



Polycystic Ovarian Syndrome and Infertility: A Literature Review

ANCHAL SINGH
P.G Student

Isabella Thoburn College, Lucknow, U.P. India

DR. CHITRA SINGH
Department of Zoology

Isabella Thoburn College, U.P India

Abstract:

The most frequent endocrine problem in women is polycystic ovary syndrome, which is a primary cause of anovulatory infertility. *To treat polycystic ovarian syndrome-related infertility, a variety of medicinal approaches are employed, either alone or in combination. This narrative review was done to offer an update and synthesis the existing information on the management of infertility caused by polycystic ovarian syndrome. Changing one's lifestyle is frequently the focus of management. The use of letrozole, clomiphene citrate, or gonadotropins is indicated for pharmacological ovulation induction. Assisted reproductive technologies or laparoscopic ovarian drilling are frequently recommended when it fails. The use of metformin in combination with other medications is frequently suggested. Alternative and complementary treatments have become more popular in recent years.*

Keywords: *Assisted, Female, Infertility, Ovulation Induction, Polycystic Ovary Syndrome, Reproductive Techniques, Anovulatory Infertility, Endocrine Disorder*

1. Introduction

Polycystic Ovarian Syndrome cause anovulatory infertility in about 80% Women around the world. It was first proposed by Stein and Leventhal in 1935. PCOS diagnosis is complex, including genetic, environmental and lifestyle factors. PCOS may vary widely and is most observed in the post pubertal period. Despite of diversity of phenotypes women with PCOS are characterized by polycystic ovaries, chronic anovulation, hyperandrogenism and gonadotropin abnormalities. Patients suffering from PCOS will consult for different degrees of hyperandrogenism (hirsutism, seborrhea, acne), irregular menstrual cycle, infertility and excessive weight gain. The ignorance of irregular menstrual cycle and its delayed diagnosis is the major cause of infertility nowadays. Ricardo Azziz (et.al 2006) PCOS is a metabolic-endocrine-reproductive Syndrome Conservatively affecting 6%-10% of all reproductive aged women worldwide. Marcella cedars (et.al.2003) the top the topic of ovarian morphology in PCOS is controversial. Not only are the diagnostic criteria still frequently debated (despite the Consensus Conference of Rotterdam in 2003), but it is also debated whether the morphology is a result of, or intrinsic to, the underlying pathophysiology of PCOS. This presentation will discuss available evidence regarding the morphology of the ovary in women with PCOS versus the general population, and if there are specific aspects of this morphology that may be more predictive of the disorder itself and/or the metabolic consequences of the disorder. In addition, we will discuss the physiology and potential pathophysiology associated with variant morphological patterns and introduce concepts about ovarian aging and PCOS of ovarian morphology in PCOS is controversial.

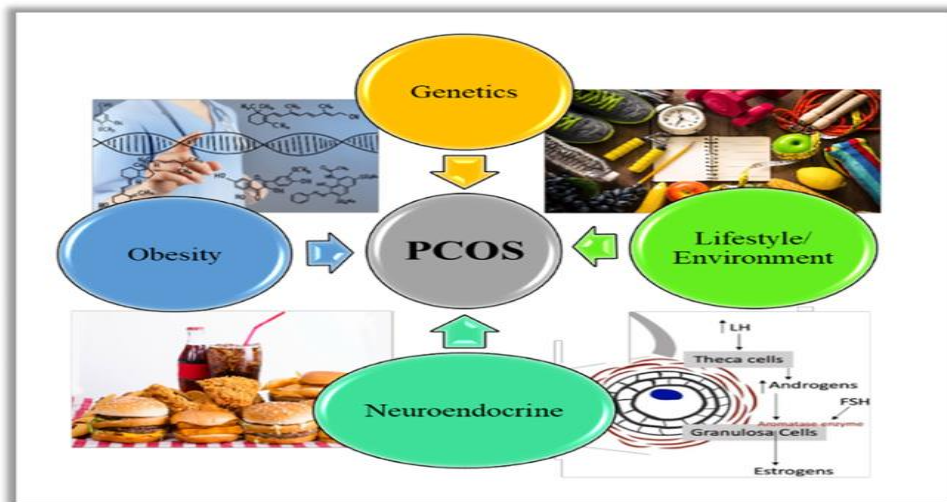
2. Evaluation of infertility in pcos patients

The diagnosis of infertility is suggested after at least 12 months of pregnancy in couples having sexual intercourse on a regular basis (about 2 to 3 times/week). PCOS is generally considered the most basic cause of infertility among females but a full evaluation is needed before excluding other possible causes of infertility as other endocrine disorders (thyroid dysfunctions, hyperprolactinemia, congenital

adrenal hyperplasia, premature ovarian insufficiency), anatomical dysfunctions (endometriosis, pelvic inflammatory diseases) or iatrogenic causes (surgery, chemotherapy, radiations).

When exploring infertility, it is important to examine the patient's medical and surgical history as well as the familial history. Blood samples, ultrasonography and hysteroscopy etc. are recommended for examination.

Some other tests like Anti Mullerian hormone (AMH) is useful in the evaluation of infertility (AMH) is produced by granulosa cells of early follicles and helps to evaluate the ovarian reserve, during menstrual cycle AMH level remain consistent. the women's suffering from PCOS present AMH levels 2 to 3 times higher than non- PCOS women.



<https://www.sciencedirect.com/science/article/pii/S266639612100008X>

3. PCOS and reproductive health

90-95% women are suffering from anovulatory infertility and PCOS is the most common cause. Even most of the women seeking treatment of infertility have PCOS, and most of the women get to know about PCOS after seeking treatment of infertility. Women with PCOS have reduced level of follicle stimulating hormone (FSH), and increased level of luteinizing hormone along with increased level of androgens and insulin. these imbalances of hormone can result in oligomenorrhea or amenorrhea. Increased production of estrogen and elevated production of androgen (testosterones, dehydroepiandrosterone, and androstenedione) by the ovaries can cause various clinical characteristics including cysts on the surface of ovaries (polycysts), skin and hair symptoms.

Pregnant women have higher risk of suffering from gestational diabetes mellitus or going through a first trimester spontaneous abortion than those without PCOS.

4. Etiology of PCOS

Dr. Dunaif (et.al) conducted studies which have led the way in redefining PCOS as a major metabolic disorder that is one of the top risk factors for type 2 diabetes mellitus. The causal factors of PCOS are yet not known but it is assumed to be a multifactorial condition with a genetic component. In comparison to an estimated 4–6% prevalence in the general population, around 20–40% of first-degree female relatives of women with PCOS acquire PCOS themselves. Daniel Dumesic (et.al) the maternal fetal environment plays an important role in the developmental programming of adult disease. Fetal androgens excess from congenital adrenal hyperplasia or virilizing tumors precedes development of PCOS like symptom after birth while fetal metabolic, hormonal and ovarian dysfunction also accompanies gestational diabetes which is common in PCOS mothers. Even if it was never diagnosed, many women with PCOS have female relatives who have the condition. As with type 2 diabetes,

multiple genes are expected to play a minor role in the genesis of PCOS, and candidate genes have been identified in recent genome-wide association studies. Epigenetic and environmental variables, such as an unhealthy diet and lack of physical activity, are likely to exacerbate any underlying genetic susceptibility. Bart C.J.M Fauser (et.al 2003) PCOS is a complex of symptoms of unknown etiology. Such condition are heterogenous by nature, and the identification of useful diagnostic criteria poses a major challenge.

5. Epidemiology of PCOS

PonJola Coney (et.al) PCOS symptoms usually begin at menarche and manifest after puberty the syndrome may not always be diagnosed, or is misdiagnosed, because it can present on a variety of phenotype and abnormalities that can be present in other variety of phenotype and abnormalities that can be present in other endocrine disorder

6. Ultrasound picture: normal ovary vs polycystic ovary



Ultrasound photo: Polycystic ovary with many antral follicles

source - www.sciensdirect.com



Ultrasound photo: Normal ovary
with a single mature follicle

Surgery picture of a typical, enlarged polycystic ovary
The numerous small cysts are just under the thick outer capsule



Surgery Photo: Enlarged polycystic ovary picture of a typical, enlarged polycystic ovary. The numerous small cysts are just under the thick outer capsule

Source: www.sciencedirect.com

7. Management of pcos related infertility

7.1 Lifestyle changes

With premature adrenarche have an increased likelihood of PCOS. Obesity may increase this risk. The mechanism by which obesity may increase risk for PCOS is not completely understood, although acquired insulin resistance and compensatory hyperinsulinemia are likely factors. Whether greater adiposity in prepubertal children increases the prevalence of PCOS has not been examined. The first line treatment recommended for women with PCOS is weight loss. A healthy diet and regular exercise are known to be helpful in reducing IR and hyperandrogenism, and to optimize hormonal imbalance, lipid profile and cardiovascular health. R. Jeffrey Chang (et.al) Obesity is associated with PCOS in about 50% of cases. The consequences of obesity include both reproductive and metabolic abnormalities that commonly worsen symptomatology and increase long-term health risks in this disorder. Obesity is associated with increased adrenal activity in adults and children. In obese prepubertal girls, circulating adrenal androgens are elevated compared with nonobese girls. Clinical examples in adults indicate that excess androgen exposure may induce a PCOS phenotype. In early adolescence, it has been proposed that exaggerated adrenarche leads to initial hyperandrogenemia with subsequent development of PCOS. In addition, girls

7.2 Ovulation induction

Anovulation or oligo-ovulation is seen in 70% of women with PCOS, hence ovulation induction is most effective for treatment for infertility in women with PCOS.

Assisted reproductive technologies

ART mainly IVF, ICSI and in vitro maturation (IVM) are shown to have a role in PCOS after other methods as ovulation induction fails or if there are other reasons like tubal damage or male factor infertility.

7.3 Laparoscopic ovarian drilling

A small surgery called Laparoscopic Ovarian Drilling (LOD), maybe a resource for ovulation induction

8. Conclusion

PCOS is a complicated reproductive, metabolic, and psychological illness with a wide range of clinical indications and is one of the leading causes of infertility. Before resorting to medication treatments, lifestyle adjustments should be regarded first-line treatment for PCOS-related infertility. The next

stage is ovulation induction, with letrozole being the top choice, followed by CC. Gonadotropins are the next step for women who have failed first-line oral ovulation induction medication. ART or LOD can be utilised for women who do not become pregnant with ovulation induction medications or who have additional infertility problems (Fig. 1). PCOS is a complicated reproductive, metabolic, and psychological illness with a wide range of clinical indications and is one of the leading causes of infertility.

References

1. Bulsara, J., Patel, P., Soni, A., & Acharya, S. (2021). A review: Brief insight into polycystic ovarian syndrome. *Endocrine and Metabolic Science*, 3, 100085.
2. Cena, H., Chiovato, L., & Nappi, R. E. (2020). Obesity, polycystic ovary syndrome, and infertility: A new avenue for GLP-1 receptor agonists. *The Journal of Clinical Endocrinology & Metabolism*, 105(8), e2695-e2709.
3. Cunha, A., & Pova, A. M. (2021). Infertility management in women with polycystic ovary syndrome: a review. *Porto biomedical journal*, 6(1), e116.
4. Cunha, Anita MDA, ; Pova, Ana Margarida MD, Ph.D. b,c,d Infertility management in women with polycystic ovary syndrome: a review, *Porto Biomedical Journal: January/February 2021 - Volume 6 - Issue 1 - p e116*
5. Dennett, C. C., & Simon, J. (2015). The role of polycystic ovary syndrome in reproductive and metabolic health: overview and approaches for treatment. *Diabetes spectrum: a publication of the American Diabetes Association*, 28(2), 116–120.
6. Fertility treatment in women with polycystic ovary syndrome: a decision analysis of different oral ovulation induction agents. *Fertility and sterility*, 94(7), 2659–2664.
7. Franks, S. (1995). Polycystic ovary syndrome. *New England Journal of Medicine*, 333(13), 853-861. Norman, R., Wu, R., & Stankiewicz, M. (2004). Polycystic ovary syndrome Jungheim, E. S., & Odibo, A. O. (2010).
8. Jungheim, E. S., & Odibo, A. O. (2010). Fertility treatment in women with polycystic ovary syndrome: a decision analysis of different oral ovulation induction agents. *Fertility and sterility*, 94(7), 2659–2664.
9. Melo, A. S., Ferriani, R. A., & Navarro, P. A. (2015). Treatment of inf Cena, H., Chiovato, L., & Nappi, R. E. (2020). Obesity, polycystic ovary syndrome, and infertility: A new avenue for GLP-1 receptor agonists. *The Journal of Clinical Endocrinology & Metabolism*, 105(8), e2695-e2709.
10. Ndefo, U. A., Eaton, A., & Green, M. R. (2013). Polycystic ovary syndrome: a review of treatment options with a focus on pharmacological approaches. *P & T: a peer-reviewed journal for formulary management*, 38(6), 336–355.