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CLINICAL PICTURE OF COVID 19 IN PATIENTS WITH TUBERCULOSIS

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ABOUT ARTICLE

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Abstract: In the conditions of the COVID-19 pandemic, timely diagnosis of tuberculosis is of particular importance. Patients with complaints of cough for 3 weeks or more should be examined for tuberculosis and COVID-19 (sputum microbiological examination, chest X-ray examination, nasopharyngeal and/or oropharyngeal swab using PCR for SARS-CoV-2 RNA). If COVID-19 is ruled out, a consultation with a TB specialist and additional examination for tuberculosis are carried out. In case of a combination of two infections - tuberculosis and COVID-19, the patient should be hospitalized in specialized medical organizations repurposed for the treatment of COVID-19 and tuberculosis. Children with diagnosed or suspected pneumonia are recommended to undergo the Diaskintest test. Consultation with a TB doctor is recommended for children with positive and questionable reactions to the Diaskintest test.

INTRODUCTION

The spread of COVID-19 at the all world has made it necessary to mobilize the resources of medical organizations of all profiles to combat this disease. Timely diagnosis and treatment of patients with COVID-19 and prevention of the spread of the disease during a pandemic is a priority [1, 2]. Tuberculosis is a socially significant infectious disease and the suspension of anti-tuberculosis measures cannot be justified under any circumstances. Late detection of tuberculosis and interruptions in treatment lead to the spread of the disease, the development of drug resistance of the pathogen and the unfavorable development of the tuberculosis situation. In the majority of patients with tuberculosis, COVID-19 occurs in a severe form with the development of viral pneumonia, leading to acute

respiratory distress syndrome [1–3]. In the context of the COVID-19 pandemic, timely diagnosis of tuberculosis is of particular importance [1]. I. Diagnosis of tuberculosis when patients visit primary health care organizations and medical organizations providing specialized medical care (with the exception of organizations specializing in phthisiology).

All persons who seek medical help with complaints of cough for 3 weeks or more are subject to examination for tuberculosis. In the context of the new coronavirus infection COVID-19 pandemic, it is necessary to screen such patients not only for tuberculosis, but also for COVID-19. When diagnosing tuberculosis, a microbiological [method of microscopy for acid-fast mycobacteria (AFB)] or molecular genetic examination of sputum, as well as a radiological examination of the chest organs (radiography or computed tomography) are performed. Sputum for analysis is collected by the patient independently at home after instructions from medical personnel. Sputum collection for testing for AFB and DNA of Mycobacterium tuberculosis (MBT) is carried out three times. To exclude the disease of the new coronavirus infection COVID-19 in patients with cough, the material obtained by taking a smear from the nasopharynx and/or oropharynx is examined using polymerase chain reaction (PCR) for SARS-CoV-2 RNA. Sputum (if available) can be used as additional material for research. At the same time, at the beginning of the disease, the most informative material is obtained by taking a nasal smear; at a later stage, sputum is the most informative. If a patient has a cough and a temperature of more than 37.5 °C, the case of illness is suspected of COVID-19. Within 24 hours, the material obtained by taking a smear from the nasopharynx and/or oropharynx is examined using PCR for SARS-CoV-2 RNA and computed tomography of the chest organs. At the first negative result of a smear test, a repeat test is carried out within 48 hours, then on the 11th day of observation. The examination and management of such patients is carried out in strict compliance with sanitary and epidemiological standards in an outpatient (at home) or inpatient setting (infectious diseases hospital), depending on the severity of the condition. Medical workers who collect, package and transport clinical samples, conduct laboratory tests, must be trained in the requirements and rules of biological safety when collecting and working with material suspected of being contaminated with microorganisms of pathogenicity group II, strictly observe infection safety measures and use personal protective equipment. It should be noted that changes in the lungs detected during a computed tomography scan may be caused by COVID-19, while the result of PCR diagnostics for SARSCoV-2 may be negative. According to studies using PCR diagnostics, in the first seven days from the onset of the disease, the SARS-CoV-2 virus is detected in almost 70% of patients, then the rate begins to decrease and from the 15th day from the onset of the disease is no more than 45.5%. If there are changes characteristic of coronavirus infection, a repeat PCR test for SARS-CoV-2 RNA and consultation with an infectious disease specialist are necessary. If COVID-19 is ruled out, a

consultation with a TB specialist and additional examination for tuberculosis are carried out. A consultation with a phthisiatrician can be carried out in the form of a telemedicine consultation, at home while the patient is self-isolating, or in another medical institution if the patient is currently hospitalized there. If a diagnosis of tuberculosis is made with a negative COVID-19 status, the TB doctor, when visiting the patient at home, assesses the severity of his condition. In case of mild or moderate severity, while ensuring infection safety measures, tuberculosis treatment and observation at home are organized in conditions of self-isolation of the patient. A patient with tuberculosis is prescribed one of the chemotherapy regimens depending on drug resistance data. It is mandatory to ensure control over the intake of anti-tuberculosis drugs, including through information and communication technologies. Based on the results of the examination, it is possible to identify a combination of two infections – tuberculosis and COVID-19. In this case, the patient must be isolated and sent by ambulance to an infectious diseases hospital or specialized medical organizations repurposed for the treatment of COVID-19 and tuberculosis.

Diagnosis of tuberculosis. Mandatory diagnostic tests when making a diagnosis of tuberculosis are: microbiological studies, including the study of two samples of diagnostic material using fluorescent microscopy, a cultural method (on liquid and solid media), molecular genetic testing for the presence of DNA markers of Mycobacterium tuberculosis and mutations of resistance to anti-tuberculosis drugs. When obtaining MBT growth, carrying out species identification of the isolated cultures and determining the sensitivity of MBT to anti-tuberculosis drugs by the cultural method. In patients hospitalized for treatment of tuberculosis, if additional symptoms of intoxication and/or respiratory disorders or new changes during control computed tomography appear, it is necessary to perform a sputum or other material test using PCR for SARSCoV-2 RNA. Upon receipt Clinical symptoms in children correspond to the clinical picture of an acute respiratory viral infection caused by other viruses: fever, cough, sore throat, sneezing, weakness, myalgia. The severity of the febrile reaction can be different: fever up to 38 °C is observed in half of sick children, in a third of children an increase in body temperature is recorded from 38.1 to 39.0 °C. Other symptoms, relatively rare symptoms, with a frequency of no more than 10%, were diarrhea, weakness, rhinorrhea, and vomiting. Tachycardia is observed in half of hospitalized children, tachypnea in a third. Children rarely experience a decrease in saturation of less than 92%. Risk groups for an unfavorable prognosis for severe co-infection (tuberculosis + COVID-19) in children - newborns and young children; children not vaccinated with BCG (BCG-M); unfavorable premorbid background, especially congenital malformations, diseases of the cardiovascular system, respiratory organs, diabetes mellitus, malignant neoplasms, Kawasaki disease;

immunodeficiency states of various origins; co-infection with other infectious diseases, especially respiratory syncytial virus infection in young children.

Routine examination of children and adolescents for tuberculosis during the epidemic During the pandemic, there are limited opportunities for conducting preventive medical examinations. Routine examination of children and adolescents using immunodiagnostics is not carried out. Accordingly, detection of the disease is possible mainly from among those who have applied for medical help with complaints, or from those who are registered with a TB doctor in risk groups for tuberculosis (contact with tuberculosis patients, altered sensitivity to tuberculosis allergens). Recommended: - for all children who seek medical help with respiratory complaints (cough, shortness of breath, chest pain), increased body temperature for more than 7 days, purulent-inflammatory processes in various organs and tissues for more than 14 days (lymphadenitis , osteitis, etc.) carrying out immunodiagnostics of tuberculosis infection - Diaskintest skin test; - children who seek medical help with respiratory complaints (cough, shortness of breath, chest pain) undergo a plain chest x-ray; - anti-tuberculosis institutions providing anti-tuberculosis care to children and adolescents, switch to the use of remote technologies - correspondence consultations with patients based on the results of the studies; - for children in contact with a tuberculosis patient, immunodiagnostics should be carried out strictly by appointment, and if possible, at home. The issuance of medical reports and recommendations is carried out using remote technology in compliance with the requirements for working with personal data. Provide medical care at home. If it is necessary to conduct an in-person examination by a TB doctor in a medical organization, observe the time for pre-registration of the patient for an appointment with separation of patients; - preventive treatment of latent tuberculosis infection in children should be carried out at home.

Features of diagnosing tuberculosis in children and adolescents during the COVID-19 pandemic

1. Children with the presence/suspect of pneumonia are recommended to undergo the Diaskintest test. Children with positive and questionable reactions to the test are recommended to consult a TB doctor.

2. Collection of anamnesis from a child suspected of having tuberculosis during the COVID-19 pandemic should include collection of an extensive epidemiological history, including the following information:

- stay of adults from the child’s environment in other countries and in other regions of the Russian Federation;

- date of return from another state/subject of the Russian Federation; - having contact with persons infected with COVID-19;

- previous examinations of people from the child's environment for COVID-19 (if available);

- previous examinations of the child for COVID-19 (if available). 3. General blood and urine tests, biochemical blood test (total protein, fractions, glucose, ALT, AST, bilirubin, urea).

4. Examination of sputum for acid-fast mycobacteria.

5. Blood tests for HIV, hepatitis, syphilis.

6. Computed tomography of the chest.

7. Conducting telemedicine consultations with medical specialists if indicated. 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 disease hospital, examination for COVID-19, and joint management by an infectious disease specialist and a phthisiatrician until a final diagnosis is established.

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