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Comparision of Anti- Mullerian and Testosternoe Hormones in Sudanese women with PCOS at Elsir Abluehassan center for Fertility, Khartoum

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ABSTRACT

Polycystic ovary syndrome (PCOS) is the most common endocrine disorder among women in the reproductive age. It is characterized by an ovulation manifested as oligomenorrhea or amenorrhea, elevated levels of androgens and luteinizing hormone (LH), and polycystic ovaries by ultrasound. PCOS also encompasses a broad spectrum of clinical, hormonal and ultrasonographic characteristics.The study was aimed to compare serum AMH levels between PCOS and normal women; and to investigate the relationship between AMH and testosterone.An analytical case control study implemented in Dr. Alser Abulehassan Center for Infertility, Khartoum. A number of 50 women with PCOS and a number of 30 healthy women were recruited for the study. Medical records were examined for patients who sought fertility consultation or treatment during the period from April 2015 till June 2015. The study protocol was approved by the Medical Ethical Committee of Alneelain University. AMH and Testosterone were significantly higher in the PCOS women in comparison to normal women. The AMH was positively correlated to Testosterone ($r=.691$, $p<0.01$), and negative correlation with body excessive hair ($r= - 426$, $p< 0.05$). Also negative correlation was found between infertility and excessive body hair ($r= - 3.17$, $p< 0.05$), while no correlation was found between AMH and women age and weight. Higher serum AMH and testosterone levels in PCOS women than in healthy women; and significant positive correlations between AMH and testosterone and in the PCOS women exclusively. AMH has been proposed as a marker of PCOS and as suggested to be useful initial diagnostic test for PCOS.

Keywords: ANTI-MULLERIAN-TESTOSTERONE, PCOS, Sudanese Women

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INTRODUCTION

Polycystic ovary syndrome (PCOS) is perhaps the most striking example in humans where some these fine-tuned mechanisms is not functioning perfectly. The syndrome, associated with polycystic ovaries, anovulation and clinical or biochemical hyperandrogenism, is a phenotypically heterogenic endocrine disorder affecting women of reproductive age with a prevalence of 6-10%[1]. Also obesity, insulin resistance and the metabolic syndrome are related to PCOS[2].

Anti-Mullerian hormone (AMH) plays a central role in sexual differentiation by inducing the regression of the Mullerian ducts in male fetuses. In females; AMH is produced in the granulosa cells of the human ovary after mid-gestation[3-5]. AMH is expressed in granulosa cells of growing follicles up to the antral stage, suggesting an important role in early ovarian folliculogenesis[6-7]. AMH is able to inhibit the initiation of primordial follicle growth[8] and may also decrease the sensitivity of antral follicles to follicle-stimulating hormone (FSH)[8-10]. Testosterone has been shown to lower AMH expression in the mammalian ovary in vitro[11]. In humans, however, the association between androgens and AMH remains uncertain, and its exact function in follicular recruitment and long-term effects is not well understood.

Polycystic ovary syndrome (PCOS) is the most common endocrine disorder in women, producing symptoms of hyperandrogenism, oligoor amenorrhoea and polycystic ovaries (PCO)[12-13]. Serum AMH levels and the ovarian antral follicle count (AFC) correlate closely both in healthy subjects and in women with PCOS[14-16]. In PCOS, serum AMH correlates positively with serum concentrations of testosterone (T) and negatively with age[17]. Furthermore, women with higher serum levels of AMH and T have longer menstrual cycles compared with those with lower levels[18]. In line with these observations, in non-hirsute girls with oligo-amenorrhoea (OA), the levels of AMH are similar to those in the PCOS population but higher than in girls with normal cycles[19-22].

AMHhas been reported to be not associated with metabolic risks in adolescence and in early adulthood[23-24], but contradictory results have been published in adult female populations[21-22,25-26].

The use of the measurement of serum AMH serum levels as a diagnostic tool for PCOS has been recently under debate[27-29]. Women with PCOS have higher concentrations of AMH, and accordingly, AMH correlates with the AFC. Thus, AMH has been proposed to be a substitute for AFC in the diagnosis of PCOS[15-27-28]. AMH has also been reported to correlate with other symptoms of PCOS, such as hyperandrogenismand oligoamenorrhoea.[14-31],

Piotr and Anna, 2011 found that the concentration in serum of patients with PCOS (73.68 ±25.58 pmol/l) was significantly higher than in healthy women (16.97 ±5.80 pmol/l) ($p < 0.05$).[32]

The main aim of the present study was to compare Anti-mullerian and testosterone hormones in Sudanese women with PCOS and to elucidate the relationship between serum AMH and testosterone levels.

MATERIALS AND METHOD

Study Area: The study was conducted in Dr. Elsir Abluehassan center for fertility in Khartoum after an agreement from the center administrators. Verbal informed consent was obtained from any contributor in this study.

Study Design: Analytical retrospective case control study.

Study population:

Medical records were examined for patients who sought fertility consultation or treatment during the period from April 2015 to June 2015. The study protocol was approved by the Medical Ethical Committee of Alneelain University which is a part of the University Dean Ship of Scientific Research.

Sample Size: The study included 50 women with POCs with age ranged between 24 to 35 years and 30 matched apparently healthy women. All of them sought fertility consultation or treatment in Elsir Abluelhassan Center for Fertility.

Inclusion Criteria: Patients who fitted the medical definition of infertility "One year of unprotected intercourse but not pregnant", with no previous in vitro fertilization (IVF) or intra-cytoplasmic sperm injection (ICSI) cycles.

Exclusion Criteria: presence of 1) history of ovarian or adnexal surgery, 2) suspicious findings of ovarian malignancy, and 3) presence of endocrine disorders such as diabetes mellitus, hyper-prolactinemia, thyroid dysfunction, congenital adrenal hyperplasia, Cushing's syndrome, and adrenal insufficiency.

Clinical and laborotary examination:

Diagnosis of PCOS was based on the revised Rotterdam criteria, as follows when two of the three following criteria are present:

oligo/anovulation, clinical and/or biochemical signs of hyperandrogenemia, and polycystic ovaries (≥12 follicles measuring 2-9 mm in each ovary)[33-34].

Sample Collection:

On the day of oocyte retrieval and after overnight fast, the women underwent blood sampling by venepuncture at approximately 9:00 AM. Serum was separated and frozen in aliquots at -80^{o}C for subsequent centralized analysis.

Hormone examination:

Serum AMH levels were determined using a commercially Immuno Enzymotric Assay by AIA-360 Automated Immunoassay Analyzer from Tosoh[35].

Statistical Analysis:

All analyses were performed using Statistical Package for the Social Sciences software 15.0. (SPSS Inc., Chicago, IL).

One simple t-test Analysis was used to compare between AMH and Testosterone hormones among PCOS group. Age and weight results were reported as mean±SD. Also correlation was performed to establish the relationships among the investigated hormones. The level of significance (p) was determined to be less than 0.05.

RESULTS AND DISCUSSION

The study results were depicted in table 1, 2.The age and weight of tested women were homogeneous). However the mean age of women with PCOS was (29.6±5.4) years while the mean weight was (92.7±19.9) kg, ($p< 0.05$) (Table 1).

Table (1): the (mean ±SD) of AMH, Testosterone and body weight

Variable	Normal =30 Mean ± SD	Pcos(n=50) Mean ± SD	p-value Mean ± SD
AMH(pmol/l)	2.6± 1.0	11.4±5.5	000***
Testosterone (pmol/l)	25.9±7.5	81.9± 26.8	000***
Weight(kg)	-	92.7± 19.9	000***

***p-value considered significant at 0.05 levels .

AMH concentration in serum of patients with PCOS (11.4±5.5 pmol/l) was significantly higher than in healthy women (2.6 ±1.0 pmol/l) ($p < 0.05$). Regarding Testosterone the concentration in serum of women with PCOS (81.9±26.8) also was significantly higher than in healthy women (25.9±7.5) (Table 2). The present study confirmed a significant increase in AMH concentrations in the blood serum of women with PCOS compared to healthy women of similar age, which is consistent with the literature data (36-37).

Table (2): Correlation between AMH and level and other clinical and hormonal information.

Variable	Correlation coefficient	p-value
Testosterone	0.691	0.000
Age	-0.269	0.059
Weight	0.133	0.358
Body hair	-0.426**	0.002
Acne	-0.152	0.291
Infertility	-0.108	0.456

Correlation is significant at p.value <0.05 (2-tailed)

The study revealed positive correlations between AMH and Testosterone (r=.691, p<0.01), (Table 3). These findings are in accordance with the results of previous studies[38-42]. A negative correlation was obtained between AMH and body excessive hair (r= - 426, p< 0.05). This finding supported by the statement that PCOS is associated with acne, hirsutism, infertility, abdominal obesity, type 2 diabetes, hypertension and dyslipidemia, with the latter four being cardiovascular disease (CVD) risk factors.[43]

A negative correlation was confirmed between body excessive hair and infertility (r= - 3.17, p< 0.05). The results supported by other studies from U.S. which stated that PCOS affects about five percent of U.S. women and is a common cause of infertility, menstrual irregularity, and excessive hair growth.[44] This underappreciated condition is the most common cause of female infertility in the U.S.[45]

No correlation was found between AMH and women age and weight. The finding in line with Adel et al.[46]

CONCLUSION

In conclusion, the present study has demonstrated higher serum AMH and testosterone levels in PCOS women than in healthy women; and significant positive correlations between AMH and testosterone and in the PCOS women exclusively.

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