Hormonal assessment in women with polycystic ovary syndrome in Tikrit city.

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Abstract

Introduction: Polycystic ovarian disease (PCOS) is probably the most prevalent endocrinological disorder affecting females and is the most common cause of menstrual disturbance during the reproductive age. It is characterized by polycystic ovaries on ultrasound and/or clinical and biochemical signs and symptoms of hyperandrogenism and/or oligo-anovulation. Therefore, this study was designed to determine relationship among LH/FSH ratio, BMI and the clinical profile of females suffering from PCOS. **Methods:** Blood samples were taken from 90 subjects (60 patients with PCOs and 30 normal healthy women as controls) after getting informed consent for hormone profile (FSH and LH) by ELISA kit of Kamiya Biomedical company. Body Mass index (BMI) and Ultra-sonogram related findings of polycystic ovarian syndrome patients were recorded. **Result:** There are significant elevations in the concentration of FSH and LH in PCOs patients as compare with normal healthy non pregnant women, ($p \leq 0.01$). Moreover, there is significant increase in the concentration of serum testosterone of patients with PCOs as compare with control women, ($p \leq 0.01$). Also, there is significant increase in the concentration of prolactin of patients with PCOs as compare with control women, ($p \leq 0.01$). However, there is significant reduction in the concentration of progesterone of patients with PCOs as compare with control women, ($p \leq 0.01$). **Conclusion:** LH and FSH were significantly correlated with obesity and infertility in PCOs patients.

Keywords: PCOs, Infertility, BMI, obesity, LH, FSH, prolactin.

التقيم الهرموني في النساء المصابات بمتلازمه تكيس المبايض المتعدد في مدينه تكريت

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الخلاصه

المقدمة: متلازمه تكيس المبايض المتعدد هو على الأرجح أكثر أنواع اضطراب الغدد الصم انتشارًا التي تؤثر على الإناث وهو السبب الأكثر شيوعًا لاضطراب الطمث خلال سن الإنجاب. ويتم تميز تكيس المبايض المتعدد بواسطه فحص الموجات فوق الصوتية و / أو العتماد على العلامات السريرية والفحوصات الكيميائية الحيوية وأعراض فرط الأندروجينية و / أو عدم الإباضة. ولذلك ، تم تصميم هذه الدراسة لتحديد العلاقة بين نسبة LH / FSH ، معيار كتلة الجسم والملف الشخصي السريري للإناث الذين يعانون من متلازمة تكيس المبايض. **طرق العمل**: تم أخذ عينات الدم من 90 امراه (ستون امراه مرضى بمتلازمه تكيس المبايض و ثلاثون امراه سليمات) بعد الحصول على موافقة مستنيرة لهرمون الشخصية (FSH و LH) من قبل ELISA مجموعة من شركة كيميا الطبية الحيوية. تم حساب مؤشر كتلة الجسم من وزن و طول الجسم والنتائج المتعلقة فحص الموجات فوق الصوتيه من مرضى متلازمة المبيض المتعدد الكيسات. **النتائج:** هناك ارتفاعات كبيرة في تركيز هرموني المحفز للجريبه و هرهون الاباضة FSH و LH في النساء المرضى بمتلازمه تكيس المبايض PCOs مقارنة مع النساء السليمات، ($p\leq 0.01$). وعلاوة على ذلك ، هناك زيادة كبيرة في تركيز هرمون التستوستيرون في دم المرضى الذين يعانون من PCOs مقارنة مع النساء السليمات في مجموعه السيطرة ، ($P\leq 0.01$). أيضا ، هناك زيادة كبيرة في تركيز البرولاكتين من المرضى الذين يعانون من PCOs مقارنة مع النساء السيطرة ، ($P\leq 0.01$). ومع ذلك ، هناك انخفاض كبير في تركيز البروجسترون من المرضى الذين يعانون من PCOs مقارنة مع النساء السيطرة ، ($P\leq 0.01$). الخلاصة: ارتبط LH و FSH بشكل كبير مع السمنة والعقم في مرضى PCOs.

الكلمات المفتاحيه: متلازمه تكيس المبايض, هرمون محفز الجريبه، هرمون الاباضة، التستسيرون

Introduction

Polycystic Ovary Syndrome (PCOs) is one of the most common endocrinopathies in women of reproductive age group with a prevalence rate of nearly 5–10% among women of reproductive age (1,2). It is characterized by chronic anovulation, hyperandrogenism, and multiple small subcapsular cystic follicles in the ovary on ultrasonography(2). PCOS is diagnosed by the appearance of at least two of the following criteria: increased androgenic hormones, irregular or absent ovulation, and enlarged ovaries comprising over 12 follicles (3).

Polycystic ovary syndrome (PCOS) is a complex condition characterized by elevated androgen levels, menstrual irregularities, and/or small cysts on one or both ovaries (4,5). The disorder can be morphological (polycystic ovaries) or predominantly biochemical (hyperandrogenemia) and elevated adenosine De aminase, (1,6,7). Hyperandrogenism, a clinical hallmark of PCOS, can cause inhibition of follicular development, microcysts in the ovaries, anovulation, and menstrual changes (8,9).

Medical studies using ultrasound have found that around one in four women has polycystic ovaries, but most of them have none or few of the other symptoms associated with polycystic ovary syndrome. The main features of PCOS are male hormone excess and polycystic ovaries. Some of the problems that women with PCOS may have the followings, (10-11):

1. Excess hair on the body (hirsutism);

2. Acne and other skin problems;

3. Scalp hair loss;

4. Irregular or missing periods;

5. Heavy periods;

6. Fertility problems;

7. Insulin resistance;

8. Weight issues

The **aim** of the study is to compare hormonal behavior between PCOs patients and normal healthy non pregnant women.

Patients and methods

Ninety women were participated in the present study, (60 women with polycystic ovary syndrome

and 30 normal healthy non pregnant women).

The study done in Tikrit teaching hospital- department of Obstetric and gynecology department and private clinic. All patients were diagnosed by special clinician of obstetric and gynecologist. Ultrasound grapy was done for all patients. Five ml of blood samples were taken after overnight fasting.

Inclusion criteria – the diagnosis of PCOS is fulfilled by Rotterdam ESHRE/ASRM sponsored PCOS consensus criteria, when two of the following first three clinical features will be present, (11).

- **a.** Clinical or biochemical evidence of hyperandrogenism.
- **b.** b. Chronic anovulation
- **c.** c. Polycystic ovaries on imaging

Age of study subjects were between 14 to 40 years. They readily agreed to participate in the study with an informed consent. Serum LH, FSH was evaluated with the help of chemiluminescence ABBOTT 1000 isr.

Blood was collected on 3rd day of either normal or induced menstrual cycle. LH and FSH value was evaluated from the serum. Expected value of LH during follicular and luteal phase 5 IU/L and during ovulation 60 IU/L.

Expected value of FSH during Follicular and luteal phase is 10 IU/L and during ovulation it is 15-20 IU/L. Serum FSH, LH, Testosterone, Prolactin and progesterone were done by using commercial kits and according to standard procedures, and were determined by enzyme-linked immunosorbent Assay (ELISA) kit (R&D Systems, Minneapolis, USA). Commercial kits were supplied by Syntron Bioresearch, Inc, (12).

Statistical analysis was done by using student T test. All data were presented as mean and standard deviation and Probability value less than 0.05 was accepted as significant value, ($p \leq 0.05$).

Results

As in table 1, there are significant elevation in the values of body weight and BMI in PCOs patients as compare with healthy control women, ($p \leq 0.01$). Also, there are significant increase in the values of), waist circumference, (WC) and hip circumference (HC) in PCOs patients as compare with

healthy control women, (P≤ 0.05).

Table 1 The mean and standard deviation of age, body weight, body mass index (BMI), waist circumference, (WC); hip circumference (HC) of women with PCOS and control subjects.

Parameters	**Control women**	**PCOs patients**	**P value**
Age (years)	28.6 ± 5.1	29.1 ± 4.7	NS
Body weight (Kg)	62.5 ± 2.5	79.1 ± 8.4	0.05
BMI (Kg/M^2)	22.7 ± 2.6	29.9 ± 5.85	0.01
WC (cm)	81.8 ± 8	97 ± 13	0.05
HC (cm)	99 ± 11	121 ± 12	0.05

While table 2 shows the mean and standard deviation (SD) of serum hormones of POCs patients and normal healthy non pregnant women.

Table 2 the mean and standard deviation (SD) of serum FSH, LH, Testosterone, Prolactin and progesterone in POCs patients and normal healthy non pregnant women.

Hormones	Control women	PCOs patients	P value
FSH (MIu/ ml)	6.1 ± 1.3	11.01 ± 2.9	0.01
LH (MIu/ml)	7.8 ± 2.1	17.03 ± 7.2	0.01
Testosterone (ng/ml)	0.34 ± 0.1	0.927 ± 0.24	0.05
Prolactin (ng/ml)	5.4 ± 1.9	26.9 ± 7.6	0.01
Progesterone (ng/ml)	4.9 ± 1.2	0.74 ± 0.23	0.01

There are significant elevations in the concentration of FSH and LH in PCOs patients as compare with normal healthy non pregnant women, (p≤ 0.01). Moreover, there is significant increase in the concentration of serum testosterone of patients with PCOs as compare with control women, (p≤ 0.01). Also, there is significant elevation in the concentration of prolactin of patients with PCOs as compare with control women, (p≤ 0.01).

However, there is significant reduction in the concentration of progesterone of patients with PCOs as compare with control women, ($p \leq 0.01$).

Discussion

Although PCOS is a relatively common disorder with 5-10% of prevalence among women of reproductive age its etiology remains unknown [10]. In the present study the basic finding on which diagnosis of PCOS was made in the presence of polycystic ovary by ultrasound with clinical finding of oligoamenorrhoea and or hirsuitism fulfilling Rotterdam ESHRE/ASRM sponsored PCOS consensus criteria, (11).

Serum level of androgens including androstenedione and testosterone may be elevated, (13, 14). The ratio of LH to FSH is elevated in women with PCOS. High LH / FSH ratio are 2:1or 3:1 as tested on day three of menstrual cycle. A ratio of 2:1 or higher was present in <50% of women with PCOS in one study, (15). LH/FSH ratio is not characteristic attribute of all PCOS women. Most of the PCOS women with normal gonadotrophin ratio belongs to a group of patients suffering from hyperinsulinemia and obesity, (15, 16).

There is no cure for Polycystic Ovary Syndrome and it does not go away on its own. Treatment is aimed at reducing its symptoms and preventing further complications. Options depend on the type and severity of the individual woman symptoms and her desire to become pregnant. Diet, exercise and maintaining a healthy body weight may help many women manage the symptoms of PCOS. These life style changes are recommended to help decrease insulin resistance, (17).

The characteristic increase in LH relative to FSH release, have long been appreciated in PCOS. Because of the pulsatile nature of their release a single test fails to detect an increase LH/FSH ratio, (18, 19).

Abnormality of hypothalamo-Pituitary ovarian or adrenal axis has been implicated in PCOS, (20). Disturbance in the pulsatility of Gonadotrophin releasing hormone (GnRH) results in the relative increase in LH to FSH release [19]. An abnormal feedback mechanism

by ovarian estrogen is blamed to play role in this discriminated increase in LH release, (21).

In PCOS women, normal gonadotrophin axis is disturbed. This is reflected by high level of LH, low FSH levels and reversal of LH: FSH ratio. FSH levels in PCOS show lower than normal value and are comparable at different days of menstrual cycle without significant variations. Hormonal milieu in normal weight and overweight/obese women differs. Excessive body weight in PCOS hastens or exacerbates the complications of the disease, (20).

Antimullerian hormone (AMH) is increased in PCOS and may become part of its diagnostic criteria, (16). Although, it is proven that AMH measurement prior to gonadotropin stimulation could provide useful information to direct the application of mild patient-friendly stimulation protocols in order to avoid OHSS (17, 18, 21). In the present study, AMH was not measured.

The fat distribution in women with PCOS and healthy control and reported that PCOS patients showed a significantly higher amount of body fat mass index than the controls. In this study we found significant differences in fat distribution between women with PCOS and controls, (22, 23, 24).

Upper body fat distribution in women with PCOS has been mainly explained by androgen excess. Reubinoff *et al*. (2009) reported that testosterone inhibits femoral lipoprotein lipase activity. This finding suggests that testosterone may contribute to the upper-half body type fat distribution, (25).

The present study **concluded** that Since FSH and LH, testosterone were elevated in PCOs patients and significantly correlated with obesity and infertility. This finding agree with previous results, (1,3,8,19).

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