

Polycystic Ovary Syndrome

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KEYWORDS

• Polycystic ovary syndrome • Risk factors • Long-term effects • Insulin resistance

KEY POINTS

- Risk factors for polycystic ovary syndrome (PCOS) include genetics, metabolic profiles, and the in utero environment.
- Long-term consequences of PCOS include metabolic complications such as diabetes, obesity, and cardiovascular disease.
- Dysregulation of insulin action is closely linked to the pathogenesis of PCOS.

HISTORY OF POLYCYSTIC OVARY SYNDROME

It is unclear when polycystic ovary syndrome (PCOS) was first described, but there are some clues in the Egyptian papyri to suggest the presence of PCOS-like syndrome. Hippocrates (460–377 BC) noted “but those women whose menstruation is less than 3 days or is meager, are robust, with a healthy complexion and a masculine appearance; yet they are not concerned about bearing children nor do they become pregnant.”¹ Soranus of Ephesus (ca. 98–138 AD) noted that “sometimes it is also natural not to menstruate at all. It is natural too in persons whose bodies are of a masculine type. We observe that the majority of those not menstruating are rather robust, like mannish and sterile women.”² Moises Maimonides (1135–1204 AD) reported “there are women whose skin is dry and hard, and whose nature resembles the nature of a man. However, if any woman’s nature tends to be transformed to the nature of a man, this does not arise from medications, but is caused by heavy menstrual activity.”³ Achard and Thiers⁴ observed a similar relationship between hyperandrogenism and diabetes in their study of the “bearded woman.” These historical statements compile a variety of signs that are suggestive of PCOS.

In 1721, Italian scientist Antonio Vallisneri made a connection between masculine features and abnormal morphology of ovaries: “young married peasant women,

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moderately obese and infertile, with 2 larger than normal ovaries, bumpy and shiny, whitish, just like pigeon eggs."⁵ In 1935, Stein and Leventhal⁶ ultimately formally described a syndrome of amenorrhea and polycystic ovaries (Fig. 1); they further depicted this syndrome, which bore their name, as one that involves masculine features, such as acne and hirsutism.

DEFINITION OF PCOS

Today this syndrome is termed PCOS. It is one of the most prevalent disorders, affecting about 5% of women of reproductive age.⁷ At present, 3 definitions of PCOS are most commonly cited (Box 1). These definitions were proposed by National Institute of Child Health and Human Development (NICHD) in 1990, the European Society for Human Reproduction and Embryology and American Society for Reproductive Medicine (ESHRE/ASRM or Rotterdam) in 2003, and Androgen Excess Society (AES) in 2006. Each of these definitions underlines the importance of excluding other causes of androgen excess and anovulatory fertility before diagnosing PCOS.

The NICHD criteria were an important first step toward establishing a universally accepted definition of PCOS. However, this definition was based on majority opinion and not on clinical trial evidence. PCOS is defined as the presence of both androgen excess and oligo-anovulation. In subsequent years it was realized that the clinical presentation of PCOS was much more variable than the NICHD criteria suggested, and polycystic ovarian morphology was often present in women with biochemical and clinical findings of PCOS. In 2003, the revised Rotterdam consensus definition included polycystic ovaries as a third diagnostic marker for PCOS. Based on this definition, a woman with the diagnosis of PCOS should meet 2 of the 3 following criteria: (1) presence of oligo-anovulation or chronic anovulation, (2) clinical and/or biochemical signs suggesting hyperandrogenism, and (3) polycystic ovaries on ultrasonographic examination. The Rotterdam definition of PCOS broadened the phenotypic expression of the syndrome and redefined PCOS as primarily a syndrome of ovarian dysfunction.⁸ The Rotterdam definition quickly became controversial, as PCOS could now be defined even in the absence of androgen excess or menstrual irregularity. In 2006, the Androgen Excess Society formed a task force to review existing data on PCOS. It was concluded that evidence to support features of PCOS in women with polycystic

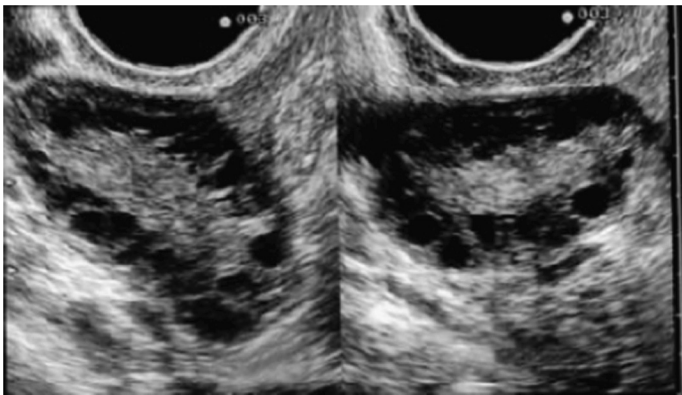


Fig. 1. Sonographic depiction of bilateral polycystic ovaries: 10 or more follicles with peripheral distribution. (From Balen AH, Laven JS, Tan SL, et al. Ultrasound assessment of the polycystic ovary: international consensus definitions. *Hum Reprod Update* 2003;9:505–14; with permission.)

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