



3400-A Old Milton Pkwy • Ste 360 • Alpharetta GA 30005
770.475.0077 • GeorgiaHormones.com

Poly Cystic Ovary Syndrome (P.C.O.S.)

Robert P. Goldman, MD

What is Poly Cystic Ovary Syndrome?

A syndrome is a group of signs and symptoms often seen together, as opposed to a disease, which has a single specific cause. Poly Cystic Ovary Syndrome is the most common reason for irregular periods in women of reproductive age. It is often associated with infertility, hormone imbalance, irregular or skipped periods, heavy bleeding, glucose and insulin imbalance, metabolic syndrome, excess weight, excess body hair, male pattern baldness, high levels of male hormones, acne, and of course, ovarian cysts.

The cause

There are several starting points and a number of different problems that can lead to PCOS. Not every woman has all the symptoms and individual issues often depend on the personal starting point. We will look at several different ways a woman can develop PCOS and how she can best deal with her specific, individual problems.

How the menstrual cycle works

Situated at the base of the brain above the eyes, the hypothalamus and pituitary gland (the master gland) direct the ovaries and their hormone output. The pituitary sends two signaling hormones to the ovaries. Follicle stimulating hormone (FSH), directs oocytes (egg cells) to grow. FSH also tells the granulosa cells in the ovaries to make estrogen. Luteinizing hormone (LH), directs the theca cells in the ovaries to make two male hormones (androgens) — androstenedione and testosterone. The granulosa cells take the androgens and turn them into estrogen. At the start of the cycle, after the beginning of menstrual bleeding, FSH is usually higher than LH. **Virtually all of the androgens made by the theca cells are turned into estrogen by the granulosa cells.** Only a small amount of testosterone is released into the blood. When the egg is fully ripe and ready to be released, the pituitary gland sends out a huge surge of LH and FSH lasting a few hours. This signals the launch of the egg and also signals the granulosa cells to make progesterone (in addition to estrogen). **Progesterone is only released into the blood if an egg has been successfully produced.**

Estrogen, testosterone and progesterone

Estrogen stimulates the growth of tissue inside the uterus, stimulates breast

growth, encourages salt and water retention, improves verbal thinking, stimulates the brain, encourages desire to eat carbohydrates and the deposit of abdominal fat, raises good cholesterol, lowers bad cholesterol, and reduces bone loss. Estrogen raises LH. Progesterone matures the tissue in the uterus, matures breast tissue, removes excess water and salt, calms the brain, reduces desire to eat carbohydrates and gain weight, is neutral on cholesterol and stimulates bone strength. Progesterone lowers LH. Testosterone stimulates muscle growth, male pattern body hair, male pattern hair loss on the head, acne, and stimulates bone strength. **Testosterone blocks the full maturation of eggs, preventing ovulation.**

High LH Type PCOS

In some women, pituitary output can be unusual. LH levels are higher than FSH. Some researchers think this may be due to exposure to higher than normal maternal testosterone levels while a female baby is still a fetus. This causes over stimulation of the theca cells inside the ovary and excess output of androgens. With excess androgen inside the ovary, the granulosa cells can turn a lot into estrogen, even creating excess estrogen. The extra androgens inside the ovary can prevent the full maturation of egg cells. The eggs grow to a certain point but do not launch or disappear. The partially enlarged eggs build up and form a row of small cysts.

This is where the name Poly Cystic Ovary Syndrome comes from. Few or no mature eggs are produced, making pregnancy rare and causing infertility problems. If an egg doesn't launch, progesterone cannot produce and the lining of the uterus simply builds and builds. There is no progesterone to prevent the lining from being over stimulated by the unopposed estrogen. The excessively thickened lining bleeds irregularly. There is no progesterone to bring the high LH levels back down. In some women, excess testosterone leaks out of the ovary into the blood. This can cause male type effects of acne, excess body and facial hair, and male pattern baldness.

Insulin Resistance Type PCOS

Insulin is a hormone produced by the pancreas and used by the body to control levels of glucose (sugar) in the blood. It forces glucose into fat and muscle cells. **Some women are resistant to the effects of insulin.** This causes insulin levels to be unusually high, resulting in sugar turning into fat (especially in the abdomen). **Abdominal fat can turn testosterone into estrogen. In addition, insulin stimulates the ovary to make additional estrogen.** Extra estrogen stimulates the desire to eat more sugar and starch, which causes a rise in glucose. This stimulates even higher insulin production.

The additional estrogen over stimulates LH production, causing extra androgens to be made by the theca cells, inhibiting ovulation, resulting in no progesterone production.

Over the years these women become more obese, have excess body and facial hair, irregular periods, excess unopposed estrogen, unable to get pregnant because of low egg production, and are at risk of getting diabetes. There is no progesterone to bring high LH levels back down.

Combined States

If a woman fails to ovulate (make an egg) for long enough, the absence of progesterone will cause a rise in LH and progress toward PCOS. This leads to estrogen excess and weight gain, which can cause insulin resistance. Thus, high LH type PCOS can turn into Insulin Resistance type. On the flipside, chronic insulin resistance causes high estrogen levels leading to excess LH. The two starting points tend to move toward each other in the spectrum of PCOS. Today, Americans consume much larger quantities of carbohydrates and sugar in the form of soft drinks, breads, pasta and pastries (versus their ancestors). This elevates insulin levels and Insulin Resistance, increasing the number of PCOS young women.

Premenopause: As a woman ages, so do her eggs. Many eggs do not function for women over the age of 35. A non-functioning egg may not ovulate resulting in experiencing many months without progesterone production. **This leads to a PCOS pattern.**

Therapy

Irregular, heavy periods and estrogen excess: The primary problem is lack of progesterone. Progesterone can be given in a cyclic fashion from day 10 through day 26 of the cycle. This helps to reduce heavy bleeding, thins the lining of the uterus, suppresses the excess LH production and also reduces androgen production. Birth control pills work by suppressing FSH and LH and turn the ovaries off. They will do many of the same things as progesterone and also prevent pregnancy, if that is desired.

Insulin resistance

There are several medications used for adult onset diabetes that lower insulin resistance. Metformin (Glucophage) is the most popular. When combined with a low carbohydrate diet and exercise, Metformin can restore ovulation and normal cycles.

Excess androgen

The above therapies help in reducing male hormone levels. In addition, several medications help with acne, facial hair, body hair and hair loss. Electrolysis can be used to remove excess hair.

Infertility

Clomiphene Citrate has been used for many years to suppress LH, raise FSH and promote ovulation and pregnancy. In more difficult cases, infertility specialists have many techniques for controlling reproduction. In general, these therapies are more complex and expensive and are not needed for simple regulation of cycles in women that do not want to become pregnant.

Premenopause

Treatment with progesterone will often correct the problem, correcting abnormal bleeding, slowing the growth of fibroids and markedly reducing the need for surgery.