



## COMPLICATIONS OF GLUCOCORTICOID THERAPY IN PATIENTS DIABETES SURVIVED COVID-19

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<https://www.doi.org/10.5281/zenodo.7820420>

### ARTICLE INFO

Received: 03<sup>rd</sup> April 2023

Accepted: 11<sup>th</sup> April 2023

Online: 12<sup>th</sup> April 2023

### KEY WORDS

COVID-19, ACTH, glycemic  
profile, diabetes mellitus,  
glucocorticoids.

### ABSTRACT

*Our work was to study the complications of glucocorticoid treatment in patients with type 2 diabetes with COVID-19. To do this, we took control of two groups of patients who underwent covid-19, with type 2 diabetes and without any chronic diseases. We witnessed changes in the hormonal background of patients, monitored the course of diabetes, and also came to the conclusion that when treating any patient with glucocorticoids for a long time, recommendations from endocrinologists are needed. We have covered everything in more detail in this article.*

**Acuteness.** In 2020, the world is facing an unprecedented public health challenge due to the invasion of the novel coronavirus SARS COV-2. It is also a challenge for the health systems of all countries of the world. The most vulnerable in these conditions were patients with diabetes mellitus (DM) due to the peculiarities of their immune status and immune response to a viral attack, due to excessively high activity of the virus in conditions of hyperglycemia, due to comorbidity and obesity, which often accompany the course of DM.[1,3,4]The severe course of the COVID-19 disease requires a mandatory review of the usual hypoglycemic therapy. It is extremely important to maintain optimal glycemic control and prevent the development of ketoacidosis, and therefore, in most cases, insulin becomes the priority drug for glycemic control. The search for new drugs to fight coronavirus infection continues, new randomized clinical trials of drugs start.[2,5,6]Innovative anti-diabetic drugs are also being tested as candidates for potentially effective agents to combat coronavirus. The WHO Country Office in the People's Republic of China takes note of the media statement on cases of "viral pneumonia" in Wuhan, People's Republic of China posted on the website of the Wuhan Municipal Health Commission.[7,8]According to WHO, the number of victims from a new disease in 2022 amounted to more than 15 million people. Almost 3.5 years have passed since the first detection and it would seem that we have defeated another outbreak of the pandemic, but complications and side effects from treatment do not let us forget about ourselves. In this regard, we decided to delve into one of the complications after glucocorticoid therapy in patients with type 2 diabetes, and also compared the results of the study with those who did not have diabetes.[7,9,10] The most vulnerable categories of people



susceptible to this disease are patients with severe chronic diseases, such as heart and vascular diseases (coronary heart disease (CHD), heart failure, arterial hypertension, cerebrovascular disease), chronic obstructive disease lungs (COPD), chronic kidney disease and, of course, diabetes mellitus (DM). An analysis conducted by different groups of scientists from China, Italy, and the United States showed a unequal incidence of confirmed SARS COV-2 infection in diabetic patients. Thus, according to the Centers for Disease Prevention and Control, the incidence of DM among patients with COVID-19 was 5.3% of 20,892 patients in China [1,2,3], 10.9% of 7162 patients in the United States, and 35.5 % out of 355 patients in Italy [4,5]. If we compare the data on the prevalence of COVID-19 in China and the United States (5.3% and 10. 9% respectively) with the overall prevalence of diabetes in these countries (10.9% and 13.3% respectively) [11,13] , it becomes clear that the number of infected patients with diabetes does not exceed the overall prevalence of diabetes in these countries. This means that the risks of developing this disease in patients with diabetes do not exceed those in the general population. However, if a person with diabetes is already infected with the new coronavirus SARS COV-2, then the disease is much more severe than in patients without diabetes, and the death rate in patients with diabetes is significantly higher. This fact was confirmed in a number of studies by Chinese colleagues, whose experience is summarized in the review [12,14,15].The tendency of patients with diabetes to have a more severe course of the disease with a higher incidence of deaths can be explained by the peculiarities of the interaction of the virus and its receptor under conditions of hyperglycemia, the characteristics of the immune response and the health status of patients with diabetes in general [1,2,3].

**Target:** To study the complications of glucocorticoid therapy in patients with type 2 diabetes with COVID-19.

**Materials and research methods.** We examined 40 patients with complaints of psycho-emotional disorders, weakness, lethargy, adynamia, anxiety, fear, vegetative vascular disorders, complicated cardiopathy, sinus tachycardia, bradycardia, exertional angina. We divided the patients into 2 groups: the first group included 20 patients with type 2 diabetes mellitus who recovered from COVID-19 and received dexamethasone at a dose of 16 mg per day for 10 days; the second group also consists of 20 patients with type 2 diabetes mellitus who did not undergo COVID-19. We measured fasting glucose and postprandial glucose, blood cortisol, and blood ACTH.

**Research results.** The glycemic profile in patients of the first group was high: fasting blood glucose -  $8.62 \pm 0.46$  mmol/l. Postprandial -  $13 \pm 0.56$  mmol/l. In the second group of patients, the glucose level was much lower than in the patients of the first group. The fasting blood glucose level in the second group of patients was  $6.23 \pm 0.26$  mmol/l, postprandial -  $9.68 \pm 0.42$  mmol/l. Below are the results of the comparison of hormonal levels: The level of cortisol on an empty stomach is reduced, the level of ACTH, on the contrary, is increased. The level of cortisol in the first group of patients was  $100.2 \pm 20$  nmol/l.

The level of -ACTH is  $70.6 \pm 5$  pg/ml. Compared with the first group, in the second group of patients, the levels of cortisol and ACTH were within the normal range.

**Conclusions.** Thus, the use of glucocorticoids in the treatment of COVID-19 against the background of type 2 diabetes mellitus leads to a worsening of the course of diabetes, thereby increasing blood glucose levels. The use of glucocorticoids leads to impaired adrenal function,



which is manifested by a decrease in cortisol levels and an increase in ACTH. Thus, the treatment of patients with COVID-19 with glucocorticoids should be carried out in accordance with the recommendations of endocrinologists, and, if possible, monitor fasting and postprandial glucose levels, and hormonal levels, in particular ACTH and Cortisol.

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