

## An Overview on Diagnosis and Management Approach of Poly Cystic Ovarian Syndrome

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### ABSTRACT

**Introduction:** Polycystic ovary syndrome (PCOS) is a condition characterized by underlying metabolic and hormonal dysfunction. Patients are premenopausal, presenting with acne, infertility, and hirsutism. The presentation remains heterogeneous as many patients would present with symptoms relating to another autoimmune disease such as metabolic syndrome, thyroid dysfunction, or diabetes mellitus. **Methods:** We searched Pubmed for ((polycystic ovary syndrome) (AND (diagnosis) OR (management)) OR polycystic ovary disease))). **Review:** The diagnosis of PCOS is relatively straightforward, given that is highly suspected during clinical assessment and examination. Laboratory investigations aid in identifying underlying autoimmune conditions that may affect treatment. Therapeutic management is focused on the three areas of pathophysiology: ovarian dysfunction, hyperandrogenism, and metabolic disorders. **Conclusion:** The gynecologist should attempt to manage the myriad of symptoms in PCOS. This management should focus on close goals of symptom control and long term goals of infertility and remission. This approach to management should be fuelled by establishing a rapport with the patient, attending to their requirements and expectations.

**Keywords:** polycystic ovary syndrome, infertility, oral contraceptives.

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### INTRODUCTION

A characteristic of many gynecologic diseases is an underlying hormonal imbalance of oestrogens and androgens. The classical example of such imbalance is polycystic ovarian syndrome [1-4]. It is one of the commonest

endocrine disorders in women of reproductive age. In addition to being one of the most common causes of secondary infertility in women. This is a rather relatively milder form of polycystic ovaries disease, where the ovary would contain at least 15-20 follicles. A polycystic ovarian syndrome is considered an

autoimmune disorder, as studies have reported the involvement of autoantibodies in this disorder. The pathophysiology can be broken down to endocrinal disturbance, chronic anovulation, and increased testosterone, underlying comorbid endometrial hyperplasia, and other autoimmune disorders. Moreover, PCOS is dangerous as it could be a sign of underlying cancerous development. These cancers include endometrial, ovarian, and breast cancers, due to the shared metabolic and endocrinal abnormalities with the former condition. [5] There is also a genetic tendency of disease development in patients of African origin. [6] But further research might be needed to ascertain the potential confounding factors of socioeconomic status and healthcare.

### METHODOLOGY

We searched Pubmed for ((polycystic ovary syndrome) (AND (diagnosis) OR (management)) OR polycystic ovary disease))). Regarding the inclusion criteria, the articles were selected based on the inclusion of one of the following topics: polycystic ovary syndrome, oral contraceptives, infertility, endometrial hyperplasia, metformin in infertility, thyroid dysfunction in women. Exclusion criteria were all other articles that did not have one of these topics as their primary endpoint.

### Pathophysiology

In the normal menstrual cycle, there is fluctuation in hormonal levels, which disappears when polycystic syndrome occurs. This fluctuation is replaced by a rather steady state of follicular stimulating hormone (FSH) and luteinizing hormone (LH). The absence of luteinizing hormone surge leads to chronic anovulation and inevitably to infertility. With the absence of ovulation, there will be no corpus luteum to produce progesterone. In the absence of progesterone production, oestrogen roams unopposed and eventually causes endometrial hyperplasia. This is because progesterone causes flourish and cyclic shedding of the endometrium, which is polycystic syndrome becomes hyperplastic and manifests with irregular bleeding.

Hyperandrogenism develops when there hypersecretion of androgens by the stromal

theca cells. These are stimulated by insulin-like growth factor-1 and increased LH levels. [7] This excess in androgen will eventually lead to menstrual dysfunction and the development of PCOS. [8] Although, recent evidence has shown a more prominent role of anovulation and non-androgenic metabolic disturbance in the development of PCOS. [9] Nevertheless, PCOS is known to affect liver functionality, due to hormonal imbalances. [10] There is also a known association of PCOS with non-alcoholic fatty liver disease, especially in young women with higher body mass index. [11] The increased levels of circulating androgens, androstenedione, and testosterone, would suppress the hepatic production of sex-hormone-binding globulin that is produced normally by the liver. [12] This suppression manifests as hirsutism. Furthermore, uncontrolled androgen levels prevent normal processes of follicular development and subsequently causing premature atresia of the follicles. Combination of stromal theca cells hyperplasia with premature follicular atresia leads to a thickened ovarian capsule, manifesting as an enlarged ovarian mass on examination.

### Clinical Features

The patients affected with this disease would present with a variety of symptoms relating to the menstrual cycle and the hormonal imbalance of oestrogen with androgen. Polycystic ovarian syndrome would cause menstrual dysfunction, and many patients would present initially with complaints about their menstrual cycle. Other patients may present with their partners, with a history of secondary, and on occasion primary, infertility. The polycystic ovarian syndrome should always be on the differential list for infertility because the hormonal disturbance in the former disorder would lead to anovulation. Moreover, females could present with additional symptoms and signs suggestive of a hyperandrogenic state. These patients would complain of increased body hair, increased weight gain, and snoring. The suspicion of autoimmune disease should alert the gynecologist of the potential presence of other disorders, namely metabolic syndrome, and diabetes. After adequate history information from the patient, the best next step is to examine

for any suggestive signs. These include confirming the symptoms referenced by the patient from hirsutisms and other androgenic features. Patients with underlying autoimmune disorders such as diabetes may also have acanthosis nigricans on the back of the neck. Furthermore, on examining the abdomen, the physician should palpate for any enlarged ovarian masses.

### Diagnostic Investigation

The evaluation of polycystic ovarian syndrome is similar to other autoimmune diseases, as identifying any co-morbid autoimmune diseases is necessary. The investigation is also purposeful to exclude other differential diagnoses of menstrual cycle disturbance and hyperandrogenic state. These include endocrinal hyperactivity in tumors of the ovaries, adrenal glands, thyroid gland, and pituitary gland. Therefore, the following tests are important and include: thyroid function tests, prolactin, testosterone level, serum beta-hCG, dexamethasone suppression tests, free androgen index, urinary cortisol, and insulin-like growth factor levels. [13, 14] This exclusion is important as diagnostic criteria for Rotterdam diagnosis for this condition includes at least two out of three criteria, in addition to exclusion of other aetiologies of infertility (Table 1). This updated format of the diagnostic criteria reduces false positives, and only patients with a higher risk of PCOS are included in the diagnosis. [15]

**Table 1:** Rotterdam Criteria for Diagnosis of PCOS:

Criteria	Description
Ovulation cycle	Oligo or anovulation
Clinical / Laboratory	Clinical signs of hirsutism or alopecia Raised free androgen index or free testosterone
Ultrasonographic Imaging	Cystic ovaries
Additionally, exclusion of the following conditions: congenital adrenal hyperplasia, androgen-secreting tumors, Cushing syndrome, thyroid dysfunction, and hyperprolactinemia.	

In particular, the hyperandrogenic state requires confirmation by the following investigations: raised androstenedione levels

increased free testosterone. Additionally, the hormonal profile of PCOS patients include a raised LH and lowered FSH level on the second day of the menstrual cycle. The typical finding is an increased LH to FSH ratio of at least 2:1. In patients who develop diabetes, a high insulin level would be detected, as insulin resistance occurs in this condition, and the fasting insulin ratio would commonly be below 4.5. In patients with prolactinomas, the serum prolactin would be raised by 30% from normal levels.

While imaging has increased the accuracy of diagnosis, PCOS remains a diagnosis depending on clinical symptoms and laboratory investigations. This is because ultrasonographic imaging, commonly used to investigate the disease, is operator dependent. The ultrasonographic examination is often uncomfortable for many patients, as it is commonly a transvaginal approach. [13] Other alternatives include pelvic computerized tomographic scan and magnetic resonance imaging of both the ovarian and adrenal glands. Moreover, the gynecologist could proceed to take an ovarian biopsy if feasible, as this would offer histopathologic evidence of the disease. Alternatively, an endometrial biopsy could be taken and would show either hyperplasia or malignancy in cases of PCOS.

### Management Approach

Once the diagnosis is highly suspected or confirmed, the patient should be offered a thorough approach to the disease. The aim is to restore near-normal life, cure infertility, and reduce symptoms. The initial management is with dietary modification, routine exercise, and a weight loss schedule. This lifestyle modification is especially important in patients who develop diabetes, or thyroidal dysfunction. In addition to lifestyle management, it is important to correct hormonal and metabolic imbalances. Fortunately, oral contraceptives can handle most of the complications of polycystic ovarian syndrome, which include: anovulation, infertility, hirsutism, and menstrual dysfunction. These contraceptives include ethinyloestradiol and medroxyprogesterone. [16] A combination of lifestyle modification, metformin, and weight-reducing surgery is a beneficial strategy in the management of PCOS. [17]

In addition to oral contraceptives, patients with excessive bodily hair could benefit from androgenic-blockade. Examples of the latter drug group include leuprolide, finasteride and, a diuretic, spironolactone. [16] Other patients with hirsutism could use topical removal of excess hair through eflornithine. Furthermore, topical agents are available for controlling acne manifestations, and these include benzooyl peroxide, tretinoin, adaplene, erythromycin, clindamycin, or sodium sulfacetamide.

Women who are planning to conceive and family planning could benefit from fertility drugs such as clomiphene citrate, a selective oestrogen receptor modulator, and letrozole. This therapeutic intervention is necessary, as complications may occur in pregnancy. These complications include miscarriage, hypertensive, and diabetes of pregnancy, in addition to a higher risk of Caesarean section and fetal growth abnormality. [18] Metformin is not routinely recommended for infertility treatment alone and is used primarily in controlling diabetes along with insulin or with other modalities in PCOS. However, recent studies have shown a curative effect of metformin in PCOS at a dose of one gram per day for 25.5 weeks. [19] Alternatively, recurrent implantation failure even after in-vitro fertilization could benefit from growth hormone therapy. [20] This is because growth hormone would decrease the oxidative stress induced-apoptosis, which is increased in PCOS. [21]

Gynecologists are also skilled at the surgical intervention of female organs, and surgery is often required for the normal restoration of the menstrual cycle and ovulation. There are multiple intervention options and include laser drilling, electrocauterization, and multiple biopsies. Laparoscopic ovarian drilling is especially useful in pregnancy incidence within the first six months of the procedure. [22]

### CONCLUSION

PCOS is a combination of anovulation, hyperandrogenism, and cystic formation. This combination results in endocrinal dysfunction causing distress to the patient. Therapeutic options fortunately exist and are effective in the management of the condition. The gynecologist should manage the disease on a patient basis, as

every patient has their priorities with regards to symptomatic treatment and follow-up.

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