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EVALUATION OF THE EFFECTIVENESS OF ANTI-MULLERIAN HORMONE IN THE DIAGNOSIS OF POLYCYSTIC OVARY SYNDROME

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ABSTRACT

Polycystic ovary syndrome is one of the most common endocrine disorders in women of childbearing age, and in view of the complications it causes that have a negative impact on the nature of the lives of affected women. Wadi Al-Shati area according to Rotterdam criteria and evaluated the efficiency of AMH in diagnosing this syndrome. The study included 50 women diagnosed with PCOS by ultrasound, their ages ranged between 25-45 years, divided into two groups according to the incidence of the syndrome. **Objective**: To evaluate whether anti-Müllerian hormone (AMH) can be used as a diagnostic marker for polycystic ovary syndrome (PCOS). **Materials and Methods:** In this study, 50 samples were collected from female donors who were recently diagnosed with polycystic ovary syndrome (PCOS) by ultrasound. Among them were samples of healthy women who did not suffer from the syndrome as a control sample who visited the infertility center in the city of Sabha. They were from different areas of the city of Sabha and its suburbs, as well as a number of women who visited Al-Sara Clinic, Al-Firdaws Clinic and Al-Amal Clinic in the Brak Al-Shati area. **Results:** The results of this study showed no significant differences in AMH concentration levels between women with PCOS and healthy women under study. **Conclusion:** The results of this study showed an increase in the number of women with the syndrome in the age group (26-30 years), and no significant differences in the concentration of AMH between the two groups, as the P-Value was higher than 0.05, while it showed the presence of significant differences in the concentration of LH and age, and the P-Value was less than 0.05.

KEYWORDS: Menstrual disorders, AMH, PCOs.

INTRODUCTION

Polycystic ovary syndrome is one of the most common endocrine disorders in women of childbearing age. It is also known as the Stein-Leventhal syndrome. This syndrome affects women aged between (18) and 45 years according to the Rotterdam reference criteria. It is characterized by many signs and symptoms, including, but not limited to, hyperandrogenism, decreased or absent ovulation, and ovarian syndrome.[1,2]

Ovarian abnormalities are the main cause of the disorder, but additional factors such as obesity and environmental factors affect the development of symptoms patients' personality.[3]

As Roe Durham (2003) pointed out, PCOS is a syndrome of ovarian dysfunction with androgen excess and ovarian follicle formation as the primary symptoms. When ultrasound is used to diagnose PCOS, PCOS may show signs of a variety of disorders, which appear nonspecific in approximately 20% of asymptomatic females. The common age of onset is adolescence, while the common time for diagnosis is during a woman's thirties or forties. This is because most symptoms do not appear until a woman reaches her twenties or thirties, although some symptoms appear initially.[5,4]

Elevated androgens are the underlying cause of PCOS, which in turn affects the ability of the ovaries to perform their required functions.[3]

PCOS includes many symptoms that are similar to many of the symptoms of polycystic ovary syndrome (PCOS) are intertwined with other disorders that may affect women of reproductive age, including, but not limited to, weight gain, menstrual irregularities, acne, depression,

hair loss, high blood pressure, excessive facial and body hair growth, and skin pigmentation.[6]

Polycystic ovary syndrome (PCOS) leads to many complications that negatively impact the quality of life of affected women, including infertility resulting from insufficient or no ovulation, which occurs in more than 75% of them.[2]

Obesity: Many studies have shown that obesity plays a major role in the development of PCOS, as evidenced by the often significant improvement in the regularity of the menstrual cycle in response to weight loss in affected women.[7]

Anxiety and Depression: It has been proven that the symptoms commonly associated with PCOS lead to a significant decrease in health-related quality of life. Therefore, any woman with the condition needs treatment PCOS: Consider and understand the negative impact this condition may have on psychosocial norms. For example, although the treatment of hirsutism may be considered a purely cosmetic problem, excessive facial hair has been shown to be one of the main causes of perceived psychological stress in women with PCOS, often due to embarrassment over excessive hair growth. Infertility and weight problems have also been found to affect other social and psychological factors. Infertility can cause tensions within the family in public settings.[8]

Cardiovascular Disease: Women with PCOS have multiple risk factors for cardiovascular disease, including hyperandrogenemia, insulin resistance, and glucose intolerance.[9,2]

The symptoms of polycystic ovary syndrome are similar to many other disorders that affect women at this stage of life, so it is necessary to confirm the infection and treat it to avoid the resulting complications. This is done by looking at the symptoms and signs, as a patient with polycystic ovary syndrome is characterized by many signs and symptoms that may be similar to other diseases, including the absence or lack of ovulation, which is more important than others in diagnosis, as well as acne, high blood pressure, and others.[6]

Ultrasound (US) is also one of the diagnostic methods, through which the number of eggs inside the ovary is determined, which in the case of infection is 12 or more inside the ovary, as well as the volume of the ovary, which is more than 10 ml in this case.[3]

As well as laboratory results, there are many laboratory tests that support the diagnosis of polycystic ovary syndrome, including measuring:
Follicale Stimulating Hormone (FSH)
Luteinizing Hormone (LH).
There is an increase in the secretion of the hormone LH and a decrease in the secretion of the hormone FSH
Low Density Lipoprotein (LDL),
very Low Density Lipoprotein (v LDL)
High Density Lipoprotein (HDL).

And also anti-Müllerian Hormone which is known as (AMH) also Müllerian inhibiting substance, which is a peptide hormone produced by the granulosa cells of the follicles and is considered a highly sensitive marker of the ovarian reserve of follicles.[10]

The hormone has an inhibitory effect on both the primordial follicle and the response of the follicles to the follicle-stimulating hormone (FSH) during the growth phase, which leads to the accumulation of these follicles and thus to an increase in the size of the ovary, which is indicated by ultrasound (US).[1]

The AMH hormone is high in women with polycystic ovary syndrome, as the ovary contains a large number of small follicles containing granulosa cells that secrete it.[1,10]

MATERIALS AND METHODS

In this study, 50 samples were collected from female donors who were recently diagnosed with polycystic ovary syndrome by ultrasound, including samples from healthy women who did not suffer from the syndrome as a control sample, during a period of 39 days, starting from 30/6 to 8/7/2019, whose ages ranged between (25 - 45) years, after taking into account all the appropriate conditions for taking the sample based on the tests to be measured, including, but not limited to, fasting to conduct lipid prophile and FBS tests, and that the donor be on the second or third day of the menstrual cycle to conduct the FSH LH test. In addition, information related to the subject of the study was collected by asking the questions included in the questionnaire for this study.

Study Area

This study included a number of women who frequented the Infertility Center in the city of Sebha, as they were from different areas of the city of Sabha and its suburbs, as well as a number of women who frequented the Al-Sara Clinic, Al-Firdaws Clinic, and Al-Amal Clinic in Brak Al-Shati area.

Sample Taking Method

The donor was examined by a gynaecologist using an ultrasound device to determine whether or not she had polycystic ovary syndrome. After the necessary conditions for the tests were met, the attached questionnaire was filled out. After that, samples were drawn from the blood vessels of the arm using a pressure bandage and sterile syringes equipped with needles. The samples were then distributed between plastic tubes containing the anticoagulant Fluoride + EDTA to conduct the FBS test and dry sterile plastic tubes free of any anticoagulant to conduct AMH, FSH, LH, and Lipid profile were left for half an hour at room temperature (25 c^{o}) until they clotted. After that, they were separated after completing the coagulation process using a centrifuge at a rate of 3000 rpm for 5 minutes. The serum was separated from the blood cells using a semi-automatic pipette. The separated serum samples were then placed in sterile, clean, dry plastic tubes and stored in a special refrigerator to preserve the samples at (20-) degrees Celsius until the test was performed.

Devices Used

The Screen Plus chemistry device was used using the colorimetric method to measure FBS, CHO, TG, HDL, and LDL. The I chroma hormone device was used to measure FSH, LH and the ELISA device was used to measure AMH.

RESULTS

Table 1: Difference between the arithmetic mean and standard error of the variables between infected and healthy women under study.

P-Value	Infected women	Healthy women	Variables
	Arithmetic mean +- standard error		
Number	30	20	
Age	28.27 ± 1.14	33.10 ± 1.64	*0.021
Hip circumference	4.11 ± 110.60	4.13 ± 101.55	0.127
Waist circumference	3.26 ± 88.06	3.83 ± 77.95	0.051
Body mass index	1.36 ± 28.98	2.63 ± 28.36	0.815
AMH	0.75 ± 4.81	6.69 ± 3.77	0.315
FSH	1.54 ± 9.68	0.85 ± 8.60	0.543
LH	1.59 ±10.72	0.63 ± 5.97	*0.009
FBS	2.71 ± 86.70	3.29 ± 93.76	0.105
CHO	7.81 ± 164.53	8.04 ± 151.95	0.268
TG	68.11 ± 125.36	12.61 ± 92.70	0.720
HDL	2.22 ± 36.36	3.44 ± 41.85	0.190
LDL	7.23 ± 103.09	7.12 ± 89.28	0.835

*** Presence of significant differences**

The results of this study showed that there were no statistically significant differences between the two groups in either FBS, CHO,TG, HDL, LDL, or any of the biochemical parameters that assess the risk of obesity, atherosclerosis, or vasculitis in women with polycystic ovary syndrome compared to age and weight-matched women.

The results of this study showed that the age group (26-30 years) was the age group that represented the largest number of PCOS cases in the samples under study, representing 36.6%, followed by the age group (31)-(35) at 16.6%. The results of this study also showed statistically significant differences in terms of age between women with polycystic ovary syndrome and healthy women.

The results of our study also showed statistically significant differences in LH concentration between women with polycystic ovary syndrome and healthy women, as the P-value was less than 0.05.

The results of our study showed no significant differences in FSH concentration between women with polycystic ovary syndrome and healthy women, as the P-value was higher than 0.05.

The current study also showed no significant differences between women with polycystic ovary syndrome compared to the control group in AMH concentration under the same conditions for both groups, as the P-value was higher than 0.05.

The results of our study showed that 8 out of 30 cases with polycystic ovary syndrome suffered from excessive hair growth under the chin and below the navel, representing 26.7% of the total cases, which is the highest percentage compared to the other symptoms in our study. Seven cases suffered from acne, representing

23.3% of the total cases, 26 cases, representing 86.6% of the total cases, suffered from menstrual disorders, and 7 cases suffered from overweight, representing 23.3% of the total cases. There were also 3 cases suffering from hair loss, representing 10.0% of the total cases.

The results obtained showed a high prevalence of this syndrome among women of reproductive age in the study area, with the percentage of affected women reaching 60% based on the Rotterdam criteria.

DISCUSSION

The results of this study showed no significant differences between women with polycystic ovary syndrome and the control group in AMH concentration under the same conditions for both groups, with a P-value of 0.315. The value was higher than 0.050. The results of this study are inconsistent with a study conducted by Homburg et al. (2013) in London, which showed significant differences between women with PCOS and PCOM and healthy women. It was proven that serum AMH concentration reflects the number of small follicles in the ovary, which explains the high concentrations of AMH in patients with both PCOS and PCOM. However, AMH has not been identified as a contributing factor in the diagnosis of polycystic ovary syndrome, and its role in the pathophysiology of this mysterious syndrome is still under investigation.

In Italy, a study was also conducted by La Marca and Volpe (2006) to evaluate whether AMH measurement could be used as a useful tool in the diagnosis of polycystic ovary syndrome. The results of this study showed that AMH is the best marker reflecting the decline in reproductive age, and that AMH measurement can be useful in predicting the stage of menopause. It also proved that AMH is a good surrogate marker for the diagnosis of polycystic ovary syndrome. In this study, it was proven that AMH can be used (La Marca and Volpe (2006)) as a marker for granulosa cell tumors.

It is now well established that serum AMH concentrations reflect the number of small preantral follicles and small antral follicles in the ovary (Fanchin et al., 2003, Laven et al., 2004, Weenen et al., 2004, Hendriks et al., 2005, Nelson et al., 2007, La Marca et al, 2010). This would explain the elevated AMH levels.

found in both PCOM and PCOS. However, it has been shown that each individual follicle in the polycystic ovary of women with PCOS produces significantly more AMH than its counterpart in the correspondingly sized normal ovary (Pellatt et al., 2007, Pellatt et al., 2010). It is not known whether this is a result of the influence of androgens, luteinizing hormone, or insulin, or whether it is an intrinsic property of polycystic ovarian follicles.

This finding was also inconsistent with a study conducted in Iraq on 60 women with PCOS and 30 healthy women, in which higher AMH levels were observed in PCOS patients compared to healthy controls. This study also indicated that age, serum cortisol, and testosterone significantly influence AMH levels in PCOS patients. This study also suggested that dividing PCOS patients into groups provides more information than assessing them as a whole group, especially when dividing patients according to insulin resistance.

CONCLUSIONS

This study concluded that there were no significant differences in AMH concentration between women with and without polycystic ovary syndrome, which may indicate that there is no relationship between this hormone and polycystic ovary syndrome. Women with polycystic ovary syndrome had higher LH levels and lower FSH levels compared to healthy women.

Recommendations

Conduct further studies with a larger sample size on the effectiveness of AMH in diagnosing polycystic ovary syndrome. Other variables include conducting studies on high AMH and determining the causes of this elevation in women with polycystic ovary syndrome and healthy women. Use a larger sample size and study multiple risk factors in subsequent studies in our community to determine incidence rates and contributing factors. Use modern communication methods to program awareness bulletins to reach the largest possible number of people and spread health awareness among them.

REFERENCE

1. Dewailly, D., et al., Diagnosis of polycystic ovary syndrome (PCOS): revisiting the threshold values of follicle count on ultrasound and of the serum AMH level for the definition of polycystic ovaries. Human reproduction, 2011; 26(11): 3123-3129.
2. Azziz, R., et al., The prevalence and features of the polycystic ovary syndrome in an unselected population. The Journal of Clinical Endocrinology & Metabolism, 2004; 89(6): 2745-2749.
3. Bednarska, S. and A. Siejka, The pathogenesis and treatment of polycystic ovary syndrome: What's new. Adv Clin Exp Med., 2017; 26(2): 359-367.
4. Hashemipour, M., et al., Prevalence of polycystic ovary syndrome in girls aged 14–18 years in Isfahan, Iran. Hormone Research in Paediatrics, 2004; 62(6): 278-282.

5. Lynch, R., A Case Study of Polycystic Ovarian Syndrome, 2013.
6. Lynch, R., A Case Study of Polycystic Ovarian Syndrome, in Requirements of HON 4202013. 42.
7. Balen, A.H., Polycystic ovary syndrome (PCOS). The Obstetrician & Gynaecologist, 2017; 19(2): 119-129.
8. Jones, G., et al., Health-related quality of life measurement in women with polycystic ovary syndrome: a systematic review. Human reproduction update, 2008; 14(1): 15-25.
9. King, J., Polycystic ovary syndrome. Journal of midwifery & women's health, 2006; 51(6): 415-422.
10. Eldar-Geva, T., et al., Serum anti-Mullerian hormone levels during controlled ovarian hyperstimulation in women with polycystic ovaries with and without hyperandrogenism. Human Reproduction, 2005; 20(7): 1814-1819.