Study of Changes in Carbohydrate Metabolism in Patients with Sars-Cov-2

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Abstract. Covid-19 infection, one of the most urgent problems of the 21st century, was first detected in December 2019 in Wuhan, China, and was declared a pandemic by the World Health Organization on March 11, 2020. According to the WHO, the elderly patients with concomitant diseases dominate the structure of infection with the new coronavirus. Cardiovascular system diseases, diabetes mellitus (DM), obesity, and chronic diseases are the most common among concomitant diseases. It is known that the main target organs of the SARS-CoV2 are the mucous membranes of the respiratory tract and the gastrointestinal tract. However, the virus uses ACE2 receptors to enter the cell, and this receptor is present not only in the lungs, but also in many other tissues and organs, including the exocrine part of the pancreas and the islets of Langerhans.

Keywords: COVID-19, SARS-CoV2, diabetes, carbohydrate metabolism disorder, glycated hemoglobin (HbA1c), hyperglycemia, postprandial hyperglycemia.

Introduction

The "Covid-19" infection, which is one of the most urgent problems of the 21st century, was first detected in December 2019 in Wuhan, China, and was declared a pandemic by the World Health Organization on March 11, 2020. At the beginning of October 2020, the number of infected people worldwide exceeded 37 million. According to the WHO, the elderly patients with concomitant diseases dominate the structure of infection with the new coronavirus. Cardiovascular system diseases, diabetes mellitus (DM), obesity, and chronic diseases are the most common among concomitant diseases [2].

It is known that the main target organs of the SARS-CoV2 virus are the mucous membranes of the respiratory tract and the gastrointestinal tract. However, the virus uses ACE2 receptors to enter the cell, and this receptor is present not only in the lungs, but also in many other tissues and organs, including the exocrine part of the pancreas and the islets of Langerhans. According to Yan Y. et al.'s research data, binding of the virus to ACE2-receptors in the beta-cells of the pancreas can lead to the malfunction of the gland and the development of hyperglycemia [4].

In addition, one of the causes of carbohydrate metabolism disorders in COVID-19 is stress hyperglycemia based on the release of counterinsular hormones, as observed in acute infectious diseases and acute pathological conditions. According to MacIntyre E. and his co-authors, among 2124 patients hospitalized with pneumonia in Canada in 2012, the prevalence of

stress hyperglycemia was 67%, and after 5 years, diabetes was found in 14% of them [5]. According to the research of Ilias I. and his co-authors, hyperglycemia was detected in 55.5% of SARS-CoV2 patients with no history of diabetes who were hospitalized in the intensive care unit in Athens, Greece [6].

Purpose of the study is to study the prevalence of carbohydrate metabolism disorders in patients with coronavirus infection and no history of diabetes.

Materials and methods

Between 2020 and 2022, 62 patients aged 18-72 who were treated in the 2nd therapy and endocrinology department of the 3rd clinic of the Tashkent Medical Academy and who were outpatients, and who were treated in the RIEIATM diabetology department were examined. During the examination, the patient's medical history was collected, glycated hemoglobin level (HbA1c), blood plasma glucose on an empty stomach and postprandial glucose were checked in all patients. Anamnesis information was collected from patients taking into account the main risk factors. The parameters of the laboratory examination were studied: glycated hemoglobin, fasting and fasting blood glucose levels, UQT. Glycated hemoglobin HbA1c $\geq$ 7.0%, which provides more accurate information than fasting blood glucose, was considered a disorder of carbohydrate metabolism. A total of 62 patients were taken for statistical analysis, of which men (E) - 35, women (A) - 27; prevalence of carbohydrate metabolism disorders was studied in them.

Results

Patients aged 18-72 years with a positive PCR response who were infected with COVID-19 were examined. Median age was 55 years (42-68). Men - 56.4% (35 patients), women - 43.5% (27 patients). HbA1c from 62 patients <7% - in 14 patients (22.5%); 7% and higher in 48 patients (77.4%) and the prevalence of carbohydrate metabolism disorder in 77.4% (48 patients). In 38.7% (24 patients) of the examined patients (62 patients), it was found that blood glucose level was impaired in the form of glucose tolerance disorder, and in 40.3% (25 patients) in the form of diabetes mellitus.

The prevalence of carbohydrate metabolism disorders in the examined patients was 77.4% (48 patients) among 62 patients and these patients were followed up. 42 (87.5%) of these patients were treated with a combination of biguanides (metformin) and sulfonylureas (glimepiride) or DPP-4 inhibitors and biguanides (metformin); Insulin therapy was used in 6 patients. After 3 months of follow-up, in 14 out of 48 patients (29.1%), the blood sugar level decreased to a normal level and the drugs were canceled; In the re-examination after 6 months, it was found that the blood sugar level was normal even though these patients did not take any drugs.

Conclusions

It was found that carbohydrate metabolism disorders are common in patients with a new coronavirus infection and no history of diabetes. An increase in HbA1c, fasting plasma glucose and postprandial glucose in examined patients are signs of transient hyperglycemia. Due to the prevalence of carbohydrate metabolism disorders in patients, SARS-CoV2 can be thought to have diabetogenic properties.

1. Carbohydrate metabolism disorder among patients with SARS-Cov-2 infection and no history of diabetes in 77.4%

2. In 38.7%, the amount of glucose in the blood was disturbed in the form of impaired glucose tolerance. In 40.3%, blood glucose levels were disturbed in the form of diabetes.

3. After 3 months of observation of 48 patients, 29.1% (14 patients) showed normal blood sugar

levels on the background of treatment, and after 6 months, blood sugar levels were normal even without treatment, and this was transient hyperglycemia. showed. In 70.8%, the amount of sugar in the blood did not change after 3 months and 6 months, and they were diagnosed with diabetes.

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