



Early diagnosis in polycystic ovary syndrome

Abstract: NPs are in an ideal position to educate patients on the lifelong implications of polycystic ovary syndrome (PCOS). A timely diagnosis and comprehensive plan are needed to appropriately manage patients with PCOS. This article highlights diagnostic criteria, common comorbid conditions, psychological impacts of the clinical manifestations, management approaches, and implications for NPs.

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PCOS) is the most common endocrine problem affecting women of reproductive age today. About 4% to 21% of women are affected by PCOS.^{1,2} Among women with secondary amenorrhea, PCOS is the cause in about one-quarter to one-third of cases, and it accounts for 70%-80% of women with androgen excess and hirsutism.^{3,4} Despite the prevalence, many women with PCOS find the diagnostic experience to be lengthy, involving several healthcare providers and leaving them with unmet information.⁵

There are significant unmet needs in the diagnosis and treatment of PCOS, as well as gaps in health professional knowledge. A study by Gibson-Helm et al. found that it took greater than 2 years for one-third of the participants to receive a PCOS diagnosis, and almost half required three or more health professionals to establish a diagnosis.⁶ The same study found that most of the women were dissatisfied with the diagnosis experience and level of information received. Research has shown multiple knowledge gaps among medical providers regarding PCOS, including diagnostic criteria, overall management, management of psychosocial comorbidities, and psychological implications.⁷⁻⁹ Gaps in knowledge have been found as early as the medical training years.¹⁰ The article presents information to raise awareness of this underrecognized condition and the importance of timely diagnosis.

Diagnostic criteria

Over the last 30 years, three sets of diagnostic criteria have been proposed for PCOS.¹ In 2003, 27 PCOS experts met in Rotterdam for a conference, partially sponsored by the European Society of Human Reproduction and Embryology (ESHRE) and the American Society for Reproductive Medicine (ASRM), to come up with a consensus on how to diagnose PCOS. Although the Androgen Excess Society (AES) proposed a new set of diagnostic criteria for PCOS in 2006, most agencies have adopted the Rotterdam criteria for PCOS diagnosis.^{1,11,12}

Since PCOS is a group of signs and symptoms, the Rotterdam criteria require

Keywords: hirsutism, nurse practitioners, PCOS, polycystic ovary syndrome, Rotterdam criteria

the presence of two of the following three criteria for a PCOS diagnosis: 1) oligo- or anovulation, 2) clinical and/ or biochemical signs of excess androgen activity, and 3) polycystic ovaries on ultrasound (see *Criteria for diagnosis of PCOS using Rotterdam Criteria*).¹³

Chronic anovulation

Menstrual problems can indicate an underlying health condition and should be assessed.^{13,14} A cycle length slightly longer than normal (32 to 35 days) or irregular (32 to 35-36 days) requires evaluation for ovulatory dysfunction. To establish chronic anovulation, the menstrual cycle length in an adult woman should be greater than 35 days. Throughout adolescence, a cycle length up to 40 days can be considered normal.¹³ Serum progesterone levels can be measured to determine ovulation. A serum progesterone during days 21 or 22 of a cycle greater than 7 ng/mL has been found to be most predic-

To evaluate for polycystic ovaries, a transvaginal ultrasound should be used to assess ovarian morphology.

tive of ovulation.^{13,15} Calendar methods and apps have not been found to be predictive of ovulation accuracy however can be utilized to establish cycle length.^{16,17}

Excess androgen activity

Androgen excess can be determined by biochemical or clinical features. Hyperandrogenism in PCOS can manifest as hirsutism, acne, and alopecia.¹⁸ Hirsutism, excessive hair growth in women in a male-like distribution, is a common PCOS feature.¹⁹ The most commonly used scale for classifying hirsutism is the modified Ferriman-Gallwey (mFG) score.¹⁸ The mFG score includes nine body areas which are sensitive to androgen (upper lip, chin, chest, arm, upper abdomen, lower abdomen, upper back, lower back, and thighs)—a score from 0 (no hair) to 4 is assigned to each.²⁰ Terminal, uncut hair greater than 0.5 cm in length should be used and distinguished from vellus hair when utilizing the mFG score.¹⁸

Racial and ethnic variations affect body hair growth. Taking into consideration racial differences, a mFG score of 6 to 8 or higher is often used to signify hirsutism.¹⁸ The Androgen Excess-PCOS Society has proposed the need to utilize ethnic-specific mFG cutoff scores for hirsutism in women with PCOS.^{21,22} Although ethnic variations in hair growth have been found to affect mFG scores, research on the topic is limited. Larger cohort studies are needed to evaluate ethnic variations for the mFG.²²

For adult women, acne and alopecia are biochemical indicators of hyperandrogenism. During the adolescent years, only hirsutism should be considered a biochemical indicator.¹³ Women with PCOS and acne have been found to have higher concentrations of testosterone.²³ A metaanalysis by Carmina et al. found prevalence of female pattern hair loss among patients with PCOS to be 20% to 30%.²⁴ Measuring serum androgen remains controversial; however, free testosterone has been shown to be a sensitive marker for hyperandrogenic disorders.^{3,13}

Polycystic ovaries

To evaluate for polycystic ovaries, a transvaginal ultrasound should be used to assess ovarian morphol-

ogy. Over the last decade, ultrasound technology has advanced and the clinician needs to be aware of the sensitivity of the ultrasound used.¹³ The Androgen Excess-PCOS Society has suggested using ultrasound machines with a transducer frequency of at least

8 mHz for optimal ovarian evaluation.²⁵

Polycystic ovaries are defined as having at least 25 follicles per ovary and/or ovarian volume of 10 mL or greater. Measuring follicle number per ovary is recommended over ovarian volume. However, without newer ultrasound technology, achieving an accurate follicle count is not possible, and measurement of ovarian size, which can be assessed with older ultrasound technology, may be necessary.^{13,25} The use of anti-Müllerian hormone as a surrogate diagnostic marker of polycystic ovaries is not recommended at this time.^{25,26}

Common comorbid conditions

Women with PCOS have multiple long-term health risks. Patients with PCOS who have a body mass index of 25 or higher may have a greater risk of metabolic disorders.²⁷ Women with PCOS have an increased risk of overweight and obesity and are predisposed to central obesity.²⁸⁻³⁰ Additionally, it has been estimated that approximately 70% of women with PCOS have insulin resistance.³¹ A meta-analysis found a higher prevalence of impaired glucose tolerance and type 2 diabetes mellitus in women with PCOS compared with women without the disorder.³² The Amsterdam ESHRE/

ASRM-Sponsored 3rd PCOS Consensus Workshop Group found PCOS to be a major risk factor for developing impaired glucose tolerance and type 2 diabetes.²¹

The presence of insulin resistance and hyperinsulinemia increases the risk of cardiovascular disease in women with PCOS.³³ A systemic review and metaanalysis found that women with PCOS have higher triglyceride and low-density lipoprotein cholesterol levels and lower high-density lipoprotein cholesterol levels than women without PCOS.³⁴ A study by Marchesan and Spritzer found the prevalence of systemic arterial hypertension among women with PCOS to be 65%, compared with 41% of a control group.³⁵

Additionally, women with PCOS are at risk for other public health concerns. Women with PCOS have a two- to sixfold increased risk of endometrial cancer.^{2,21,36} Subclinical hypothyroidism and thyroid autoimmunity, as well as obstructive sleep apnea and other sleep disturbances, are also increased in women with PCOS.³⁷⁻³⁹ Women with PCOS are at increased risk for depressive and anxiety symptoms.⁴⁰

Approach to management

Goals of PCOS treatment include improvement of hyperandrogenic features, management of underlying metabolic abnormalities, reduction of risk factors for type 2 diabetes and cardiovascular disease, prevention of endometrial hyperplasia, contraception for those not pursing pregnancy, and ovulation induction for those pursing pregnancy.⁴¹ The first step in treatment of women with PCOS and overweight or obesity is lifestyle interventions for weight loss. Weight loss can improve insulin resistance and hyperandrogenism. Lifestyle interventions include exercise and dietary modifications, the same as for the general population.^{41,42} At present, no definitive evidence has been found regarding the best diet for patients with PCOS. Antiobesity medications can be considered for women with PCOS.²

For women with menstrual irregularities who are not pursuing pregnancy, Barbieri and Ehrmann recommend use of combined estrogen-progestin oral contraceptives (COCs).⁴¹ Although off-label for use in PCOS, COCs assist in antagonizing the endometrial proliferative effect of estrogen and is considered a logical approach for prevention of endometrial hyperplasia.^{2,41} Progestin-only therapy may be an option for women with a relative or absolute contraindication to COCs as outlined in the CDC US Medical Eligibility Criteria for Contraceptive Use.⁴³ It is important to note, however,

Criteria for diagnosis of PCOS using Rotterdam Criteria¹¹⁻¹³

Presence of two of the following three criteria are needed for a PCOS diagnosis:

- 1. Oligo-ovulation or anovulation
- 2. Excess androgen activity
- 3. Polycystic ovaries on ultrasound

that the optimal method of endometrial hyperplasia and endometrial cancer prevention remains unknown.²

Metformin in combination with a COC, although off-label for PCOS, should be considered in women with metabolic features of PCOS where diet and exercise plus COC are unsuccessful.² Metformin is second-line therapy to improve menstrual abnormalities in women with PCOS.⁴¹ Other potential benefits of metformin in women with PCOS are reduction of hyperinsulinemia and weight loss.⁴⁴

For treatment of hirsutism from hyperandrogenism, COCs are recommended as a first-line treatment.²⁰ Cosmetic options for hirsutism may include bleaching, shaving, and use of chemical depilatory agents. Plucking can damage the hair follicle and result in ingrown hairs or folliculitis, therefore should not be encouraged. Permanent hair removal can be successful with electrolysis; however, the process is slow and time-consuming. Laser epilation is more rapid with less permanency than electrolysis.45 Antiandrogen medications should only be considered after 6 months of failed COC and cosmetic therapy for symptoms of hirsutism.² First-line antiandrogen pharmacologic therapy is spironolactone, an aldosterone and androgen receptor antagonist.41,45 Longterm management of acne and alopecia may be best delivered in collaboration with dermatology.47

For women desiring pregnancy, weight loss and ovulation-induction medications are recommended.⁴¹

All women with PCOS should be assessed for cardiovascular risk factors. Women with overweight or obesity and PCOS should have a fasting lipid profile, and all women with PCOS should have BP measured at least annually. Assessment of glucose should occur at baseline and then every 1 to 3 years, depending on diabetes risk factors.²

Screening for anxiety and depressive symptoms should occur routinely for all women with PCOS at the time of diagnosis; treatment options should be based on clinical practice guidelines.² Current guidelines advocate for screening for sleep disturbances among women with PCOS and obesity with the goal of alleviating symptoms such as snoring, waking unrefreshed from sleep, daytime sleepiness, and for the risk of fatigue contributing to mood disorders.^{2,46}

To assess the emotional, psychosocial, and hirsutism problems associated with quality of life, the PCOS Health-related Quality-of-Life Questionnaire (PCOSQ), the PCOS Quality of Life scale (PCOSQOL), and the



More research is needed to determine if PCOS, its clinical manifestations, or its consequences lead to an increased prevalence of psychological disorders in women with the disease.

Health Related Quality-of-Life Questionnaire for PCOS (PCOSQ-50) have been studied and may be useful to highlight the greatest concern and evaluate treatment options.^{2,47-51} The PCOSQ includes 26 items, each with a 7-point Likert scale, in five domains: emotions, body hair, weight, infertility, and menstrual problems.⁵¹ Currently, the PCOSQ is the most widely researched qualityof-life tool in women with PCOS.^{50,51} The PCOSQOL is a 35-item scale with four subscales: impact of PCOS, infertility, hirsutism, and mood. The PCOSQOL includes the psychological, social, and environmental aspects needed in a quality-of-life assessment.⁵⁰ The PCOSQ-50 includes 43 items with a 5-point Likert scale in six domains: psychosocial and emotional, self-body image, fertility, sexual function, obesity and menstrual disorders, and hirsutism. The tool is used globally and has some validity and reliability.47-49

Based on the patient's perceptions of the problems, appropriate intervention and counseling should be offered for psychological disorders in women with PCOS.²¹ A pilot study found that a minimal, inexpensive psychological intervention involving relaxation techniques and guided imagery in women with PCOS produced improvements in anxiety and depression and reduced adrenal hormone levels.⁵²

The quality-of-life tools demonstrate promising validity and reliability for women with PCOS.⁴⁷⁻⁵¹ The ES-HRE/ASRM Workshop Group acknowledged a knowledge gap regarding the validity of screening tools for psychopathology in women with PCOS. More research is needed to determine if the disease, its clinical manifestations, or its consequences lead to an increased prevalence of psychological disorders in women with PCOS.²¹

Implications for NPs

NPs are in a unique position to counsel women of all age groups who may have PCOS in the clinical setting. Over 70% of NPs provide primary care.⁵³ NPs and women with PCOS need to be aware of the negative impact of the disease on quality of life.² A systematic review found that PCOS is associated with psychological morbidity and has a major impact on quality of

life, with obesity and hirsutism being the biggest predictors. Additionally, patients with PCOS may experience reduced interpersonal and social relationships and may feel less attractive.⁵⁴

The shift into menopause for women with PCOS is not fully un-

derstood.²¹ By the fourth decade of life, women with PCOS have been found to have decreased androgens and ovarian volume and increased ovulatory cycles. Unfortunately, the metabolic abnormalities persist and waist circumference is increased when compared with healthy controls.⁵⁵

Women with PCOS are vulnerable to adverse health effects throughout their lifespan. Timely diagnosis is imperative in order to achieve improved patient care and satisfaction, to implement lifestyle modifications for prevention and management of cardiovascular disease and diabetes, and to implement anxiety and depression screening.⁷

Conclusion

PCOS is a complex disease often accompanied by multiple comorbidities which can affect the health, quality of life, and lifespan of a woman. The diagnostic process is often lengthy and may leave the patient with unmet needs. To diagnose PCOS, two of three criteria need to be met: 1) oligo-ovulation or anovulation, 2) clinical or biochemical signs of excess of androgen activity, and 3) polycystic ovaries on ultrasound. Women with PCOS have multiple long-term health-related risk factors that need to be routinely evaluated. The goal of PCOS treatment includes improvement of health abnormalities with weight loss and COC being firstline recommendations. Adding metformin as a secondline therapy to improve menstrual abnormalities when diet and exercise plus COC are not successful can benefit women with PCOS in reducing hyperinsulinemia. Antiandrogen medications should be considered if COC fails to improve hirsutism.

NPs are in a unique position to provide a timely diagnosis and counsel women on the adverse health effects of PCOS. PCOS can negatively impact psychological health as well as interpersonal and social relationships, with obesity and hirsutism being the biggest contributing factors to decreased quality of life in those with PCOS. Diagnosing PCOS early provides better opportunities for implementation of lifestyle interventions to reduce the risk of cardiovascular disease and diabetes and lessen the negative psychosocial impact of PCOS on quality of life.

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The author and planners have disclosed no potential conflicts of interest, financial or otherwise.

DOI-10.1097/01.NPR.0000873528.58247.9e

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Lippincott Professional Development is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation.

This activity is also provider approved by the California Board of Registered Nursing, Provider Number CEP 11749 for 2.0 contact hours and 0.5 pharmacology consult hours. Lippincott Professional Development is also an approved provider of continuing nursing education by the District of Columbia, Georgia, West Virginia, New Mexico, South Carolina, and Florida, CE Broker #50-1223. Your certificate is valid in all states.

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NCPD Nursing Continuing Professional Development