COVID-19 ON THE BACKGROUND OF DIABETES DISORDERS OF COAGULATION

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Annotation: Epidemiological studies conducted during the COVID-19 pandemic proved a strong negative effect of joint pathology on the severity and outcome of SARS-CoV-2 viral infection [1].

Cardiovascular diseases, especially arterial hypertension (AH) and diabetes mellitus (QD), are among the most common and are associated with the highest number of complications among patients with COVID-19[2]. So according to the observations of Chinese scientists, most deaths were recorded among patients with joint pathology, including hypertension (53,8%), diabetes (42,3%), heart disease (19,2%) and blood vessels (15,4%) [3]. In Italy, the most severe patients requiring treatment in the intensive care unit often suffered from hypertension (49%), other cardiovascular diseases (21%) and diabetes (17%)[4]: Diabetes mellitus accounted for 35,5% of deaths from SARSCoV-2[5]. In the United States, diabetes was found in 10,9% of patients with COVID-19 and in 32% of those requiring intensive care [6].

Key words: COVID-19; SARS-CoV-2; diabetes; glycemia; hypercoagulation;

Relevance: The obtained data allow us to confidently talk about the contribution of severe forms of diabetes and the development of the death of COVID-19. If we take into account that diabetes is often associated with other risk factors for the side effects of this disease, it becomes clear that patients with hypertension and other cardiovascular diseases, obesity and old age require special approaches in determining the prognosis and choosing treatment. [7].

the correct selection of pathogenetic therapy is impossible. Also it is important to determine the negative consequences in patients with a combination of COVID-19 and diabetes in order to choose the right treatment tactics for such patients.

There are different opinions about the mechanisms of the severe course of SARS CoV-2 infection against the background of diabetes . Systemic inflammatory changes and immune disorders characteristic of diabetes may play an important role, including suppression of neutrophil chemotaxis and T-lymphocyte immune response, disruption of cytokine production with acceleration of the inflammatory cascade, and destruction

of microorganisms. reduction of infection [8], including SARSCoV-2 [9]. The presence of obesity in many patients with diabetes contributes to the maintenance of systemic inflammation: on the one hand, excess adipose tissue, in addition, increased production of pro-inflammatory cytokines, adipokines and chemokines. encourages it due to its increase. On the other hand, in relation to vitamin D deficiency, vitamin D is an immunomodulator and affects the production of anti-inflammatory factors (both mechanisms can increase the development of COVID-19) [10].

COVID-19 and diabetes can be of great scientific and practical importance in early detection of complications and timely pathogenetic therapy in a large number of patients. It is impossible to achieve this goal without determining the characteristics of the SARS-CoV-2 disease in the background of diabetes, including their local specificity and manifestations characteristic of all regions.

The goal: To study the covid-19 with diabetes, to evaluate the impact of carbohydrate metabolism and coagulation disorders on the severity of joint pathology.

Materials and methods: As a research object at the multidisciplinary clinic of the Tashkent Medical Academy in January-August 2021 diabetes 90 treated with type 2 and diagnosed with Covid 19 examination of the patient's medical history .

Nasopharyngeal and oropharyngeal swabs were positive for COVID-19 and viral pneumonitis was diagnosed using computed tomography (CT) .

All those who pass control divided into three groups:

-first (45 patients with diabetes accompanying COVID-19).

- the second (45 patients with COVID-19 without diabetes).

- 20 healthy individuals of the same age and gender (10 women and 10 men) were taken for the treatment group .

Criteria for inclusion of patients in groups:

1. Positive for COVID-19 using nasopharyngeal and oropharyngeal swabs and viral pneumonitis was diagnosed using computed tomography (CT) .

of glucose hemoglobin (HbA1c) above the upper limit of the accepted norm .

includes a comparative assessment of the initial clinical and metabolic parameters of patients in both groups and their observation during hospitalization.

Gender distribution between groups 1-2 (21 women and 24 men in group 1,19 women and 26 men in group 2) .

Control methods: During the treatment in the main and control groups, glucose levels are determined in blood and urine samples, and the following are determined in blood samples: prothrombin time, prothrombin index, APPT, MNO , fibrinogen, thrombin time .

Results:

The following were found when the blood glucose level was checked.

The level of glycemia in the first group increased, as expected, hyperglycemia accompanying diabetes, especially at the beginning of the stage of inpatient treatment, continued despite increased glucose-lowering therapy.

confirmed in the first four days of inpatient treatment in patients with diabetes and coronavirus in group 1 (average glucose level - 12.5 ± 1.3 mmol/l), on the 7th day of the observation period (average glucose level - 9.3 ± 2.1 mmol/l) and on the 12th day of the observation period (average glucose level - 7.8 ± 1.7 mmol/l) confirmed that hyperglycemia remained.

In the second study, it was confirmed in the first four days of inpatient treatment in a patient infected with coronavirus (average glucose level - 9.5 ± 1.5 mmol/l), on the 7th day of the observation period (average glucose level - 8, 3 ± 1.5 mmol/l) and on the 12th day of the observation period (average glucose level - 5.3 ± 1.5 mmol/l) confirmed that hyperglycemia remained.

When checking the level of glucose in the general urinalysis, the following were found.

Table 1

No	Group 1	Group 2	control group
Day 4	**2.80%**	**1.80%**	**0%**
Day 7	**1.90%**	**0.80%**	**0%**
Day 12	**0%**	**0%**	**0%**

and exacerbation of glycemia in SARS-CoV-2 is facilitated by the specific effect of infection on carbohydrate metabolism:

1) using the virus as a functional receptor for ACE 2, which is also expressed in the liver and pancreas, making them a potential target and thereby increasing hyperglycemia [11];

2) activation of the transcription factor of anti-inflammatory cytokine genes during the cytokine storm-interferon-regulating factor-5 and its binding to uridine diphosphate-N-acetylglucosamine formed during glucose metabolism, which is developed through a feedback mechanism stimulates its release [12].:

3) deoxyhemoglobin - increased production of glucose due to the damage of the virus of glycated hemoglobin [13].

In turn, hyperglycemia serves as a pathogenetic factor that worsens the prognosis in respiratory tract infections, including infections [14]. According to previous experience [15], this can be combined with an increase in the amount of glucose in the secretion of alveoli, an increase in viral replication, a weakening of immunity to the virus, and a severe violation of lung structure and function. As with other viral infections, hyperglycemia in COVID-19 is a risk factor for death[16].

Another central pathogenetic factor in the development of complications of COVID-19 is coagulopathy with a high risk of hypercoagulability and venous, arterial and microvascular thrombosis [17]. Apparently, the probability of thrombus formation in SARSCoV-2 infection exceeds the same risk in other acute infectious diseases, which is due to the unique pathophysiological effect of the virus on blood coagulation processes, which is inflammation and associated with the mediation of high activity of pro-inflammatory cytokines.

According to our data, hypercoagulability and high thrombogenic activity are characteristic of the entire group infected with SARS-CoV-2 (see Table 2). In both observation groups, the average level of Pv, Tv, and fibrinogen was significantly higher than normal, at least at the beginning of hospitalization, and over time, a shift towards normal was achieved, taking into account the use of anticoagulant therapy.

Table 2

	PTI %	**MNO**	**APPT**
Group 1	**141 ± 6**	**0.62 ± 0.04**	**19.6 ± 2.9**
Group 2	**132 ± 7**	**0.69 ± 0.04**	**22.4 ± 3.2**
Control group	**114 ± 6**	**0.98 ± 0.03**	**28.3 ± 4.5**

In the comparative evaluation of blood coagulation indices, significant differences between the main and control groups attracted attention, which showed the severity and stability of coagulopathies in patients with diabetes.

The obtained data confirm the role of coagulopathies in the pathogenesis and clinical manifestations of SARS-CoV-2 infection, their specific severity and duration with concomitant diabetes, as well as their significant contribution to the development of adverse outcomes.

Summary

The research made it possible to draw the following conclusions.

1. In patients with SARS-CoV-2 infection and diabetes, high hyperglycemia is associated with decreased O2 saturation, increased respiratory failure, and severe pneumonia. An increase in HbA1c level is less related to the severity of the pneumonia process, previous unsatisfactory control of diabetes may have a negative effect mediated by the worst glycemic indicators and the exacerbation of metabolic diseases.

2. Patients with COVID-19 are characterized by the development of hypercoagulation, which is accompanied by a clear and constant increase in the content of D-dimer and fibrinogen in the blood. In combination with diabetes, the severity of coagulopathies and the periods of normalization of the main parameters of the coagulogram increased significantly. Fibrinogen levels are important indicators of

adverse outcomes in the SARS-CoV-2 patient population in general and diabetes in particular.

From the obtained results, it can be concluded that diabetes is an intensifier of SARS-CoV-2 viral infection and indicators of thrombotic origin shift to the side of hypercoagulation . Conducting clinical diagnostic analyzes on time helps to achieve positive results even at the severe level of the disease .

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