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Hello and welcome to another episode of the APAOG podcast I'm the show's host and creator Morgan Bechtel. And today we'll be learning about polycystic ovarian syndrome, AKA PCOS. PCOS is the most common endocrinopathy affecting reproductive age women.

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With the prevalence of between 8 and 13 percent depending on the population studied and definitions used.

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PCOS is a very multifactorial syndrome, consisting of several reproductive, metabolic, and physiological factors. The exact cause of PCOS is as yet to be determined, and there are no known genetic contributions or environmental factors that have been found to be a direct cause of this condition in the next 30 minutes or so, we'll dive into the history behind PCOS,

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its symptomatology, diagnosis and treatment so hold tight to your ovaries as we dive into polycystic ovarian syndrome.

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In the mid 1900s, a doctor, Irving Frayler Stein, and his colleague, Doctor Michael Leventhal, were working at Michael Reese Hospital in Chicago, IL, researching the cause of sterility in women. Stein and Leventhal found that many of their patients who suffered from quote-un-quote sterility, which was used synonymously with infertility at the time also often had excessive body hair, or irregular or absent menstrual cycles.

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After three decades of research together, Stein and Leventhal coined the term Stein Leventhal syndrome and went on to publish an article called the Stein Leventhal syndrome, a curable form of sterility, which described the research as well as proposed treatments to help restore patients, menstrual cycles and fertility, like much in medical history, the credit for medical discoveries

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Often falls to those whose research is more well known, or who are considered to be more popular in the medical and scientific communities.

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Stein and Leventhal are regarded to been the first investigators of PCOS. However, in 1721, a doctor of Valisneria and Italian scientist described a married and infertile woman with shiny ovaries with a white surface and the size of pigeon eggs. Whether it was because they lived in an era where information could be mass distributed.

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Or the fact that they were American. Stein and Leventhal are generally credited for defining PCOS.

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It was not until the early 1990s that the National Institute of Health sponsored a conference on PCOS where formal diagnostic criteria were proposed and afterwards largely utilized.

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Now that we have a little background on or about let's discuss the presentation and diagnosis of PCOS. Most patients will initially present with symptoms of irregular menses and or hyperandrogenism think male pattern, hair loss, acne, hirsutism, AKA excess of hair.

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Many females will also struggle with fertility.

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Diagnosis starts with a comprehensive history and physical exam, making sure to focus on the regularity and length of a patient's menses, discussing any symptoms of hyperandrogenism as mentioned above, and asking about common comorbidities such as obesity, hypertension, diabetes, or other metabolic conditions.

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PCOS is diagnosed if a patient meets two out of the three Rotherham criteria which are as follows. Oligomenorrhea or Anovulation, clinical and or biochemical signs of hyperandrogenism and polycystic ovaries on transvaginal ultrasound.

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Now let's break each of these criteria points down a little further.

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Oligomenorrhea refers to when a female's menstrual cycle is greater than 35 days between Menses or has fewer than 9 menstrual cycles per year, and ovulation refers to an egg, aka ovum does not release from the ovary during normal menstrual cycle. Chronic anovulation is what commonly contributes to the infertility seen in patients with PCOS.

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Now clinical symptoms of hyperandrogenism include male pattern baldness,

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acne and hirsutism. Once a thorough history and physical exam, has been performed, labs are drawn to rule out other causes of irregular menses, including human chorionic gonadotropin, HCG. Again, we want to make sure that they're not pregnant, prolactin to rule out a pituitary tumor, or other causes of hyperprolactinemia.

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A TSH to rule out any thyroid dysfunction and FSH. If that's elevated it could indicate that the ovaries are not functioning appropriately and releasing estrogen as signaled as it's supposed to. We also want to order an A1C to make sure we're looking for any diabetes or hyperinsulinemia and we want to do serum androgen levels.

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Total testosterone and 17 hydroxyprogesterone to confirm the hyperandrogenism and to rule out any non classic congenital adrenal hyperplasia due to 21 hydroxylase deficiency.

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Again, a transvaginal ultrasound is also performed to evaluate for that polycystic ovaries, which is defined as the presence of 12 or more follicles in either ovaries. Measuring 2 to 9mm in diameter and or increased ovarian volume in at least one ovary. Generally, PCOS is a clinical diagnosis, as most patients will have at least two of the three concerns, when seen for initial evaluation, however

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Blood work should be completed in order to rule out other secondary causes that may not be associated with PCOS. The differential diagnosis for PCOS is a long one and includes the following conditions.

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Androgens creating tumors. Exogenous androgens. Cushing syndrome. Remember. That's the excessive cortisol. Non-classical, congenital adrenal hyperplasia. Acromegaly again. That's the excessive growth hormone.

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Genetic defects and insulin action primary hypothalamic amenorrhea, primary ovarian failure. Thyroid diseases.

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And prolactin disorders again think that prolactinoma or hyperprolactinemia, from medications like methyldopa or risperidone.

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Once a patient is diagnosed with PCOS, a multimodal approach to treatment is often taken. Weight loss management via healthy diet and regular exercise is considered for the first line intervention, as weight loss can restore ovulatory cycles and improve metabolic risk.

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According to an up-to-date article from May 2022, there's no good evidence that one type of diet is superior to another for patients with PCOS, low carbohydrate diets have become very popular, based on the notion that the less carbohydrate leads to less hyperinsulinemia and therefore less insulin resistance.

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However, a 12 week study a high protein low carb diet that means 30% protein, 40% carbs, 30% fat.

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Versus a low protein diet, high carb diet with 15% protein, 55% carbohydrate and 30% fat were equally less effective for weight loss, improvement in menstrual cycles, insulin resistance, dyslipidemia and abdominal fat granted. This is one study of 28 overweight women with PCOS now.

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Nutritionists and dietitians are a great resource for patients looking for further support and improving their diet. One of the concerns of PCOS is the increased risk of endometrial hyperplasia and possibly endometrial cancer due to chronic anovulation.

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Now, this is often combated with combined oral contraceptive pills, as the daily exposure to progestin antagonizes the endometrial proliferative effective estrogen. If there are contraindications to oral contraceptive pills, think history of DVT, breast cancer, and the patient is not able to take oral contraceptive pills.

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Progesterone only pills or the Depo Provera shot is recommended and should be discussed. For the management of symptoms associated with hyperandrogenism and antiandrogen medication such as sprinalactone is considered.

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And with that, we typically start at 15 milligrams twice a day. Now there are contraindications as spironolactone that include hyperkalemia Addison's disease and use with allopurinol one as it may cause hyperkalemia. Now. Patients could also be referred to a dermatologist for further topical acne treatments and or laser hair removal recommendations.

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Although some clinicians use metformin to treat hirsutism, the Endocrine society clinical practice guide suggest against this routine use as its associated with minimal or no benefit, and is considered less effective than treatment with oral contraceptive pills.

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And or anti-androgens. Now for a long time, metformin was thought to be beneficial in treating PCOS by reducing insulin levels, ovarian androgen production and in restoring a normal menstrual cycle. However, clinical data shows that it's inferior when compared to weight loss. Combined oral contraceptive pills and antiandrogen medications, and therefore is now considered. 2nd or even third line treatment in most cases of PCOS.

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As mentioned previously, many patients with PCOS struggle with fertility. Given the menstrual irregularities and anovulation that are associated with the condition.

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The American Society for Reproductive Medicine and the European Society of Human Reproduction and Embryology recommend that before any intervention is initiated, preconception counseling should emphasize the importance of lifestyle modifications, especially weight reduction and exercise in women who are overweight as well as smoking cessation and reduction of alcohol consumption.

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For some time, the recommended first line treatment for ovulation induction was an antiestrogen clomiphene. However, randomized controlled trial data and Cochrane Systematic Review findings show that aromatase inhibitor letrozole is associated with increased ovulation rates, clinical pregnancy rates, and live birth rates compared with clomiphene citrate.

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PCOS is associated with several comorbidities, including cardiovascular disease, diabetes melitus,

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obstructive sleep apnea and anxiety and depression. Frequent screening for these conditions should include fasting, lipid profile and A1C, blood pressure and weight monitoring. PHQ 9 and GAD questionnaires as well as evaluating for symptoms of obstructive sleep apnea, including snoring, excessive daytime sleepiness. And morning headaches.

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If any of the above screenings should return positive,

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Then consider referral to the appropriate specialist, including endocrinology, therapy, cardiologist or Sleep Medicine.