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Determining the insulin resistance rate in Polycystic Ovary Syndrome patients (PCOs)

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Abstract:

Background: *Polycystic ovarian syndrome is the most common endocrine disorder of reproductive-age women.* ***Object:*** *to detect Insulin resistance rate among PCOs patients in AUHOG .during May 2014 to December 2015.*
Study design: *Prospective Observational case-control Study.* ***Materials and methods:*** *Patients included in the study are PCOs patients that are diagnosed according to Rotterdam Criteria 2003 after excluding the co-morbidities. We compare the results with women had the same age and weight. Study method is based on: Fasting glucose and fasting insulin as well as Oral Glucose tolerance test.* ***Results****: our results demonstrated that 60% of the patients were obese with BMI more than 25 kg/m^2. Clinically: Signs and symptoms of hyper-androgenism: 77 % of patients suffer from Hirsutism, whereas 60% suffer from Obesity. Laboratory finding: 12 cases had elevated testosterone levels. Fasting glucose was abnormal in18% compared with 4% in controls. OGTT test was abnormal in 6% compared with3% in controls. Fasting insulin was above 20 IU/ml in (16%) compared with 4% in controls (P<0.05). Patients who G/I ratio was below 4.5 were (13%). compared with 1% in controls. Insulin resistance according to G/I ratio at cut off value of 4.5 was 13% (P<0.05).*
Conclusion*: Insulin resistance was existed only in 18%patients of PCOs. Comparison with 4%in control study, so there is no evidence to use Insulin-Sensitizing Agents in treatment patients.*

Key words: *Insulin, Poly Cystic Ovary, Resistance, Aleppo University.*

INTRODUCTION

Polycystic ovarian syndrome is the most common endocrine disorder of reproductive-age women and affects approximately 4 to 12 percent [1, 2, 3].In 2003 in Rotterdam, Netherlands, a consensus meeting between the European Society of Human Reproduction and Embryology and the American Society for Reproductive Medicine (ESHRE/ASRM) (The Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group, 2004) redefined PCOS (Table 1-1). Affected individuals must have two out of the following three criteria: (1) oligo- and/or anovulation, (2) hyperandrogenism (clinical and/or biochemical), and (3) polycystic ovaries on sonographic examination. However, because other etiologies, such as congenital adrenal hyperplasia, androgen-secreting tumors, and hyperprolactinemia, may also lead to oligo-ovulation and/or androgen excess, these must be excluded. Thus, PCOS is at present a diagnosis of exclusion.

Table 1-1 Definition of Polycystic Ovarian Syndrome
ESHRE/ASRM (Rotterdam) 2003 To include two out of three of the following: 1. Oligo or anovulation 2. Clinical and/or biochemical signs of hyperandrogenism 3. Polycystic ovaries (with the exclusion of related disorders)
NIH (1990) To include both of the following: 1. Oligo-ovulation 2. Hyperandrogenism and/or hyperandrogenemia (with the exclusion of related disorders

The Rotterdam criteria constitute a broader spectrum than that formerly put forward by the National Institutes of Health (NIH) Conference in 1990 [4]

Etiology

The underlying cause of PCOS is unknown. However, a genetic basis that is both multifactorial and polygenic is suspected, as there is a well-documented aggregation of the syndrome within families[5]. Specifically, an increased prevalence has been noted between affected individuals and their sisters (32 to 66 percent) and mothers (24 to 52 percent) [6.7.8]

Insulin Resistance

Women with PCOS also display greater degrees of insulin resistance and compensatory hyperinsulinemia than nonaffected women. Insulin resistance is defined as a reduced glucose response to a given amount of insulin. The mechanism of this decreased insulin sensitivity appears to be due to a postbinding abnormality in insulin receptor-mediated signal transduction [9]. Both lean and obese women with PCOS are found to be more insulin resistant than nonaffected weight-matched controls[10].

Table 1-2 Consequences of Polycystic Ovarian Syndrome
Short-term consequences 1. Irregular menses 2. Hirsutism/acne/androgenic alopecia 3. Infertility 4. Obesity 5. Metabolic disturbances 6. Abnormal lipid levels/glucose intolerance

Long-term consequences

1. Diabetes mellitus
2. Cardiovascular disease
3. Endometrial cancer

Signs and Symptoms

Menstrual Dysfunction: Characteristically, oligomenorrhea (fewer than eight menstrual periods in 1 year) or amenorrhea (absence of menses for 3 or more consecutive months) with PCOS begins with menarche. [11].

1-Hyperandrogenism

Hirsutism : In a female, hirsutism is defined as the presence of coarse, dark, terminal hairs distributed in a male pattern. Hirsutism should be distinguished from hypertrichosis, which is a generalized increase in lanugo, that is, the soft, lightly pigmented hair associated with some medications and malignancies. Polycystic ovarian syndrome accounts for 70 to 80 percent of cases of hirsutism, with idiopathic hirsutism being the second most frequent cause [12].

2-Impaired Glucose Tolerance and Type 2 Diabetes Mellitus

Women with PCOS are at increased risk for impaired glucose tolerance (IGT) and type 2 DM. Based on oral glucose tolerance testing of obese women with PCOS, the prevalence of IGT and DM is approximately 30 percent and 7 percent, respectively [13]. Similar findings were reported in a group of obese adolescents with PCOS[14]. In addition, cell dysfunction that is independent of obesity has been reported in patients with PCOS [15].

3-Obesity

Compared with age-matched controls, women with PCOS are more likely to be obese, as reflected by an elevated body mass index (BMI) and waist:hip ratio [16]. This ratio reflects an android or central pattern of obesity, which itself is an independent risk factor for cardiovascular disease [17].

MATERIAL AND METHODS

Study group are PCOs patients who were diagnosed according to Rotterdam Criteria 2003 after excluding the co-morbidities. We compare the results with women had the same age and weight.

Study method is based on:

- Full detailed history and clinical examination including Bp, BMI and waist to hip circumference.
- Ultra sonographic scanning for ovarian volume and follicles and ovulation.
- Lab. Study including:
    - Basal LH/FSH.
    - Fasting glucose and fasting insulin.
    - Free testosterone and DHEAs.
    - Oral Glucose tolerance test.
- Normal Glucose value 70-110 mg/dl. Insulin range 15.6-24.4 and the main value 20 IU/ml.

- G/I ration cut off value 4.5, the values less than it indicate insulin resistance.

Study design: Prospective Observational case-control Study. The sample size was 200 women half of them had poly cystic ovary syndrome.

RESULTS

1-Fasting glucose:

Table (1): the number and percentage for Fasting glucose to study and controls groups

		Fasting glucose	
		normal	**abnormal**
Study group	**number**	82	18
	percentage	82.0%	18.0%
Control group	**number**	96	4
	percentage	96.0%	4.0%
	total	178	22
		89%	11.0%

We use (PHI) analyses to study correlation between study and controls groups. And we notice a significant relation between the two groups. And the P value was <0.05

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Phi	-.224-	**.002**
N of Valid Cases		200	

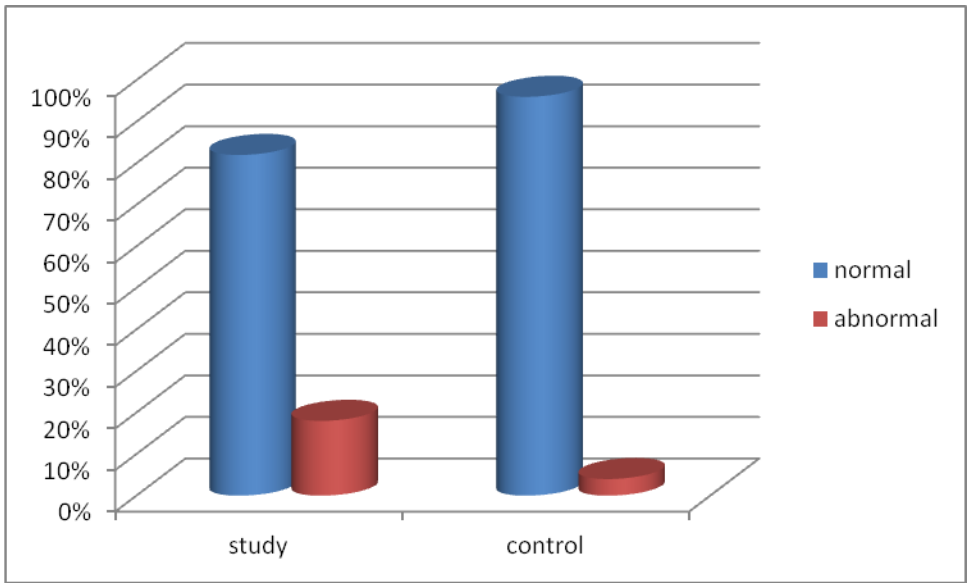

Figure (1): the fasting glucose for study and controls groups

2-Fasting insulin:

Table (2) : the number and percentage for Fasting insulin to study and controls groups

		Fasting insulin	
		normal	**abnormal**
Study group	**number**	84	16
	percentage	84.0%	16.0%
Control group	**number**	96	4
	percentage	96.0%	4.0%
	total	180	20
		90%	10.0%

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Phi	-.200-	.005
N of Valid Cases		200	

We use (PHI) analyses to study correlation between study and controls groups. And we notice a significant relation between the two groups. And the P value was <0.05.

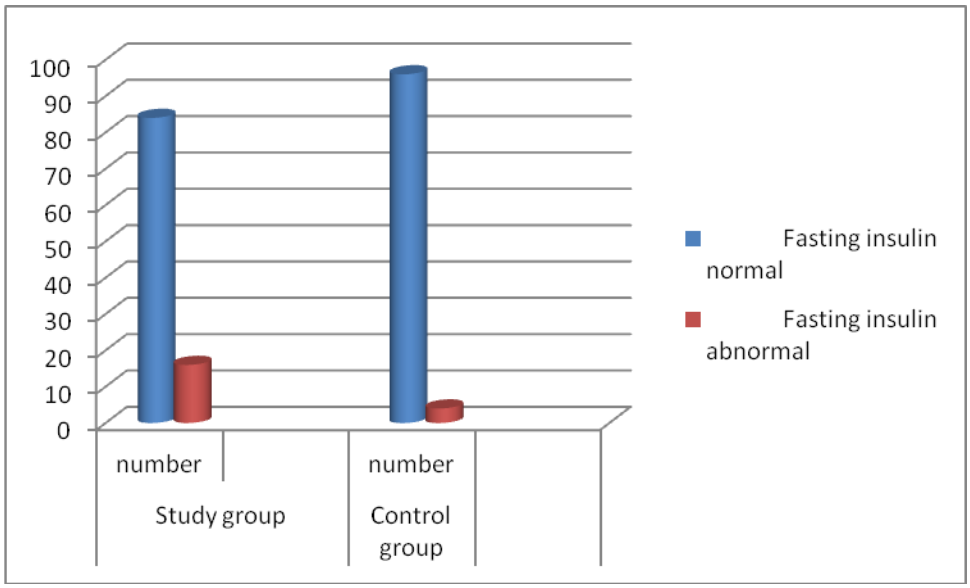

Figure (2):the fasting insulin for study and controls groups

3-Glucose tolerance test:

Table (3): the number and percentage for Fasting insulin to study and controls groups

		Glucose tolerance test	
		normal	**abnormal**
Study group	**number**	94	6
	percentage	%94	0.0%
Control group	**number**	97	3
	percentage	97.0%	3.0%
	total	191	9
		97.8%	2.2%

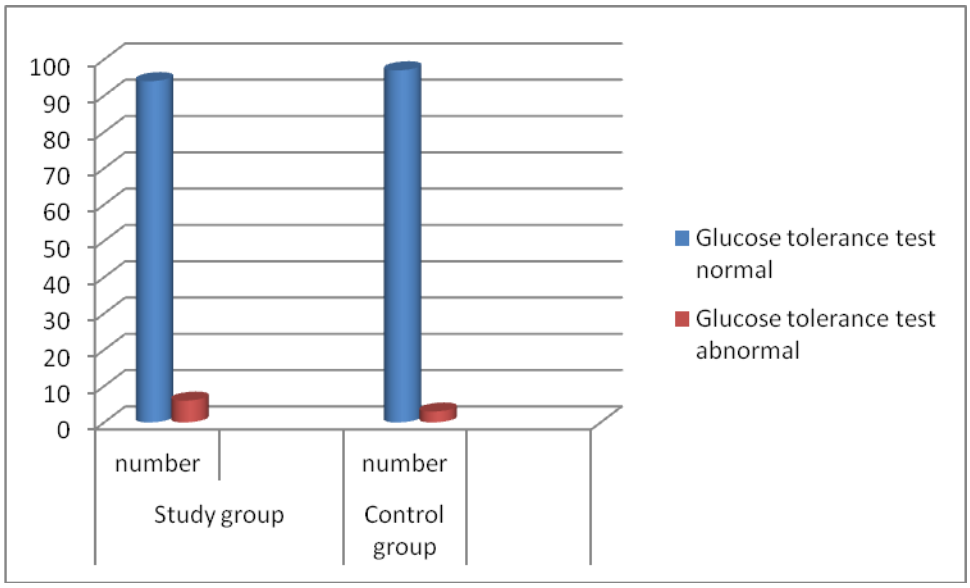

Figure (3): the Glucose tolerance test for study and controls groups

4- Glucose/insulin ratio:

Table (4) : the number and percentage for Glucose/insulin ratio to study and controls groups

		Glucose/insulin ratio	
		normal	**abnormal**
Study group	**number**	87	13
	percentage	87.0%	13.0%
Control group	**number**	99	1
	percentage	99.0%	1.0%
	total	186	14
		93.0%	%7

we notice a significant relation between the two groups for Glucose/insulin ratio . And the P value was <0.05.

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Phi	.235	.001
N of Valid Cases		200	

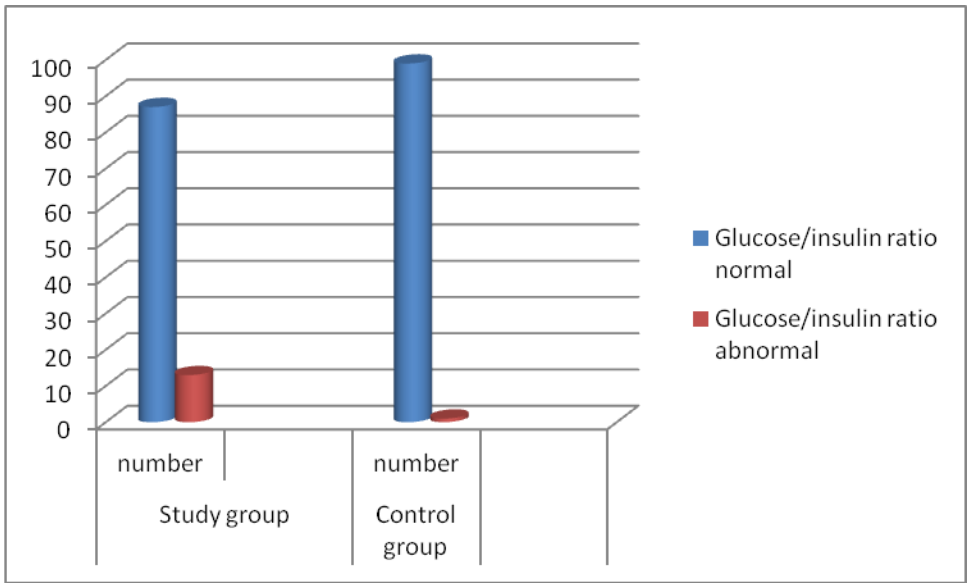

Figure (4): the Glucose tolerance test for study and controls groups

DISCUSSION

The major problem in patients PCOS was oligo menorrhea and the next was Hirsutism, while the infertility form 72.4% of married women.

Although the use of insulin sensitizers in PCOS has not been approved by the Food and Drug Administration (FDA),a lot of doctors prescribes this medication, they have been found to be increasingly beneficial for both metabolic and gynecologic issues. For example, metformin may be used to treat women with infertility and PCOS. This drug improves peripheral insulin sensitivity by reducing hepatic glucose production and increasing target tissue sensitivity to insulin. Metformin decreases androgens in both lean and obese women, leading to increased rates of spontaneous ovulation.

We notice that the major value for insulin resistance was form18% when we use fasting glucose test. And the other values were less in fasting insulin and G/I ratio tests .While in control study was form 4% and there is no big different explain this use of insulin-Sensitizing Agents.

Recommendation: The insulin resistances do not exceed 18% therefore there is no evidence to use Insulin-Sensitizing Agents in treatment PCOS patients.

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