

POLYCYSTIC OVARY SYNDROME**Mirxamidova Mohinur Akmaljon qizi**

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Abstract. Polycystic ovary syndrome is a common endocrine and gynecological disorder affecting women of reproductive age and characterized by reproductive, hormonal, and metabolic abnormalities. The present study evaluated the clinical and hormonal characteristics of women with polycystic ovary syndrome and assessed changes in menstrual function, manifestations of hyperandrogenism, and reproductive outcomes. The study included 50 patients.

Menstrual irregularities, hirsutism, acne, and hormonal disturbances were among the most frequently observed clinical manifestations. Following treatment, menstrual regularity improved, clinical manifestations of hyperandrogenism decreased, and significant changes in hormonal parameters were observed. Pregnancy was achieved in 21 patients during the follow-up period. The findings demonstrate the importance of comprehensive clinical and hormonal assessment and individualized management in women with polycystic ovary syndrome.

Keywords: Polycystic ovary syndrome, menstrual irregularities, hyperandrogenism, insulin resistance, hormonal profile, ovulation, reproductive function, infertility, ovarian morphology.

СИНДРОМ ПОЛИКИСТОЗ ЯИЧНИКОВ

Аннотация. Синдром поликистозных яичников является распространенным эндокринно-гинекологическим заболеванием, встречающимся у женщин репродуктивного возраста и характеризующимся репродуктивными, гормональными и метаболическими нарушениями. В настоящем исследовании изучены клинические и гормональные особенности женщин с синдромом поликистозных яичников, а также оценены изменения менструальной функции, клинических проявлений гиперандрогении и репродуктивных исходов. В исследование были включены 50 пациенток. Наиболее часто выявлялись нарушения менструального цикла, гирсутизм, акне и гормональные изменения. После проведенного лечения отмечалось улучшение регулярности менструального цикла, уменьшение клинических проявлений гиперандрогении и достоверная положительная динамика гормональных показателей. В период наблюдения беременность наступила у 21 пациентки. Полученные результаты подчеркивают важность комплексной клинической и гормональной оценки, а также индивидуального подхода к ведению женщин с синдромом поликистозных яичников.

Ключевые слова: Синдром поликистозных яичников, нарушения менструального цикла, гиперандрогения, инсулинорезистентность, гормональный профиль, овуляция, репродуктивная функция, бесплодие, морфология яичников.

Introduction

Polycystic ovary syndrome is one of the most common endocrine and gynecological disorders affecting women of reproductive age. It is characterized by a combination of reproductive, hormonal, and metabolic abnormalities.

The clinical manifestations of the syndrome are diverse and may include menstrual irregularities, impaired ovulation, increased androgen activity, hirsutism, and acne. In addition to its effects on reproductive health, polycystic ovary syndrome is closely associated with metabolic disturbances, making its comprehensive assessment clinically important. The pathogenesis of polycystic ovary syndrome is complex and involves hormonal imbalance, insulin resistance, hyperinsulinemia, and increased androgen production by the ovaries. Reduced sensitivity to insulin may result in compensatory elevation of circulating insulin levels, which can influence ovarian function and stimulate androgen production. Increased androgen activity may subsequently interfere with normal follicular development and ovulation, contributing to menstrual irregularities and reproductive dysfunction.

The clinical presentation of polycystic ovary syndrome varies considerably among patients. In some women, prolonged menstrual irregularities and anovulation are the predominant manifestations, whereas in others, clinical signs associated with increased androgen activity may be more pronounced. Increased body weight, excessive accumulation of adipose tissue, and metabolic abnormalities may also occur. Therefore, assessment based on a single clinical manifestation is insufficient, and a comprehensive diagnostic approach is required.

Diagnosis involves a detailed assessment of the patient's clinical condition, menstrual and reproductive history, hormonal parameters, and ovarian morphology using ultrasonography.

Evaluation of follicle-stimulating hormone, luteinizing hormone, anti-Müllerian hormone, testosterone, sex hormone-binding globulin, and dehydroepiandrosterone sulfate may provide important information regarding ovarian and androgenic activity. Laboratory findings should be interpreted together with clinical manifestations and instrumental examination results to improve diagnostic accuracy.

Ultrasonographic examination of the ovaries allows assessment of ovarian volume, follicle number, follicular distribution, and morphological characteristics of ovarian tissue.

However, ultrasonographic findings alone are insufficient for establishing a diagnosis of polycystic ovary syndrome. Clinical manifestations, hormonal parameters, and ovulatory function should be evaluated comprehensively to obtain a more accurate assessment of the patient's condition. Evaluation of metabolic abnormalities is also of considerable clinical importance in women with polycystic ovary syndrome. Assessment of carbohydrate metabolism, insulin sensitivity, blood glucose levels, and lipid metabolism can provide valuable information about the patient's overall metabolic status. Early identification of metabolic disturbances is important for preventing potential long-term complications and developing an individualized patient management strategy.

Relevance

Polycystic ovary syndrome is a common endocrine and reproductive disorder among women of reproductive age and represents an important clinical problem because of its effects on both reproductive and metabolic health. Menstrual irregularities, ovulatory dysfunction, and clinical or biochemical manifestations of hyperandrogenism may significantly affect fertility and quality of life. In addition, metabolic abnormalities such as insulin resistance, impaired glucose metabolism, and changes in lipid metabolism may accompany the syndrome and increase the risk of long-term complications. The variability of clinical manifestations makes early recognition and comprehensive assessment particularly important. Therefore, studying the clinical, hormonal, and metabolic characteristics of polycystic ovary syndrome is relevant for improving diagnostic approaches and individualized patient management.

Aim

The aim of this study was to evaluate the clinical, hormonal, and metabolic characteristics of polycystic ovary syndrome and to determine the significance of these parameters in the development and clinical course of the condition.

Main part

Polycystic ovary syndrome is a common endocrine disorder affecting women of reproductive age and is characterized by a wide range of clinical manifestations. Menstrual irregularities are among the most frequent manifestations and may include prolonged menstrual cycles, oligomenorrhea, or complete absence of menstruation. Ovulatory dysfunction is another important feature that may contribute to difficulties in achieving pregnancy. Hyperandrogenism may present clinically through excessive facial or body hair growth, acne, and changes in scalp hair distribution. The severity of these manifestations varies considerably between patients, and some women may have significant hormonal abnormalities with relatively mild clinical symptoms. Increased body weight and excessive accumulation of adipose tissue are frequently observed, although polycystic ovary syndrome can also occur in women with normal body weight. Insulin resistance may contribute to increased androgen production and impaired ovarian function, thereby aggravating menstrual and reproductive abnormalities. Clinical assessment should therefore include a detailed menstrual and reproductive history, evaluation of androgen-related manifestations, anthropometric measurements, and assessment of metabolic risk factors.

A comprehensive evaluation makes it possible to identify different clinical manifestations of the syndrome and provides an important basis for accurate diagnosis and individualized management.

The hormonal abnormalities associated with polycystic ovary syndrome are complex and involve interactions between ovarian, adrenal, hypothalamic, pituitary, and metabolic mechanisms. Increased androgen production and androgen activity represent important features of the syndrome and may interfere with normal follicular development and ovulation. Insulin resistance may result in compensatory hyperinsulinemia, while elevated insulin concentrations can stimulate androgen production by ovarian theca cells. Hyperinsulinemia may also reduce hepatic production of sex hormone-binding globulin, thereby increasing the proportion of biologically active circulating androgens. Alterations in follicle-stimulating hormone and luteinizing hormone secretion may further influence follicular maturation and ovarian function.

Anti-Müllerian hormone concentrations may also be increased in some patients because of an increased number of small ovarian follicles. The hormonal profile can vary according to the clinical phenotype and individual characteristics of the patient. Therefore, assessment of a single hormonal parameter is insufficient for comprehensive evaluation. Laboratory findings should be interpreted together with clinical manifestations and ovarian morphology. It is also important to exclude other endocrine disorders that may produce similar symptoms, including thyroid dysfunction and disorders associated with excessive prolactin secretion.

Metabolic abnormalities are an important component of polycystic ovary syndrome and may occur in women with different body compositions, including those with normal body weight. Insulin resistance is one of the major metabolic abnormalities associated with the syndrome and can lead to compensatory increases in circulating insulin concentrations.

Persistent hyperinsulinemia may stimulate ovarian androgen production and contribute to the progression of hyperandrogenic manifestations and ovulatory dysfunction. Disturbances in carbohydrate metabolism may also develop, increasing the risk of impaired glucose tolerance

and type 2 diabetes mellitus. Evaluation of fasting blood glucose, glycated hemoglobin, and, when clinically indicated, an oral glucose tolerance test can provide important information regarding carbohydrate metabolism. Assessment of insulin resistance may provide additional information about the patient's metabolic risk. Body mass index and the distribution of adipose tissue should also be considered because excessive central adiposity may be associated with increased metabolic risk.

Abnormalities in lipid metabolism may accompany disturbances in glucose regulation, including increased triglyceride concentrations and reduced high-density lipoprotein cholesterol levels. These metabolic changes may contribute to an increased long-term risk of cardiovascular disease. For this reason, metabolic assessment should be incorporated into the comprehensive clinical evaluation of women with polycystic ovary syndrome. Early identification of metabolic abnormalities allows appropriate preventive and therapeutic measures to be implemented and may reduce the risk of long-term complications.

The diagnosis of polycystic ovary syndrome requires a comprehensive assessment that integrates clinical manifestations, hormonal parameters, reproductive history, and instrumental findings. A detailed menstrual history is essential for evaluating the frequency, duration, and regularity of menstrual cycles, while information regarding previous pregnancies, infertility, and reproductive outcomes provides additional clinical information. Physical examination should include assessment of manifestations associated with increased androgen activity, particularly hirsutism and acne, as well as anthropometric measurements that may indicate metabolic risk.

Laboratory investigations are used to evaluate reproductive and androgenic status, including assessment of follicle-stimulating hormone, luteinizing hormone, testosterone, sex hormone-binding globulin, dehydroepiandrosterone sulfate, and anti-Müllerian hormone when clinically appropriate. Ultrasonographic examination of the ovaries provides information about ovarian volume, follicular number, follicular distribution, and ovarian morphology. Transvaginal ultrasonography may provide more detailed visualization of ovarian structures in appropriate patients. However, ovarian morphology should not be interpreted independently from clinical and hormonal findings. Other endocrine disorders that can produce similar manifestations should also be excluded during the diagnostic process. The integration of clinical, laboratory, and instrumental information improves diagnostic accuracy and allows the clinical phenotype of the syndrome to be characterized more precisely. Such a comprehensive diagnostic approach provides an important foundation for selecting an individualized management strategy.

The clinical significance of polycystic ovary syndrome extends beyond reproductive dysfunction because the condition may influence metabolic health, psychological well-being, and long-term quality of life. Management should therefore be individualized according to the patient's clinical manifestations, metabolic status, reproductive plans, and personal health priorities. In women with menstrual irregularities, restoration of regular menstrual cycles and protection of endometrial health may represent important therapeutic objectives, whereas women planning pregnancy may require an approach focused on restoration of ovulatory function and fertility. Management of excessive body weight in overweight patients may contribute to improvement in metabolic and reproductive parameters. Regular physical activity and a balanced dietary pattern are important components of lifestyle management and may improve insulin sensitivity and overall metabolic health. Patients with metabolic abnormalities require appropriate monitoring of glucose and lipid parameters. Clinical manifestations of hyperandrogenism, including hirsutism and acne, may also have a significant psychological

impact and should therefore be addressed as part of comprehensive care. Psychological well-being and quality of life should be considered during clinical follow-up because chronic reproductive and metabolic disorders can affect emotional health. Long-term monitoring is important because metabolic and reproductive risks may change over time. A multidisciplinary approach may be beneficial when reproductive, endocrine, metabolic, and psychological problems occur simultaneously. Early recognition, individualized management, and regular follow-up can reduce the potential long-term consequences of polycystic ovary syndrome and improve reproductive outcomes, metabolic health, and overall quality of life.

RESULTS

The study included 50 women with polycystic ovary syndrome, with a mean age of 27 ± 4 years and a mean body mass index of 26.3 ± 4.5 kg/m². At baseline, menstrual irregularities were observed in 40 patients (80.0%), while regular menstrual cycles were reported in 10 patients (20.0%). Clinical signs of hirsutism were identified in 18 patients (36.0%), whereas 32 patients (64.0%) did not demonstrate clinically significant hirsutism. Acne was observed in 10 patients (20.0%), while 40 patients (80.0%) had no clinically significant acne manifestations.

Hormonal assessment demonstrated elevated androgen activity in the studied patients.

The mean serum testosterone concentration before treatment was 80.66 ± 34.83 mg/L.

The mean luteinizing hormone concentration was 13.95 ± 4.44 mIU/mL, while the mean follicle-stimulating hormone concentration was 5.55 ± 1.56 mIU/mL. The mean luteinizing hormone to follicle-stimulating hormone ratio was 2.60 ± 0.77 , indicating a hormonal imbalance characteristic of the studied population. Following treatment, clinically significant improvements were observed. Menstrual cycles became regular in 41 patients (82.0%), compared with only 10 patients (20.0%) before treatment. The number of patients with hirsutism decreased from 18 (36.0%) to 13 (26.0%), while the prevalence of acne decreased from 10 patients (20.0%) to 1 patient (2.0%). These changes indicate an improvement in the clinical manifestations of hyperandrogenism and menstrual dysfunction.

The hormonal parameters also demonstrated statistically significant changes. Serum luteinizing hormone decreased from 13.95 ± 4.44 mIU/mL to 8.30 ± 2.73 mIU/mL, while follicle-stimulating hormone increased from 5.55 ± 1.56 mIU/mL to 6.62 ± 1.61 mIU/mL. The luteinizing hormone to follicle-stimulating hormone ratio decreased from 2.60 ± 0.77 to 1.27 ± 0.35 . Serum testosterone decreased from 80.66 ± 34.83 mg/L to 47.56 ± 20.37 mg/L. All these hormonal changes were statistically significant, with $p < 0.001$. An improvement in reproductive outcomes was also observed. Twenty-one patients (42.0%) achieved pregnancy within six months following treatment. Among them, 10 patients conceived spontaneously within three months, while 11 patients achieved pregnancy following ovulation induction. These findings demonstrate that improvement in hormonal balance and menstrual regularity was accompanied by improved reproductive outcomes in a substantial proportion of the studied patients.

Discussion

The obtained results demonstrate that polycystic ovary syndrome is associated with a combination of reproductive, hormonal, and clinical abnormalities. In the study involving 50 patients, menstrual irregularities were observed in the majority of participants, confirming that impaired ovulatory function represents one of the major clinical manifestations of the condition.

The increase in the proportion of patients with regular menstrual cycles from 20.0% before treatment to 82.0% after treatment indicates a substantial improvement in menstrual function.

Clinical manifestations associated with hyperandrogenism also demonstrated positive changes following treatment. The prevalence of hirsutism decreased from 36.0% to 26.0%, while the proportion of patients with acne decreased from 20.0% to 2.0%. These findings suggest a reduction in androgen-related clinical manifestations and indicate that improvement in hormonal balance may be accompanied by favorable clinical changes.

The hormonal findings further supported the observed clinical improvement. A reduction in luteinizing hormone concentration, an increase in follicle-stimulating hormone concentration, and a decrease in the luteinizing hormone to follicle-stimulating hormone ratio were observed after treatment. Serum testosterone concentration decreased from 80.66 ± 34.83 mg/L to 47.56 ± 20.37 mg/L. The statistically significant changes in these hormonal parameters, with $p < 0.001$, indicate a favorable hormonal response. Reproductive outcomes were also positive during the follow-up period. Pregnancy was achieved in 21 patients, corresponding to 42.0% of the study population.

Ten patients achieved spontaneous pregnancy within the first three months, while 11 patients became pregnant following ovulation-induction treatment. These findings suggest that improvement in menstrual function and hormonal balance may contribute to improved reproductive outcomes in women with polycystic ovary syndrome. Overall, the results emphasize the importance of a comprehensive assessment of clinical manifestations, hormonal parameters, and reproductive outcomes in patients with polycystic ovary syndrome. Evaluation of these parameters together provides a more complete understanding of disease progression and treatment response.

Conclusion

The findings of the study indicate that polycystic ovary syndrome is characterized by pronounced reproductive and hormonal disturbances that can significantly affect female reproductive health. The observed improvement in menstrual regularity, reduction in clinical manifestations of hyperandrogenism, and favorable changes in hormonal parameters demonstrate the importance of comprehensive clinical assessment and appropriate management of the condition. The reduction in serum testosterone concentration and improvement in the balance between luteinizing hormone and follicle-stimulating hormone were accompanied by positive changes in reproductive function. The achievement of pregnancy in a considerable proportion of the examined patients further indicates that correction of hormonal and ovulatory disturbances may contribute to improved reproductive outcomes. Therefore, the assessment of menstrual function, clinical manifestations of hyperandrogenism, and hormonal status should be considered important components of the clinical management of women with polycystic ovary syndrome.

Individualized treatment and regular follow-up may improve reproductive function and contribute to better long-term outcomes.

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