



Serum leptin & IR In Obese women with PCOS&

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introduction

- Polycystic ovary syndrome(PCOS) is a heterogeneous endocrine disorder affects one in 15 women worldwide.
- characterized by hirsutism, acne, anovulation, hyperandrogenemia, polycystic ovaries, and infertility.

Clinical manifestation of PCOD



Acne



Acanthosis



Hirsutism



Obesity



IRREGULAR MENSES



HAIR LOSS



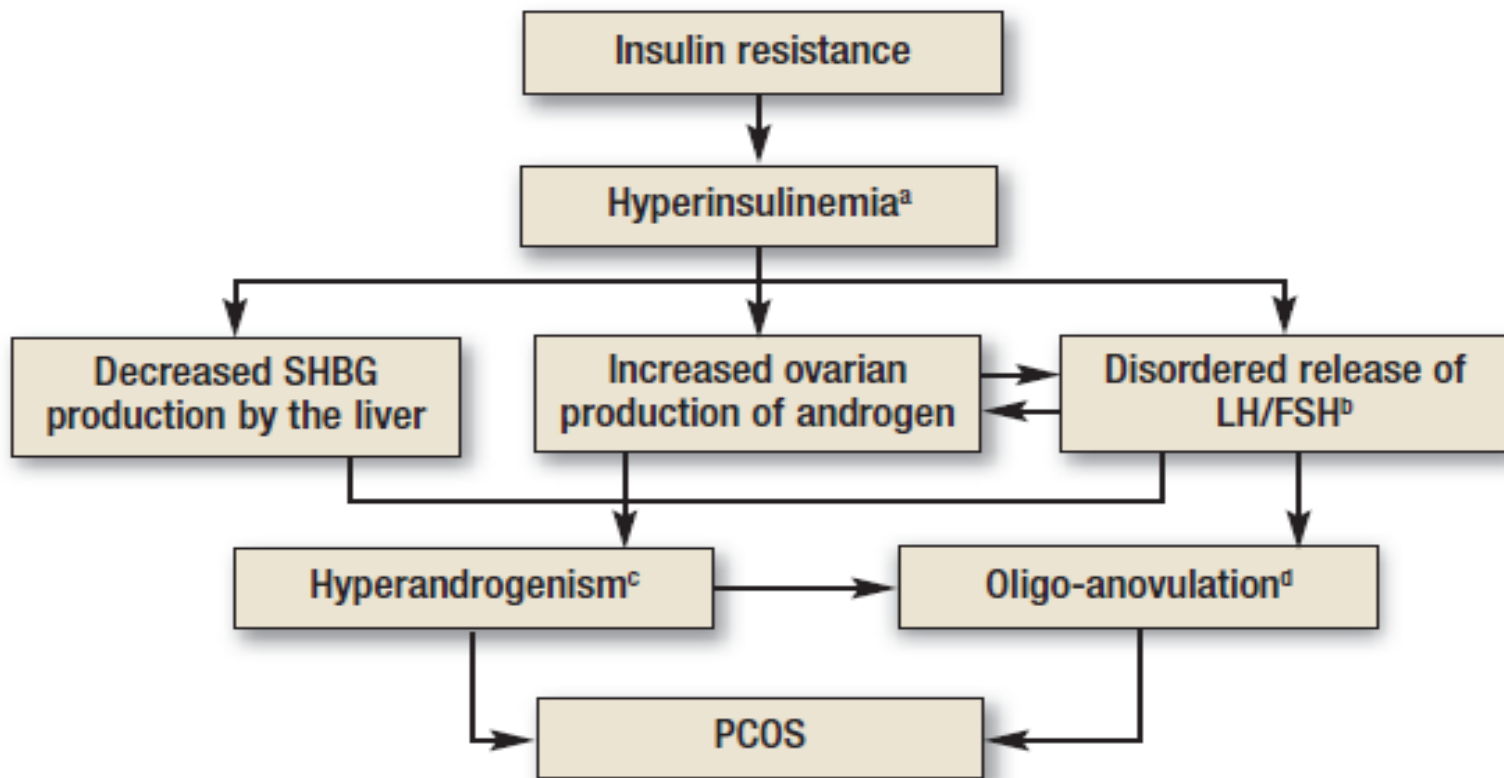
Infertility

Criteria	NIH 1990	Rotterdam 2003	Androgen Excess Society 2006
Diagnostic criteria	Must include	Two of following three	Must include
	Chronic anovulation	1. Oligo/anovulation	Ovarian dysfunction Oligo/anovulation Polycystic ovaries on USG
	Clinical and/or biochemical signs of hyperandrogenism	2. Clinical and/or biochemical signs of hyperandrogenism	Androgen Excess Hirsutism hyperandrogenemia
		3. Polycystic ovaries on USG	

All criteria assume that other causes of androgen excess have been ruled out, PCOS: Polycystic ovarian syndrome

- Obesity in particular, central obesity is present in 10–65% of women with PCOS
- Body fat distribution is also important as central/abdominal obesity is associated with IR and has a greater impact on fertility.
- The presence of obesity can also magnify IR.

- In most cases, PCOS also involves metabolic alterations such as insulin resistance (IR), hyperinsulinemia, dyslipidemia, and obesity
- lead to an increased risk of developing
 - ✓ endometrial cancer
 - ✓ type 2 DM
 - ✓ cardiovascular diseasecompared with the general population



^aElevated levels of insulin in the blood.

^bPituitary hormones that stimulate the ovaries.

^cElevated blood levels of male hormones.

^dAbsent or irregular ovulation.

LH indicates luteinizing hormone; FSH, follicle-stimulating hormone; PCOS, polycystic ovarian syndrome; SHBG, sex hormone-binding globulin.

- The adverse effects of obesity on female fertility include
 - impaired ovulation,
 - oocyte maturation
 - irregular menstrual cycle,
 - endometrial development,
 - uterine receptivity elevated miscarriage rate,
 - lower implantation, and lower pregnancy rates

- Adipose tissue has been revealed to play important roles in the regulation of many physiological processes by secreting cytokines named adipokines that exert multiple effects at both the local and the systemic level
- It has been associated with body mass index (BMI), insulin action, and glucose metabolism..

- Adipokines comprise :
 - ✓ Non adipose-specific cytokines such as retinol binding protein-4 (RBP4), lipocalin-2 (LCN2), interleukin 6 (IL6), IL1 β , and tumor necrosis factor α (TNF α)
 - ✓ Adipose-specific cytokines or cytokines, such as, adiponectin (APN), resistin, and leptin.
- Leptin is a 16 [kDa](#) protein which is produced by adipocytes, that plays a key role in regulating energy intake and energy expenditure, including [appetite](#) and [metabolism](#)

-Chen X1, Jia X, Qiao J, Guan Y, Kang J. Adipokines in reproductive function: a link between obesity and polycystic ovary syndrome. J Mol Endocrinol. 2013; 50:R21-37

-Zhang Y, Proenca R, Maffei M, Barone M, Leopold L, Friedman JM. Positional cloning of the mouse obese gene and its human homologue. Nature 1994; 372:425-32

- leptin is widely present in reproductive tissues, its relationship to reproductive hormones is still poorly understood.
- The deficiency of leptin or leptin receptors (LEPR) due to loss of function mutations in the corresponding genes has been linked to infertility and delayed puberty development in humans and rodents.

- leptin and its receptor have been implicated in maintaining other normal female reproductive functions including :
 - lactation,
 - folliculogenesis,
 - ovarian steroidogenesis,
 - development of dominant follicles and oocytes,
 - maturation endometrial development,
 - menstrual cycle regulation and endometrial receptivity .

- The heterogeneity of clinical manifestations of PCOS patients makes this syndrome even challenging in the field of endocrinology, metabolism, and reproduction.
- Our current understanding of the role for leptin in PCOS is far from complete.

STUDY AIM

- This study aimed to investigate changes in serum leptin concentrations among obese women with PCOS and healthy obese women



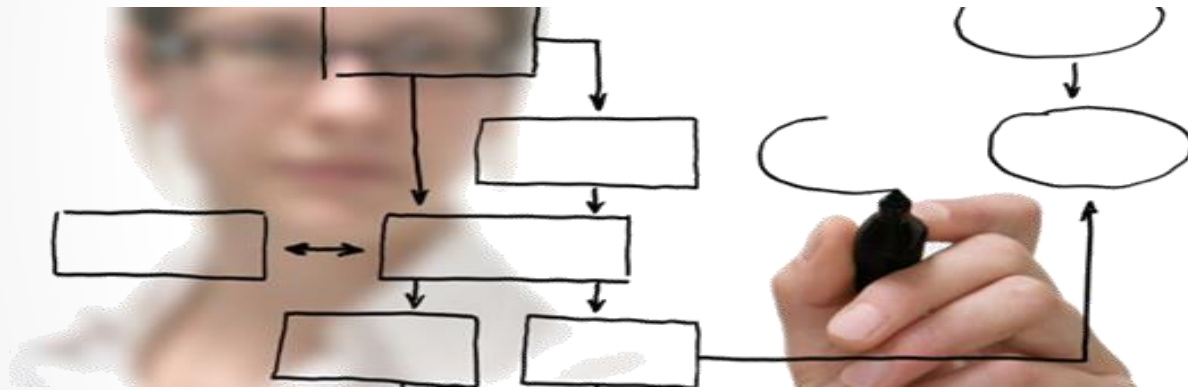


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METHEDODOLOGY



- King Abd El-Aziz Hospital
(Department of Obstetric & Gynecology)
- 56 subjects who divided into two main groups
 - ✓ 40 women with PCOS
their mean age was 34.3 ± 2.08 years
 - ✓ 16 women obese control

- All patients are having normal other hormones level & non on using any horm. treatments or drugs
- None of them had detectable pituitary or hypothalamic dysfunction.
- None had received any drugs known to interfere with hormonal concentrations for at least 3 months before the study.



- Blood samples were used for estimation of serum

fasting blood glucose,
Insulin &
FSH, LH
progesterone
prolactin, and
testosterone levels
leptin assay

Insulin resistance was estimated by means of homeostasis model assessment for insulin resistance (HOMA-IR) index which is calculated by the formula: $\text{fasting insulin concentration } (\mu\text{IU/mL}) \times \text{fasting blood glucose (mmol/L)} / 22.5$

- **Statistical analysis:**

- performed using IBM SPSS software package version 20.0

- continuous variables were presented as means \pm standard deviation (SD)

- Pearson correlation coefficient was used to determine the relationship between continuous variables

- independent sample t-test was used.

- P value less than 0.05 was considered as a statistically significant

RESULTS AND DISCUSSION



Variable	Group I (n=40)	Group II (n=16)	t	P value
Age (years)	34.3 ± 2.08	28.1 ± 4.61	2.04	0.138
BMI (kg/m ²)	34.84 ± 4.77	33.59 ± 1.23	2.207	0.078
Glucose (μIU/mL)	6.04± 1.61	4.75± 0.26	2.161	0.067
Insulin (μIU/mL)	11.02± 4.79	9.30 ± 5.71	1.018	0.343
HOMA-IR	2.96± 1.43	2.12±1.44	1.671	0.139
FSH (mIU/mL)	4.80 ± 2.58	6.8 ± 1.73	2.320	0.049*
LH (mIU/mL)	7.71± 6.91	5.14 ± 1.65	1.177	0.027*
Testosterone (ng/mL)	0.91± 0.49	0.49 ± 0.3	2.427	0.046*
Progesterone (nmol/L)	0.90± 2.01	4.3±2.1	2.161	0.045*
Prolactin (ng/mL)	15.18± 10.68	13.26 ± 1.35	0.571	0.582
Leptin (ng/mL)	23.78± 5.99	16.86 ± 0.90	3.647	0.005*

Table 1

Mean Age, Anthropometric Measurement, Metabolic and Hormonal

Zhong N, Wu XP, Xu ZR, Wang AH, Luo XH, Cao XZ, et al. Relationship of serum leptin with age, body weight, body mass index, and bone mineral density in healthy mainland Chinese women. Clin Chim Acta 2005; 351: 161-8

Variable	Leptin	
	r	p
Age	0.633	0.367
BMI	0.809	0.049*
Prolactin	-0.094	0.796
Progesterone	-0.425	0.221
LH	-0.088	0.810
FSH	0.225	0.560
Testosterone	-0.119	0.780
Glucose	0.052	0.903
Insulin	0.279	0.503
HOMA	0.315	0.447

**Table (II):
Correlation between leptin and different parameters**

Zhong N, Wu XP, Xu ZR, Wang AH, Luo XH, Cao XZ, et al. Relationship of serum leptin with age, body weight, body mass index, and bone mineral density in healthy mainland Chinese women. Clin Chim Acta 2005; 351: 161-8

	Noninsulin resistant subgroup (n = 15) mean ± SD	Insulin resistant subgroup (n =25) mean ± SD	t	P value
BMI (kg/m ²)	30.03±4.58	32.4±3.39	0.614	0.413
Leptin (ng/mL)	16.22±2.59	25.52±5.56	3.35	0.044*

Table III

BMI and Serum Leptin Level in Noninsulin Resistant and Insulin Resistant Obese Women with PCOS

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CONCLUSION AND RECOMMENDATIONS



- Leptin may have a role in the ovarian dysfunction in obese patients with PCOS.
- The body mass index and insulin resistance are the two main factors Governing serum leptin levels.
- Emphasis on the importance of early detection and education for patients with polycystic ovary syndrome.
- The importance of developing strategy that consider following up patients with polycystic ovary syndrome for monitoring their hormonal levels, diet as well as their weight.
- The need for further studies in larger subjects and in different areas in the kingdom of Saudi Arabia with

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THANK YOU