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Study Of Polycystic Ovary Syndrome Incidence And Its Relation To Infertility Among Women In Thi Qar Governorate

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Abstart:

In this study, 50 cases of women with polycystic ovary syndrome were reviewed for infertility unit at Al Hussein Educational Hospital and 40 healthy women were considered as control groups. The present study aims to identifying the changes in the levels of some reproductive hormones including prolactin (PRL), testosterone and thyroid stimulating hormone (TSH), in women with the syndrome and compare it with control group. The results of the statistical analysis showed a significant increase in the concentration of prolactin hormone, which reached the arithmetic mean (25.78 ± 31.103) ng/mg for the infected women while it was (5.594 ± 12.61) ng/mg, in the control group. There was also a high significant difference in the concentration of testosterone as the arithmetic average of the infected and control group (5.78 ± 3.09), (0.308 ± 0.37) ng / mg, respectively .While there was no significant difference in the concentration of thyroid stimulating hormone between the two groups of study.

Key word: TSH hormone, Testosterone hormone, Prolactin hormone.

1-Introduction :

Polycystic ovary syndrome (PCOS) is a complex entity that includes a variety of clinical or biochemical markers such as hyperandrogenism, ovulatory dysfunction, and the external appearance of polycystic ovary. Moreover, diagnosis should be determined in the absence of other diagnoses such as Cushing syndrome, congenital adrenal hyperplasia, tumors producing androgen and hyperprolactinemia (**Rotterdam, 2004; Schmidt, 2011**).

The prevalence of hypothyroidism in the reproductive age group is 2-4% and has been shown to be the cause of regular infertility and miscarriage (**Verma et al., 2012; Kameswaramma, 2017**).

Thyroid insufficiency can be easily detected by assessing TSH levels in the blood. Many women with infertility who have hypothyroidism with hyperprolactinemia due to increased production of thyrotropin releasing hormone (TRH) hormone are impaired ovulation dysfunction (**Goswami et al., 2009**).

Ovulation disorders constitute 30% of female infertility, one of the most common causes of women's inability to conceive. The causes of failed ovulation can be divided into five main categories: genetic, hormonal, ovarian scarring, early menopause, and incorrect folliculogenesis.

Hormonal infertility is the most common, as it is linked to the balance of complex hormones and their interaction with each other. About 50% of ovulation cases occur because the ovary fails to produce normal follicles in which the egg can mature. The most common cause of this is PCOS (**Carrell and Peterson, 2010**).

Disorders in the hypothalamus or pituitary may also lead to hormonal sterility. The hypothalamus is responsible for sending signals to the pituitary gland that then stimulates the ovaries with FSH and LH to begin maturation of the egg through a feedback loop known as the HPG axis. If hypothalamus fails to induce and control the process, the eggs do not rise and the results Ovulation is incorrect (**Carrell and Peterson, 2010**).

The objective of this study is to try to find a significant difference between women with syndrome PCOS and non-infected women in terms of concentration of the prolactin hormone and testosterone and thyroid stimulating hormone.

2-Materials and Methods

Subjects

This study was conducted in infertility unit at Al Hussein Educational Hospital in Thi -Qar Governorate for the period 1/10/2017 to 1/2/2018. The study involved 50 women who suffer from PCOS, All women with infertility were classified into five age groups ranging from (18->37) years. As well as selecting a control group that included 40 healthy women. Information was taken from all women with infertility and control by using a special questionnaire. The hormonal tests were then performed for them.

Examination of hormones: -

Three ml of blood was withdrawn the blood has then been transferred to a clean dry plain plastic tube and allowed to clot at 37°C for 10 minutes. The tubes have been centrifuged at 3000 rpm for 7-10 minutes and then the serum has been collected and kept at -20°C until used.

The level of prolactin and thyroid stimulating hormone was measured by using a standardized measurement kit from (Monobind Inc), (USA) (**Fisher., 1996**), While the measurement kit used to measure the level of testosterone is equipped by the French company (VEDALAB) (**Tietz ., 1995**). Each hormone was measured using the steps attached to the examination kit and according to the company's instructions for the (ELIZA) assay.

3- Statistical analysis: -

The results were statistically analyzed using T- test, where the value of mean \pm standard deviation (SD) were obtained. The results were compared between the women with polycystic ovary syndrome and the control group with probability level ($P < 0.05$).

4- Results and discussion: -

Polycystic Ovary Syndrome (PCOS):-

Polycystic Ovary Syndrome (PCOS) is the most common endocrine and metabolic disorder in women (Maliqueo *et al.*, 2009), with a prevalence of up to 17.8% and characterized by hyperandrogenism, irregular cycles, polycystic ovaries (Azziz, *et al.*, 2009; March, *et al.*, 2010). Most women with PMS Polycystic ovaries are able to compensate for their insulin resistance (IR), but a significant proportion of them have beta cell function (Mahabeer, *et al.*, 1990; Dunaif and Finegood, 1996). Which increases the risk of developing type 2 diabetes (T2D) independently of the body mass index (BMI) and age (Legro *et al.*, 1999). In addition, women with PCOS are at increased risk for development of dyslipidemia and hypertension (Chen, *et al.*, 2007; Legro, *et al.*, 2001), with increased prevalence of metabolic syndrome (Glueck, *et al.*, 2003). The pathogens of PCOS are unclear, but are thought to be multi-factor. There is a strong association between hyperinsulinemia and hyperandrogenism (HA) in PCOS, but the mechanisms behind their relationship with PCOS are not fully understood (Schuring, *et al.*, 2008).

Distribution of women with PCOS by age groups:-

For the age of the patients and the control group, the age was divided into five age groups as follows: 18-22 years, 23-27 years, 28-32 years, 33-37 years, >37 years, Table 1.

Table 1: Shows the distribution of women with PCOS and control according to age

| age groups (years) | control | | Patients with pcos | |
|------------------------|-------------|-------------|--------------------|-------------|
| | % | number | % | number |
| 18-22 | 17.5 | 7 | 22 | 11 |
| 23-27 | 27.5 | 11 | 26 | 13 |
| 28-32 | 20 | 8 | 30 | 15 |
| 33-37 | 10 | 4 | 12 | 6 |
| >37 | 25 | 10 | 10 | 5 |
| Total number | 100% | n=40 | 100% | n=50 |

Since polycystic ovary syndrome is a life-long condition that can occur at all ages. The most common age group in our study ranged from 28-32 years, followed by 23-27 years, 18-22 years, 33-37 years, 37 years old, 30%, 26%, 22%, 12% and 10% respectively, This may be because the most common age group is women who are trying to conceive. Our findings were fully consistent with (Majumdar and Singh ., 2009 ; Moraan and Teede ., 2009), who observed that PCOS is one of the most common causes of infertility, affects 4-12% of fertile women. Some cases also appear in young adolescents. It is rare above the age of 40 years.

Examination of hormones: -

Prolactin (PRL) is one of the multiple hormones produced by the pituitary gland. The most important role of prolactin is to stimulate milk production in women after the birth of the child (**Emokpae *et al.*, 2005**). High levels of prolactin are a common problem encountered in reproductive disorders (**Choudhary, and Goswami., 1995**). High prolactin secretion which causes dysfunction of the gonads and infertility resulting from high estimates of prolactin.

Prolactin inhibits two hormones that are essential for ovulation: FSH and GnRH. When GnRH secretion is low, FSH and LH secretions are also low and therefore do not stimulate gametal production and reproductive steroids (**Cramer .*et al.*, 2003; Poppe and Velkeniers, 2002**). So when there are high levels of this hormone in the blood, women will not bleed and this non-ovulation can also cause irregular menstrual cycles, and this will lead to infertility (**Kumkum *et al.*, 2006; Micheal and Dermott ., 2002**).

In this study, mean of the hormone prolactin of the infected and control reached (31.103 ± 25.78), (12.61 ± 5.594) ng / ml, respectively., With proven results of our study a high significant difference ($P < 0.001$) between the study group at the moral level of 0.05 and the degree of freedom ($df = 88$).

These results are consistent with a study by (**Tawfiq., 2013; Nissreen., *et al.*, 2014**) who observed that women with infertility due to ovulation disorder increased their proportion of prolactin due to insufficient progesterone release from corpus luteal.

As for the thyroid stimulating hormone (TSH) reached the arithmetic average in women with syndrome Polycystic ovary (3.46 ± 5.197 μ IU / ml), while the value of the arithmetic mean (2.48 ± 1.242 μ IU / ml) in the control group, The results of the statistical analysis showed no significant difference between the two groups ($P > 0.05$) at a significant level of (0.05).

These results are consistent with the results of (**Mahnaz *et al.*, 2013**), which showed that there was no significant difference in TSH level in the infertile women compared with the control group. The Thyroid Releasing Hormones (TRH) falls under the control of negative reactions of the TSH through a short negative feedback loop. Any increase in TSH will reduce the release of TRH, which in turn will inhibit prolactin secretion and will also deliver TSH levels to the normal level.

However, this study differed with (**Mohan and Sultana.,2010; Sunita *et al.*, 2013**), who found that there was a significant difference between women who were infected and not affected by TSH concentration, which may be due to the presence of atrophy in the function of thyroid gland in infected women Cause secondary menopause, Hypothyroidism increases when the ovaries can not produce and release eggs, Also they can not produce enough progesterone and estradiol necessary for the menstrual cycle to occur, except in low amounts of the adrenal gland (**AL-Jubouri, 2006**). Anomalies in thyroid function can also have adverse effects on reproductive health and pregnancy (**Jefferys, *et al.*, 2015 ; Gupta, *et al.*, 2016**).

Arithmetic average of the male hormone testosterone in women with pcos (3.09 ± 5.78 ng / ml), while the control group was (0.37 ± 0.308 ng / ml). The results of the statistical analysis showed a significant difference between the two groups ($p < 0.001$) for the concentration of the hormone. This result was consistent with the studies conducted by (**Sporanda and Papic, 2004 ; Gilling, *et al.*, 1997**).

Testosterone (T) is a steroid hormone that causes the polycyclic ovary syndrome. The hormone is produced in females from the ovaries and adrenal gland (Marx and Mehta, 2003). The reason for the rise of the hormone (T) is due to the fact that the outer layer of ovary and tissue within the ovary heart was thick in women with PCOS. The dense pulp of the ovary inside contains theca cells that produce additional amounts of testosterone and this result was consistent with (**Nelson, *et al.*, 2001**), which suggests that

ovarian thecal cells in women affected with PCOS are more efficient in converting the androgen precursors into testosterone than in the normal theca cells.

It is worth mentioning that 8% of (T) concentration in the bloodstream is associated with the binding of the sex hormones beta- Globulin (B- Globulin), 19% is associated with albumin and only 1% is free and not associated with any type of binding protein (Perez., 1994).

High concentrations of estrogens and thyroid hormones in the blood stimulate (B- globulin) synthesis. On the contrary, high levels of androgens, glucocorticosteroids, growth hormones, insulin and obesity inhibit their process (Nelson, et al., 2008).

The observed increase in (T) concentration may be due in part to the low level of B- globulin under obese and also to the negative effect of insulin, which may have significantly increased its concentration due to PCOS. Therefore, a large part of the concentration (T) will remain free and unrelated to any protein link, which would cause a significant increase in concentration in the bloodstream table 2.

Table2: Shows the arithmetic mean of the concentration of hormones in the control groups and pcos patients

| groups | number | Mean ± standard deviation | Standard error | |
|--------|----------|---------------------------|----------------|----------|
| TSH | control | 40 | 2.48 ± 1.242 | .19651 0 |
| | patients | 50 | 3.46 ± 5.197 | .73509 0 |
| TESTO | control | 40 | .37 ± 0.308 0 | .04886 0 |
| | patients | 50 | 3.09 ± 5.78 | 0.81749 |
| PRO | control | 40 | 12.61 ± 5.954 | .94147 0 |
| | patients | 50 | 31.103 ± 25.78 | 3.64674 |

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