

# Some Indicators of Reproductive Health in Different Forms of Polycystic Ovary Syndrome

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**Abstract** The article presents data on the study of reproductive disorders in women with PCOS, depending on the phenotype of the disease. Anamnesis was studied, clinical and hormonal studies were conducted in 133 patients with PCOS. The frequency of reproductive disorders and pregnancy outcomes were determined depending on the clinical form of the disease.

**Keywords** Polycystic ovary syndrome, Reproductive function, Phenotype, Reproductive disorders, Hormonal studies, Pregnancy, Pregnancy outcomes

## 1. Introduction

One of the most common causes of reproductive and health disorders in women of fertile age is polycystic ovary syndrome (PCOS). Clinical practice dictates the need to provide assistance to patients suffering from PCOS, and help them in solving problems, the main of which, obviously, is infertility. In addition, menstrual irregularities, metabolic disturbances, and cosmetic problems associated with excess androgen production are symptoms that are present in various combinations in all patients with PCOS and require treatment [1].

PCOS in the light of modern research refers to diseases of a polyetiological nature, the pathogenesis of the disease remains not fully understood. Accordingly, therapeutic approaches depend on the underlying problem with which the patient seeks a doctor. For obstetricians and gynecologists, the most frequent problems of this contingent of patients are primary or secondary infertility, fetal loss syndrome, and a number of pregnancy complications [2]. In the general population of women of reproductive age, depending on the diagnostic criteria used, the prevalence of PCOS ranges from 5 to 12%, while in the structure of infertile marriage, PCOS is 35-50%. Despite the high incidence of this disease and many years of clinical practice, the treatment of reproductive disorders in women with PCOS remains in the focus of attention of gynecologists and reproductologists. The variety of clinical manifestations of the disease requires differentiation from specialists in the choice of therapeutic tactics [3].

**The objective of the research:** To analyze reproductive disorders in women with PCOS depending on the phenotype of the disease.

## 2. Materials and Methods

We examined 133 patients aged 19-35 years with PCOS. The diagnosis and phenotypes of the disease were verified on the basis of the recommendations of the Rotterdam Consensus (2003). We have developed special questionnaires that include reasons for going to a medical institution, anamnesis data, reflecting diseases of the reproductive system, features of the course of pregnancy and childbirth, the presence of gynecological diseases. To clarify the diagnosis and exclude conditions similar to PCOS, hormonal studies were carried out with standard kits by the ELISA method. The data obtained were subjected to statistical processing using standard computer programs with the calculation of the arithmetic mean ( $M$ ), standard deviation ( $\sigma$ ), mean error of the arithmetic mean ( $\pm m$ ).

## 3. Results and Discussion

Currently, most researchers have accepted the diagnostic criteria proposed by the 2003 Rotterdam Consensus, the European Society for Fertility and Embryology, and the American Society for Reproductive Medicine. According to the consensus, the diagnosis of PCOS is eligible after excluding other similar conditions, if any two of the following three criteria are present: anovulation or oligo-ovulation, clinical and / or laboratory signs of hyperandrogenism, polycystic ovary according to ultrasound. At the same time, depending on the

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combination of symptoms, 4 phenotypes of the disease are distinguished. These phenotypes combine a fairly wide range of clinical manifestations of the disease. There are differences in clinical and laboratory parameters, some hormonal characteristics of each phenotype are demonstrated in Table 1.

Comparative assessment of hormonal parameters in patients with PCOS with different phenotypes revealed a number of differences. The highest testosterone levels were observed in patients in the androgenic and complete phenotype groups. Accordingly, these groups showed the lowest levels of estradiol, which corresponds to the state of "androgenic ovarian failure" observed in patients with PCOS. One of the diagnostic signs of patients with PCOS is the LH/FSH ratio  $> 2.5$ . The average LH values were the highest in the group with the full phenotype, more than 50% of patients had high values of this gonadotropin. The parameters of prolactin were practically identical in the compared groups. There were intergroup differences and adrenal hormones: statistically significantly high values of cortisol were in the group of patients with an ovulatory phenotype, the lowest in the group with a non-androgenic phenotype. The ambiguous indicators of adrenal function may indicate an ambiguous role of the adrenal glands in the process of steroidogenesis in different phenotypes.

Despite the fact that the clinical picture of PCOS and the patient's complaints are highly variable, the subject of treatment to a gynecologist is, as a rule, violations of the reproductive system.

We analyzed the frequency and nature of reproductive disorders in women with PCOS, depending on the form of the disease (Table 2).

It was revealed that, with the exception of phenotype II,

the main reason for treatment in all other forms is primary infertility (from 58.3% to 71.4%). With phenotype II of PCOS, the main problem of patients is recurrent miscarriage (68.2%). This phenotype differs from the classical form of PCOS, since the presence of ovulation in these women excludes disorders like oligo-amenorrhea. It is noteworthy that the diagnosis of PCOS in the ovulatory phenotype is practically not made, and the cause of reproductive disorders is mainly associated with other causal factors (infection, extragenital pathology). Menstrual dysfunction not related to fertility, as the main reason for treatment, is most often detected in the full phenotype. The forms of menstrual dysfunction were oligo-amenorrhea, recurrent abnormal uterine bleeding.

In the surveyed women who had a history of pregnancy, we analyzed their outcomes. In patients with androgenic phenotype, spontaneous miscarriage occurred in 55.5% of cases, undeveloped pregnancy - in 22.2%, premature birth - in 11%. Normal term delivery was observed in 11.0% of the respondents. With the ovulatory phenotype, spontaneous miscarriage occurred in every fifth woman (20%), miscarriage - in 66.5%. normal term delivery was observed in 13.4%. With a non-androgenic phenotype, spontaneous miscarriage occurred in 53.2%, non-developing pregnancy - in 26.6%, premature birth - in 6.5%, normal term delivery was in 13.5%. In patients with the full phenotype of the disease, spontaneous miscarriage occurred in 25% of cases, miscarriage - in 35.0%, premature birth - in 20%, normal term delivery was in 10% of the respondents. In addition to the high frequency of reproductive losses in women with PCOS, the 2-3 trimester of pregnancy was complicated in almost every second trimester by arterial hypertension or preeclampsia.

**Table 1.** Hormonal indices in different PCOS phenotypes

Hormonal indicator	Phenotype I (androgenic)	Phenotype II (non-androgenic)	Phenotype III (ovulatory)	Phenotype IV (full)	Control
Cortisol	156.5±11.9 $\diamond$	106.2±24.0* $\wedge$ $\diamond$	230.0±28.8* $\wedge$ #	151.5±20.3# $\diamond$	172.2±20.54
Estradiol	58.9±5.2* $\diamond$	125.8±39.3* $\wedge$ $\diamond$	68.9±10.2	51.5±3.8*# $\diamond$	75.81±4.50
Testosterone	1.5±0.4 $\diamond$	0.8±0.1* $\wedge$ $\diamond$	1.2±0.2*	1.7±0.2* $\diamond$	0.50±0.02
FSH	6.4±0.9	5.1±0.8	7.6±1.8	5.1±1.8	7.51±0.68
LH	11.5±1.0* $\diamond$	13.7±1.7* $\diamond$	9.4±1.8* $\wedge$ #	17.0±3.1* $\wedge$ # $\diamond$	4.69±0.84

Note: \* - reliability of data in relation to the control group ( $P < 0.05-0.01$ );  $\wedge$  - reliability of data between indicators of androgenic and other phenotypes ( $P < 0.05-0.01$ ); # - reliability of data between indicators of non-androgenic and other phenotypes ( $P < 0.05-0.01$ );  $\diamond$  - reliability of data between indicators of ovulatory and other phenotypes ( $P < 0.05-0.01$ )

**Table 2.** Reproductive system pathology in women with PCOS

Reasons for treatment	Phenotype I (n=47)	Phenotype II (n=22)	Phenotype III (n=28)	Phenotype IV (n=36)
Infertility I	63.9 + 5.9%	18.0 + 2.5	71.4+ 8.5	58.3+ 6.0
Infertility II	8.5 + 1.1	9.1+ 1.2	10.7+ 1.8	14.0+ 2.5
Recurrent miscarriage	17.0 + 2.1	68.2+ 8.5	10.7+ 1.5	11.1+ 2.0
Menstrual dysfunction not related to fertility	10.6 + 1.8	4.5+ 0.7	7.1+ 1.0	16.6+ 2.1

## 4. Conclusions

Thus, polycystic ovary syndrome is a disease with a high incidence of reproductive disorders and complications of pregnancy. Detected disorders is different in phenotypes of PCOS, which should be taken into account in the treatment and preconception counseling.

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