



## Optimized Diagnosis and Monitoring Conditions of Patients with Covid-19

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**Abstract:** Coronavirus infection 2019 is one of the most global problems of modern medicine today. This disease affects all segments of the population in all countries of the world. This article discusses modern aspects of the diagnosis of this disease, as well as ways to optimize the rapid and reliable diagnosis of the disease.

**Key words:** Corona virus infection, COVID-19, diagnostic criteria, PCR test, express test, combined diagnostics.

### Introduction

Corona virus disease 2019 (COVID-19) is an acute respiratory infection caused by a novel corona virus. On December 31, 2019, the World Health Organization (WHO) received information about cases of pneumonia of unknown microbial etiology that occurred in the city of Wuhan, Hubei Province, China. The WHO later announced that a new type of corona virus had been found in samples taken from these patients. Since then, the outbreak has become rampant and rapidly spread around the world, with WHO first declaring a Public Health Emergency of International Concern on January 30, 2020, and then officially declaring it a pandemic on March 11, 2020 [1]. Clinical research is ongoing to learn more about the virus, its origin, how it affects the human body, and its treatment. This topic is based on the best evidence currently available, but because the situation is constantly changing, the evidence is limited in some regions, and some recommendations may be based on observational studies and retrospective analyses, as well as randomized controlled trials and clinical guidelines [2].

A potentially severe acute respiratory infection caused by the novel SARS-CoV-2 virus. The clinical picture of the disease is usually a respiratory infection, the severity of symptoms of which varies from a mild flu-like illness to severe viral pneumonia leading to acute respiratory distress syndrome, which can be fatal. Characteristic symptoms include fever, cough, shortness of breath, and loss of taste/smell, with some patients experiencing mild upper respiratory symptoms or no symptoms at all. Complications of severe illness include multiple organ failure, septic shock, and venous thromboembolism, among others. Symptoms can be persistent and persist for more than 12 weeks in some patients [3,4].

Today, different methods of diagnosing coronavirus are used. infections . Some tests can be taken only in the laboratory, others - on their own (you don't even have to call a doctor at home ,it is enough to buy special kits in a pharmacy) [5]: 1) PCR test . Laboratory study showing whether COVID -19 DNA is present in human biomaterial . 2) RT-LAMP. An analogue of the PCR test , where the focus is not on DNA, but on RNA. 3 ) Antigen test . An express diagnostic method that detects the presence of specific virus proteins in the biomaterial. 4) Immunochromatography . Detection of the virus through a blood test. 5) Testfor antibodies to the coronavirus . It finds out whether a person has been ill with COVID -19, whether his immune system is able to resist the infection [6]. The first four methods have an identical task. They differ in complexity of implementation, time spent, accuracy. The fifth cannot replace them [ 7,8].

PCR is a polymerase chain reaction. It can only be done in the laboratory, because it requires studying the molecular structure of DNA. The essence of the procedure is as follows[9]:

1. A swab is taken from the human nasopharynx (for greater accuracy, this should be done by a medical professional).
2. The region of interest in the DNA of the biomaterial is isolated.
3. Amplification (multiple doubling) of this area is carried out to a volume that is optimal for visualization.
4. The rendered fragments are studied.
5. If a virus continues to appear in it when copying a piece of DNA, then the patient is infected. You can get the results of the PCR test in a few days. While waiting (especially if you have symptoms), it is best to self-isolate. Today it is the most reliable diagnostic method [ 10,11].

Accurate diagnosis of COVID-19 infection is essential to limit the spread of the SARS-CoV-2 virus and clinical management of the disease. At the same time, the recommended antibiotic therapy for signs of a secondary infection requires a guideline for de- eslaxationof these drugs [ 12].

### **Purpose of the study :**

The purpose of our study is aimed at developing diagnostic test systems to determine: 1. IgG / IgM antibodies against SARS-CoV-2; 2. SARS-CoV-2 antigen; 3. inflammatory marker procalcitonin .

### **Materials and methods**

Antibodies to procalcitoninand N-protein SARS-CoV-2 (OOO Bialeksa , Russia), anti- species antibodies to IgM and IgG(OOO Imtek , Russia) were used. Membranes for immunochromatography (MDI, India). Express development-tests included a comprehensive optimization of operating parameters and the selection of conditions for conductinganalysis.

### **Research result:**

To develop a serological test, the RBD protein was used as a target. It is part of the S-protein of the coronavirus that directly binds to the ACE2 m receptors in human cells. Antibodies specific to the RBD protein are predominantly neutralizing.The test strip has two analytical zones, the signal in which is formed by binding with anti- species immunoglobulins immobilized on the membrane against G and M type antibodies, respectively. The test system for the determination of immunoglobulins in serum / plasma / blood has successfully passed clinical trials, according to the results of which the sensitivity for IgM was 99%, and for IgG - 98%. The specificity was 99%.

The antigen test was developed to determine the nucleoprotein of the SARS-CoV-2 virus. Carboxylated latex compounds were used as markers for the formation of the control and analytical zones.red and blue particles, respectively. Components screened and conditions selectedassembly of

the test system, which made it possible to achieve an analytical sensitivity of less than 0.7 ng / ml of nucleoprotein with an analysis time of less than 10 minutes. The shelf life of the test system is more than 2 years (shown under conditions accelerated aging).

Procalcitonin, a precursor of the hormone calcitonin, is inextricably linked to the course of the disease and, as has been confirmed in a number of studies, its concentration can be used to adjust the treatment strategy for patients with coronavirus infection. We have developed a set of individual test strips for the determination of procalcitonin in serum / plasma with the corresponding detection limits of 0.1 / 0.5 / 5.0 ng / ml. This range allows efficient and accurate determination of PCT concentration. The analysis time is 15 minutes. The diagnostic sensitivity and specificity, confirmed by clinical trials of the test, were 99% and 99%, respectively.

### Conclusion

Short analysis time (10–15 min), high sensitivity and specificity, as well as a simple non-instrument evaluation of the results obtained make it possible to effectively use the developed tests for the clinical diagnosis of a new coronavirus infection COVID-19, assessment of individual and potential herd immunity, as well as reviewing drug therapy in order to prevent antibiotic resistance and the risk of drug complications.

### Literature

1. Coronavirus (2019-nCoV) Overview, CDC, February 1, 2020 Content Source : National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases; <https://www.cdc.gov/coronavirus/2019-nCoV/summary.html>
2. Hui, David S.; Azhar, Esam E.I.; Madani, Tariq A.; Ntoumi, Francine; Kock, Richard; Dar, Osman; Ippolito, Giuseppe; Mchugh, Timothy D.; Memish, Ziad A. The continuing epidemic threat of novel coronaviruses to global health – the latest novel corona virus outbreak in Wuhan, China (English) // International Journal of Infectious Diseases: journal. - 2020. - January 14 (vol. 91). - P. 264-266. — ISSN 1201-9712. — DOI:10.1016/j.ijid.2020.01.009.
3. Thrombo-inflammatory syndrome in COVID-19. The place and role of anticoagulant therapy in the treatment of COVID-19 / Sugraliev A.B., Plinio Cirillo // Zh.Medicina (Almaty) - №3 (213) 2020]
4. Undiagnosed pneumonia - China (HU) (01): wildlife sales, market closed, RFI Archive Number: 20200102.6866757. ProMED mail. International Society for Infectious Diseases. Accessed January 13, 2020.
5. Guidance COVID-19: investigation and initial clinical management of possible cases/ [https://www.gov.uk/government/publications/Updated 27 April 2020](https://www.gov.uk/government/publications/Updated%2027%20April%2020).
6. ZhonghuaJie, He He, Hu Xi, ZaZhi. Clinical features of 2019 novel corona virus pneumonia in the early stage from a fever clinic in Beijing. Article in Chinese; Abstract available in Chinese from the publisher.
7. Jonas F Ludvigsson. Systematic review of COVID-19 in children show milder cases and a better prognosis than adults. *actapediatrica*. First published: 23 March 2020 <https://doi.org/10.1111/apa.15270>.
8. Laboratory testing for 2019 novel corona virus (2019-nCoV) in suspected human cases Interim guidance 17 January 2020.
9. Temporary guidelines. Prevention, diagnosis and treatment of novel coronavirus infection (COVID-19). Version 7 (06/03/2020) of the Ministry of Health of the Russian Federation, p.165.

10. Guidelines “Peculiarities of clinical manifestations and treatment of a disease caused by a new coronavirus infection (COVID-19) in children, version 2 - 03.07.2020, p.4-8.
11. “Updated diagnosis, treatment and prevention of COVID-19 in children: experts' consensus statement condensed version of the second edition”, Kun-Ling Shen, Yong-Hong Yang, [...] – Global Pediatric Pulmonology Alliance, World Journal of Pediatrics volume 16, pages 232–239 (2020).
12. Global Surveillance for human infection with novel corona virus (2019-nCoV) Interim guidance, 27 February 2020

