

A BRIEF REVIEW ON POLYCYSTIC OVARY SYNDROME

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ABSTRACT

Polycystic ovary syndrome is considered as the most common endocrine disorder amongst reproductive age women, with features that suggest varying combinations of reproductive functional deficits (such as ovulatory dysfunction) and androgen excess (such as acne and hirsutism). Women with PCOS have difficulty becoming pregnant (i.e., are infertile) due to hormone imbalances that causes or result from altered development of ovarian follicles. One such imbalance is high blood levels androgens, which come from both the ovaries and adrenal gland. Symptoms of PCOS include irregular or no menstrual periods, acne, weight gain, excess hair growth on the face and body, thinning scalp hair, ovarian cysts. Women with PCOS are at risk for type 2 diabetes, high cholesterol, infertility, heart disease. However, in majority of the population PCOS can be manageable with healthy diet plan and exercise. Finally, the study presents that, the general information for PCOS. It is needed for every woman to know about PCOS and its related problems.

I. INTRODUCTION

Polycystic ovary syndrome also referred to as hyper androgenic anovulation (HA), or Stein–Leventhal syndrome, is one of the most common endocrine disorder that affecting women in reproductive age.¹ The World Health Organization (WHO) have estimated that PCOS has affected 116 million women (3.4%) worldwide in 2012. Globally, the prevalence estimates of PCOS are highly variable, ranging from 2.2% to as high as 26%. In India, experts claim 10% of the women to be affected by PCOS and yet no proper statistical data published on the prevalence of PCOS is available².

The name “polycystic ovarian syndrome” refers to the appearance of small cysts along the outer edge of the enlarged ovaries of women with PCOS³. PCOS was first described in United States in 1935⁴, and it is characterized by hyperandrogenism, ovulatory dysfunction, and polycystic ovarian morphology⁶. Around 20% of women have the characteristic appearance of polycystic ovaries on ultrasound scans and 7–8% have the additional clinical and biochemical features of PCOS itself.⁵

II. TYPES OF CYSTS

PCOS patients have numerous cysts in their ovaries with the diameter of 12mm and more than 12 cysts will be present. There are 2 types of cysts functional ovarian cysts and complex ovarian cyst. The functional ovarian cysts are not dangerous and usually do not cause any symptoms, while the non-functional ovarian cysts called as the complex ovarian cysts.

Further the functional cysts are of 2 types. Firstly, follicle cyst that contain a follicle that has failed to rupture and which is filled with fluids. Secondly, corpus luteum cysts that occurs when the follicle ruptures to release the egg, but then seals up and swells with fluid.

Complex ovarian cysts may be associated with endometriosis, polycystic ovarian syndrome

(PCOS) and other conditions. Polycystic ovaries occur when the ovaries are abnormally large and contains many small cysts on the outer edges.⁶

III. SIGNS AND SYMPTOMS

PCOS begins during adolescence and gradually progress to adulthood and its effects persist even during post-menopause. Clinical features of PCOS can be grouped into three categories – reproductive, metabolic, and psychological. Reproductive features include ovulatory and menstrual dysfunction, infertility, hirsutism,

hyperandrogenism, miscarriage, and increased risk of gestational diabetes. More than 50% of women with PCOS take treatment for infertility, and 70–80% of them have oligomenorrhea or amenorrhea. Metabolic features comprises increased risk of dyslipidemia, insulin resistance, metabolic syndrome, type 2 diabetes, and CVD. Psychological implications are depression, anxiety, negative body image and poor quality-of-life.⁷

Studies show that 70% of women suffering from PCOS have hirsutism and they take it as one of the most annoying aspects of PCOS which make them feel “unfeminine.”⁵ Recent meta-analysis in PCOS women showed a raise in the prevalence of both depressive and anxiety symptoms compared with controls.⁸ Loss of femininity, body image concerns, and coping with these conditions all contribute to poorer mental health outcomes.⁹

IV. DIAGNOSIS

PCOS can be diagnosed on the basis of Rotterdam criteria

Adults

In adults (two of clinical or biochemical hyperandrogenism, ovulatory dysfunction, or polycystic ovaries on ultrasound) after exclusion of related disorders. Where both oligo- or anovulation and hyperandrogenism are present, where ultrasound is not necessary for diagnosis .

Adolescents

The diagnosis during adolescence is controversial with adult diagnostic criteria overlapping with normal pubertal physiological events. Adolescent diagnostic recommendations include.¹⁰

(Figure 1)

Adolescent diagnosis
1. Irregular periods Irregular menstrual cycles are defined as: <ul style="list-style-type: none"> • normal in the first year post menarche as part of the pubertal transition • > 1 to < 3 years post menarche: < 21 or > 45 days • > 3 years post menarche to perimenopause: < 21 or > 35 days or < 8 cycles per year • > 1 year post menarche > 90 days for any one cycle • Primary amenorrhea by age 15 or > 3 years post thelarche (breast development) When irregular menstrual cycles are present a diagnosis of PCOS should be considered.
2. Clinical hyperandrogenism should focus on hirsutism, not on mild to moderate acne common in adolescence. Where clinical hyperandrogenism is not present, biochemical hyperandrogenemia testing is appropriate using high quality assays.
3. Pelvic ultrasound and anti-mullerian hormone measurement are not recommended for adolescent diagnosis.

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V. FACTORS THAT CAUSES PCOS OR RISK FACTORS

Obesity

Obesity is a common finding in woman with PCOS and between 40-80% woman with this condition are reported to be obese.⁷ Many studies explain that women with PCOS have increased visceral and subcutaneous body fat distribution due to increased androgen production rates, this central obesity follows a masculinized body fat distribution where the amount of visceral fat correlates with the degree of insulin resistance ⁶

Genetics

PCOS is an oligo genic condition, with a heritability of 70%. The rates of PCOS in first degree relatives of patients with PCOS were 24% and 32%, respectively.⁷ Some candidate genes have been identified as contributing to the risk of PCOS , including 7 β -hydroxysteroid-dehydrogenase type 6 (HSD17B6).⁶

Hyperandrogenemia

Hyperandrogenemia is defined as increased circulating levels of androgen. The normal range of total testosterone for women is 15 - 70 (ng/dl). A total testosterone level > 70 ng/dl is regarded as hyperandrogenemia. Females with hyperandrogenemia are most likely to have PCOS.⁷

Environment/lifestyle

Several lifestyle factors and environmental exposures have been associated with severe PCOS phenotype. Sedentary lifestyle is associated with increased metabolic dysfunction, and weight gain is associated with hyperandrogenism and oligo anovulation.⁶

Intrauterine exposure

The exposures to testosterone in utero might predispose to the later development of PCOS. One of the Animal studies have demonstrated that in utero exposure is correlated with development of a PCOS-like syndrome including hyperinsulinemia, oligoanovulation, hyperandrogenism and polycystic ovaries. Also exposure to androgens may impair estrogen and progesterone inhibition of GnRH, contributing to increase in pulse frequency.⁶ (Engl, 2005)

VI. PATHOPHYSIOLOGY OF PCOS

The pathophysiology of PCOS deals with a multifaceted disease involving uncontrolled ovarian steroidogenesis, excessive oxidative stress, aberrant insulin signaling, and genetic/environmental factors. An intrinsic defect in theca cells that can partially explain the hyperandrogenemia in patients with PCOS. Moreover, women with PCOS have theca cells that, still secrete high levels of androgens due to an intrinsic activation of steroidogenesis even in the absence of trophic factors.¹¹ Thus, intrinsic dysregulation also affects granulosa cells which produce up to 4 times higher levels of anti-mullerian hormone in women with PCOS in comparison to healthy controls. Studies also show that an elevated number of follicles, primarily pre-antral and small antral follicles, in females with PCOS. A defect in apoptotic processes in some maturing follicles further increases their count in PCOS patients. Also, decreased insulin sensitivity attributable to a postreceptor binding defect in the insulin signaling pathways has been identified as an intrinsic component of PCOS, independent of obesity.¹² It was also reported that an alteration in gene expression of some players in the insulin signaling pathways by microarray gene analysis. Moreover, PCOS has been associated with increase in glycooxidative stress secondary to mitochondrial dysfunction. Oxidative stress can induce insulin resistance and hyperandrogenism in patients with PCOS. Familial aggregation of PCOS and genomic identification of PCOS-susceptibility loci support the role of genetics in the etiology of this disease. Some studies showed an inherited component of androgen excess in patients with PCOS. Furthermore, a polymorphic marker in fibrillin 3 gene associated with PCOS, D19S884, has been identified in independent sets of families carrying the disease.

VII. COMPLICATIONS OF PCOS**Subfertility:**

This is largely due to a consequence of oligo anovulation, but may also result from abnormalities in oocyte development due to hormonal or other abnormalities. Women with PCOS may have reduced fertility due to the associated endocrine and gynecologic abnormalities that impact ovarian quality and function. Accounting for up to 90% of ovulatory disorders, PCOS-associated persistent periods of anovulation are positively correlated with infertility.

Miscarriage:

There is an increased risk of miscarriage in PCOS patients who do conceive; however, this risk is confounded by the high rate of obesity in this population, which is also a risk factor for miscarriage. Various research data also suggest an increased risk of miscarriage in women with PCOS. The influence of PCOS phenotype, whether classic or non-classic, on female fertility remains poorly comprehended. Data describing the effects of PCOS on pregnancy outcomes are also limited and based on small trials. Thorough studies are needed to assess the degree of infertility in PCOS various phenotypes and to understand the reasons for increased negative pregnancy outcomes in this group of women. Concerning the effects on the embryo, women with PCOS are 2.5 times at a higher risk of giving birth to small for gestational age children in comparison to healthy females and offspring show an increased morbidity and mortality compared to controls.

Cardiovascular disease:

Patients with PCOS often exhibit dyslipidemia, which is likely related both to hyperinsulinemia and hyperandrogenism. In 2010, the Androgen Excess-PCOS society provided a consensus statement about increased risk of CVD in women with PCOS and developed a guideline to prevent such complication. Yet, despite the increased cardiovascular risk markers and the indubitable presence of CVD risk factors in this population, uncertainty remains regarding the increased cardiovascular morbidity and mortality in patients with PCOS. Discrepancies between studies might be due to the heterogeneous nature of the populations studied. Therefore, supplementary methodologically rigorous trials are needed to determine the absolute risk of CVD in patients with PCOS throughout age ranges.

More recent data showed that patients with PCOS have significantly elevated levels of circulating biomarkers of CVD, including C-reactive protein and lipoprotein A, in comparison to matched controls. Other studies demonstrated a higher burden of indicators of atherosclerosis with early onset cardiovascular dysfunction, i.e., arterial stiffness, endothelial

dysfunction, and coronary artery calcification.

Type 2 Diabetes Mellitus:

Patients with PCOS are thought to have an increased risk of developing T2DM above the risk conferred by their level of insulin resistance and as many as 10% may develop T2DM by their fourth decade.

Malignancies:

A combination of hyperinsulinemia, hyperandrogenism, and oligo anovulation increases the risk of endometrial cancer and other endometrial disorders. Females suffering from PCOS present many risk factors associated with the development of endometrial cancer, such as obesity, insulin resistance, type II diabetes mellitus, and anovulation. Anovulation triggers an

unopposed uterine estrogen exposure. This can subsequently trigger the development of

endometrial hyperplasia and ultimately endometrial cancer. As a matter of fact, studies show that women with PCOS have a three-fold increased risk of developing endometrial cancer which is mostly well differentiated with a good prognosis. Regardless, no data supports ultrasound screening for endometrial thickness in women with PCOS, which comes in agreement with the American Cancer Society against screening for endometrial cancer in patients with average or increased risk. Yet women should be advised to notify their healthcare provider for any spotting or unexpected bleeding. On the other hand, there are limited data to support any association between PCOS and breast and ovarian cancer.

Psychiatric disorders:

Women with PCOS have an increased risk of anxiety, depression, binge-eating disorder, and bipolar disorder. Psychological stress and PCOS have been shown to be intimately related.

In addition, females with PCOS have a lower self-esteem and body satisfaction and subsequently tend to have more psychiatric hospital admissions than controls. As a result, they display a low quality of life and are prone to a high degree of emotional. It is worth noting that obesity, acne, hirsutism and irregular menstrual cycles, all associated with PCOS, are major contributors to the psychological stress that the patients experience due to the challenging of the female identity and her body image.

Others:

High Blood Pressure or Hypertension

High Cholesterol

High Lipids

Sleep Apnea

Higher risk of Gestational diabetes.

VIII. CONCLUSION

Majority of women are unaware regarding PCOS, its causes, symptoms, and complications. Application of educational program and supportive measures like patient forums, workshops, and internet based information for adolescent girls and women in different settings should be considered in order to increase the level of knowledge and awareness which also helps in early diagnosis and treatment.

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