



The Relationship Between Leptin and PCOS

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Abstract

Background: The *ob* gene produces a leptin hormone that works as a satiety signal to the hypothalamus. Leptin may have a role in polycystic ovary syndrome (PCOS) via its role on obesity and insulin resistance.

Materials and Methods: A prospective, retrospective cross-sectional study included 78 females student aged 17-25 years. The retrospective data included clinical, anthropometric and hormonal profile of each subject. Leptin concentration was measured by enzyme absorbent by BioVendor Human Leptin ELISA. Statistical analysis was performed by IBM SPSS Statistics 21.0 for Windows XP (IBM, USA).

Results: leptin found to be significantly higher in those women with PCOS than in women without PCOS (p-value 0.037). Also, Overweight/Obese subjects had higher leptin level (22.85 ng/ml) than non-overweight/non-obese subjects (8.82 ng/ml) with (p-value <0.05). OW/Ob group showed higher frequency of family history of PCOS and diabetes, irregular menstrual cycle (IP) and high Ferriman-Gallwey score. Leptin is significantly correlated with insulin, testosterone, BMI, DHEAS, progesterone, FAI and PCOS.

Conclusion: PCOS, overweight and obese subjects exhibit high leptin level

Background

One of the most essential adipose-derived hormones is leptin hormone. Leptin hormone is generally encoded by the obese (*ob*) gene. It plays an important role in regulating energy consuming expenditure. It functions by binding to the leptin receptor in hypothalamus. Leptin is expressed by adipocytes of white adipose tissue. It could play a role in polycystic ovary syndrome which a hormonal disease, that affects 5% to 10% of women in the reproductive age. PCOS symptoms include hair growth (hirsutism), menstrual disturbance, infertility, hyperinsulinemia, and multiple ovarian cysts. Most women with PCOS are obese and diabetic ^{1,3}.

Aim: Measure the circulating leptin hormone and evaluate its relationship with PCOS among overweight and obese subjects.

Material & Method

Study design:

Overnight fasting blood samples were drawn from volunteers. This step was follow by centrifugation and collecting of the serum. Other data such as IP and BMI were collected by questionnaires, and assessment. The Ferriman-Gallwey score were used to evaluate the hirsutism. Human leptin ELISA Clinical Range, was used in order to perform quantitative measurements of human leptin in patients' serum samples.

Participants:

Seventy eight QU female students ranged in age between 17 and 25 years old participated in this study.

Statistical Analysis:

The relationship between leptin and PCOS were determined by IBM SPSS Statistics 21.0 for Windows XP (IBM, USA) ².

Results

The characteristics of the study subjects was based on the presence of overweight/ obesity (OW/ Ob) and non overweight/non obesity (non OW/Ob).

Table 1 : Clinical and biochemical characters of the study subject groups: (OW/ Ob) and (non OW/Ob).

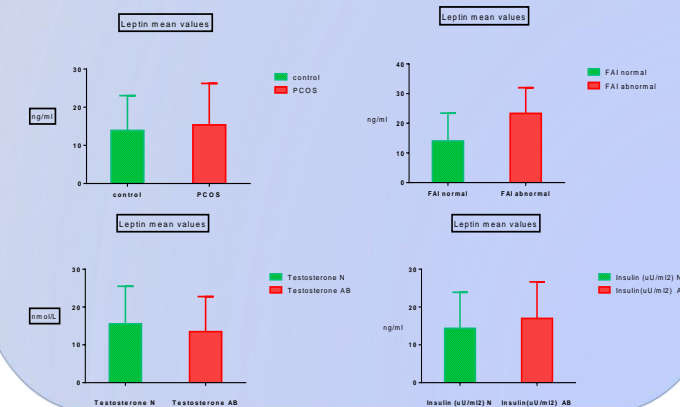
	OW/Ob	Non OW/non Ob	P- value
Age(years)	21.50 (20.00-22.50)	21.00 (20.00-22.00)	0.651
BMI (kg/m ²)	27.78 (26.32-29.34)	22.43 (19.65-25.83)	0.000*
Age of menarche (years)	11.50 (11.00-13.00)	12.00 (12.00-14.00)	0.753
mFG score	11.50 (8.00-15.50)	14.00 (11.00-15.00)	0.395
Glucose (mg/dL)	92.00 (79.00-97.25)	89.00 (82.00-95.00)	0.429
Estradiol(pmo/L)	156.00 (124.00-223.50)	323.00 (145.00-522.00)	0.619
Progesterone (nmol/L)	1.40 (0.40-4.25)	0.60(0.50-2.00)	0.691
Testosterone(nmol/L)	0.94 (0.65-4.04)	1.66 (0.91-2.17)	0.033*
FAI	2.28 (1.37-10.48)	3.31 (1.50-5.71)	0.125
DHEAS* (umol/L2)	9.81 (7.89-12.33)	8.40 (6.85-9.37)	0.022*
SHBG (nmol/L)	41.00 (31.50-56.75)	51.00 (36.00-63.00)	0.021*
Insulin (uU/mL)	11.50 (5.00-22.00)	8.00 (5.00-20.00)	0.623
Prolactin (mIU/L)	300.50 (244.00-372.75)	306.00 (223.00-377.00)	0.320
TSH (mIU/L)	1.52 (1.13-2.46)	1.20 (0.95-2.40)	0.491
FreeT4 (pmol/L)	14.35 (12.70-15.45)	14.20 (12.80-14.60)	0.579
Leptin ng/ml	22.85 (14.13-29.38)	8.82 (7.05-12.07)	0.000*

References:

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Results

The results showed that overweight/ obesity subjects had significant higher median value of BMI, testosterone, DHEAS and leptin than non overweight/non obese female with (P; 0.000, 0.033, 0.022, 0.000) respectively. SHBG is significantly lower in OW/OB than non-OW/OB subjects with p value (p=0.021). Other variables such as prolactin, Free T4, insulin and female sex hormones are not significantly different between the two groups. Leptin is found to be correlated to BMI, testosterone, DHEAS, progesterone, insulin, FAI, rotterdam criteria, and to SHBG but inversely. A Significant difference in distribution of (Testosterone, SHBG, and DHEAS) between the two groups was observed and its P- values were (0.026, 0.040, 0.023) respectively. OW/OB exhibit higher frequency of high leptin above 2.78, higher frequency of lower SHBG, and three folds of high DHEAS than 11.0umol/L.



Conclusion:

- 1-Leptin hormone is increased among students presented with PCOS.
- 2-Leptin increased in overweight and obese students.
- 3-Leptin correlated with androgens and hirsutism.
- 4-Leptin hormone could play a role in PCOS via its effect on fat (BMI), and/or androgens or insulin.

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