

Pcos

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THE STORY IN ONE SENTENCE

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“Polycystic ovary syndrome (PCOS): a hormone mix-up where the ovaries overproduce androgens and skip ovulation. Rotterdam criteria say you need two out of three findings (high androgens, no ovulation, or cystic ovaries on ultrasound). Treat the symptoms that bother her most and block the slide into type 2 diabetes and heart disease.”

Normal anatomy — the body's job

The hypothalamus (the brain's cycle timer), pituitary gland (the hormone messenger under the brain), and ovaries talk back and forth in a monthly loop to ripen and release one egg, then reset. This is called the HPO axis (hypothalamic-pituitary-ovarian axis). Keep that smooth cycle in your head, because every PCOS finding is a wrench thrown into this loop.

BODY'S JOB

Every month, the hypothalamus releases GnRH (gonadotropin-releasing hormone) in pulses. GnRH tells the pituitary to release FSH (follicle-stimulating hormone) and LH (luteinizing hormone). FSH wakes up several egg sacs (follicles) in the ovary; one grows fastest. Around day 14, a surge of LH pops that lead follicle and the egg shoots out (ovulation). The leftover sac becomes the corpus luteum, a temporary gland that pumps out progesterone to steady the uterus lining and keep it from overgrowing. If no pregnancy happens, progesterone drops, the lining sheds as a period, and the cycle starts fresh. Insulin (made by the pancreas) normally unlocks cells so sugar can enter and fuel them; it also keeps the ovaries making a balanced, small amount of androgens.

1. Hypothalamus releases GnRH in pulses → wakes the pituitary.
2. Pituitary releases FSH → several follicles in the ovary start to grow.
3. One follicle wins the race and makes estrogen → signals the pituitary.

4. Pituitary sends a big LH surge → the lead follicle pops and releases the egg (ovulation).
5. The empty sac becomes the corpus luteum → makes progesterone for two weeks.
6. Progesterone keeps the uterus lining stable and thin.
7. If no pregnancy, progesterone drops → uterus lining sheds as a period, cycle repeats.
8. Insulin unlocks muscle and fat cells → sugar enters, blood sugar stays normal, ovaries make only a small amount of androgens.

What breaks

Two breaks team up in PCOS. First, the body's cells stop listening to insulin (insulin resistance), so the pancreas floods the blood with extra insulin trying to force sugar inside. High insulin pushes the ovaries to overproduce testosterone and other male hormones (androgens). Second, the pituitary puts out too much LH and not enough FSH, so eggs start growing but stall before they can pop out. Without ovulation, no corpus luteum forms and progesterone never rises, leaving the uterus lining to grow wild and periods to scatter or disappear.

CLINICAL TERM

Insulin resistance with compensatory hyperinsulinemia, leading to ovarian androgen excess (hyperandrogenism). Altered GnRH pulsatility increases the LH-to-FSH ratio, which arrests follicle maturation and prevents ovulation (anovulation). Chronic anovulation causes progesterone deficiency and unopposed estrogen stimulation of the endometrium.

How the body compensates

The body does not sit still while insulin resistance and anovulation take over. The pancreas cranks out extra insulin to try to push sugar into cells. The pituitary pumps more LH hoping to force an egg out. Fat cells store extra energy because insulin is high. The uterus keeps responding to estrogen even without progesterone to reset it. These are desperate workarounds, not fixes—they buy time but push the body toward diabetes, infertility, and uterine overgrowth. Your job is to spot the slow slide before it tips into type 2 diabetes, endometrial cancer, or irreversible metabolic damage.

1. Pancreas pours out extra insulin (hyperinsulinemia) to overcome cell resistance and keep blood sugar from spiking into diabetes range—this keeps fasting glucose and HbA1c near-normal for years, masking the problem.
2. Pituitary increases LH pulses trying to trigger ovulation, but without balanced FSH the follicles stall; this keeps some estrogen production going so she does not feel completely hormone-depleted.

3. Fat tissue (especially around the belly) stores extra calories because high insulin is a fat-storage signal; this protects blood sugar short-term but builds central obesity and worsens insulin resistance in a vicious cycle.
4. Ovaries keep making estrogen from the many small follicles, so bones stay strong and she does not get hot flashes, but progesterone is missing so the uterus lining is never pruned.
5. Liver makes less SHBG (sex hormone-binding globulin) when insulin is high, leaving more free testosterone in the blood; this amplifies androgen symptoms like excess hair growth (hirsutism) and acne even if total testosterone is only mildly elevated.
6. Periods may still come sporadically (every few months) because estrogen withdrawal can trigger a bleed even without ovulation, giving the false impression that cycles are 'sort of normal.'
7. The crash point to watch for: fasting glucose crosses into prediabetes (100–125 mg/dL) or diabetes (≥ 126 mg/dL), HbA1c rises above 5.7%, the uterus lining becomes dangerously thick (endometrial stripe >4 mm without a period for months raises cancer risk), blood pressure and lipids climb (metabolic syndrome), or she cannot conceive after a year of trying.
8. A woman with normal-looking vital signs, regular-ish periods every few months, and 'only' some extra hair is not stable—she is on a slow glide path to type 2 diabetes, heart disease, and endometrial cancer unless you intervene early.

Domino effect

1. Muscle and fat cells stop responding to insulin (insulin resistance develops). — Genetics, weight gain (especially belly fat), low physical activity, and possibly prenatal androgen exposure all make cells ignore insulin's signal; the exact trigger varies, but the result is the same—cells lock their doors and sugar piles up outside.
2. The pancreas floods the blood with extra insulin (hyperinsulinemia) to force sugar into resistant cells. — High insulin is the body's short-term fix to keep blood sugar from spiking, but it has two dangerous side effects: it directly tells the ovaries to make more testosterone, and it tells the liver to make less SHBG (the protein that binds and inactivates testosterone), so free active testosterone rises.
3. The hypothalamus speeds up GnRH pulses, skewing the pituitary to release too much LH and not enough FSH. — High insulin and high androgens both feed back to the brain and crank up GnRH pulse frequency; the pituitary responds by making more LH than FSH, which is backward from the normal balance needed to ripen and release an egg.

4. Follicles start to grow in the ovary but stall before ovulation (anovulation); many small cysts (two to nine millimeters) line the ovary like a string of pearls on ultrasound. — Without enough FSH, follicles cannot finish maturing; high LH directly stimulates the theca cells (the outer shell of each follicle) to pump out extra androgens instead of preparing an egg for release.
5. No corpus luteum forms, so progesterone stays low or absent and the uterus lining grows unchecked (unopposed estrogen). — Ovulation is the trigger that turns the empty follicle into the corpus luteum (the temporary gland that makes progesterone); without ovulation, progesterone never rises, and estrogen—still being made by the many small follicles—keeps telling the uterus lining to grow thicker and thicker.
6. Periods become irregular—sometimes weeks to months apart, sometimes very heavy, sometimes absent (oligomenorrhea or absent periods (amenorrhea)). — The lining builds up for months because there is no progesterone to stabilize it; eventually it outgrows its blood supply and sheds in an unpredictable, often heavy bleed, or it may not bleed at all if estrogen stays steady.
7. Thick, dark hair grows on the face (upper lip, chin), chest, lower belly, and back (hirsutism); scalp hair thins in a male pattern. — High free testosterone converts to DHT (dihydrotestosterone) in hair follicles; DHT makes body hair grow thick and dark and shrinks scalp hair follicles at the temples and crown.
8. Acne flares, especially on the face, chest, and upper back. — Androgens enlarge oil glands (sebaceous glands) and make them produce more sebum; the extra oil clogs pores, and bacteria multiply, triggering inflammation and pimples.
9. Weight climbs, especially around the waist and belly (central obesity). — High insulin is a fat-storage hormone; it shunts calories into fat cells and makes it hard to burn fat for energy, so even normal eating leads to weight gain; belly fat then makes insulin resistance worse, spinning a vicious cycle.
10. Dark, thick, velvety skin patches (acanthosis nigricans) appear on the neck, armpits, groin, or under the breasts. — Sky-high insulin makes skin cells (keratinocytes) and pigment cells multiply faster than normal; this creates the dark, rough texture that is a visible red flag for severe insulin resistance.
11. She cannot get pregnant (infertility). — Without ovulation, no egg is released for sperm to fertilize; even if sperm are healthy and plentiful, there is nothing to meet them, so conception cannot happen.
12. Over years, fasting glucose and HbA1c creep up into prediabetes (fasting 100–125 mg/dL, HbA1c 5.7–6.4%) or type 2 diabetes (fasting ≥ 126 mg/dL, HbA1c $\geq 6.5\%$). — The pancreas can only compensate for so long; eventually beta cells burn out or cannot keep up, insulin secretion drops, and blood sugar rises above the normal range.

- 13.** The uterus lining overgrows (endometrial hyperplasia) and, if unchecked for years, can turn into endometrial cancer. — Estrogen tells lining cells to divide; progesterone tells them to stop and mature; without progesterone for months or years, cells keep dividing, pile up, and some pick up mutations that lead to cancer—PCOS raises lifetime endometrial cancer risk about three-fold if anovulation is never treated.
- 14.** Blood pressure rises, HDL cholesterol drops, triglycerides climb, and she develops metabolic syndrome. — Insulin resistance, central obesity, and chronic low-grade inflammation (driven by belly fat) all damage blood vessel walls, raise blood pressure, and scramble lipid metabolism, paving the road to heart disease and stroke.

Symptoms · what the patient feels, and why

- Irregular or missing periods: The ovaries make too much testosterone (a male hormone) and not enough progesterone (the hormone that controls the monthly cycle), so the lining of the uterus does not shed on a regular schedule the way it should.
- Extra hair growth on face, chest, or belly (hirsutism): High testosterone (an androgen, or male hormone) tells hair follicles on the face and body to grow thicker, darker hair in places where only men usually have it.
- Acne that keeps coming back, especially on the jaw and chin: Too much testosterone makes the oil glands in the skin pump out extra oil (sebum), which clogs pores and feeds the bacteria that cause pimples.
- Thinning hair on the scalp (like male-pattern baldness): High androgens (male hormones) shrink the hair follicles on top of the head, so the hair grows back thinner and weaker each time until it stops growing.
- Weight gain, especially around the belly, that is hard to lose: Insulin resistance (the body's cells ignore insulin's signal to take in sugar) makes the pancreas pump out extra insulin, which tells fat cells to store more fat and makes it very hard to burn it off.
- Dark, velvety patches of skin in body folds (neck, armpits, groin): High insulin (from insulin resistance) makes skin cells grow faster and darker in places where skin rubs together, a sign called acanthosis nigricans.
- Trouble getting pregnant (infertility): The ovaries do not release an egg every month (no ovulation) because the hormone signals are out of balance, so there is no egg for sperm to meet and fertilize.
- Many small fluid-filled sacs (follicles) on the ovaries seen on ultrasound: The eggs start to grow inside their sacs each month, but the hormone imbalance stops them from finishing and releasing, so the sacs pile up like a string of pearls around the edge of the ovary.

Focused exam

- Excess hair growth (Hirsutism) (extra dark, coarse hair on face, chest, belly, or back): PCOS ovaries make too much testosterone (the main male hormone). That testosterone tells hair follicles to grow thick, dark hairs in places where only men usually have them. Count the hairs or use a Ferriman-Gallwey score to track how bad it is.
- Acne on face, chest, or back that won't go away: High testosterone makes the oil glands in her skin pump out extra oil. Pores get clogged and infected. In PCOS, acne shows up alongside irregular periods and extra hair—not by itself.
- Irregular or absent periods: In PCOS, the ovaries never finish ovulation, so the uterus does not get the signal to shed its lining on a schedule. Ask: How many periods did you have in the last year? Fewer than 8 means ovulation is broken. This is the clearest sign that the hormones are off.
- Acanthosis nigricans (dark, velvety skin on neck, armpits, or groin): Her cells resist insulin, so insulin piles up in the blood. High insulin tells skin cells to grow and darken. This is a red flag that her body can't use insulin the right way—the root problem in most PCOS cases.
- Polycystic ovaries on pelvic ultrasound (12 or more small follicles, or ovary volume > 10 mL): In PCOS, follicles start to grow but never finish maturing or pop out an egg. They pile up like a string of pearls along the edge of the ovary. This is the 'polycystic' part and matches the hormone findings.
- Central obesity (extra belly fat, waist-to-hip ratio > 0.85): Her body resists insulin, so it stores extra energy as fat—especially around the belly. High insulin also tells the ovaries to make more testosterone. Weight gain and high androgens feed each other in a loop.

Diagnostics · every test answers a question

- Total and free testosterone → Is her body making too much male hormone?
- TSH (thyroid-stimulating hormone) → Is her thyroid working right?
- Prolactin → Is there too much prolactin blocking ovulation?
- 17-hydroxyprogesterone (17-OHP) → Is an enzyme defect in the adrenal gland causing high androgens?
- Fasting glucose and 2-hour oral glucose tolerance test (OGTT) → Can her body handle sugar, or is she heading toward diabetes?
- LH-to-FSH ratio → Is the brain sending the wrong signal to the ovaries?
- Lipid panel (total cholesterol, LDL, HDL, triglycerides) → Is her cholesterol creeping up?
- Pelvic ultrasound → Do her ovaries look polycystic?

Treatment logic

- Weight loss of 5–10% through diet and exercise → Losing even a little weight makes her cells listen to insulin again. When insulin drops, the ovaries make less testosterone. Periods come back, acne improves, and fertility goes up. This is the single most powerful fix for the root problem.
- Combined oral contraceptive pill (estrogen + progestin) → The pill stops the ovaries from making testosterone by shutting down LH. It also delivers a steady dose of hormones so the uterus sheds on schedule every month. Over 3–6 months, acne clears, hair growth slows, and periods become predictable.
- Metformin 1500–2000 mg daily (start low, go slow) → Metformin makes her cells respond to insulin again. When insulin drops, the ovaries quiet down and make less testosterone. Periods become more regular, and the risk of diabetes goes down. It works best with weight loss.
- Spironolactone 50–100 mg daily (up to 200 mg) → Spironolactone blocks testosterone receptors in the skin and hair follicles. Acne improves in 3–6 months, and new hair growth slows. Old hairs do not fall out—you have to remove them separately (laser, shaving).
- Letrozole 2.5–5 mg daily for 5 days (if she wants to get pregnant) → Letrozole blocks estrogen production in the brain for a few days. The pituitary panics and pumps out more FSH and LH to rescue estrogen levels. That surge of FSH forces a follicle to mature and ovulate. She can conceive.
- Annual screening for type 2 diabetes, dyslipidemia, obstructive sleep pauses in breathing (apnea), and depression → PCOS triples the risk of diabetes, doubles the risk of sleep pauses in breathing (apnea), and quadruples the risk of depression. Catching these early prevents heart attacks, strokes, and suicide. Screen fasting glucose or HbA1c yearly, lipids every 2 years, and ask about mood and snoring at every visit.

Medications

Lifestyle modification (weight loss, exercise) · First-line therapy

Losing just 5 to 10 percent of body weight — for example, 10 pounds if you weigh 200 — can restart the whole system. Fat tissue makes extra hormones (like estrogen and androgen) and releases chemicals that make insulin work poorly. When you lose even a small amount of weight through healthy eating and moving your body most days, fat cells shrink, insulin starts working better, and the ovaries often start releasing eggs again (ovulation). Many women see

their periods return, blood sugar improve, and testosterone drop naturally. This is the most powerful step and often the only one needed.

1. You eat fewer calories than your body burns, and you move your body regularly (at least 150 minutes of moderate activity per week, like brisk walking).
2. Fat cells shrink and release less estrogen, less testosterone, and fewer inflammatory chemicals.
3. Muscle cells become more sensitive to insulin, so your pancreas does not have to make as much.
4. Lower insulin means the ovaries make less testosterone and start releasing eggs again.
5. Periods become more regular, unwanted hair growth slows, and risk of diabetes drops.

SAFETY WATCH

Aim for slow, steady loss (1 to 2 pounds per week) through balanced meals and regular activity — crash diets or extreme restriction can backfire and worsen hormones. · If you have an eating disorder history or very low weight despite PCOS, work closely with a doctor and dietitian. · Track your periods; if they become regular, you can get pregnant, so use contraception if you are not trying to conceive.

Combined oral contraceptive pill (OCP, birth control pill with estrogen and progestin) · Hormonal contraceptive

The pill delivers steady, low doses of estrogen and progestin (a lab-made form of progesterone) every day. This steady signal tells the brain's control tower — the hypothalamus and pituitary gland — to stop sending the hormones (LH and FSH) that push the ovaries to make testosterone and estrogen in big, uneven bursts. The ovaries quiet down, testosterone drops, and the lining of the uterus sheds on a regular schedule. The pill also raises a liver protein (SHBG, sex hormone binding globulin) that locks up free testosterone in the blood, so less is available to cause acne and hair growth.

1. You take a pill every day that contains both estrogen and progestin.
2. The steady hormone levels signal the hypothalamus and pituitary to stop releasing LH and FSH.
3. Without LH peaks, the ovaries do not release eggs and make far less testosterone.
4. The liver responds to estrogen by making more SHBG, which grabs and holds testosterone so it cannot reach the skin or hair follicles.
5. Acne improves, unwanted hair growth slows (though hair already present takes months to shed), and you get a predictable monthly bleed.
6. The uterine lining sheds regularly, which prevents it from becoming too thick (hyperplasia) and lowers cancer risk.

SAFETY WATCH

Small increased risk of blood clots (deep vein clot formation (thrombosis), pulmonary embolism (a clot lodging in a lung artery)), especially if you smoke, are over 35, or have clotting disorders — never smoke while on the pill. · Slight increase in blood pressure — check it before starting and every year. · Not safe if you have a history of blood clots, stroke, certain heart conditions, breast cancer, or migraine with aura. · Nausea, breast tenderness, and mood changes can happen in the first few months; often improve with time. · Does not protect against sexually transmitted infections — use condoms if at risk.

Metformin · Biguanide (insulin sensitizer)

Metformin makes your body use insulin better. It works mainly in the liver, telling liver cells to stop dumping so much sugar into the blood between meals. It also helps muscle cells grab sugar from the blood more easily. When blood sugar and insulin levels drop, the ovaries get a clearer signal and often start working more normally — some women begin to ovulate and have regular periods. Metformin does not directly lower testosterone, but by lowering insulin it can indirectly reduce androgen levels over time. It is especially helpful if you have prediabetes or type 2 diabetes along with PCOS.

1. You take metformin by mouth, usually twice a day with meals.
2. The drug enters liver cells and blocks the enzyme (mitochondrial complex I) that makes new sugar from stored nutrients.
3. The liver releases less glucose, so fasting blood sugar drops.
4. Lower blood sugar means the pancreas makes less insulin.
5. Muscle cells also become more sensitive to insulin and pull more glucose out of the blood.
6. With less insulin circulating, the ovaries produce less testosterone, and egg release (ovulation) may restart.
7. Some women see more regular periods, modest weight loss (a few pounds), and lower diabetes risk.

SAFETY WATCH

Stomach upset, nausea, diarrhea, and cramping are very common, especially at first — starting with a low dose and taking it with food helps; the extended-release form causes less stomach trouble. · Rarely causes lactic acidosis (acid from oxygen-starved tissues) (dangerous acid buildup in the blood), especially if you have severe kidney disease, liver failure, or heavy alcohol use — your doctor will check kidney function before starting and yearly. · Stop metformin temporarily if you need IV contrast dye for a scan (CT, angiogram) or if you become severely dehydrated or ill. · Very rarely causes vitamin B12 deficiency with long-term use — your doctor may check levels if you develop numbness or anemia. · Safe in pregnancy for some women with diabetes, but always discuss with your OB if you conceive.

Spirolactone · Aldosterone antagonist (anti-androgen)

Spirolactone blocks testosterone from locking onto its receptors in the skin and hair follicles. Think of testosterone as a key and the receptor as a lock — spironolactone jams the lock so the key cannot turn. This means even though testosterone is still in your blood, it cannot send the signal that makes hair follicles grow thick, dark hair (hirsutism) or oil glands pump out excess sebum (which causes acne). Over many months, unwanted hair growth slows and acne often improves. Spirolactone was originally designed to remove extra fluid and lower blood pressure (it blocks aldosterone, a hormone that holds onto salt and water), so it has a mild diuretic (water-pill) effect as well.

1. You take spironolactone by mouth once or twice daily.
2. The drug travels through the blood and enters cells in the skin and hair follicles.
3. It sits on the androgen receptor and blocks testosterone and DHT (dihydrotestosterone, a more potent form) from binding.
4. Without androgen signaling, oil glands shrink and make less sebum, so acne improves.
5. Hair follicles get less signal to grow thick, dark hair, so new growth is finer and slower — but hair already present takes 6 to 12 months to shed, so patience is key.
6. In the kidneys, blocking aldosterone means you pee out more salt and water, which can slightly lower blood pressure.

SAFETY WATCH

Can raise potassium levels in the blood (hyperkalemia), which is dangerous for the heart — your doctor will check potassium before starting and periodically, especially if you have kidney problems or take ACE inhibitors or NSAIDs. · Causes increased urination, especially at first — take it in the morning to avoid nighttime bathroom trips. · Can make periods irregular or cause breakthrough bleeding. · Causes severe birth defects in male fetuses (blocks testosterone needed for normal development) — you **MUST** use reliable contraception while on spironolactone; often prescribed together with birth control pills. · May cause breast tenderness, dizziness (from blood pressure drop), or fatigue. · Not safe if you have severe kidney disease or high potassium.

Letrozole · Aromatase inhibitor (ovulation induction agent)

Letrozole blocks an enzyme called aromatase, which normally converts androgens (like testosterone) into estrogen. When you take letrozole, estrogen levels drop for a few days. The brain's control center (the hypothalamus and pituitary) senses the low estrogen and responds by releasing more FSH (follicle-stimulating hormone). FSH travels to the ovaries and pushes several follicles (tiny sacs that hold eggs) to grow. Usually one follicle becomes dominant, matures, and releases an egg (ovulation). Letrozole is now the first-choice medication to induce ovulation in women with PCOS who are trying to get pregnant, because studies show it leads to more live births than the older drug clomiphene.

1. You take letrozole pills (usually 2.5 to 7.5 mg) by mouth for 5 days early in your cycle (typically days 3 to 7).
2. The drug blocks aromatase, so estrogen levels fall temporarily.
3. The pituitary gland senses low estrogen and pumps out more FSH.
4. FSH reaches the ovaries and stimulates several follicles to grow.
5. One follicle usually becomes dominant, grows large, and releases a mature egg around day 14.
6. If sperm are present (from timed intercourse or insemination), the egg can be fertilized and pregnancy can occur.
7. Your doctor monitors with ultrasound and sometimes blood tests to confirm ovulation.

SAFETY WATCH

Generally well tolerated; side effects are usually mild and short-lived (hot flashes, headache, fatigue, dizziness). · Small risk of multiple pregnancy (twins) if more than one follicle releases an egg — your doctor monitors follicle number with ultrasound. · Rarely, ovarian hyperstimulation (ovaries become swollen and painful) — much less common than with injectable fertility drugs. · Not for use if you are already pregnant; take a pregnancy test before each cycle. · If you do not ovulate on the starting dose, your doctor may increase the dose in the next cycle. · Requires monitoring by a fertility specialist or OB-GYN experienced in ovulation induction.

Clomiphene citrate (Clomid) · Selective estrogen receptor modulator (ovulation induction agent)

Clomiphene tricks the brain into thinking estrogen is low. It blocks estrogen receptors in the hypothalamus and pituitary, so even though estrogen is in the blood, the brain cannot sense it. The brain responds by releasing more GnRH (gonadotropin-releasing hormone), which then pushes the pituitary to make more FSH and LH. These hormones travel to the ovaries and stimulate follicles to grow and release an egg. Clomiphene was the first oral ovulation drug and is still used, but letrozole is now preferred in PCOS because it results in higher pregnancy and live birth rates.

1. You take clomiphene pills (usually 50 to 150 mg) by mouth for 5 days early in your cycle (days 3 to 7 or 5 to 9).
2. The drug blocks estrogen receptors in the brain.
3. The hypothalamus and pituitary think estrogen is low and release more FSH and LH.
4. The ovaries respond by growing follicles and (hopefully) releasing an egg around day 14.
5. You have timed intercourse or insemination around ovulation.
6. Your doctor may monitor with ultrasound and progesterone blood tests to confirm ovulation.

SAFETY WATCH

Common side effects: hot flashes, mood swings, bloating, breast tenderness, headaches. · Can thin the uterine lining (endometrium) and cervical mucus, which may reduce pregnancy chances despite ovulation. · Small risk of multiple pregnancy (twins occur in about 5 to 10 percent of clomiphene pregnancies). · Rarely, visual changes (blurry vision, seeing spots or flashes) — stop the drug and call your doctor if this happens. · Risk of ovarian hyperstimulation is low but possible. · Should not be used for more than 6 ovulatory cycles (per FDA label) due to theoretical concern about ovarian cancer with prolonged use, though evidence is limited. · If clomiphene fails after 3 to 6 cycles, your doctor will recommend switching to letrozole, adding metformin, or moving to injectable fertility drugs.

Progestin-only therapy (medroxyprogesterone acetate, micronized progesterone) · Progestin (endometrial protection)

When you have PCOS and do not ovulate regularly, you do not make progesterone (the hormone that normally protects the uterine lining after ovulation). Without progesterone, estrogen keeps building up the lining month after month without shedding it, which can lead to endometrial hyperplasia (an overgrown lining) and, rarely, cancer. Taking a progestin (synthetic progesterone) or natural progesterone for 10 to 14 days every 1 to 3 months triggers the lining to shed in a controlled bleed, keeping it thin and healthy. This is not a treatment for periods or fertility — it is purely to protect the uterus. If you are on a birth control pill, the progestin in the pill already does this job, so no extra protection is needed.

1. If you have not had a period in 3 months (or longer), you take a progestin pill (e.g., medroxyprogesterone 10 mg or micronized progesterone 200 mg) once daily for 10 to 14 days.
2. The progestin enters the uterine lining cells and binds to progesterone receptors.
3. It stops the lining from growing and prepares it to shed.
4. A few days after you finish the pills, the lining breaks down and you have a withdrawal bleed (like a period).
5. This cycle is repeated every 1 to 3 months, depending on how often you have natural periods.

SAFETY WATCH

Generally very safe and well tolerated. · Possible side effects: bloating, breast tenderness, mood changes, headache (usually mild and temporary). · The withdrawal bleed may be heavier or longer than a normal period. · Not needed if you are on combined oral contraceptives, have a progestin IUD, or have regular periods (at least every 3 months). · If bleeding does not occur after progestin, tell your doctor — it may mean very low estrogen or a structural problem.

Eflornithine cream (Vaniqa) · Topical ornithine decarboxylase inhibitor

Eflornithine is a prescription cream you apply to unwanted facial hair. It blocks an enzyme (ornithine decarboxylase) that hair follicle cells need to grow. This slows the rate of hair growth, so you do not have to remove hair as often. It does not remove hair that is already there, and it does not kill the follicle — it just slows new growth. You still need to use other hair removal methods (shaving, waxing, laser), but the cream can make those methods more effective and longer-lasting. It only works as long as you use it; hair growth speeds up again if you stop.

1. You apply a thin layer of cream to clean, dry facial skin twice a day (at least 8 hours apart).
2. The drug absorbs into hair follicles and blocks ornithine decarboxylase.
3. Follicle cells slow down their division and growth, so hair grows more slowly and finely.
4. After 4 to 8 weeks, you notice you need to shave or wax less often.
5. You continue using the cream indefinitely if you want to maintain the effect.

SAFETY WATCH

Common side effects: stinging, burning, tingling, or redness where you apply it (usually mild and temporary). · Acne or folliculitis (inflamed hair follicles) can occur. · Rarely, rash or allergic reaction. · Avoid getting it in your eyes, nose, or mouth. · Can be used with laser hair removal or other methods. · Expensive and not always covered by insurance.

Red flags

- Sudden severe belly pain (may mean an ovarian cyst twisted or burst)
- Very heavy vaginal bleeding that soaks through a pad every hour (may mean abnormal uterine lining growth)
- Signs of diabetes: extreme thirst, peeing all the time, blurry vision, or feeling very tired
- Symptoms that appear very fast in adulthood (may point to a tumor making male hormones instead of PCOS)

- Very deep voice or large muscle growth (signs of much higher androgen levels than PCOS usually causes)

Nursing priorities

1. Measure height, weight, and waist circumference and calculate BMI (body mass index) at every visit. — Even 5-10% weight loss improves insulin sensitivity (how well the body uses sugar), restores ovulation in 55-100% of women, and lowers androgen levels; tracking helps motivate and guide treatment.
2. Check fasting glucose (blood sugar after no food for 8 hours) and hemoglobin A1C (average blood sugar over 3 months) yearly. — Up to 40% of women with PCOS develop prediabetes or type 2 diabetes by age 40 because of insulin resistance; early detection prevents kidney damage, blindness, and nerve damage.
3. Screen for depression and anxiety using a validated tool like PHQ-9 (Patient Health Questionnaire) at every visit. — Women with PCOS have 3-4 times higher rates of depression and anxiety from hormonal imbalance, body image concerns, and infertility stress; untreated mental illness lowers treatment compliance.
4. Teach the patient to take metformin with food and start at a low dose like 500 mg once daily, slowly increasing to avoid stomach upset. — Metformin lowers insulin levels and helps the body use glucose properly, which reduces androgen production and restores cycles; starting slow prevents diarrhea and nausea that make patients stop the medicine.
5. Check lipid panel (cholesterol and triglycerides) yearly and teach heart-healthy diet and exercise. — PCOS raises LDL (bad cholesterol) and triglycerides (fat in blood), increasing heart attack and stroke risk by 7 times; lifestyle changes and statins (cholesterol medicines) if needed protect the heart.
6. Educate that oral contraceptive pills regulate periods and lower androgen symptoms but must not be used if planning pregnancy. — OCPs provide synthetic estrogen and progesterone that stop the ovary from making excess androgens, reduce excess hair growth (hirsutism) (extra hair) and acne, and protect the uterine lining from cancer caused by no periods.
7. Ask about loud snoring and daytime sleepiness; refer for sleep study if symptoms present. — Obstructive sleep pauses in breathing (apnea) causes repeated drops in oxygen during sleep, raising blood pressure and worsening insulin resistance; CPAP (breathing machine at night) treatment improves both sleep and metabolic health.
8. Counsel that spironolactone takes 6 months to reduce facial hair and acne, and causes birth defects so requires reliable birth control. — Spironolactone blocks androgen receptors (where male hormones attach to cells) in skin and hair follicles; it feminizes male fetuses, so pregnancy must be prevented with contraception.

Sources

- International Evidence-based Guideline for the Assessment and Management of Polycystic Ovary Syndrome 2023
- Endocrine Society Clinical Practice Guideline 2013 (updated)
- American College of Obstetricians and Gynecologists (ACOG)
- Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group

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