

FACTSHEET

POLYCYSTIC OVARY SYNDROME (PCOS)

The polycystic ovary syndrome (PCOS) is the commonest hormonal disturbance to affect women. The main problems that women with PCOS experience are menstrual cycle disturbances (irregular or absent periods), difficulty in controlling body weight and skin problems (acne and unwanted hair growth on the face or body). Not all women with PCOS experience all of the symptoms and a woman's problems may change over time. In particular if an individual becomes overweight, then her problems are likely to worsen.

About 30% of women have polycystic ovaries, although a smaller proportion will have symptoms of the polycystic ovary syndrome - perhaps 15-20% of women. The problem therefore is extremely common, although many women have relatively mild symptoms.

What are polycystic ovaries?

Women have two ovaries which are situated in the pelvis alongside the uterus (womb). The ovaries have two main functions: the release of eggs and the production of hormones. The ovaries contain thousands of eggs which are present from birth. Each egg is surrounded by a group of cells which develop into a small fluid filled blister/cyst, or follicle. If a woman is having regular periods and is ovulating, one of these follicles grows to about 20mm diameter and then releases its egg, which passes into one of the fallopian tubes. It is in the fallopian tube that fertilisation occurs and the fertilised egg (embryo) then travels into the womb where it implants into the womb lining (endometrium) and grows as a pregnancy. If fertilisation does not occur, the endometrium comes away as a menstrual period about 14 days after ovulation.

The second main function of the ovary is the production of hormones. Hormones are substances that are released into the blood stream and circulate around the body influencing other organs. The hormones from the ovary influence many parts of the body, in particular the womb and breasts. There are many hormones that are released from the ovary and they fall into three main groups: oestrogens, androgens and progestogens. Women make all of these hormones, but sometimes in different proportions. Testosterone is the main androgen hormone, made by the ovaries of all women. Oestrogen is made out of testosterone and helps the lining of the womb (endometrium) to grow.

Polycystic ovaries contain many small follicles which each contain an egg and have started to grow, but do not reach a mature size and instead remain at a size of about 2-9mm in diameter. A polycystic ovary usually contains at least twelve of these small follicles or cysts. The ovaries are also slightly enlarged and their central hormone producing tissue (stroma) is also thickened. The diagnosis is best made by an ultrasound scan which visualises the ovaries and the small cysts within them. Sometimes blood tests show characteristic changes in hormone levels, although these changes are not universal and can vary considerably between different women.

The ultrasound picture is not always clear and some women with the polycystic ovary syndrome may have an ultrasound scan that does not suggest polycystic ovaries. The syndrome is defined by the presence of at least two out of the following three:

- 1) Signs or symptoms of high androgens (unwanted facial or bodily hair, loss of hair from the head, acne or an elevated blood level of testosterone) - after other causes for this have been excluded
- 2) Irregular or absent menstrual periods - after other causes for this have been excluded
- 3) Polycystic ovaries on ultrasound scan

Women with ***polycystic ovary syndrome*** may have the following hormonal disturbances:

Elevated levels of:

- Testosterone: an ovarian androgen hormone that influences hair growth;
- Oestrogen: an ovarian hormone that stimulates growth of the womb lining (endometrium);
- Luteinising hormone (LH, a pituitary hormone which influences hormone production by the ovaries and is important for normal ovulation);
- Insulin (a hormone that is principally involved in utilisation of energy from food), which when elevated may stimulate the ovary to over-produce testosterone and prevent the follicles from growing normally to release eggs and hence cause the ovary to become polycystic. Indeed it is high levels of insulin that is thought to be one of the main problems for women with polycystic ovary syndrome. Insulin becomes more elevated in women who are overweight.

There are many other subtle hormonal abnormalities that affect ovarian function and influence the menstrual cycle, fertility, bodily hair growth, body weight and general health.

Investigations

Standard blood tests include measurements of:

- The following hormones: testosterone, luteinising hormone (LH), follicle stimulating hormone (FSH), oestradiol, thyroid hormones, prolactin. Sex hormone binding globulin (SHBG) - the protein that carries testosterone around the blood is also sometimes, but not always, measured. Anti-Mullerian Hormone (AMH) is a more recent test that may also sometimes be suggested.
- Glucose tolerance test - a sugary drink is given first thing in the morning on an empty stomach and blood taken at the time of the drink and then again after 2 hours. This helps to see how well the body handles sugar in food and is a screening test for diabetes. In essence it helps to assess the action of insulin.
- Cholesterol levels (best done first thing in the morning before anything is eaten or drunk)

An ultrasound scan of the pelvis allows visualization of the ovaries and also the womb - it is important also to measure the thickness of the womb lining (endometrium).

What causes polycystic ovary syndrome?

It is now thought that having polycystic ovaries may run in families and there is evidence of a genetic cause. Some women may have polycystic ovaries and never have symptoms - or for that matter never know that they have polycystic ovaries. In fact, it appears that between 20 - 33% of women in the UK have polycystic ovaries, of whom perhaps three-quarters have symptoms of the polycystic ovary syndrome - often these symptoms are mild. There are racial differences, with women from Southern Asia, for example, having a higher rate of PCOS and disturbed insulin metabolism than European Caucasian women.

Ovaries do not suddenly become polycystic, but women who have polycystic ovaries may develop symptoms at any time, for reasons that are not always clear. A gain in body weight is often the precipitating cause for the development of symptoms. The appearance of polycystic ovaries does not disappear although symptoms may improve, either naturally or as a result of therapy.

It appears that one of the fundamental problems is with over production of insulin due to inefficient handling of energy from food. Whilst the extra insulin is working hard, but ineffectively, to turn food into energy it fails and gets turned into fat. The high levels of insulin have other effects in the body - including stimulating the ovaries to over produce androgens (mainly testosterone), preventing normal ovulation and also longer term effects on the circulation (leading to high cholesterol levels and an increased risk of cardiovascular disease: heart attack and stroke). There is also an increased risk of diabetes occurring in later life.

The balance of hormones is affected by body weight and being overweight can greatly upset this balance and make the above symptoms worse. Some women with polycystic ovaries only develop symptoms if they put on weight. Being overweight (obesity) is commonly associated with the polycystic ovary syndrome and this increases the risk of heart disease and high blood pressure in later life. Many clinics now measure cholesterol levels and if they are abnormal, dietary advice is given. A high fibre, low fat and low sugar diet at a young age, together with regular exercise, may help to reduce problems such as high blood pressure and heart attacks when older. Smoking cigarettes seriously worsens the risk of developing these problems. Another problem sometimes seen in later life is "late onset diabetes" in which the body is unable to use sugar efficiently. If this occurs it is then necessary to reduce the dietary intake of carbohydrates and sometimes to take oral medication. The risk of both cardiovascular disease and diabetes can be reduced by keeping to the correct weight for your height.

The small cysts in the ovaries do not get larger; in fact they eventually disappear and are replaced by new cysts. Unless they develop into a mature follicle that will ovulate when it is about 20mm in diameter, the cysts are on average 5mm and no greater than 9mm. These are not the type of ovarian cyst that require surgical removal, as such cysts are 50mm or larger. The cysts of the polycystic ovary do not cause ovarian cancer.

Women with infrequent or absent periods are at risk of excessive growth of the lining of the womb (endometrium). It is important that the endometrium is shed on a regular basis to prevent this from happening for if the endometrium becomes too thick it may sometimes develop into cancer of the womb (endometrial carcinoma). The endometrium can be seen on an ultrasound scan and if it appears too thick, or irregular, a dilatation and curettage (D & C) operation is advised in order to examine the endometrium under a microscope.

Treatment of the polycystic ovary syndrome:

1. Menstrual irregularities

Irregular and unpredictable periods can be unpleasant and a nuisance as well as suggesting irregular ovulation and the risk of endometrial thickening. If pregnancy is not desired the easiest approach is the use of a low dose combined oral contraceptive (that is a contraceptive pill). This will result in an artificial cycle and regular shedding of the endometrium. Some women cannot take the pill and require alternative hormonal therapy to induce regular periods, such as a progestogen for 5-10 days every 1-3 months, depending upon an individual's requirements. We believe that it is important to have a period at least once every 3 - 4 months to prevent abnormal thickening of the womb lining. An alternative is to use a progesterone secreting coil (Mirena Intrauterine System) which releases the hormone progesterone into the womb, thereby protecting it and also often resulting in reduced or absent menstrual bleeding.

2. Infertility

If ovulation occurs erratically it will take longer than average to get pregnant and if ovulation is not occurring it is not possible to conceive without treatment. If the menstrual cycle is irregular it is necessary to take steps to make it regular in order to achieve monthly ovulation and hence a better chance of conception. There are a number of treatments that are used to stimulate regular ovulation.

Women who are overweight have a reduced chance of conception, whether naturally or with assistance and an increased risk of miscarriage and other pregnancy related complications. Weight loss is important before starting fertility therapy and this is best achieved by a strict diet and exercise programme.

First it is necessary to check that the fallopian tubes are open and that your partner's sperm count is normal. The first drug to try is usually a tablet called clomifene citrate (Clomid), which induces ovulation in about 75% of women of whom perhaps 50-60% can expect to get pregnant after six months' therapy. If clomifene does not work the alternatives include daily hormone injections of a drug that contains follicle stimulating hormone (FSH) or alternatively an operation performed by laparoscopic ("key hole") surgery in which the ovaries are cauterized (called ovarian diathermy or "drilling") - both will induce ovulation in about 80% of women.

Treatments to induce ovulation must be monitored by ultrasound observation of the developing follicle in the ovary. This requires attending the fertility clinic on a regular basis in order to prevent the main side effect, which is a multiple pregnancy. The aim of the treatment is to induce the release of only one egg. Another risk of treatment is the ovarian hyperstimulation syndrome (OHSS), when the ovaries respond over-sensitively and can make the individual very unwell.

Metformin is a drug that has been used for many years for the treatment of diabetes. It helps the body use insulin more efficiently and therefore it was thought that it might help to correct one of the fundamental abnormalities of the syndrome, thereby improving ovarian function. Large studies however have failed to demonstrate any clear benefit from the use of metformin and so we only recommend it for women with a proven problem with high glucose levels and occasionally combined with clomiphene in some women who do not respond to clomiphene alone.

3. Skin problems

If androgen (testosterone) levels are high the skin may be affected. Acne (spots) may occur on the face, chest or back. Sometimes there is also unwanted hair growth on the face, chest, abdomen, arms and legs. These problems may be confined to small areas of the body, but sometimes they are more prominent, especially in women with darker hair or skin, simply because the unwanted hair is more noticeable than in fairer people. A less common problem is thinning of hair on the head, although if this occurs it is rarely serious. Being overweight probably causes the worst problems for women with the polycystic ovary syndrome as obesity aggravates imbalances of the hormones that control ovulation and that affect the skin and hair growth.

The contraceptive pill Dianette contains cyproterone acetate (an anti-androgen) and is an effective therapy for acne and unwanted hair growth. Spironolactone is another effective preparation, particularly for older women who may also have high blood pressure (for whom the contraceptive pill may not be allowable). An alternative contraceptive pill, Yasmin has also shown to be effective although there may be an increased risk for developing thrombosis (blood clots) early in the therapy.

Physical treatments such as electrolysis and waxing may be helpful whilst waiting for the above medical treatments to work, as the drug therapies may take 6-9 months or longer before any benefit is perceived. However electrolysis and waxing are expensive and should only be performed by

properly trained therapists as scarring can result from unskilled treatment. Recently laser therapy has proven effective, particularly for women with dark hair and fair skin. Shaving can help some women and does not make hair grow back faster.

A topical preparation, Vaniqa (Eflornithine) also appears to be very useful in helping reduce unwanted bodily hair. Vaniqa may cause some thinning of the skin and so high factor sun block is recommended if you are in the sun.

4. Weight

Being overweight worsens the symptoms of PCOS. It can be very hard to lose weight and there isn't a simple solution. Having PCOS does not make you gain weight, but women with PCOS find it easy to put on weight as their metabolism works inefficiently to deal with food. Regular physical exercise (at least 20-30 minutes of hard exercise 5-7 days per week) will increase the body's metabolism and significantly improve the ability to lose weight and improve long term health.

Much has been written about diet and PCOS. The right diet for an individual is one that is practical, sustainable and compatible with your lifestyle. It is sensible to keep carbohydrate content down and to avoid fatty foods. It is often helpful to sit down with a dietician to work out the best diet for you. A number of drugs are available that may help with weight loss. These can be prescribed by general practitioners and their use must be closely monitored. Sometimes surgery to either reduce the size of the stomach or place a band around the stomach (bariatric surgery, gastric banding) may be helpful for those who find it very difficult to lose weight.

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September 2016