

Polycystic Ovary Syndrome

What is Polycystic Ovarian Syndrome?

Polycystic Ovarian Syndrome (PCOS) is characterized by the presence of multiple ovarian cysts and excess androgen production.

Clinical Features

- Oligo or amenorrhoea
- Hirsutism
- Acne
- Obesity
- Insulin resistance
- T2DM
- Sleep Apnoea
- Anovulatory infertility
- Mood swings

Prevalence

One in five females of reproductive age are found to have polycystic ovaries on ultrasound scan, but not all these women will exhibit symptoms of the clinical syndrome. Most data suggests a prevalence of PCOS between 6–9% [1–3] but some ethnic groups have higher incidences [4], [5]. Care should be taken when reviewing the literature as different diagnostic criteria are used [6].

Aetiology

The pathogenesis of PCOS is not fully understood, and likely to be multi-factorial. There is a clear genetic component with familial clustering [7], however the exact mode of inheritance is unknown [8].

Hypersecretion of LH stimulates chronic overproduction of androgens by ovarian thecal cells. There is a relative lack of FSH resulting in a high LH to FSH ratio [9]. This imbalance in hormones causes arrest in follicular development, so the luteal phase of the menstrual cycle is never reached, and menstruation does not occur. High serum androgen levels due to overproduction of LH cause the other clinical symptoms of the syndrome, such as decreased insulin sensitivity,

hirsutism and acne [10]. Decreased sensitivity to insulin causes the pancreas to secrete more, which in turn worsens the clinical syndrome as insulin stimulates androgen production by the ovaries.

Approximately 50% of women with PCOS are overweight or obese, therefore it is thought that obesity may play a role in the pathogenesis of PCOS. It is known that women with PCOS who are obese experience more severe symptoms than those with PCOS of normal weight. Mechanisms likely to be involved in worsening the symptoms of the syndrome are further hyperinsulinaemia related to obesity, increased oestrogen production due to surplus adipose tissue, and decreased sex hormone binding globulin synthesis [11].

Diagnosis

In 2003, the National Institute of Health and the American Society of Reproductive Medicine reevaluated the definition of PCOS and developed the Rotterdam Criteria. The Rotterdam Criteria requires two of the following three features for a diagnosis of PCOS, after the exclusion of other disorders with similar presentation [12]

- Oligo or anovulation
- Clinical and/or biochemical signs of hyperandrogenism
- Polycystic ovaries

Investigations

Firstly on examination hirsutism, acne and BMI should be assessed. Disorders with a similar presentation to PCOS must then be excluded for a diagnosis of PCOS to be made. Differential diagnoses include premature ovarian failure, hyperprolactinaemia or hypogonadotropic hypogonadism causing amenorrhoea, whilst congenital adrenal hyperplasia, Cushing's syndrome, androgen secreting tumors or exogenous androgens could also cause hyperandrogenism.

Initial tests should include basal (day 2–5) LH, FSH, prolactin, testosterone DHEAS, androstenedione and sex hormone binding globulin levels [12].

A fasting glucose or glucose tolerance test should be performed to assess for T2DM/reduced glucose tolerance, which although not diagnostic of the syndrome adds to the clinical picture.

Transvaginal ultrasound of the ovaries should be performed to assess the presence of polycystic ovaries, defined as >12 follicles per ovary with follicles measuring 2–9 mm diameter, or total ovarian volume > 10 mL [12].

Long Term Health and Management

The ideal method of symptom management for PCOS patients who are overweight is lifestyle advice to encourage weight loss. This significantly improves symptoms and reduces risk of long term complications. Lifestyle advice should be given with an emphasis on diet and regular exercise.

Women with PCOS are at an increased risk of type 2 diabetes mellitus, particularly if they are obese (BMI>30), have a family history of diabetes and are over 40 years of age [13]. It is therefore prudent to regularly screen patients with PCOS with fasting glucose measurements.

Patients with PCOS often have many risk factors for cardiovascular disease, including obesity, T2DM, hyperlipidaemia and hypertension [14], [15]. Although the presence of these risk factors have not yet been shown to increase the incidence of CVA in the PCOS population [16], it would be sensible to assess and appropriately manage cardiovascular risk. Lipid lowering treatment should not be used routinely in PCOS patients however, and prescribed only by a specialist [13].

Sleep apnoea is more common in women with PCOS even compared to weight matched controls. Snoring and daytime sleepiness symptoms ought therefore to be explored with patients, assessed and treated where necessary [13].

The arrest of follicular development in PCOS and subsequent disruption of the menstrual cycle results in chronic exposure of the endometrium to oestrogen. It is thought that this may increase the risk of endometrial hyperplasia and carcinoma in the long term [17]. To reduce this risk, women with PCOS who are not trying to conceive should be offered a five day course of progestogen every three months, the use of the combined oral contraceptive pill, or an intrauterine contraceptive such as Mirena ® to induce withdrawal bleeds [18].

For hirsutism and acne symptoms a number of licensed treatments exist including the combined oral contraceptive pill, cyproterone acetate and topical facial eflornithine. These can be used in combination with cosmetic treatments such as shaving, waxing or laser hair removal. Metformin can also be used to reduced circulating androgen levels, improve regulation of menstrual cycles, and increase insulin sensitivity, although unlicensed for PCOS treatment in the UK remains a popular treatment choice. [9].

Fertility and Pregnancy in PCOS

Anovulation is an important issue for women with PCOS trying to conceive. Overweight patients should be advised to lose weight to

increase their chance of spontaneous ovulation, and reduce risk of pregnancy complications. The risk of gestational diabetes is particularly high in this patient population.

The first line treatment for ovulation induction in the PCOS population is clomifene citrate or tamoxifen [19]. According to NICE guidelines, treatment should be administered for 12 months alongside regular ultrasonographic monitoring to allow for the minimum therapeutic dose, reducing risk of multiple pregnancy.

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