J.Thi-Qar Sci. Vol.6 (2) June/2017

ISSN 1991- 8690 الترقيم الدولي 8690 - 1991

Relation between polycystic ovary syndrome and thyroid status and clinical, biochemical characteristics in AL-Nasiriya city

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Abstract

Objective: To assess the status of thyroid function and thyroid disorders and some important clinical and biochemical parameters in patients with polycystic ovary syndrome (PCOS).
Setting: This study was carried out in the infertility unit in AL-Hussein teaching hospital in AL-Nasiriya city.
Materials and Methods: 50 women with age of 18-35 years met conventional clinical criteria for PCOS. Anthropometric measurement including weight, height, and body mass index (BMI) were assessed. Laboratory investigations like free T3, free T4, TSH, LH and FSH were measured. Transabdominal pelvic ultrasonography was performed.
Results: The characteristics of women recruited, showed that 20 patients (40%) with PCOS were in the age group of 18-35 years old. Thyroid disorders was detected in 20 PCOS patients (40%), hypothyroidism was detected in 15 PCOS patients (30%) while hyperthyroidism was detected in 5 patients (10%). The relationship between study variables as assessed by correlation analysis revealed statistical significant among LH/FSH ratio, LH level, BMI and irregular menses with thyroid disorders in PCOS patients and revealed no statistical significant with hirsutism and acne.
Conclusion: The study demonstrated high prevalence of thyroid disorders especially hypothyroidism in patients with PCOS. It will be helpful to assess thyroid function routinely in patients with PCOS and offer thyroid hormone replacement therapy if necessary.

Introduction

Polycystic ovaries on ultrasound are very common and can be seen in up to 33 % of women of reproductive age; however, the majority of women with polycystic ovaries do not have features of polycystic ovary syndrome (PCOS) and do not require intervention (1). PCOS is the most frequent cause of an ovulatory infertility in women and is often associated with menstrual irregularities (2, 3).

PCOS is a metabolic syndrome, characterized by anovulation, hyperandrogenism and polycystic ovary. PCOS exists commonly among women at reproductive age with an incidence rate of 6 – 10 % (4).

The cause of PCOS remains unclear but is likely to be multifactorial. The essential changes are: excess androgen produced by the theca cells of the ovaries, loss of sensitivity to insulin which result to insulin resistance resulting in hyperinsulinaemia in many women with PCOS, raised luteinizing hormone (LH) levels due to increased production from the anterior pituitary gland (in around 40 % of women with PCOS) and lastly raised oestrogen levels in some women which may lead to hyperplastic endometrium (1).

During the reproductive years, PCOS is associated with important reproductive morbidity including infertility, irregular uterine bleeding and increased pregnancy loss (5).

The clinical manifestations of PCOS includes oligomenorrhea, infertility, acne, hirsutism, fat, and acanthosis nigrigans. In addition, those patients may develop with many other related endocrine and metabolic diseases, and have increased risk of suffering endometrial cancer, impaired glucose tolerance, diabetes, and cardiovascular disease (6, 7).

Thyroid disorders and PCOS are two of the most common endocrine disorders in the general population. Although the etiopathogenesis of hypothyroidism and PCOS is completely different, these two entities have many features in common. An increase in ovarian volume and cystic changes in ovaries have been

reported in primary hypothyroidism. In the other direction, it is increasingly realized that thyroid disorders are more common in women with PCOS as compared to the normal population (8,9,10,11).

Recently, several researches suggested the relationship between PCOS and autoimmunity with controversial results, which showed that serologic makers of autoimmunity elevated in patients with PCOS (12).

Most interestingly, hypothyroidism can initiate, maintain or worsen the syndrome (11). Hence, in the past few years different studies from various parts of the world regarding thyroid disorders in PCOS patient, have tried to explore the PCOS-thyroid interface, Mostly the results showed higher incidence of elevated thyroid stimulating hormone (TSH) levels and four times higher prevalence of autoimmune thyroiditis in PCOS subjects (13). Gleicher et al. hypothesized that functional autoantibodies could contribute to the development of PCOS, which represents hyperfunction of follicular recruitment in the ovaries, similar to hyperthyroidism in Graves' disease (14). Autoimmune thyroiditis (AIT), or named Hashimoto's thyroiditis, or chronic lymphocytic thyroiditis, is the most prevalent autoimmune state that affects up to 5-20% of women during the age of fertility which is due to chronic inflammation of the thyroid and can lead to hypothyroidism finally (15).

Patients, Materials And Methods

50 infertile women (failure to achieve pregnancy after one year of regular unprotected intercourse) in the age group of 18 – 35 years visiting the infertility unit in AL Hussein teaching hospital between march 2015- march 2016 were included in this study. The Rotterdam classification was used to defined PCOS as : (1) menstrual anomalies like amenorrhoea (no cycles in the past 6 months), oligomenorrhoea (cycles lasting longer than 35 days), or long cycles, (2) clinical and/ or biochemical hyperandrogenism, (3) ultrasound (USG) finding of polycystic ovaries (multiple cysts more than 12 in numbers of 2-9 mm in size) . The appearance of 2 of these 3 findings was required to define PCOS (16). Patients having any major systemic illness, Cushing syndrome, hyperprolactinemia, acromegaly, functional hypothalamic amenorrhea, congenital adrenal hyperplasia, and patients receiving drugs for any other systemic illness were excluded from our study (17). Clinical hyperandrogenism was defined as hypertrichosis and/ or acne, and/ or androgen pattern of alopecia (18, 19). Detailed medical history including menstrual history was obtained and physical examination was performed in all patients. Laboratory investigations like blood glucose (fasting and 2 hours post 75 gram glucose), serum LH, FSH, free T3, free T4 (free thyroxin levels), thyroid stimulating hormone (TSH), which were measured by an automated immune-enzyme assay systems were performed to all patients. A luteinizing hormone (LH) to follicle stimulating hormone (FSH) ratio above 2 was considered elevated. Transabdominal pelvic ultrasound was performed to all patients to detect the presence of cystic ovaries.

Ultrasonography of the thyroid gland was done in the presence of thyroid enlargement or not to exclude any impalpable thyroid abnormalities. Ultrasound of thyroid was performed using a 7.5 MHz tranducer with duplex sonography. Statistical analysis was done by using Chi-square test using appropriate software (SPSS version 19).

Results

This study was conducted among 50 patients of PCOS according to Rotterdam classification of PCOS in the age group 18-35 years. In this study population maximum numbers of PCOS patients were in the age group of 18-24 years (20 patients; 40%) followed by the age group of 31-35 years (19 patients; 38%) followed by the age group of 25-30 years (11 patients; 38%) as show in table (1) and figure (1).

Table (1): of sociodemographic distribution of studied sample of PCOS

Age (years)	18-24	25-30	31-35
	20	11	19
occupation	student	employer	House wife
	1	1	48

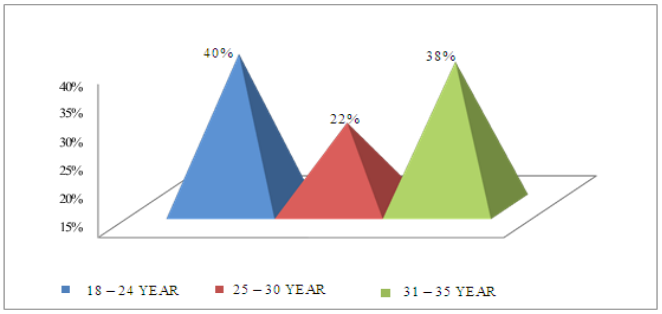

Figure (1): percentage of age with polycystic ovary syndrome

This study show 40% of patients with PCOS had thyroid disorders (hypothyroidism and hyperthyroidism) with primary and secondary infertility that present with PCOS. Our study show 15 patients (30%) had hypothyroidism and 5 patients (10%) had hyperthyroidism, as shown in table (2) and figure (2).

Table (2): prevalence of thyroid disorders in primary and secondary infertility with PCOS

		Hyperthyrodism	Hypothyrodism
Primary infertility	21 (42%)	4 (8%)	11 (22%)
Secondary infertility	9 (18%)	1 (2%)	4 (8%)
Total	30 (60%)	5(10%)	15 (30%)

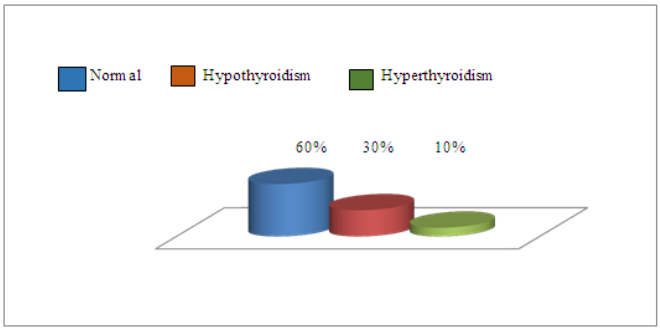

Figure (2): percentage of thyroid disorders in PCOS

Table (3) show statistical values of different variables in normal thyroid function and thyroid disorders among the polycystic ovary syndrome patients. This table show 10 polycystic ovarian syndrome patients with thyroid disorders had elevated LH-FSH ratio above 2 with statistically significant and the P value < 0.05. The study also show 8 patients with polycystic ovary syndrome and thyroid disorders had elevated LH level with statistically significant (P value < 0.05). 25 patients with thyroid disorders in PCOS had BMI > 30, 30 patients with thyroid disorders in PCOS had irregular menses with both statistically significant association (P value < 0.05). The study shows no significant association with acne or hirsutism.

Table (3): Statistical values of different variables among PCOS with normal thyroid and thyroid disorders

Feature	Normal thyroid	Thyroid Disorder	Significant (p value)
LH/FSH ratio > 2	6	10	P=0.001
LH	4	8	P=0.001
HIRSUTISM	24	15	P=0.804
ACNE	12	7	P=0.832
BMI (obesity)	10	25	P= 0.001
IRREGULAR MENSES	20	30	P=0.001

Discussion

In this study, the age group of PCOS is maximum in 18-24 years and had decreased after that. This may be due to menstrual symptoms begin from puberty itself that leads to early presentation of the PCOS.

This study revealed higher prevalence of thyroid disorders among PCOS, and show 40% of patients with PCOS had thyroid disorders (30% with hypothyroidism and 10% with hyperthyroidism) and these findings are very close to the study done by Janssen, et al. where observed a high prevalence of thyroid disorders in 175 patients with PCOS (11).

In the present study, 16 PCOS patients had elevated level of LH/FSH ratio > 2. This has been also seen in a study, Banaszewaska,et al. found raised LH/FSH ratio in 45.4% of their patients and Anlakesh, et al. detected a prevalence of raised LH/FSH in 64% of their 107 PCOS patients (20,21).

This study also show raised LH level in 12 PCOS patients (with normal thyroid function and thyroid disorders), and this had been seen in Shaheen Ara Anwary, et al. found raised LH level in 56% patients with PCOS (20,21).

Obesity was detected in 35 PCOS patients (with normal thyroid and thyroid disorders) of our study, which is also similar to other studies; Delhi based study with 33 PCOS patients, obesity was detected in 46%. Najem, et al., obesity was observed in 57% among 318 PCOS patients (22).

Irregular menses had observed in a high prevalence in PCOS patients. There are three key features of the condition:

- Absent or sporadic ovulations, resulting in irregular periods.

- High levels of androgenic hormones such as testosterone.
- Enlargement of the ovaries and many follicles that surrounded the eggs (polycystic ovaries).

Although hirsutism and acne were found in a high percentage in PCOS, there was no correlation between hirsutism and acne with thyroid disorders in PCOS patients in our study.

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