (0,-0,5)	0,16±0,16(0,-0,5)	0,012

References:

1-Robinson KN, Teran-Garcia M. From infancy to aging: biological and behavioral modifiers of fetuin-A. Biochimie. 2016;124:141-149

2-Yerlikaya FH, Mehmetoğlu İ. Fetuin-A ve fizyopatolojik etkileri. Türkiye Klinikleri J Endocrin. 2012;7(1):21-7

3-Kurtoğlu S, Hatipoğlu N, Mazıcıoğlu M, Kendirici M, Keskin M, Kondolot M. Insulin resistance in obese children and adolescents: HOMA-IR cut-off levels in the prepubertal and pubertal periods. J Clin Res Pediatr Endocrinol. 2010;2(3):100-6