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Evaluation of Thyroid Autoimmunity's in Women with Polycystic Ovary Syndrome

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ABSTRACT:

Background Polycystic Ovary Syndrome - PCOS- is the most common endocrine disease that affects women of reproductive age. The Aim is to assess the levels of thyroid antibodies in women with PCOS in Iraq, and to learning the link between PCOS and thyroid hormones.

Patients & Methods: Two study groups have been investigated; the first group consists of one hundred and five infertile women with PCOS. The second group is healthy control which consists of forty six healthy fertile women. Hormonal analysis was performed by using a ready kit in accordance with the manufacturer's instruction (Biomerieux SA Etoile-France) and minividas full automated system (Triiodothyronine) .Thyroxine is performed by a one-step enzyme immunoassay competition method with a final fluorescent detection (ELIFA) (Enzymelinked immunoflourecent assay) and minividas full automated system (Biomerieux SA Etoile- France). Thyroid stimulation hormones , anti -thyroid peroxidase autoantibodies ,anti-TPO and anti -thyroglobulin antibodies Tg is performed by means of immunoassay sandwich with a final fluorescent detection (ELIFA) method with the use of a ready kit in accordance to the manufacturer's instruction (Biomerieux) and MiniVidas Full automated system (Biomerieux).

The Results: It was found a highly significant difference ($p< 0.01$) between the thyroid stimulation hormone means (7.03± 13.45) µIU/ml of the infertile women with a mean of (3.51±4.43) µIU/ml of the control group, while the mean of Triiodothyronine and Thyroxine was found a slightly significant difference ($0.05>p>0.1$),). A positive result was found for thyroid peroxidase antibody (TPO-Abs)in infertile women (19.95 1± 39.53) IU/ml was higher than that of the control (4.82±4.7) IU/ml; anti-Tg autoantibodies in infertile women were (31.31±65.86) IU/ml compared to control (11.75±27.30) IU/ml with a significant difference($P=0.001$).

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Introduction

Polycystic ovaries are due to incomplete follicular development or to failure of ovulation in women without specific underlying diseases of the pituitary glands [(1).] Furthermore, conditions of increased adrenal androgen production and hyperprolactinemia. [(2)] Thyroid disorders are an especially important topic affecting women throughout the reproductive age because even asymptomatic cases can lead to complications such as infertility so, the possible investigate of thyroid disorders causes and diagnoses have been considered of great importance in the knowledge of pregnancy loss and infertility [(3)]. We now recognize that PCOS is in fact, a systemic endocrine and metabolic disorder. Although the delicate balances between thyroid hormones have been reported in primary hypothyroidism may be disrupted with hyper production of ovarian volume and cystic changes in ovaries. [(4).] Moreover, abnormal productions of inflammatory antibodies have been suggested to be related to the frequency of infection and abortion caused. [(5)] Multiple factors are at work; it may be called the "Polycystic Ovary/Excess Androgen Production /Adrenal Hyperplasia / Insulin Resistant / Hyperlipidemia / Often Overweight / An ovulatory /Hirsute / Sometimes Acne" Syndrome [(6)]. Therefore, the possible effect of thyroid hormones and their autoantibodies might be under investigation

Methods

Five ml of blood was collected according to a standardized protocol from each participant and transfer to the laboratory were investigated for thyroid stimulation hormones (TSH), anti -thyroid peroxidase autoantibodies (TPO) and anti - thyroglobulin antibodies Tg were performed by means of immunoassay sandwich with a final fluorescent detection (ELIFA) (Enzyme linked immunoflourecent assay) with the use of a ready kit in accordance with the manufacturer's instruction

(Biomerieux SA Etoile-France) and MiniVidas Full automated system (Biomerieux SA Etoile- France). T3 Triiodothyronine and T4 Thyroxine are performed by a one-step enzyme immunoassay competition method with a final fluorescent detection (ELIFA) (Enzymelinked immunoflourecent assay) and MiniVidas Full automated system (Biomerieux SA Etoile- France).

Statistical Analysis: The present results are analyzed by the following statistical method which includes: Statistical descriptive tables, relative frequencies (percent), arithmetic mean and standard deviation (SD). The suitable statistical tests are used as follows: T-test, Qi-square test.

Results

It was found a highly significant difference ($p< 0.01$) between the thyroid stimulation hormone means (6.99296±13) µIU/ml of the infertile women with a mean of (3.5±4.4) µIU/ml of the control group, while the mean of Triiodothyronine and Thyroxine was found a slightly significant difference ($0.05>p>0.1$), as shown in table (1). Diagnosis of thyroid disorder depends on the detection of specific antibodies in combination with clinical finding. Their presence in patient's serum is strongly associated with infection by this organ; in the current study positive result was found for thyroid peroxidase antibody (TPO-Abs) in infertile women (19.95 1± 39.53) IU/ml was higher than that of the control (4.82±4.7) IU/ml, anti-Tg autoantibodies in infertile women were (31.31±65.86) IU/ml compared to control (11.75±27.30) IU/ml with a significant difference (P=0.001) as shown in table (2). It was found that the sera of the highest frequencies of antibody positivity were found in 2 out of 8 (25%).In addition 1 out of 8 (12.5%) patients had just positive results for ATG and personal history of goiter of primary hypothyroidism, also similar percentage was found in TPO Abs 1 out of 8 (12.5%) of total primary hypothyroid patients

as shown in table (3). The results demonstrated that autoimmune thyroiditis in infertile women is closely associated with thyroid destruction and development of hypothyroidism. The clinical and biochemical parameters were measured including: BMI, waist to hip ratio (WHR), scoring of hirsutism, menstrual irregularity, diabetes, hypertensive. as shown in figure (1)

Discussion

The mean value of serum level of TSH was highly significant different (p<0.01) in group A (6.99296±13) and B(13.5553±21.4)compared with group C (3.5072±4.4) and D(3.2743±2.6). On the other hand thyroxine concentration was found lower significant difference (0.05>p>0.1) between group A ,B and C,D .It appears from table(1) that increasing in the level of TSH while decreasing in the level of T3 and T4 in the infertile women group as compared to fertile (control) group .The current results were reflected the stimulatory effect of pituitary gland to response in releasing more quantities of TSH as a defect in the function of thyroid gland which then indicating primary hypothyroidism[7] Fortunately ,this result agreed with other study who found hypothyroidism or at risk of future hypothyroidism in infertile woman with PCOS which could be explained by the presence of thyroid hormone receptors in human oocytes and effects on differentiation of the trophoblastic[8]. Other studies showed that woman with hypothyroidism has a higher risk of infertility due to the effect of changing the peripheral metabolism of estrogen and by decreasing SHBG production; pathways may result in an abnormal feedback at the pituitary [9 Table (2) shows, that the mean value of serum level of anti-Tg was (31.31±65.86) compared with control group (11.75±27.3), while the mean value of serum level of anti-TPO was (20.51±39.53) compared with control group (4.82 ±4.68). The results are

indicated that the majority of thyroid infection due to these two antigens associated to thyroiditis [10]. Epidemiological studies that supports this results and are seen in women of autoimmune thyroiditis had a history of previous hypothyroidism [,11] Hyperandrogenism and anovulation characterize PCOS. For years, many people automatically assumed that it is purely an autoimmune disease. The occurrence of hyper estrogenic state has been proposed as one explanation for increased autoimmune diseases in females when compared to males. [12,13] A point to be noted in this study, that positive case was (12.5%) of (Tg) and similar percent was found for TPO; those results might indicate autoimmune thyroid diseases; graves' disease and hash moto's thyroiditis. This seems that thyroid hormone disorders and autoantibodies act synergistically as causative and predisposing factors for female infertility. [14 Furthermore, this study showed significant correlation between PCOS and several systematic disorder**;** such as hirsutism, diabetes, hypertensions, and high body mass index (BMI) as shown in fig (1). The results in agreement with several studies [15,16]

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Table (1). Mean concentration of serum thyroid hormones of patients and control groups.

PCOS			Control		
Variables	*Group A*	*Group B*	*Group C*	*Group D*	*P-Value*
TSH.	6.99296±13	13.5553±21.4	3.5072±4.4	3.2743±2.6	$p< 0.01$
.T4.	77.994±33.9	77.5±17.9	77.4536±14.8	74.016±14.2.	$0.05>p>0.1$
T3.	0.99965±0.6	1.4187±0.5	1.5288±0.3	1.4386±0.3	

Table (2): Prevalence of acute infection in studied groups

PCOS		Control
Number	105	46
Age (years)	31.13±6.48	31.43±6.42
Anti Tg	31.31±65.86	11.75±27.3
Anti -TPO	20.51±39.53	4.82±4.68
TSH	10.44±18.16	3.40±3.67
P=0.001		

Table (3): Percent of positive and negative cases for ATG and TPO Abs

Types of cases	N.	%	T N.	Diagnosis
Positive TPO Abs	1	12.5	8	Primary hypothyroidism
Positive ATG Abs	1	12.5		
Both (ATG and TPO) Abs Positive	1	100	1	Hashimoto's thyroiditis
No antibodies	-----	----	3	Idiopathic hypothyroidism

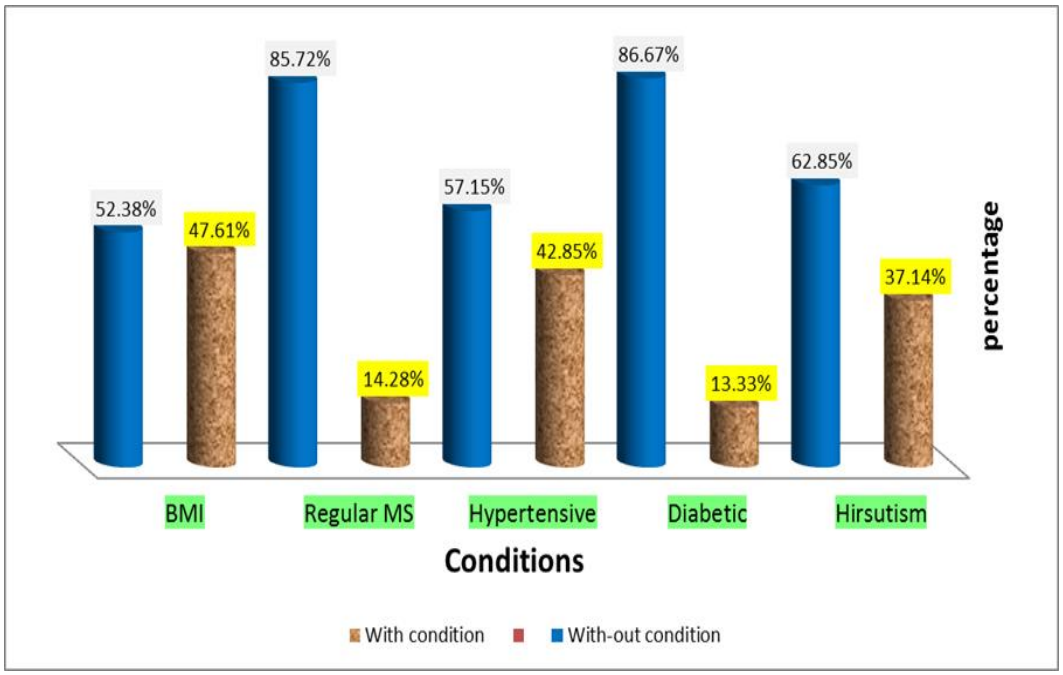

Figure (1): Distribution of PCOS women and control group according to systematic disorder.