International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2019): 7.583

Polycystic Ovary Syndrome: A Critical Study

Thakar Japan R

Sem-3, B. Pharm, KBIPER, Gandhinagar, Gujarat, India

Abstract: ***PCOS is an hyperandrogenic disorder associated with chronic oligo-anovulation and polycystic ovarian morphology. Women with PCOS may have infrequent or prolonged menstrual periods or excess male hormone androgen. Symptoms of PCOS include irregular periods, acne, weight gain, headache, skin pigmentation, male pattern baldness and excess hair growth. Various studies have been conducted to find an effective treatment of PCOS. The present article highlights the current scenario of research in the field of PCOS treatment.***

Keywords: Metabolic clearence rate (MCR), Production rate (PR), Electro-acupuncture (EA), Epinephrine (EPI), Nor-epinephrine (NE), Anti-mullerian hormone (AMH), Thyroid stimulating hormone (TSH), Follicle stimulating hormone (FSH)

1. Introduction

Polycystic Ovary Syndrome (PCOS) is a hormonal disorder which is common among women of reproductive age. It is a hyperandrogenic disorder associated with chronic oligo-anovulation and polycystic ovarian morphology Women with PCOS may have infrequent or prolonged menstrual periods or excess male hormone (androgen). The inadequate level of Follicle Stimulating Hormone (FSH) is hypothesized to be the proximate cause of anovulation. The fundamental pathophysiologic defect or PCOS still remains to be identified. The other associated conditions with PCOS are insulin resistance, hyperandrogenism and altered gonadotropin dynamics.

The differences between normal ovary and polycystic ovary are:

Normal ovary	Polycystic ovary
Formation of primary follicle occurs	No formation of primary follicle occurs
Formation of secondary follicle occurs	No formation of secondary follicle occurs
Formation of mature follicle occurs	No formation of mature follicle occurs
Ovulation occurs	No ovulation occurs

2. Signs and Symptoms of PCOS

Signs and symptoms of PCOS often develop around the time of the first menstrual period during puberty. Sometimes PCOS develops later in response to substantial weight gain. The symptoms of PCOS may vary but a diagnosis of PCOS is made when at least two of the symptoms are experienced. The possible symptoms of PCOS are:

- Irregular menstrual cycle: Infrequent, irregular or prolonged menstrual cycles are the most common sign of PCOS. The irregular menstrual cycles are identified as less than nine cycles a year or more than 35 days between 2 cycles and abnormal blood loss during menstrual cycle.
- Male pattern baldness
- Acne
- Weight gain
- Headaches
- Skin pigmentation
- Excess hair growth

3. Defining Alterations of Steroidogenesis in PCOS

In normal women, androgen production rate is the result of adrenal and ovarian secretion and conversion from precursors in peripheral tissues, particularly the adipose tissue and skin. Similarly the metabolic clearance rate (MCR) of androgens may occur in both glandular and extra-glandular tissues. Both production rate (PR) and MCR of androgens in females depend upon age and physiological status. Earlier studies have documented higher PR for both androstenedione and testosterone in women with PCOS associated with a less pronounced increase of their metabolic rates of androgens. Notably there are no studies in PCOS women with different obesity phenotypes, although there is evidence that in women with simple obesity, those with abdominal fat distribution have higher testosterone production rate, but not higher androstenedione, with respect to those with the peripheral phenotype. Estrogen and progesterone PR in women with PCOS have been poorly investigated. One of the main problems in the diagnosis of hyperandrogenic states such as, PCOS is the accurate measurement of androgens and particularly testosterone.

4. Effect of PCOS on pregnancy

Pregnant women with PCOS require continuous monitoring throughout the pregnancy. This is because such women are three times more likely to have a miscarriage. Gestational diabetes and premature delivery are some of the common adverse effects of PCOS arising during the pregnancy.

5. Diagnosis and Treatment of PCOS

Laparoscopy: since infertility is a major fall out of PCOS **Laparoscopic Ovarian Drilling** (LOD), has proved beneficial in many studies. Here the ovaries are subjected to heat or a laser to eliminate the tissue that is producing androgen (male hormone). This surgery is not commonly used. But it can be an option for women who are still not ovulating after losing weight and trying fertility medicines.

a) Risks of Laproscopy:

- Infection of the incision.
- Bleeding from the incision.
- Internal bleeding.
- Pain after inflating the abdomen with gas.

- Adhesions or scarring inside the body.

b) Chemotherapy

Following drugs are used for chemotherapy of PCOS and anovulation.

- Clomiphene: It is an oral anti-estrogen drug used in the treatment of infertility in anovulating females.
- Metformin: Marketed under the trade name *Glucophage*, is the first-line medication for the treatment of Type 2 Diabetes. Its oral formulation can also be used as a secondary treatment of PCOS when other drugs are rendered ineffective.

6. Recent research related to PCOS

- *Epinephrine and Norepinephrine Levels in Drug Induced Polycysry Rats: Effect of Electro-Acupunctutre on Anovulation*

The present study was aimed to test the hypothesis that modulation of anovulation and sympathetic nerve activity by repeated EA treatment in steroid PCOS rats. This was done by analyzing epinephrine and nor-epinephrine level using high performance liquid- chromatography (HPLC) in plasma of normal rats and by studying the histopathology of the ovary was done after repeated EA treatment on drug-induced PCO rats.

Repeated low- frequency EA treatment was carried out in the PCOS+EA group, each treatment lasted 20 minutes for everyone in two days up to 8-10 weeks. The rats were anesthetized and suspended in a harness. The needles were inserted bilaterally in the biceps femoris and erector spinae muscle in the somatic segment corresponding to the innervations of the ovaries. The needles were inserted to the depth of 0.3-0.5 cm and then connected to an electrical stimulator with the low frequency of 2Hz and the burst frequency off 80Hz. The intensity was adjusted until the local muscle contraction valid from 0.8-1.3 mA. After the treatment period, the animals in the control group, and the PCOS+EA treatment group were used for the EPI and NE estimation.

The electro-acupuncture treatment reverses the levels of epinephrine and nor-epinephrine which in turn modulates the sympathetic activity of rats and the electro-acupuncture treatment could bring back the neuroendocrinological state and the sympathetic activity of PCOS rats which in turn induce the ovulation back to normal.

- *Correlation Between Anti Mullerian Hormone (AMH) and Thyroid Stimulating Hormone (TSH) Levels in PCOS and Non-PCOS Sudanese Infertile Females*

Hyperthyroidism and Hypothyroidism have been associated with altered ovarian function, menstrual irregularities, subfertility and higher miscarriage rates suggest that thyroid hormone may affect the functioning of female reproductive system. Anti Mullerian Hormone (AMH) is suggested as an important marker for ovarian reserve and in diagnosis of women with polycystic ovary disease (PCOS). Increase number of couples facing problem with fertility and increase prevalency of thyroid diseases laid the foundation of the above study. The main objective of the study was to assess relation between AMH level and presence of PCOS.

Retrospective cross-sectional study was conducted from December 2016 to April 2017 97 women were recruited from the infertility outpatient clinic with different problems of infertility. 45 patients of them have PCOS in different level of severity, Rotterdam 2003 criteria were used on clinical evaluation on PCOS, 6 patients had irregular cycles, 3 patients had ammonehrea and 43 patients were non PCOS. Serum AMH and TSH levels were measured by enzyme linked immuno-sorbent assay. AMH results were found to be increased in PCOS patient group when compared with non PCOS group. The study thus concludes that AMH levels have no relation to TSH serum levels in PCOS and non PCOS patients.

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