

Polycystic Ovarian Cyst Disorder (PCOD): Causes and Control

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Abstract

PCOD (Polycystic Ovary Syndrome) is also known as Stein-Leventhal Syndrome. PCOD often causes clusters of small, pearl-sized cysts in the ovaries. The cysts are fluid-filled and contain immature eggs. Genetic and environment factors may contribute to this disorder. PCOD causes changes in physical appearance, irregularity in menstrual cycle and if not treated in time, leads to diabetes and heart strokes, obesity, mood disorder, endometrial cancer and sleep apnea. Women affected by PCOD are generally in the age group of 14 to 44. There is no cure for this disease but studies have found that hormones, medicines, healthy food and exercise can control the disease.

Introduction: Polycystic means many cysts. **Polycystic ovarian disorder** is a complex disorder of chronic oligoanovulation or oligomenorrhoea and clinical or biochemical hyperandrogenism (1). Genetic and environmental factors may contribute to this disorder and may affect 14-44 year age of women (5% to 10% of the group). This is one of the main reasons for infertility. 50 to 60% of women with PCOD are overweight in comparison to the non-PCOD group (2). Women affected with this syndrome often have ovulatory dysfunction, hormonal imbalance, hyperandrogenemia, obesity and hyperinsulinemia (3). The diagnosis of PCOD has life-long implications with increased risk for infertility, metabolic syndrome, type 2 diabetes mellitus, cardiovascular disease and endometrial carcinoma (4,5).

Physiology: The ovaries, where a woman's eggs are produced, have tiny fluid-filled sacs called follicles or cysts. As the egg grows, the follicle builds up fluid. When the egg matures, the follicle breaks open, the egg is released, and the egg travels through the fallopian tube to the uterus (womb) for fertilization. This is called ovulation. In women with PCO Syndrome, the ovary doesn't make all of the hormones in proper concentration, it needs for an egg to fully mature. The follicles may start to grow and build up fluid but ovulation does not occur. Instead, some follicles may remain as cysts. For these reasons, ovulation does not occur and the hormone progesterone is not made. Without progesterone, a woman's menstrual cycle is irregular or absent. The ovaries make male hormones, which also prevent ovulation.

Symptoms and pathology: Symptoms may include irregular menstrual cycle, obesity, change in blood pressure, Body mass index, increase in androgen level in blood, high glucose in blood, enlarged breasts and hyperinsulinemia. Ultrasound may show polycystic ovaries. PCOS women may have unwanted body or facial hair growth, thinning hair on the scalp, skin problems like skin darkening and acne. Hyperandrogenism and anovulation interact with insulin resistance in the PCOD. Ovarian hyperandrogenism is mainly caused by an inherent steroidogenic defect of theca cells. Increase in level of Luteinizing hormone (LH) and insulin amplify the intrinsic abnormality of theca steroidogenesis. Decrease in ratio of Follicle stimulating hormone (FSH)/ Luteinizing hormone (LH) are also involved (6).

Anovulation in PCOD is because of defective folliculogenesis. The follicular defect is due to enhanced early follicular growth and distortion of the subsequent stages towards the selection of dominant follicle (7). During folliculogenesis, androgen and insulin play a synergistic role with LH (7). Insulin stimulates tyrosine phosphorylation of Insulin receptor substrate-1 (IRS-1) and increased Glycogen synthetase kinase 3 β (GSK-3 β) in adipose tissue cause insulin resistance through IRS-serine phosphorylation. Decrease in expression of insulin-regulated glucose transporter GLUT-4 in PCOD adipocytes is also reported (8). Skeletal muscle appears to be affected by androgen-induced insulin resistance (9). Androgen may interfere with insulin signaling by amplifying phosphorylation of Akt mammalian target ribosomal S₆ Kinase and increasing serine 636/639 phosphorylation of IRS-1 (10).

Recently, advanced glycan end product (AGE) and their receptors, which are involved in inflammation and metabolic stress, are found to be elevated and correlated to PCOD. AGEs are compounds formed when glucose binds with proteins, and are believed to contribute to certain degenerative diseases and aging.

Control of PCOD: Modern life style and fast food with less physical activities add to PCO syndrome. Healthy lifestyle reduces body weight and abdominal fat, reduces testosterone and improves both hair growth, and improves insulin resistance. A healthy diet low in carbohydrates is important, as

this can help regulate blood sugar levels. Exercise can also help the body to regulate insulin and keep excess weight off. Losing weight is challenging with PCOS, but doing so can help to reduce the male hormone levels in the body and some women start to ovulate naturally. Yoga and meditation definitely regulate endocrine system and may be useful to control PCOD. Cutting down dietary AGEs significantly reduced insulin levels in women with PCOS. Foods high in AGEs include animal-derived foods and processed foods. Applying high heat (grilling, searing, roasting) to food increases AGE levels. Supplement with magnesium, chromium, omega 3s is useful in controlling. There is no absolute cure of PCOD. Having more fruits, vegetable and grain is good to reduce weight and control this. **Treatment** normally includes, Birth control pills to regulate menstruation, Insulin-sensitizing medications

Ovulation induction to treat infertility, Androgen-blocking medications, Topical anti-hair-growth medications, Other excess hair treatments, Treatments for hair loss, Acne treatments, Removal of other skin problems(11). Medicines called anti-androgens may reduce hair growth and clear acne. Spironolactone (spee-on-oh-LAK-tone) (Aldactone), first used to treat high blood pressure, has been shown to reduce the impact of male hormones on hair growth in women. Finasteride (fin-AST-uhr-yd) (Propecia), a medicine taken by men for hair loss, has the same effect. Anti-androgens are often combined with birth control pills. This problem is growing with modern life style. Number of women having this problem, especially in young ones have increased alarmingly. This needs attention to address urgently to stop ill effects later in life.

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