

## Polycystic ovary syndrome (PCOS)

Approximately 1 in 5 women have polycystic ovaries. This describes the appearance of the ovaries when they are seen on an ultrasound scan. The polycystic ovary syndrome (PCOS) is the name given to a condition in which women with polycystic ovaries have one or more additional symptoms.

### How common is PCOS?

Polycystic Ovary Syndrome affects an estimated 10% of women of childbearing age. There is no cure for PCOS; however, its symptoms may be controlled by medication and changes in lifestyle.

### What causes PCOS?

Doctors are still not entirely clear why some women have polycystic ovaries. There is often a hereditary link and a link with diabetes in the family. PCOS is thought to be due to a hormonal imbalance where the ovaries produce a little too much male sex hormone. This in turn results in further hormonal abnormalities, as measured on blood tests.

### What are the symptoms of PCOS?

Women with PCOS may have some of the following symptoms:

- **Menstrual irregularities:** PCOS often comes to light during puberty due to period problems, which affects around 75% of women with PCOS. Infrequent, irregular or absent periods are all common variations; many finding their periods particularly heavy when they do arrive. The period disturbance is a sign that there is a problem with regular monthly ovulation. Heavy, abnormal bleeding can also be caused by PCOS but other problems must be ruled out.
- **Infertility:** While women with PCOS produce follicles, which are fluid-filled sacs on the ovary that contain an egg, the follicles often do not mature and do not release an egg each month. It is these immature follicles that create the cysts. PCOS is a common cause of infertility due to irregular or absent ovulation. It is not usually 100% absolute, and some women with PCOS will ovulate normally, some will ovulate less frequently (leading to a delay to pregnancy) and some will not ovulate at all. Therefore many women with PCOS are able to conceive, especially with the help of a fertility

specialist, and to carry successful pregnancies to term. There are a number of possible treatments to help induce ovulation.

- Hirsutism (excess hair): Excess hair growth such as on the face, chest or abdomen. Hair that was previously light in colour and texture can be stimulated by male sex hormones in the system which are present because of the hormone imbalance, resulting in darkening and coarsening of hair particularly in the moustache and beard areas and around the nipples.
- Alopecia (male-pattern baldness or thinning hair): Hair thinning is more common on the top of the head than at the temples.
- Acne/Oily Skin: Oil production is stimulated by overproduction of male sex hormones. Acne can be annoying, particularly on the face, chest or back.
- Obesity or weight gain: Many, but not all, women with PCOS struggle with their weight. Commonly a woman with PCOS will have what is called an apple figure where excess weight is concentrated heavily in the abdomen, similar to the way men often gain weight, with comparatively narrower arms and legs. This is a double-edged sword for women with PCOS. Weight gain often worsens the other symptoms of PCOS and unfortunately, the hormone changes associated with PCOS make weight loss more difficult.

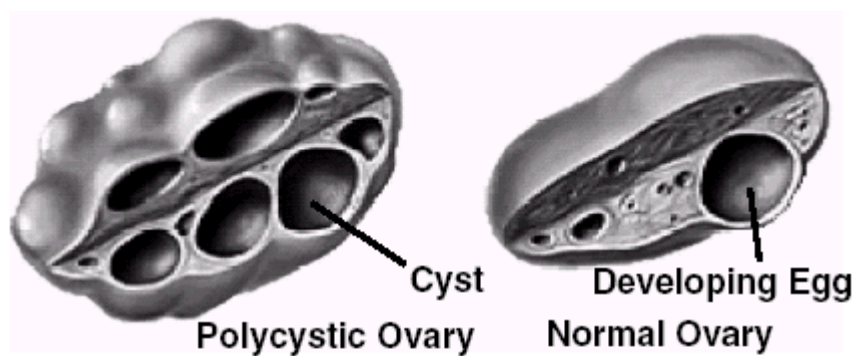
### How is PCOS diagnosed?

Part of the diagnosis is finding the symptoms mentioned above. Other tests to confirm the diagnosis include:

**Ultrasound scan:** This is usually done as an internal scan, meaning a small ultrasound probe is placed just inside the vagina, giving the best views of the ovaries and pelvic organs. In PCOS, the ovaries are found to have multiple, small cysts around the edge of the ovary. These cysts are only a few millimetres in size, do not in themselves cause problems and are partially developed eggs that were not released. A PCOS diagnosis cannot be made entirely on the basis of ultrasound alone as not all women with PCOS have cysts.

**Blood tests:** A couple of blood tests will assist in making the diagnosis - one to check the level of androgens (male hormones), such as testosterone. Another test will measure the hormones involved in egg development.

The diagnosis of PCOS is made on the basis of a combination of clinical observation and the results of investigations.



*The many cysts in a polycystic ovary are follicles that have matured but, due to abnormal hormone levels, never released eggs. In a normal ovary, a single egg develops and is released each month.  
(Source: <http://www.onhealth.com>).*

### PCOS - diabetes, insulin and long-term risks

In recent years it has become clear that PCOS is closely related to a problem with insulin. Insulin is a hormone released from the pancreas after a meal and it allows the organs of the body to take up energy in the form of glucose. In PCOS there is a 'resistance' of cells in the body to insulin, so the pancreas makes more insulin to try and compensate. The excessively high levels of insulin have an effect on the ovary, causing a rise in androgen (testosterone) levels and preventing ovulation.

One study found that 30% of slim women with PCOS have insulin resistance, however it affects as many as 75% of those who are overweight. This explains why overweight women with PCOS are more likely to suffer with excessive hairiness and infertility related to not ovulating.

### Longer-term risks of PCOS

The long-term risks of PCOS are related to both the insulin problem and the high androgen levels. High levels of insulin are associated with an increased risk of developing type 2 diabetes mellitus. Up to a third of overweight PCOS women show signs of this by their 30's and it probably becomes more common in the 40's and beyond. The best way to reduce the risk of type 2 diabetes mellitus is through careful food choices, exercise, and weight loss in overweight individuals.

Irregular or infrequent periods over a long period of time lead to an increased risk of cancer of the lining of the uterus (endometrial cancer). This is, in part, due to high levels of the hormone oestrogen, which over-stimulates the lining of the uterus. Absence of ovulation, and the resulting progesterone deficiency, also contributes to this risk. The key to reducing risk is to make sure to have some kind of "bleed" in which the lining of the uterus is shed at least every three months, preferably more often. This can be accomplished through the use of birth control pills or progesterone/progestins for period induction.

## PCOS - Treatment

### Control of irregular periods

As mentioned previously, irregular and heavy periods can occur due to problems with ovulation. Whilst it would seem that restarting ovulation would be the best treatment, this is generally reserved for when a pregnancy is desired. The ovarian stimulation drugs to do this have other side effects, making their long-term use inappropriate.

Excess weight is a cause of menstrual problems in both women with and those without PCOS. Extra oestrogen is made in fat tissues and this interferes with ovulation and leads to over-stimulation of the lining of the uterus and heavier periods. Weight reduction will improve cycle control and reduce the heaviness of menstrual flow.

Periods may be controlled by the use of the contraceptive pill, which is most suitable for women under the age of 35 who also require a good form of contraception. The other type of drug used is a progesterone-like hormone. Progesterone is the main hormone of the second half of the menstrual cycle, maintaining its length and helping reduce the heaviness. Progestagens are taken as tablets in a cyclical way, for example between days 12-26, the exact type and timing depending upon the woman's individual cycle problem.

Some women have no periods at all, and either the contraceptive pill or cyclical progestagens are advisable to avoid the risk of endometrial cancer. Around 6 periods per year is adequate to protect against this.

### Weight loss

If you are overweight as little as 5% weight loss can regulate periods, lead to more ovulatory cycles, improve hairiness, reduce the risk of heart disease and lower insulin levels. To lose weight safely and keep it off you should ideally see a dietician to discuss the optimum diet. Getting weight into the normal range and maintaining it there should be considered a lifelong process, rather than a short-term fix. Regular exercise will help ensure that you maintain the weight you lose.

### Insulin-sensitising drugs - Metformin

As previously explained, PCOS is associated with insulin resistance, leading to the body producing excessively high levels in an attempt to compensate. This higher level of insulin is known to cause abnormal cholesterol and lipid levels, obesity, irregular periods, higher levels of androgens, infertility due to disturbance of ovulation and an increased likelihood of diabetes. *Metformin* is a type of drug known as an 'insulin-sensitising agent', which improves the sensitivity of the body to insulin in turn reducing the excessively high insulin. Since it does not stimulate production of insulin, it does not cause hypoglycemia.

There are several studies that have been carried out and published concerning the use of Metformin as a treatment for PCOS. These suggest that it may well be useful in several areas: helping weight reduction, improving irregular periods, reducing androgen levels, leading to ovulation, improving hirsutism and possibly reducing the risk of miscarriage. The

most common side effects during treatment are diarrhoea, nausea, vomiting and abdominal bloating. Starting with a low dose and building up to the desired maintenance level may help. Usually symptoms lessen over time and go away with long-term use (usually after 3-4 weeks at the same dose). If diarrhoea and nausea continue, you should make sure to take the medication in the middle of a meal.

The studies that are available concerning the use of insulin-sensitising drugs are very exciting and will hopefully pave the way for a longer-term treatment for this disease, which can affect many different areas of a woman's life

### Treatment of hirsutism (hairiness)

This is usually due to above average levels of androgens - the male hormones that are normally present in women at low levels. Some women do not find the excess hair a problem, particularly if it does not affect their face, or it is blonde in colour. Sometimes excess hairiness is not abnormal and is a racial or genetic variation. Initial treatments include bleaching and electrolysis. If these do not produce an acceptable result, drugs may be used to reduce the high androgen levels, if that is the cause. These drugs do not make you fertile and in fact could harm the baby. It is essential that you do not get pregnant while taking antiandrogens.

Dianette: This is a form of contraceptive pill which contains *oestrogen* and Cyproterone acetate, an antiandrogen. It is quite effective in reducing excessive hair growth and very effective in the treatment of acne. It has the same side effects as the oral contraceptive pill, e.g. increased risk of blood clots, weight gain, mood swings and fluid retention.

Yasmin: This is a new contraceptive pill which contains *oestrogen* and drospirenone. It is associated with fewer side effects than Dianette, in particular it is less likely to make you put on weight or develop mood swings. However, as it is new we do not know whether it is as effective as Dianette in treating acne or excess hair growth.

Vaniqa: This is a new cream that inhibits hair growth. It is only licensed to be used on the face. It is effective in reducing hair growth in 7 out of 10 women who use it. Hairs become finer and grow slower so you do not need to remove them as much. It usually takes effect within 8 weeks of use. It is applied to the 'hairy' parts of your face twice a day after washing your face. Side effects include worsening acne or an allergic skin rash.

Spirolactone: This water tablet has also been shown to reduce excess hair growth. However, it frequently causes erratic periods, so is often given with a low dose contraceptive pill. The dose starts at 50mg a day, increased to 100mg a day 2 weeks later then up to 200mg a day two weeks after that. Your GP should check your blood potassium 1 week after starting Spirolactone and 1 week after each dose increase as it can occasionally cause high potassium levels. It can make your periods come on more frequently. To avoid that, once you are on 200mg a day, take it for three weeks then give yourself a week off, then repeat the treatment (similar to taking an oral contraceptive pill)

High dose Cyproterone acetate: This is very effective in treating hirsutism. It is taken on days 5-15 of the menstrual cycle, in combination with an oral contraceptive pill. You should have a monthly bleed. If your periods stop then you must let us know so we can reduce the dose of the drug. High dose Cyproterone acetate may rarely cause problems with liver function, and so regular blood tests are advised. More common side effects include tiredness, weight gain, mood changes and reduced sex drive.

All hirsutism treatments must be continued for 8-18 months before a response can be expected, due to the slow rate of hair growth. At that time, electrolysis or laser therapy can be performed to remove the unwanted hairs already present, and less return growth can be expected.

Of note, although we do not know of any long term ill effects from the above treatments, none are officially licensed for the treatment of PCOS.

### Infertility

Polycystic ovary syndrome is found in around 70% of women who have ovulation difficulties leading to infertility. This is more common in women who are overweight, and as a first-line treatment, weight reduction can be very successful in restarting spontaneous ovulation. The amount that needs to be lost is less than most women might expect - around 5% of the current weight is associated with an increased number of ovulatory cycles.

Clomiphene: Clomiphene citrate is the most commonly used drug to stimulate ovulation. It is taken in the early days of the cycle (usually days 2-6) and results in ovulation in around 80% of women overall, and a 6 month successful pregnancy rate of 45-50%.

Ovarian stimulation: When clomiphene is unsuccessful, there are two main approaches. The first is to use injectable hormones to stimulate the ovary to produce eggs. This is known as ovarian stimulation. The hormone treatment must be monitored by blood tests and ultrasound scans to avoid over-stimulation. Live birth rates after ovarian stimulation following failed clomiphene treatment reach 54% after 6 months and 62% after 12 cycles. Multiple pregnancy is always a risk with this type of treatment, but especially so for women with PCOS, whose ovaries are particularly sensitive to the hormones. If ovarian stimulation is unsuccessful, many women resort to in vitro fertilisation (IVF), success rates of which depend very much upon individual characteristics such as age, length of infertility and weight. Neither IVF nor ovarian stimulation is likely to be successful if a woman is significantly overweight.

Laparoscopic ovarian diathermy: The alternative to ovarian stimulation is an operation called laparoscopic ovarian diathermy (LOD), also known as 'ovarian drilling'. This involves a day case operation, a short general anaesthetic, and a telescope look into the abdomen. The ovaries are identified and several small holes made in each ovary, either with a fine hot diathermy probe or via laser. It is not actually known how this works, but it can restore regular ovulation, or make the ovary more sensitive to clomiphene.

By 12 months after LOD the average pregnancy rate is around 60-80%. Advantages of LOD include the fact that it may improve other symptoms of PCOS, such as menstrual disturbance, as well as avoiding the need for stimulatory drugs and their increased risk of over-stimulation and multiple pregnancy.

**For further information:**

The UK PCOS support group can be found on [www.verity-pcos.org.uk](http://www.verity-pcos.org.uk)

You can also visit the Berkshire Polycystic Ovary Syndrome Support Group:

[www.berkshirepcos.org.uk](http://www.berkshirepcos.org.uk)

More information is available on the Trust website [www.royalberkshire.nhs.uk](http://www.royalberkshire.nhs.uk)

This document can be made available in other languages and formats upon request.

Centre for Diabetes and Endocrinology, July 2003

Reviewed: March 2017

Review due: March 2019