

**DIFFICULTIES IN THE DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS OF  
COVID-19 IN CHILDREN AND ADOLESCENTS WITH TUBERCULOSIS**

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**Resume:** The spread of the SARS-CoV-2 virus and the ongoing epidemiological measures may affect the increase in the incidence of tuberculosis, which is associated with objective difficulties in detecting this infection against the background of COVID-19 and the development of complications after the disease.

Tuberculosis is an infectious disease, the problem of which is still relevant all over the world. The possibility of combining these infectious diseases can lead to an increase in mortality from tuberculosis against the background of an objective decrease in the number of cases, which is associated with difficulties in the diagnosis and treatment of tuberculosis infection against the background of COVID-19.

**Keywords:** tuberculosis, diagnosis, new coronavirus infection, COVID-19, SARS-CoV-2, pandemic.

**Relevance.** The problem of the spread of tuberculosis infection has not ceased to be relevant in the new conditions – the conditions of the pandemic New Coronavirus Disease 2019 (COVID-2019) [4]. The existing need for epidemic measures has required restrictions on tuberculosis infection screening in many countries, which may limit the effectiveness of TB programs and care for tuberculosis patients in different countries of the world [1]. WHO experts, conducting preliminary calculations of epidemic indicators, noted a decrease in the number of tuberculosis cases in various countries of the world, which is not a favorable indicator, as it is associated with objective reasons for the low detection of patients in connection with the implementation of epidemic measures regarding the spread of COVID-2019 [2]. In this situation, colleagues predict an increase in mortality from tuberculosis against the background of its late detection and an objective decrease in the number of cases [5]. Today, there is no doubt about the possible combination of two infectious diseases and the possibility of admission of a tuberculosis patient to an infectious diseases hospital [3]. Under these conditions, it is necessary to use bacteriological and molecular genetic research methods in order to isolate the DNA of *Mycobacterium tuberculosis* early and determine the drug sensitivity of mycobacteria already in an infectious hospital in order to select and prescribe adequate therapy. This need may be due to the prognosis of a more severe course of tuberculosis infection in tuberculosis patients, as indicated in their publications by Chinese colleagues [2]. However, the existing difficulty in diagnosing tuberculosis infection under normal conditions, since the diagnosis is verified only in 48% of cases [1-5], can significantly worsen in a pandemic. The similarity of the clinical manifestations of COVID-19 and tuberculosis infection, manifested by a temperature reaction, often subfebrile, cough, decreased appetite [3], and shortness of breath, may well indicate both one and the other infection. It is possible to isolate the DNA of the SARS-CoV-2 virus using existing tests only in 60-70% of cases, which is associated with low diagnostic sensitivity of the tests [2].

In such cases, only computed tomography can serve as a more sensitive method not only for diagnosis, but also for the differential diagnosis of COVID-19 with other pathological conditions [4]. It should be noted that the correct diagnosis of suspected tuberculosis is possible only in the case of bacteriological confirmation of the diagnosis, however, obtaining histological material is possible to diagnose tuberculosis in the absence of bacterial excretion [1]. Today, the entire world community is faced with the spread of the new coronavirus infection (COVID-19), which has exacerbated the problems that existed before the pandemic. Tuberculosis continues to pose a threat to lives and a public health problem in many countries. Currently, in some publications, colleagues point to the existing likelihood of a worsening of the tuberculosis epidemic situation against the background of the spread of COVID-19, which is associated with the need for isolation, disruption of the tuberculosis detection process, as well as the risk of tuberculosis reactivation in those who have previously suffered the disease and in people with latent tuberculosis infection, as well as the likelihood of severe COVID-19 manifestations in patients tuberculosis. Currently, there are isolated publications in the literature describing a combination of tuberculosis and COVID-19, however, many authors point to possible difficulties in diagnosing specific changes against the background of COVID-19. The clinical case presented in this article demonstrates the need for timely diagnosis of tuberculosis in children, especially against the background of COVID-19.

**The purpose of the study.** The aim of the study is to study the problems of diagnosis and differential diagnosis of COVID-19 in children and adolescents with pre-local forms of tuberculosis (TB).

**Materials and methods of research.** The development includes 68 patients with pre-local forms of tuberculosis who received treatment at an antituberculous dispensary, a specialized children's sanatorium.

**The results of the study.** Children are just as susceptible to COVID-19 as adults. Given the high proportion of asymptomatic and mild forms, children are currently considered as potential sources of infection. The main infection of children occurs in family homes or medical institutions (maternity hospitals). In general, COVID-19 is easier for children than for adults. An analysis of COVID-19 infection cases in children in different countries since the beginning of the pandemic shows that in 90% of cases, children have asymptomatic, mild or moderate cases of the disease. The incidence of severe and extremely severe cases of the disease does not exceed one percent. It is known that the risk of severe course in the population is higher in people with chronic diseases of the cardiovascular system, respiratory organs, diabetes mellitus, and malignant neoplasms. A higher risk of severe forms of infection caused by SARS-CoV-2, as well as other coronavirus infections, is observed in young children, children with concomitant pathology, especially congenital malformations, as well as with HIV/tuberculosis coinfection. According to foreign authors, in the conducted pathoanatomical studies, in patients with COVID-19, changes in the organs of the immune system have been revealed that resemble changes in HIV infection at the AIDS stage, with varying degrees of hyperplasia of T-dependent and, less often, B-dependent zones of lymphoid tissue with phenomena of autophagy. In severe cases of COVID-19, a "cytokine storm" develops, characterized by the production of vascular growth factor (VEGF), monocyte chemoattraction protein-1 (MCP-1), IL-8 and additionally IL-6. Activation of the complement system leads to endothelial damage, and also induces leukocytes through proteolytic fragments of proteins C3a and C5a to produce proinflammatory cytokines IL-1, IL-6, IL-8 and IFN- $\gamma$ . 68 of the surveyed had a history of contact with relatives suffering from COVID-19. The time after contact and the appearance

of clinical symptoms was more than 3-4 weeks. The leading symptoms of the examined patients were: headaches, sore or sore throat, weakness, malaise, fever. When contacting the polyclinic, during the history collection, after being tested for COVID-19 by PCR and receiving a negative result, there were no changes on the X-rays, pediatricians suspected the presence of tuberculosis, and therefore these children were sent to the centers of phthysiology. In anti-tuberculosis institutions, children and adolescents were given a Mantoux test with 2 TE, Diaskintest, and 14 patients underwent computed tomography. An increase in peripheral lymph nodes in groups 3-4, measuring 0.8- 1.3 cm, with a soft-elastic consistency in 36 and dense in 20, was found in 56 of the examined patients. Body weight was reduced in 24 patients. Percussion and auscultation of the lungs were not detected in all patients, and no pathological changes characteristic of tuberculosis were detected. After a full examination of the patients, the data obtained are submitted to the medical commission at the regional Center for Phthysiology and Pulmonology. 56 children and adolescents were diagnosed with tuberculosis intoxication, 12 patients had a "turn" of tuberculin samples. Comprehensive treatment has been prescribed, including anti-tuberculosis drugs, according to international standards, desensitizing drugs, and restorative treatment.

**Conclusion.** For children with suspected covid infection or suspected tuberculosis, it is recommended that they be examined in tuberculosis centers for a thorough examination, including a Diaskintest. In the presence of sputum, conduct a study on CD using bacterioscopy and PCR. If it is impossible to exclude the tuberculosis etiology of the disease, it is recommended to transfer the child to a boxed department of an infectious hospital, follow-up for COVID-19, modern management by an infectious disease specialist and a phthisiatrician until a final diagnosis is established.

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