PCOS

What is PCOS?

Polycystic ovary syndrome is a complete misnomer for a common condition affecting women, classically during their fertile years. First of all there are no "cysts" per se, just small follicles in the ovary which get stuck at a certain stage of development before they can get to the stage of producing an egg (at about 6-8 mm). This is the reason these patients are often infertile – i.e. because they are not producing eggs.

Why does this happen?

In fact the reason these women have this condition appears ultimately related to evolutionary pressures on human populations related to food (or more particularly the *absence* of food). Women with PCO are insulin resistant and therefore store energy very efficiently i.e. "super savers". This is all well and good in time of famine when the food supply is poor. In these circumstances, they will utilise these body stores (body fat), their body mass is reduced (they slim down), they consequently become more sensitive to insulin, and then begin to ovulate (produce an egg). In summary then they appear to be designed for times of famine (a common situation during human existence on planet earth).

I understand PCOS is very common. Why is that?

In contrast, in early twenty-first century Ireland (as in other developed countries), you can hardly step out your door without being assaulted with highly processed foods (especially carbohydrates) of all sorts – biscuits, breakfast cereal, cakes, crisps, tortilla chips, pizza, white bread, pasta, etc. Intake of these "high glycaemic" foods (i.e. high sugar) immediately elevates the insulin level and most of what has been consumed is stored for the future (the body is still waiting for famine, remember?). This surge of insulin then drops the blood sugar and the unwilling victim (maybe you) is starving again only an hour or two having eaten – and looking for another "hit" (e.g. that enticing maple pecan pastry with the mid-morning coffee). Thus the body lurches from sugar high to sugar low, storing for posterity along the way.

What problems do this cause?

The problem with this is not just the expanding waistline, but further induced resistance to insulin and the condition therefore gets worse over time. A downward spiral into metabolic no-woman's land. One serious long term health consequence associated with this worsening *insulin resistance* and associated *truncal obesity* (i.e. expanding waistline) is

the increased risk of *metabolic syndrome* arising from this. The features of this condition are high cholesterol, high blood pressure, diabetes in later life, and ultimately heart disease. In fact, men also have these although it has no similar effect on their fertility (i.e. polycystic testicles). Thus a tendency to PCOS caused by insulin resistance can be inherited on the male side although the full genetic picture has yet to be made clear.

How does PCOS reveal itself?

The classic complaints of the PCOS woman are irregular periods or no periods, often heavy and prolonged when they do come (due to a build up of the thickness of the lining of the womb over months or years without a period). She may be prone to being overweight (although not necessarily so), often craves mid-meal snacks (remember the sugar hits?), is often tired and may also complain of pelvic pain (in the lower part of the tummy). The reason for the lower tummy pain is that the uncontrolled insulin resistance is associated with an elevation of LH from the pituitary gland. This in turn stimulates the theca cells in the centre ("stroma" or substance) of the ovary to produce lots of male hormone. These cells enlarge and stretch the cortex (outside skin) of the ovary causing the ill defined pain. Clearly the condition must be metabolically out of control for the cortex to stretch and pain is therefore not a particularly good sign.

You mentioned male hormones. Why do women have male hormones?

Male hormones (also called androgens e.g. androstenedione or dihydroepiandrosterone) are produced by both women and men – it is just the proportion and absolute amounts of each which vary. *In fact is essential for the ovary (i.e. theca cells) to produce male hormones which are then converted by other cells in the ovary (called granulosa cells) to female hormones.* This female hormone is called *oestradiol* and is essential for '*oestrus*' i.e. egg production. So the humble male hormone has some use after all – even in women!

What else might you experience (if you had PCOS)?

If we think of the chain reaction from insulin to the pituitary gland and the ovary (as discussed above), then must the excess male hormone also have an effect? Yes, it does. As the polycystic ovary becomes a factory for industrial levels of male hormone production, so the unwanted effects of these androgens ("androgenic effects") become apparent. This is mostly acne on the face and / or unwanted facial hair (hirsuitism) on the upper lip, chin, around the nipples or on the tummy.

Thus you can see that the original description of PCOS comes about, i.e. amenorrhoea (no periods, hirsuitism (too many male hormones), and enlarged polycystic ovaries (follicles stuck in mid development, swollen centre of ovary from theca cells producing male hormone).

Treatment for PCOS

Can any thing be done? Yes it can.. The first place to look at is the underlying cause(s) so anything that increases insulin sensitivity is worthwhile. The most obvious of these is **exercise** (about half an hour a day) followed by using a "**low glycaemic index diet**".

What is a low glycaemic index diet?

If you remember the problem of high sugar releasing foods above, then the answer is to eat foods which release small amounts of glucose and therefore reduce the corresponding surges of insulin. These then level out the glucose / insulin levels allowing your body to use the food energy consumed for daily activity rather that storing most of it for future use around the liver or in fat. These foods include oats, porridge, bran or wholemeal bread, beans, peas, plums, apples, etc. Lean meats are also good because they do not cause a surge in insulin. The striking thing about many of these is how "natural" they are – the long and the short of it is that many (if not most) of us are poorly designed to cope with the highly processed foods that surround us - and this explains to a large extent (along with sedentary lifestyles), the epidemic of obesity evident in Western countries.

Medicine to increase insulin sensitivity

The next step is medications to increase sensitivity to insulin, the most widely used of which is Metformin. Now many health professionals are themselves unaware of the benefits of these agents in PCOS (apart from their conventional use in diabetics). However they have been clearly shown to improve outcomes in infertile patients with PCOS including ovulation (egg production) and pregnancy rates after many different types of fertility treatment.

Using the 'pill' to suppress the ovary

From the point of view of the ovary, one option is to "turn off" the ovary using the oral contraceptive pill. The trade-name of the particular pill that is commonly used is "Dianette". It has an additional effect in PCOS because it has "anti-androgenic" properties. This means it acts to reduce the effect of the male hormones that are in the circulation – in addition to suppressing the activity of the ovary. Of course this is only an option if you do not wish to have a family. Other agents can be used to counteract the effect of androgens include steroids (like dexamethasone) or spironolactone.

Surgery to help ovulation

If you do want a family, then it is important to kick start ovulation (i.e. egg production). Stein and Leventhal (see before) suggested taking a chunk out of the ovary. This operation is called a "wedge resection" and was carried out successfully for many decades. In recent years there has been a shift to a less damaging operation which achieves a similar effect – laparoscopic polycystic ovarian drill. Here a telescope is put into the tummy and a needle inserted into the ovary to disrupt it and trigger ovulation. For the purposes of simplicity, you might like to think of it as puncturing the multiple cysts although there is more to it than that.

Fertility treatment

Patients with infertility due to PCOS are often treated successfully, although there are a number of potential problems. The first is that it can be difficult to make them ovulate without getting an over-response. In other words they tend to either under-respond, or over-respond, or both! Under-response tends to occur when aiming for just one follicle

to develop in conjunction with either timed sexual intercourse (LINK – TSI) or intrauterine insemination (LINK – IUI).

The classic case here is of a patient with PCO is "clomid resistant", i.e. does not respond to a conventional oral drug to stimulate egg production called clomiphene citrate (or "clomid" by its trade-name). Stimulation is then further increased by adding in injections, although bearing in mind the increased possibility of over-stimulation. In fact the patient can develop anything from 4-24 follicles (or more) if she does over-respond. This "hyperstimulation", if it occurs, needs to be managed carefully and is dealt with elsewhere on this website (LINK – OHSS). If a patient does not respond appropriately to these agents, then IVF is the next step. In this event be reassured that, by and large, patients with PCO are generally successful.

What about my general health?

If, finally, we turn to the effect of these metabolic changes over a lifetime – independent of the issues discussed above – the main ones concern not just the "metabolic syndrome" discussed before but also (a) an increase in the long term risk of cancer of the lining of the womb (carcinoma of the endometrium) and (b) quality of life issues including excessive menstrual bleeding (dysfunctional uterine bleeding). These are best discussed with your doctor. However I think it is a good idea to do some homework before you do so. Bulletin boards on the internet are a good source of information as are specialist support networks for PCOS both in Ireland and overseas. Just google "PCOS" and find out for yourself.

Some reassurance

Although PCOS is a complex condition and can be difficult to manage, it is not insurmountable. The first step is the most difficult to take and it generally gets easier as you go along. Baby steps include the exercise and diet changes, and these may be all you need. However, even if you need other medical, surgical, or fertility treatment they are a good basis on which to get started. Good Luck from all of us here at Sims.