PECULIARITIES OF COVID-19 SUSCEPTIBILITY IN WOMEN WITH POLYCYSTIC OVARY SYNDROME

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Summary. Polycystic ovary syndrome (PCOS) is the most common endocrinological disease among women of reproductive age, the prevalence of which reaches up to 15% in the world depending on the study population and the diagnostic criteria used. Purpose: analysis of existing medical research on the increased susceptibility to Covid-19, its form and features among women with PCOS, coverage of research on this topic to raise awareness of Ukrainian physicians in building proper prevention, modernizing approaches to diagnosis, treatment and avoidance of Covid-19 complications in women with PCOS and to disseminate material and further in form PCOS patients about possible risks of Covid-19.

Results and discussion. Women with PCOS are characterized by a higher incidence of cardiovascular disease, kidney damage, non-fatty steatohepatitis, achieving a body mass index over 30 kg/m², diabetes and endometrial mucosal cancer. Metabolic syndrome characterized by hypertension, obesity, insulin resistance and dyslipidemia is found in 22.7% of women with PCOS. Given the high prevalence of various risk factors for PCOS, which coincide with the severity of Covid-19, it can be argued that women with PCOS are a critical group of patients with a potentially higher risk of adverse effects of Covid-19.

Conclusions. Despite their young age and gender, women with PCOS are at increased risk for Covid-19. Women with PCOS are characterized by hypertension, obesity, insulin resistance and dyslipidemia. Women with cardiovascular and metabolic diseases in PCOS are a group of patients with a potentially higher risk of complications from Covid-19. Women with PCOS should be informed about the need for vaccination and preventive measures during the Covid-19 pandemic, monitoring the treatment of existing pathologies and prompt medical attention for SARS-CoV-2 infection.

Key words: polycystic ovary syndrome, Covid-19, androgens, metabolic diseases.
**Introduction.** Polycystic ovary syndrome (PCOS) is the most common endocrinological disease among women of reproductive age, with a prevalence of up to 15% worldwide, depending on the study population and the diagnostic criteria used [1]. PCOS is a complex and multifactorial disease with an unclear etiology and pathophysiology [2]. The course of the disease is associated with hyperandrogenism, obesity, insulin resistance, type 2 diabetes, hypertension, dyslipidemia [3] and 70-80% of infertility [4]. Coronavirus disease is an anthropogenic disease from the group of respiratory viral infections caused by the SARS-CoV-2 virus. Since March 2020, the global outbreak of Covid-19 has led to a pandemic that continues to this day. The pathogenesis of the disease is multifactorial and not yet fully understood. SARS-CoV-2 affects various human organs and systems and can lead to serious diseases such as pneumonia, acute respiratory distress syndrome, thromboembolism, sepsis, septic shock and death [5].

SARS-CoV-2 affects different age groups. Complications with Covid-19 have been shown to be significantly more common in the elderly and senile than in young and middle-aged people, and in men compared to women. The severity of Covid-19 correlates with the presence and severity of concomitant chronic disease in patients such as diabetes, obesity and hypertension [6]. A number of these cardiovascular and metabolic diseases are present in most women with PCOS.

Increased susceptibility to infection and the severity of Covid-19 disease in males are associated with the action of androgens on target tissues such as the lungs, as well as estrogen-androgen modulation of the system, as estrogen-boosting immunity and immunosuppression testosterone [7].

Accordingly, if androgens play an important role in the pathogenesis and susceptibility to Covid-19, and cardiovascular and metabolic diseases are risk factors, what impact can this have on women with PCOS?

**Purpose:** analysis of existing research on the increased susceptibility to Covid-19, its forms and features among women with PCOS, coverage of research on this topic to raise awareness of Ukrainian doctors in building proper prevention, modernizing approaches to diagnosis, treatment and avoidance of complications Covid-19 in women with PCOS and to disseminate material and further inform PCOS patients about the potential risks of Covid-19.

**Materials and methods.** 11 articles from 2020 to 2021 with the key words PCOS and Covid-19 were analyzed. 1807 were found in PubMed, Google Scholar, ochrane, Elsevier to review the available literature in the initial search for the key words PCOS and Covid-19.

**Results and discussion.** A review and analysis of a closed cohort study of 21,292 women with PCOS and 78,310 women without PCOS in January and July 2020 in the UK shows that the risk of Covid-19 among women with PCOS is 28% higher than healthy women [8]. This predisposition is associated with several factors, among which the main one is the state of clinical or biochemical hyperandrogenism, which is present in more than 80% of women with PCOS [9]. By affecting immune cells, androgens can cause various changes in the body and reduce its resistance to infections. The article “The role of androgens in Covid-19” notes that the mechanism of action of androgens on immune cells is characterized by an increase in the number and function of neutrophils in the blood, increased production of
interleukins (IL-1b, IL-10, IL-2), transformation of growth factor-b (TGF-b) and decreased antibody production in infectious conditions. In addition to the effects of steroid hormones on the same target tissues that affect Covid-19, this knowledge also plays an important role in considering cytokine storm syndrome, which is associated with hyperproduction and neutrophil hyperfunction and often occurs in patients with severe coronavirus disease [9].

Women with PCOS are characterized by a higher incidence of cardiovascular disease, kidney damage, non-fatty steatohepatitis, achieving body mass index over 30 kg/m², diabetes and endometrial mucosal cancer (Fig.1). Metabolic syndrome characterized by hypertension, obesity, insulin resistance is found in 22.7% of women with PCOS [10,11].

Given the high prevalence of various risk factors for PCOS, which coincide with the severity of Covid-19, it can be argued that women with PCOS are critical group of patients with a potentially higher risk of adverse effects of Covid-19.


Conclusions.
1. Despite their young age and gender, women PCOS are at increased risk for Covid-19.
2. Women with cardiovascular and metabolic diseases in PCOS are a group of patients with a potentially higher risk of complications from Covid-19
3. Women with PCOS should be informed first of all about the need for vaccination and preventive measures during the Covid-19 pandemic, control of treatment of existing pathologies and prompt medical treatment for SARS-CoV-2 infection.
4. Information should be widely available to inform physicians, students, and PCOS patients about the increased susceptibility and risk of severe Covid-19 in this patient population.

References: