POLYCYSTIC OVARIAN SYNDROME (PCOS)

Taken from a lecture given by Ruth Trickey March 2003 combined with the information from Sarris & Wardle (2010) Clinical Naturopathy.

POLYCYSTIC OVARIAN SYNDROME:

1. **What is it?** One of the most complex and contentious conditions in reproductive medicine. How does your text describe it?

2. Patients may present with individual components of the syndrome e.g.
    a. Insulin resistance and obesity;
    b. Hyperandrogenism → Infertility → Anovulation – approximately 75% of anovulatory women from any cause have polycystic ovaries;
    c. Abnormal bleeding → Oligomenorrhoea, amenorrhoea, menorrhagia.

3. Characterised by ovulatory failure (and related infertility), androgen excess (hirsutism, acne), obesity, and bilateral polycystic ovaries

4. Treatment and management strategies aimed at reducing insulin resistance and hyperinsulinaemia (including weight reduction) can not only reverse androgen and luteinizing hormone abnormalities and infertility, but can also improve glucose, insulin and lipid profiles.

5. The term "polycystic ovary" is actually a misnomer; the "cysts" are actually follicles. There may be multiple (at least 10) small (2 – 8 mm) follicles around the periphery of the cortex. The ovary is usually enlarged with a volume > 6ml.

6. Approximately 25% of Australian women have polycystic ovaries (PCO) BUT only 7 – 8% have PCOS. Women with PCO but no clinical features of the syndrome *usually* have normal fertility without insulin resistance. AND should be assured that the PCO will not progress to PCOS.

7. Many patients have a strong family history of PCOS and may inherit the disorder. PCOS shares many characteristics with the metabolic disorder popularly known as Syndrome X. It is also an entity within the Metabolic Syndrome Spectrum.

8. ***Insulin resistance*** has been identified as a trigger for PCOS in between 50 and 70% of women with PCOS. It adversely affects the ovary, adipose tissue, blood lipids and (indirectly) the adrenal gland.
    a. Insulin increases production of ovarian androgens;
    b. folliculogenesis does not proceed normally and small follicles (cysts) develop that do not produce ovum;
    c. lowers SHGB production in the liver.

9. Obesity has its own effects on PCOS as obesity (especially abdominal) worsens insulin resistance and is associated with increased androgen levels. Excess adipose tissue provides a site for peripheral conversion of androgens to oestrogen to elevated and acyclic oestrogen.

10. 30 – 50% do NOT have insulin resistance:
    a. may have reduced insulin sensitivity (but not yet insulin resistance) which influences ovarian function OR
    b. may have undiagnosed insulin resistance OR
    c. PCOS might develop because of a variety of other physiological, functional or genetic disturbances.

11. Other conditions seen in conjunction with PCOS are:
    a. Androgenization;
    b. Exaggerated adrenarche;
    c. Congenital adrenal hyperplasia;
    d. Cushing's syndrome;
    e. Adrenal androgen – secreting tumours.

12. Other factors that may initiate PCOS:
    a. Intra-uterine factors;
    b. Acromegaly;
    c. Hyperprolactinaemia;
    d. 40% of PCOS patients have an eating disorder.

13. Symptoms of PCOS not related to insulin resistance may be more responsive to traditional treatments fro PCOS i.e. treatment of altered steroid hormone metabolism with ovulatory stimulants, OCP and anti-androgens.

14. Women with PCOS have increased risks of several cardiovascular risks factors including:
    a. Dyslipidaemia;
    b. Hypertension;
    c. Atherosclerosis;
    d. Non-fatal cerebrovascular disease - estimated risk of myocardial infarction in PCOS is 7.4 times that of other women; As well, cardiovascular risks have been closely linked to abnormalities of insulin action; OCP's with cyproterone (Diane, Brenda) can adversely affect blood lipids and increase CVD risk.

INSULIN RESISTANCE:

Characteristics:

1. Decreased sensitivity of cellular insulin receptors to insulin → poor uptake of glucose into cell.

2. Risk of progression to glucose intolerance then type 2 diabetes.

3. Increased risk of obesity which worsens prognosis.
4. Elevated insulin levels:
    a. Increase ovarian androgen production by direct stimulation on ovarian tissue;
    b. increase fat storage and inhibit release of fat for energy;
    c. triglyceride increase;
    d. total cholesterol levels increases, HDL cholesterol drops.

5. Many women with PCOS are symptom – free, maintain regular cycles and remain fertile as long as they maintain their body weight at the low end of their body mass index (BMI) and control insulin resistance.

6. Increasing age (a risk for insulin resistance) tends to be associated with more prevalent PCOS symptoms.

Causes and aggravating factors:

1. Inherited
2. Diet
3. Abdominal weight gain
4. Age
5. Lack of exercise
6. Smoking
7. 40% have an eating disorder

Impact:

Hyperinsulinaemia is thought to be THE primary trigger for:

- ovarian 'cysts' and infertility;
- cycle irregularity;
- hirsutism;
- increased risk of type2 diabetes;
- lipid abnormalities.

Clinical and biochemical signs and indicators:

1. Many methods have been suggested as aids to the diagnosis of insulin resistance:
    a. Raised BMI above 30;
    b. Increased waist to hip ratio;
    c. Neck circumference;
    d. BUT thin and normal weight women CAN have insulin resistance.

2. Serum insulin > 20 ulU/ml (micro international units per millilitre) BUT
    a. Serum insulin > 12 ulU/ml indicates a need to evaluate the GTT
    b. An insulin peak > 80 ulU/ml during the GGT is also diagnostic of insulin resistance.

3. A 2002 study showed that a decreased SHBG was a better predictor of insulin sensitivity in non-obese PCOS women than waist to hip ratio, waist circumference or androgen levels. (Cibula, D, et al, 2002. *J Clin Endrocrinol Metab*).

Dietary, supplement and herbal treatment:

1. No refined carbohydrates and a reduced total carbohydrate intake – use low GI foods (< 50) instead;
2. Dense breads, pasta, oatmeal;
3. Doongara and Basmati rice;
4. Root vegetables other than potatoes;

5. Temperate climate fruits;

6. Cigarette smoking should be discouraged in all women with PCOS as it will exacerbate the increased risk of atherosclerosis. It has also been shown to aggravate insulin resistance in type 2 diabetes.

7. High fibre and phyto-oestrogen intake to lower total cholesterol; improve LDL:HDL cholesterol ratio; lower BP; lower homocysteine; and reduce CVD risk:
    a. Legumes;
    b. Freshly ground linseed – kept in the fridge;
    c. Rye, seeded and sprouted wheat breads.

8. Replace carbs with protein to:
    a. stabilise energy levels;
    b. reduce sugar cravings and improve satiety:
        i. legumes, tofu and other soy products;
        ii. oily fish;
        iii. low fat yoghurt;
        iv. eggs and lean meat.

9. Chromium increases insulin sensitivity:
    a. Increases insulin binding to cells;
    b. Increases insulin receptor numbers;
    c. Activates insulin receptor kinase;
    d. Picolinate 400mcg (50mcg) chromium) 2 BD;
    e. Amino acid chelate (200mcg chromium) 1 – 2 BD;
    f. Glucose Tolerance Factor (GTF);
    g. Chromium combined with biotin (3mg TDS) enhances insulin sensitivity.

10. Magnesium:
    a. Plasma magnesium is inversely related to insulin sensitivity;
    b. PCOS women have significantly lower serum and total magnesium;
    c. Population studies show that a high daily magnesium intake is associated with a lower incidence of type 2 diabetes, and low serum magnesium with a higher incidence.

11. Omega 3 EFA's improve insulin sensitivity:
    a. Omega 3 EFAs are incorporated into the phospholipids of cell membranes;
    b. High levels of omega 3 EFAs improve insulin sensitivity and insulin transport through membranes;
    c. Conversely, a high ratio of saturated fat reduces cellular insulin sensitivity and transport;
    d. Omega 3 fatty acids are often deficient in insulin resistance;
    e. 2 – 4 gm / day as fish oils – however, reduced risk of cardiac death for post MI patients occurs with as little as 1gm daily;
    f. A higher ratio of omega-3 and omega-6 fatty acids than is currently consumed in the population is desirable.

12. Metformin (diabex, Glucophage):
    a. Improves insulin resistance;

b. Reduces body weight;
c. Reduces androgen levels;
d. Improves menstrual cycle regularity;
e. Reduces hirsutism;
f. Improves ovulation rates.

13. *Galega officinalis* (Goat's Rue): similar to Metformin
    a. Contains guanidine as well as chromium salts;
    b. Mice given *Galega officinalis* as 10% of their diet, had reduction in body fat and weight loss. A hypoglycaemic effect was also noticed;
    c. Dose of 20 – 30 ml per week.

14. *Gymnema sylvestre* (Gymnema):
    a. Some PCOS women respond better to Gymnema, either as a simple or in combination with Galega;
    b. Middle to upper end of the dose range is required. Suggest tablets if taste is a problem.

15. *Urtica dioica* folia (nettle leaf) increases SHBG and is recommended for insulin resistance of PCOS.

16. *Glycyrrhiza glabra* (licorice) reduces activity of 11*B*-OHSD and is also recommended for insulin resistance.

17. *Vitex agnus-castus*:
    a. The issues around the use of Vitex in PCOS are unresolved:
        i. Administration of Vitex can be associated with worsening of cyclic regularity;
        ii. Some practitioners recommend Vitex be used only in the luteal phase of the cycle, but difficult to prescribe because of irregular cycles;
    b. Vitex and *paeonia lactiflora* are similar in many respects, however, in PCOS:
        i. Vitex has not been evaluated for its aromatisation
        ii. Improved ovarian tissue receptivity to LH may lead to undesirable effects in PCOS – needs more research!

TREATING PCOS NATURALLY

(Mader, L, (2013) Treating PCOS Naturally, Herbalgram, iss 98, pp.58-65)

Polycystic Ovarian Syndrome (PCOS) is a hormonal endocrine disorder that affects more than 5 million women in the USA alone – and manifests itself through spectrum of symptoms, including:

- Irregular or absent menstruation;
- Lack of ovulation;
- Multiple cysts on the ovaries;
- Acne;
- Excessive facial hair (hirsutism);
- Obesity – however, many women with PCOS are of normal weight and therefore this is referred to as lean PCOS.

It is one of the leading reasons behind female infertility and it also increases the likelihood of miscarriage and infant death during or shortly after birth. Additionally, PCOS can lead to serious health issues, including endometrial cancer, osteoporosis, heart disease and diabetes **AND** because of the above is on the Metabolic Syndrome Spectrum.

Causes:

While the cause is uncertain, complex and variable, several conditions exist that can lead to the symptoms:

- Higher than normal levels of male hormone – particularly testosterone;
- Lower than normal levels of female hormone progesterone;
- Elevated levels of prolactin;
- Abnormal insulin regulation.

Treatment:

- **Allopathic (all have side effects):**
  - Oral contraceptives aimed at decreasing male hormone levels and normalising the menstrual cycle;
  - Metformin – a drug that is designed to allow PCOS patients to regulate insulin levels and support conception;
  - Also, if trying to conceive, clomiphene (Clomid, Serophene) will be given –-> a fertility drug that stimulates ovulation.

- **Herbal –** a safe and nutritive option to support ovarian function, endocrine feedback loops, thyroid function and blood sugar regulation and metabolism. Natural treatment plans formulated for PCOS patients typically focus on three main types of treatment**:**
  - **Hormonal imbalances →**
    - Chaste tree aimed at decreasing the elevated prolactin levels and improving fertility and the body's progesterone-producing process;
    - Licorice (often along with Peony) will reduce testosterone levels;
    - Dong Quai for its oestrogenic activity;
    - The following phyto-oestrogenic herbs could also be considered → Black cohosh, Red clover, Flax seed, soy and hops.

- **Insulin, blood sugar and metabolic sensitivities and/or irregularities**
    - Metabolic syndrome which presents itself as weight gain, hypertension, high blood sugar, hypercholesterolaemia;
    - Also insulin-resistance related hyperinsulinaemia which can lead to hyperglycaemia as well as hypoglycaemia;
    - Inositol (4gms) has proven to be very effective, along with folic acid (400mcg) on increasing ovulation and conception rates in infertile PCOS women. Good sources of inositol are brown rice; legumes including soy, kidney beans, garbanzo beans, lentils, hummus; carob; astragalus and alfalfa; buckwheat.
    - Vitamin D and chromium both enhance the metabolic action of insulin at the same time as decreasing total cholesterol and LDL. Chromium is also found in hibiscus, brewer's yeast, dandelion leaves, stevia and lemongrass.
    - Moderate amounts of green tea and / or good coffee due to caffeine's well documented ability to improve insulin sensitivity.
    - Taking 1 – 6gm per day of cinnamon for its ability to reduce insulin resistance and oxidative stress.
    - Gymnema has been shown to lower blood sugar levels by preventing glucose absorption.
    - Fish oils may also benefit PCOS due to their reduction in serum triglycerides.

- **Stress response and management –** in response to stress, the adrenals release cortisol, inducing an elevation in prolactin → increased androgen synthesis which, in turn, → menstrual cycle dysregulation, especially anovulation which is characteristic of PCOS.
    - PCOS treatments MUST address stress with Adaptogenic herbs "given primary consideration" as they 'improve resistance to stress through modulation at the adrenal level".
    - Herbs that are known to do this are:
        - Withania
        - American ginseng
        - Korean ginseng
        - Licorice
        - Rhodiola
        - Schisandra
    - As well the following mind-body therapies have been suggested:
        - Yoga;
        - Guided visualisation;
        - Hypnosis;
        - Aromatherapy;
        - Meditation.

- **As well:**
    - Ensuring healthy liver function is crucial to the breakdown of excess hormones;

    - Reducing alcohol intake → alcohol challenges the blood sugar regulation at the same time as putting more pressure on the liver;

- Unless underweight, regular and moderate exercise and resultant weight loss is paramount as it reduces insulin and testosterone levels – and has been shown to provide dramatic relief for PCOS symptoms – weight loss alone has led to achievement of pregnancy in 60% of cases without any medical intervention;

- Low-carb, whole food diets also have been shown to reduce insulin resistance and testosterone levels in women with PCOS.