# EVALUATION OF THE RELATIONSHIP BETWEEN SERUM ADROPIN LEVELS AND BLOOD PRESSURE IN OBESE CHILDREN

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## Background

The prevalence of obesity and related cardiovascular comorbodities are increasing rapidly. Nocturnal nondipping, enhanced blood pressure load and hypertension are the major cardiovascular complications of obesity.

Adipokines have been found to be associated with obesity induced hypertension. Adropin is a peptide hormone encoded by the energy homeostasis-associated (*ENHO*) gene. Circulating adropin is involved in energy homeostasis, regulation of insulin sensitivity and cardiovascular function. Obesity is associated with decreased circulating adropin concentrations. Adropin knockout mice models exhibited increased adiposity, hepatic steatosis and insulin resistance. It is reported that a decline in adropin action with obesity may therefore contribute to the development of insulin resistance and dyslipidemia.

To date, a few studies have been reported assessing the relationship between adropin levels and cardiovascular diseases. The first evidence regarding the vascular effect of adropin was demonstrated by an in vivo study in which the vascular effect of adropin has been examined. The results revealed that adropin was expressed in human endothelial cells, increased nitric oxide (NO) release

## Objective and hypotheses

The aim of the study was to evaulate the serum adropin levels in obese children and to determine the relationship between adropin levels and blood pressure in pediatric age group.

## Method

Forty obese children (mean age:12.5±2.5 years; male/female ratio:18/22) and 15 healthy control (mean age:15 ±3.14 years; male/female ratio: 5/15) were included to the study. Blood samples were taken for biochemical tests and adropin levels after 12 h of night fasting, and an ambulatory blood pressure monitoring (ABPM) device was applied on the same day.

The control group consisted of 15 children and adolescents (5 males, 10 females, mean age 15±3.14 years, range 7.5-15.9 years).

Obese subjects were designated into four subgroups pairs according to following categorical variables: (a) male vs. female, (b) nocturnal BP dippers vs. non-dippers, (c) insulin resistance (IR) positive vs. IR negative, (d) hypertensives vs. normotensives.

### Clinical and laboratory evaluation

Serum adropin measurement was carried out using human adropin enzyme-linked immunosorbent assay (ELISA) commercial kit (Catalog no. 201-12-3107, limit determination 5pg/ml-1000pg/ml; Sunred Biological Technology). ABPM protocol was performed by the same clinician according to the recent guidelines. A validated recorder, Norav NBP-24 NG (Norav Medical GmBH, Wiesbaden, Germany), was programmed to measure BP. Each BP value of the patients were converted to a standart deviation score (SDS) using gender and height adjusted normative data. Daytime and nighttime (sleep) BP SDS values were derived. Hypertension was defined when diastolic or systolic median BP was >1.65 SD (95th percentile). Non-dipping was defined when reduction in systolic or diastolic BP was below 10%.

## Results

Table 1. Comparison of clinical and laboratory findings between obese and healthy subjects.

| | Obese group (n=40) | Controls (n=15) | p value |
|---|---|---|---|
| Age, years | 12.5± 2.5 | 15±3.14 | 0.06 |
| Gender, (M/F)* | 18/22 | 5/10 | 0.32 |
| Weight SDS | 3.76±2.44 | 0.29±1.1 | 0.08 |
| Height SDS | 0.83±0.7 | 0.1±0.8 | 0.6 |
| BMI SDS | 2.25±1.2 | 0.27±0.83 | **<0.00** |
| Weist circumference SDS | 1.9±0.9 | 0.8±0.65 | **0.04** |

Table 2.Comparisons of laboratory parameters between obese and healthy subjects

| | Obese group (n=40) | Controls (n=15) | p value |
|---|---|---|---|
| Glucose (mg/dL) | 91.7±9.7 | 87.8±6.4 | 0.53 |
| Insulin (mIU/mL) | 18.6±15.7 | 9.5±4.2 | **<0.00** |
| AST (U/L) | 27±12.7 | 24±12.3 | 0.39 |
| ALT (U/L) | 23.9±8.8 | 21±7.5 | 0.13 |
| TG (mg/dL) | 140±94 | 83±23 | **0.02** |
| TC (mg/dL) | 156±30 | 126±25 | **0.04** |
| LDL-C (mg/dl) | 84±29.2 | 84±32.7 | 0.82 |
| HDL-C (mg/dL) | 39±6.9 | 37±5.2 | 0.13 |
| Adropin (pg/mL) | 193.56±94 | 289±187 | **0.03** |

Table 3.Comparisons of laboratory parameters between obese and healthy subjects

| Criteria | Subgroups (n) | Serum Adropin levels (pg/mL) | p value |
|---|---|---|---|
| Gender | Male (18) | 158.5 (111.51-216.5) | 0.31 |
| | Female (22) | 184.12 (149.27-220.17 | |
| Insulin resistance | IR (+)(20) | 136.73 (90.5-190.6) | 0.02 |
| | IR (-)(20) | 189.45 (105-469) | |
| Nighttime BP dipper | Dipper (35) | 164.11(73.5-469.95) | 0.72 |
| | Non-dipper (5) | 175.46(174.8-189.12) | |
| Blood preesure | Normotensive (31) | 166.78(105.26-230.34) | 0.66 |
| | Hypertensive (9) | 107.69(134.21-210) | |

Adropin levels were correlated negatively with BMI z-score (r=-0.56, p=0.034). There were no correlation between serum adropin levels and laboratory or blood pressure data in obese subjects. Adropin levels were correlated negatively with BMI z-score (r=-0.56, p=0.034.

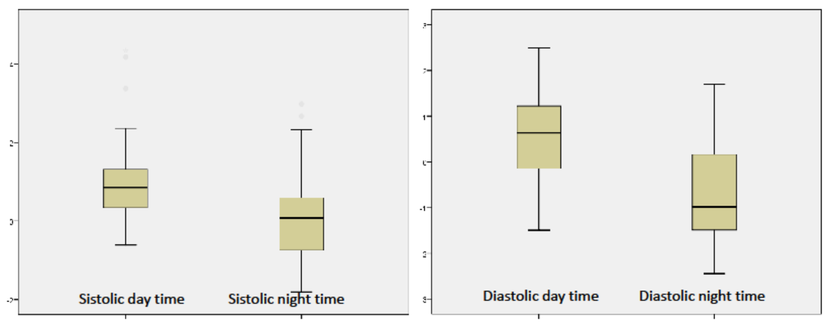


Figure 1. Systolic and diastolic day and night time blood pressure SDS values.

## Conclusion

In summary, we reported lower serum adropin levels in obese children than that of healthy ones. Serum adropin levels were also lower in patients with IR than pateints without IR. However, we didn't find any association between adropin levels and blood pressure values. This situation might have resulted due to the low number of cases in the study. Evaluation of the roles of adipokines in pathogenesis of cardiovascular diseases may lead to development of new strategies and novel therapies. In this respect, further studies are needed to evaluate the impact of adropin levels on blood pressure Serum adropin levels were significantly lower in obese children, however there were no correlation between serum adropin levels and blood pressure variables. Further studies are needed to determine the role of adipokines on blood pressure.

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