ARE POLYCYSTIC OVARIES ASSOCIATED WITH ALTERED ADIPOKINE LEVELS LIKE POLYCYSTIC OVARY SYNDROME?

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Polycystic ovary syndrome (PCOS) affects approximately 6-8% of women in the reproductive age.

The women with PCOS have increased risk of metabolic dysfunction:

- including the insulin resistance with the consequent compensatory hyperinsulinemia,

- dyslipidemia,

- systemic inflammation,

- increased oxidative stress, and endothelial dysfunction .

Duleba et al. 2012, Sharma et al. 2006, Wild et al. 2012

Adipokines (adipocytokines) have been found to contribute to the metabolic and hormonal changes in PCOS patients adiponectin, leptin, omentin, visfatin and apelin are among the members of adipocytokines group.

Wanga et al. 2012, Esteghamati et al.2013
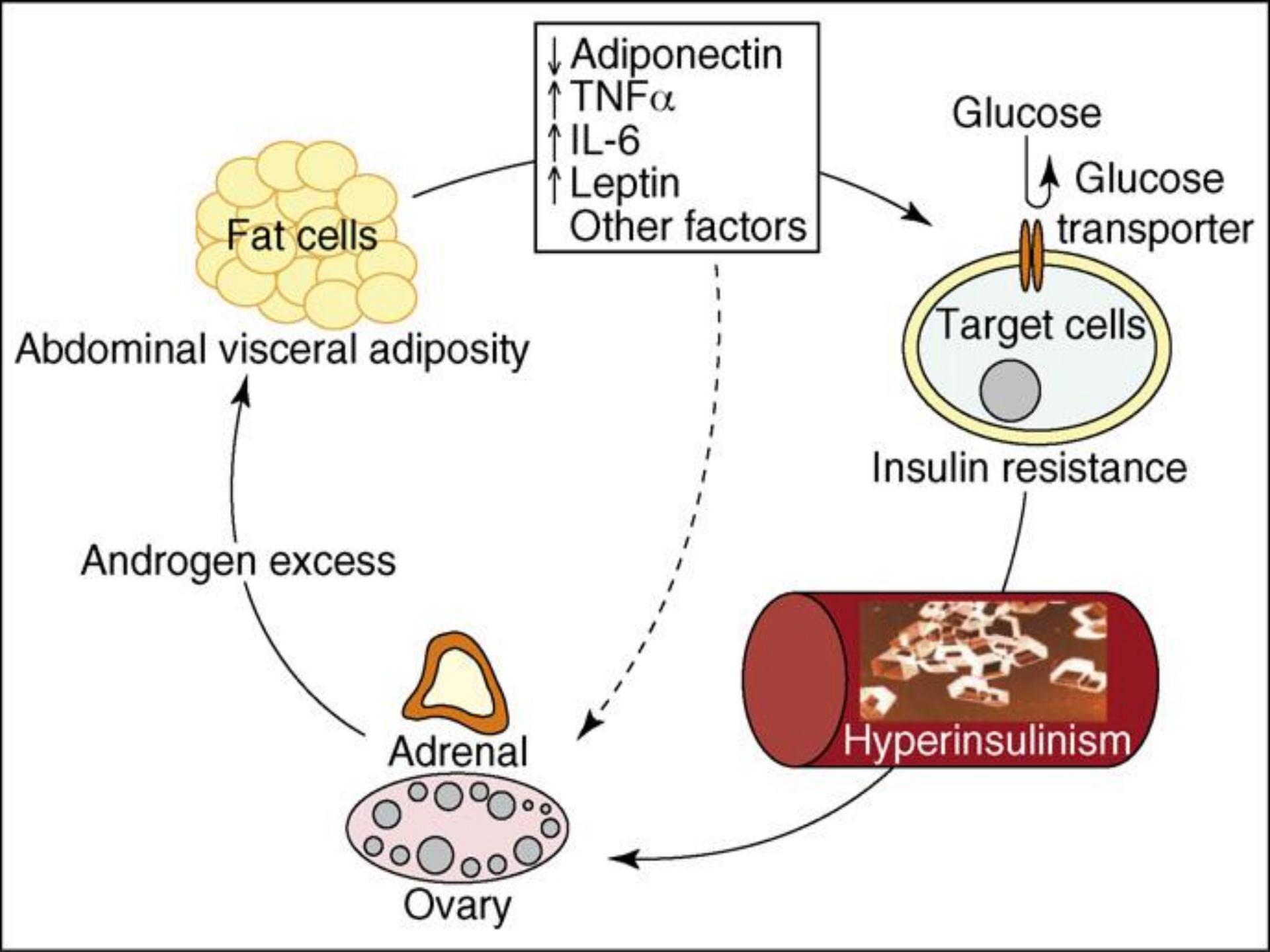
Women with ovulatory PCO develop similar rates of severe OHSS when compared to women with PCOS and the rate was significantly greater than the women with normal ovaries. This condition was partially explained by the fact that the number of follicles, oocytes retrieved and the peak estradiol levels were all significantly increased both in the women with PCO and PCOS

Swanton et al. 2010

Objective

- The aim of the present study was to evaluate relationships between alterations in adiponectin, leptin, omentin, visfatin and apelin levels in women with polycystic ovary syndrome (PCOS) and polycystic ovaries (PCO).

STUDY DESIGN

This is a cross-sectional study of 105 women, who were admitted to the Obstetrics and Gynecology Department of Bozok University, Turkey. 35 women with PCO, 35 women with PCOS and 35 women for the control group were included in this study.

DIAGNOSIS OF PCOS (ASRM)

The presence of at least 2 of the following criteria;

-polycystic ovaries in USG,

-clinical and/ or biochemical signs of hyperandrogenism,

- and oligo- and/or anovulation

* The ovaries were categorized as polycystic if 12 or more sub capsular follicles of 2-9 mm in diameter in one plane were determined in either ovary, and/or if an increased ovarian volume was found (>10 ml)
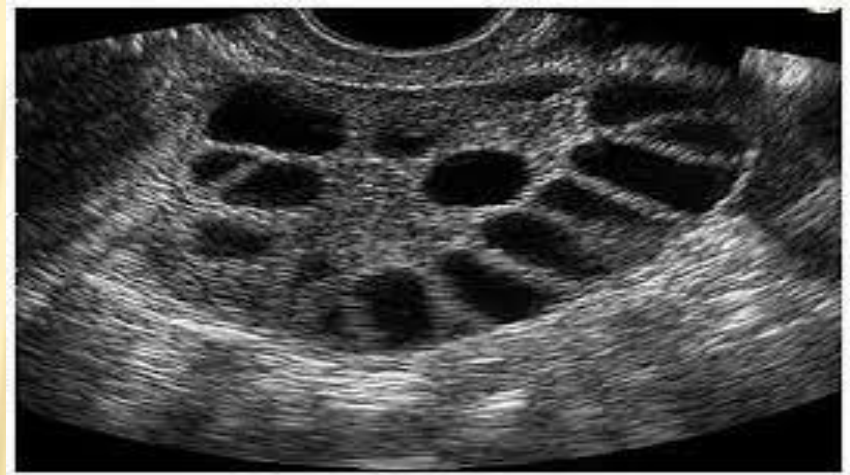
* BMI was calculated.

- The control group was established from amongst the healthy women who responded to requests for control examinations, with matching age and BMI
- 1-regular menstrual cycle and displaying normal ovary morphology with ultrasonography
- 2- no complaints of hirsutism, acne and alopecia
- 3- no endocrinologic disorders.

Exclusion criteria

* Pregnancy
* Hyperprolactinemia
* Hypothyroidism
* Cushing's disease
* Congenital adrenal hyperplasia
* Androgen-secreting tumours
* and the use of OKS, aspirin, glucocorticoids, anti-diabetics.

* Blood samples and ultrasound measurements were taken during the 3rd and 7th days of menstrual cycle.

STATISTICAL ANALYSES

- Statistical analyses were performed using SPSS 16.00. Results were expressed as mean ± SD. Comparisons among groups were performed using ANOVA, with the Tukey's HSD test for multiple comparisons. In case of non-normal distribution, nonparametric (Kruskal–Wallis) tests were applied for comparisons among the groups. Statistical significance was accepted as $p \leq 0.05$.

	PCOS (n=35)	PCO (n=35)	Control (n=35)	P value
Age (year)	23.40±5.57	23.37±7.03	23.83±6.71	0.1
BMI (kg/m2)	26.73±5.75	25.54±4.87	26.26±4.56	0.6
Fasting glucose (mmol/l)	89.71±9.13	96.54±32.49	86.89±11.28	0.13
Total cholesterol(mmol/l)	176.74±43.60	169.46±28.95	173.57±27.74	0.67
LDL(mg/dl)	110.32±34.43	340.74±142.64	104.22±27.87	0.39
Triglyceride (mmoL)	138.34±143.44	117.97±64.97	95.91±34.11	0.16
LH (IU/l)	11.56±6.15	9.69±6.21	7.47±5.55	0.01
FSH (IU/l)	5.81±1.87	5.47±2.33	6.25±2.15	0.3
Estradiol (pmol/l)	61.49±37.6	69.4±59.07	71.24±58.44	0.80
•Total testosterone (nmol/l)	0,6 (0.18-13.58)	0.25 (0.01-0.80)	0.19 (0.03-0.77)	0.04* 0.03**
DHEA-S (mmol/l)	255.82±119.72	225.79±108.47	199.55±96.63	0.1
Mean ovarian volume(cm^3)	32.26±16.06	18.88±8.16	6.44±4.64	0.0001*, 0.0001**,0.04**

	PCOS(n=35)	PCO(n=35)	Control (n=35)	P value
Apelin -36 (nmol/L)	2.65±0.72	0.90±0.29	1±0.25	0.0001
Adiponectin (ng/ml)	14.01±1.75	26.49±2.96	26.67±2.29	0.0001
Omentin-1 (ng/ml)	14.23±1.81	17.74±2.84	18.60±3.51	0.0001
Leptin (ng/ml)	24.61±10.10	3.78±1.19	4.28±0.65	0.0001
Visfatin(ng/ml)	75.48±17.07	25.44±5.31	25.7±5.36	0.0001

	Mean ovarian volumes	Luteinizing hormone	BMI	High Density Lipoprotein
Apelin -36 (nmol/L)	0.515, p<0.001	0.229, p<0.001		
Adiponectin (ng/ml)	-0.488, p<0.001	r=-0.198, p=0.043		
Omentin-1 (ng/ml)	-0.362, p<0.001			0.205, p=0.037
Leptin (ng/ml)	0.477, p<0.001		0.216, p=0.027	
Visfatin(ng/ml)	0.475, p<0.001	0.296, p=0.02		

DISCUSSION

Studies have shown that women with ovulatory PCO share some common metabolic characteristics with women who have PCOS, such as increased insulin resistance when compared to well matched controls.

In another study it was determined that the serum CRP values were higher in women with PCO compared with the healthy controls and this situation was thought to be contributed to the increased cardiovascular disease risk in patients with PCO.

Sayın et al 2003, Adams et al 2004, Engin-Ustun et al 2006

- Higher levels of Apelin- 36 in PCOS cases was demonstrated.
- Leptin levels increase in obesity , type 2 diabetes and PCOS.
- Visfatin levels were found to be significantly elevated in normal weight women with PCOS compared to BMI-matched controls.

Glinianowicz et al. 2013, Li et al. 2013,Panidis et al. 2008

- There is an association with the reduced omentin-1 concentrations and the states of insulin resistance such as obesity, diabetes, and the polycystic ovary syndrome

- The plasma adiponectin levels were found to be reduced in women with PCOS regardless of their level of adiposity and these reduced levels of adiponectin were correlated with the diminished insulin sensitivity

IN CONTRARY TO PCOS AND TYPE 2 DM IN PCO CASES ADIPOKIN LEVELS DON'T CHANGE

Esteghamati et al. 2013, Choi et al .2011, Lagaly et al. 2008

IN SUMMARY

✖ Our study suggested that adipokine levels :

-differed between PCOS and controls and between PCOS and PCO

-similar in both PCO group and their controls.

✖ PCO does not cause systemic changes that effects the expression of adipokine from the adipose tissue, which is an endocrine organ.

✖ Since the sample size in our study is small, Further studies are requeried.