

Duration of Persistence of a Specific Humoral Immune Response in Patients Undergoing COVID-19 in the Republic of Uzbekistan

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Annotation: A total of 161 patients who had been ill with Covid-19 were examined, who were at the Research Institute of Virology in inpatient treatment from March to May 2020. The diagnosis was confirmed by PCR. The duration of the retention of the specific humoral immune response of IgG antibodies against the SARS-CoV-2 virus was studied by the IHLA method. The authors found that after recovering from Covid-19, the IgG humoral immunity lasted up to 8-9-10 months. The duration of the preservation of specific immunity, IgG antibodies against the SARS-CoV-2 virus did not depend on the severity of the disease. And it may be due to the climatogeographic features of the region, the polymorphism of genes responsible for the immunopathogenetic mechanisms of the immune response of the population of the Republic of Uzbekistan, and the hyperendemicity of the region for the widespread prevalence of bacterial-viral, fungal and parasitic diseases responsible for the formation of cellular and humoral mechanisms of the immune response. Research in this area should be continued.

Keywords: COVID-19, specific humoral immunity, immunoglobulin G, clinical course of the disease COVID-19

Relevance: COVID-19 is a new virus related to coronaviruses that can cause a disease that covers almost all organs and systems of the body, with the development of multiple organ failure. It is characterized by a varied course from mild to severe to extremely severe.

In the early stages of the COVID-19 outbreak, information on the clinical course was limited, with manifestations of the disease ranging from asymptomatic or mild symptoms to severe illness and extreme severe fatalities. But as the epidemic developed, reports began to come in about other clinical manifestations, such as diarrhea, headache, etc. [1,4]. Clinical symptoms, the course of the disease, the outcomes of the disease vary greatly, they are different for different patients. As you know, the immune system is the best defense against all diseases, including COVID-19. It is known that the levels of specific antibodies to the IgM and IgG virus are important indicators for predicting population immunity against this disease and the presence of cross-reactivity with other coronaviruses [2,5] Thus, according to the results of studies conducted in different countries, patients with COVID-19 have answers IgG and IgM for SARS-CoV-2 proteins, and it is assumed that infected patients can maintain IgG levels for at least 2 weeks to 3 months. These antibodies can appear from 2 weeks after the onset of the disease [3].

Despite the ongoing research, many questions of this disease still remain open, namely, the features of the clinical course, changes in laboratory parameters, and especially the state of specific immunity, which depends on antibodies to the IgM virus and IgG to SARS-CoV-2, have not found their solution and remain relevant for many countries, including the Republic of Uzbekistan.

The purpose of the study was the study of the duration of the preservation of a specific humoral immune response - antibodies IgG to SARS-CoV-2 in patients who underwent various forms of the severity of this disease in the Republic of Uzbekistan.

Material and research methods. We examined 161 patients who were hospitalized at the Scientific Research Institute of Virology (SRI Virology). PCR studies for SARS-CoV-2 were carried out in the virological laboratory of the Research Institute of Virology.

In order to study the specific humoral immunity and the duration of its preservation, material was selected from patients who had recovered in March - 17 patients, in April - 72 patients and in May 72 people.

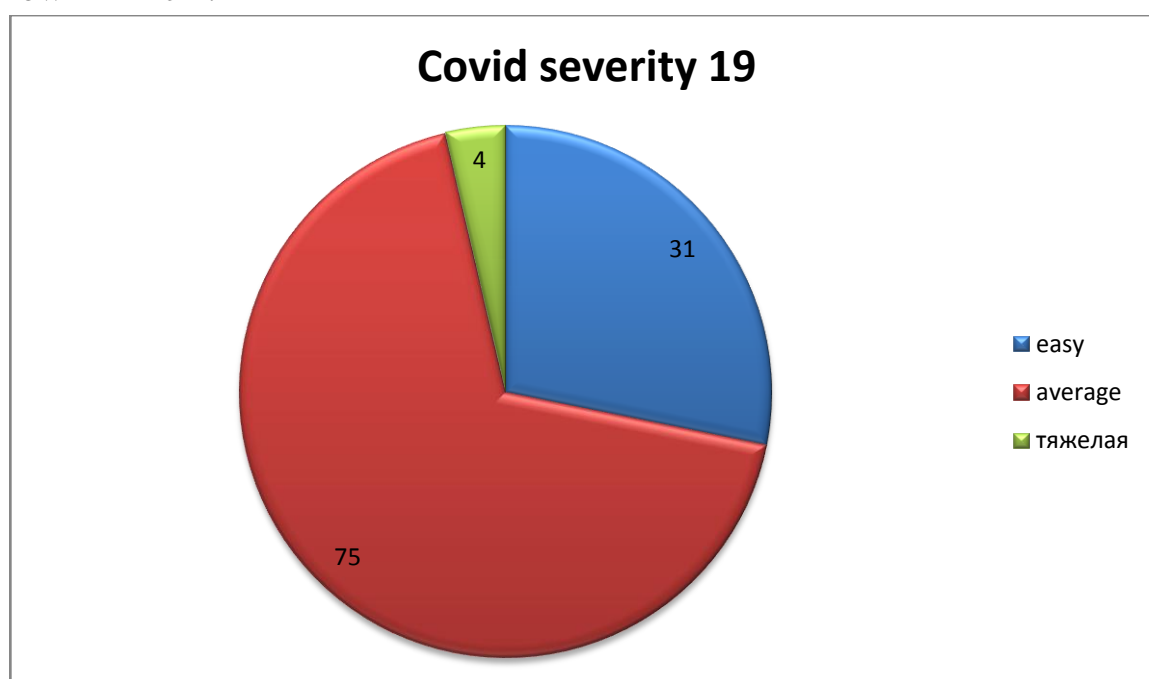
The diagnosis of Covid-19 was confirmed on the basis of PCR diagnostics

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using test systems, систем Multi-type Sample DNA/RNA Extraction-Purification Kit (Magnetic beads method) и Novel Coronavirus (2019-nCoV) Nucleic Acid Diagnostic Kit (PCR-Fluorescence Probing) made in China.

In order to study the specific humoral immune response (antibodies IgG to SARS-CoV-2), the IHLA method (immunochemiluminescent analysis) was used using test systems MAGLUMI 2019-nCoV IgG (CLIA), made in China.

The results of the study and their discussion. Initially, the patients were distributed according to the severity of the clinical course of the disease, the results are shown in Pic 1.



Pic 1. Distribution by disease severity

As you can see, 31% were patients with a mild course of the disease, with a moderate course of Covid-19 - 75%, and with a severe course - 4%. Consequently, there were much more patients with moderate clinical course than with mild and severe disease.

Below is table 1, which shows the distribution of patients depending on the severity of the disease by month.

Table 1.

Distribution of patients depending on the severity of the disease by months (%)

The severity of the disease	March	April	May	Total
Mild degree	(41%)7	(12,5%) 9	(21%)15	(19, 2%)31

Average degree	(59%)10	(82%) 59	(79%)57	(75,1%)126
Severe degree	-	(5,5%)4	-	(2,4%)4
Total	17	72	72	161

As can be seen from Table 1, in March, patients with a moderate severity (59%) prevailed, which was observed in 10 people. A mild degree was observed in 7 patients, which amounted to 41%. The severe course of the disease was not identified.

In April and May, patients with moderate to severe disease prevailed, which amounted to 82% in April, and 79% in May. Perhaps this is due to the early detection of Covid-19 and the correct introduction of quarantine measures in the Republic of Uzbekistan.

Consequently, the spring period of the Covid-19 course in the Republic of Uzbekistan was characterized by a predominance of a mild course in the month of March, a moderately severe course in March, April and May. The severe degree of the course was ascertained only in the month of April, and then in 5.5% of cases.

Further, we studied the duration of the preservation of humoral immunity in the form of antibodies IgG to SARS-CoV-2, depending on the severity of the disease after 8-9-10 months. The results are shown in Table 2.

Table 2.

Duration of IgG retention depending on the severity of Covid-19

The severity of the disease	March(n= 17)		April (n=72)		May(n=72)	
	Negativ	Positive	Negative	Positive	Negative	Positive
Mild degree	4 (23.5%)	3 (17.7%)	2 (2.8%)	7 (9.7%)	4 (5.5%)	11 (15.3%)
Average degree	2 (11.8%)	8 (47.0%)	25(34.8%)	34 (47.2%)	8(11.2%)	49(68.0%)
Severe degree	-	-	-	4 (5.5%)	-	-
Total	6 (35.3%)	11 (64.7)	22(37.6%)	45 (62.4%)	9(16.7%)	60(83.3%)

Table 2 shows that the duration of the retention of specific immunity IgG after

10 months, in persons who had a mild degree in March, was observed in 3 and moderate in 8 patients.

Persons who had been ill in April showed that a positive IgG result was observed in persons with a mild severity - in 7, with a moderate severity - in 34, and with a severe degree - in 4 patients.

Persons who had recovered in the month of May had a mild positive IgG result in 11 patients, with moderate severity in 49 patients and with a severe degree - were not observed.

We can also note that when studying the duration of IgG retention, negative IgG results were revealed, which was noted in 4 patients with mild severity in March patients, and in 2 patients with moderate severity. in those who had been ill in April with a mild degree of illness - in 2 patients, and with a moderate degree of severity - in 25 persons. In those who had recovered in May of mild months - in 4 patients, and with a moderate degree - in 8 patients.

We can also note, out of 161 patients, that cases with a mild course of the disease accounted for 13.6%. These indicators indicate that the duration of IgG retention after 8-9-10 months does not depend on the severity of the disease, which amounted to 72.0%.

To determine the specific humoral immunity of IgG, we examined the peripheral blood serum of 161 patients by the IHLA method. The reference values were as follows - (<1 positive, $1 >$ negative). Of these, 116 patients showed a decrease in IgG levels from 5.8 to 1.18. Also, the IgG level in 37 patients was negative and ranged from 0.546 to 0, 005. These indicators indicate that IgG persists for a long time in those who have recovered, regardless of the severity, which amounted to 116 (72.0%) patients.

It is known from Pai Peng, Jie Hu, Hai-jun Deng, et al. (2020) [4], who reported a change in antibodies against SARS-CoV-2 in convalescent patients within 8 months. All 20 participants' antibodies targeting the SARS-CoV-2 spike receptor (RBD) binding domain decreased from an average OD450 of 1.78 to 0.38 over 8 months. Authors Dr. AnanyaMandal (2020) [5] describes that after suffering from COVID-19, the level of antibodies decreased within three months after recovering from infection. This was frequently reported in the early months, and many experts speculated that it increased the risk of re-infection among recovering patients. This study was conducted to further investigate antibody levels over time and the continued immune response to infection for several months after the infection has recovered.

According to. Muhammad Salim Khan, Mariya Amin Qurieshi, InaamulHaq, (2020) [6] indicates that the samples were tested for the presence of IgG antibodies

specific to SARS-CoV-2 using a serological test based on chemiluminescent microparticles. The authors noted in the Srinagar region the prevalence of IgG antibodies specific to SARS-CoV-2 is low in the district.

Thus, our research results showed that among 110 patients who had been ill in April, there was a preservation of antibodies in 62 patients with mild and moderate degrees of the disease. The duration of IgG retention after 8-9-10 months. there was no dependence on the severity of the disease, which accounted for 70.9% of cases. Based on these indicators, we can say that in the Republic of Uzbekistan, in contrast to foreign literature data, the duration of IgG preservation is 8-9-10 months. To date, we still cannot conclusively judge what this phenomenon can be connected with. So far, we can talk about the features of the dry climatogeographic region, and / or the polymorphism of genes responsible for the immunopathogenetic mechanisms of the immune response of the population of the Republic of Uzbekistan, and most likely about our hyperendemic region in terms of the widespread prevalence of bacterial-viral, fungal and parasitic diseases responsible for the formation of cellular and humoral mechanisms of the immune response. In this regard, the research should be continued and analyzed in depth.

Findings:

1. The duration of the retention of specific humoral immunity IgG in recovered patients with Covid-19 was observed for 8-9-10 months. Of the 161 examined patients, antibodies were detected in 72% of cases.

2. The duration of the preservation of specific humoral immunity - IgG antibodies of those who have had Covid-19, does not depend on the severity of the disease.

3. The level of long-term preservation of IgG most likely depended on the climatogeographic region, the polymorphism of genes responsible for the immunopathogenetic mechanisms of the immune response of the population of the Republic of Uzbekistan, and the hyperendemicity of the region for the widespread prevalence of bacterial-viral, fungal and parasitic diseases responsible for the formation of cellular and humoral mechanisms of the immune response.

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