CLINICAL AND DIAGNOSTIC FEATURES OF MULTISYSTEM INFLAMMATORY SYNDROME IN CHILDREN ASSOCIATED WITH COVID-19

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The article highlights the problem of multisystem inflammatory syndrome in children associated with COVID-19, which is a new disease. Pediatricians from leading countries around the world during the coronavirus infection pandemic reported cases of hospitalization of children with unusual symptoms, manifested primarily by fever and multisystem inflammation. Some of these children were in a critical condition with symptoms of shock and multiple organ failure, and some had manifestations similar to Kawasaki disease. A report from our own practice presents a clinical case of a multisystem inflammatory syndrome that developed in a child who had an acute form of a new coronavirus infection.

Keywords: multisystem inflammatory syndrome, COVID-19, children.

At the end of April 2020 Specialists from a number of countries in Europe and North America reported serious illnesses in children, manifested by fever and multiple organ changes with characteristic laboratory signs of severe inflammation. A connection was also found between the observed illnesses with a previous new coronavirus infection, which in all cases was confirmed by the presence of specific antibodies (IgG) in the blood patients. The acute phase of COVID-19, as practice shows, in most children proceeds quite easily, in an erased or even in a subclinical form [1–3].

“Long COVID” and “post-COVID syndrome” are not yet accepted medical terms, however, articles are beginning to appear in the specialized literature describing the phenomenon of symptoms or various complaints that last more than 3-4 weeks, which are reported by patients who have had SARS-CoV- infection. 2. Trisha Greenhalgh et al. due to the lack of an official definition, they proposed the following division in their article:

1) prolonged COVID-19 (extended COVID-19) - for cases where symptoms persist > 3 weeks from the onset of infection,

2) chronic COVID-19 (chronic COVID-19) - if symptoms persist > 12 weeks after the onset of symptoms.

The authors of this study also suggested that the criterion for laboratory confirmation of SARS-CoV-2 infection was not a prerequisite for diagnosing long-term or chronic COVID-19, as many people do not get tested or tests give false negative results, although clinical symptoms and epidemiological history indicate COVID-19. In turn, the National Institute for Health and Care Excellence (NICE), in agreement with the Scottish Intercollegiate Guidelines Network and The Royal College of General Practitioners, in its recommendations on October 30, 2020, for the first time described the following forms of COVID-19:

1) acute COVID-19 (acute COVID-19) - complaints and symptoms of COVID-19 lasting up to 4 weeks

2) ongoing symptomatic COVID-19 (ongoing symptomatic COVID-19) - complaints and symptoms of COVID-19 lasting from 4 to 12 weeks

3) post-COVID-19 syndrome - complaints and symptoms that develop during or after COVID-19 and last >12 weeks and are not the result of another diagnosis.

However, after 14–42 days, some “convalescents” develop symptoms observed in the advanced phase of severe forms of a new coronavirus infection in adults [1, 2]. In this case, we are talking about a dynamically developing inflammatory reaction with the active involvement of internal organs, primarily the heart. The complexity of diagnosing such processes is associated, firstly, with the lack of experience in working with such patients and, secondly, with a wide variety of clinical manifestations, in some cases coinciding with both the signs of Kawasaki disease and toxic shock syndrome [3,4].

Multisystem inflammatory syndrome (in the English abbreviation - MIS-C) - manifest, quite striking in clinical terms

inflammatory process in children and adolescents. WHO 15 May 2020 formulated a preliminary definition of this form of the disease: fever for 3 days or more in a child or adolescent

aged 0 to 19 years; and two of the following:

- rash or bilateral non-purulent conjunctivitis or signs of inflammatory lesions of the skin and mucous membranes (oral cavity, hands, feet);

- hypotension or shock;

signs of myocardial dysfunction, pericarditis, valvulitis or other cardiac pathology, including echocardiographic signs;

- signs of coagulopathy (decrease in prothrombin time, partial thromboplastin time, increase in the level of D-dimer);

- acute disorders of the gastrointestinal tract (diarrhea, vomiting or abdominal pain);

- increased levels of inflammatory markers such as ESR, C-reactive protein or procalcitonin;

- the absence of other obvious causes for the occurrence of inflammation of microbial etiology, including bacterial sepsis, toxic shock syndrome, streptococcal toxic shock syndrome;

- evidence suggestive of COVID-19 (positive RT-PCR, antigen test, or serology) or

the likelihood of contact with patients with COVID-19. To laboratory markers of multisystem inflammatory syndrome, allowing to confirm

diagnosis, experts also include the following [2, 5, 10]:

- an increase in the level of inflammatory markers in the blood, including ESR, C-reactive protein (CRP), ferritin, lactate dehydrogenase;

- lymphopenia <1000 in 1 µl, thrombocytopenia <150 thousand in 1 µl, neutrophilia in the general blood test;

hyponatremia, elevated levels of D-dimer.

Experts recommend that any child with suspected multisystem inflammatory syndrome be hospitalized and evaluated for an infectious [6] or non-infectious [7] cause. Modern experience of working with children with COVID-19 has shown that the acute phase of the disease, to a large extent corresponding to viral catarrh of the respiratory tract, is relatively mild. In some cases, it is asymptomatic. This was also the case in our observations. We were unable to establish the dates of onset of the first symptoms and features of the early clinical signs of coronavirus infection.

A more dramatic picture follows. Most of these "newly ill", as practice shows, have to be hospitalized. In some patients, multiple organ changes are observed. It is this circumstance that gave grounds to describe this condition as a multisystem inflammatory syndrome in children. Subsequently, it was proposed to divide it into two phenotypes:

Kawasaki-like and non-specific syndrome. The latter, in particular, is characterized by extensive symptoms of damage to a number of organs and systems (involvement of the gastrointestinal tract, respiratory and / or neurological changes that do not fit into the symptom complex of the first variant - Kawasaki disease). Initially, both phenotypes were designated as a single, monoetiological process associated only with SARS-CoV-2. The second obligatory component of the syndrome was the severity of the systemic inflammatory response and multiple organs, involvement in the process of several organs, and even systems. To what extent is all of the above mandatory leaving the post-covid syndrome?

In this context, it makes sense to refer to a number of recent publications on this topic, in particular, the formation of a clinical variant of mucocutaneous lesions similar to the multisystem inflammatory syndrome in the so-called reactive mucocutaneous exanthema, or, in the English abbreviation, RIME [8,9].

We present a description of a clinical case in a patient with similar clinical symptoms who had previously had COVID-19. Girl, 4 months 13 days. She fell ill acutely with an increase in body temperature to 39.1 ° C, manifestations of nasal congestion, rashes on the body, loose stools up to 5 times per day. The child was hospitalized in the specialized clinical infectious diseases hospital Zangiota No. 1. Upon admission, the child's condition was of moderate severity due to intoxication, intestinal and skin syndromes. The girl is conscious and crying. Meningeal signs are negative. There are no focal neurological symptoms. Body temperature 36.8 ° C (against the background of antipyretic drugs), respiratory rate 34 per minute, heart rate 132 beats / min, oxygen saturation 98%, blood pressure 90/55 mm Hg. There are no signs of dehydration. The skin is pale, on the legs, the face has a maculopapular rash, in some places confluent. There is diffuse hyperemia in the pharynx, the tonsils are enlarged. Tongue dry, covered with white coating. Lips dry, chapped. Nasal breathing is difficult due to serous discharge.

The cervical group of lymph nodes is palpable: small, multiple, mobile, painless. Auscultatory breathing in the lungs is hard, carried out in all fields, rales are not heard. Heart sounds are muffled. The abdomen is soft, moderately swollen, painful in the umbilical region. The liver protrudes 1.5 cm from under the edge of the costal arch, the edge is even, elastic. The spleen is not enlarged. Diuresis is reduced, the chair is decorated.

On the 7th day of illness, the child retains a high temperature (38–39.6 °C), and a rash develops. Marked hemorrhagic rash on the body in the form of mild petechiae throughout the body, there was swelling of the hands and feet. The child refuses to eat, the liquid does not drink. In the blood test, leukocytosis increases, an increase in ESR to 32 mm / h. A preliminary diagnosis was established: ARVI, severe course. Viral diarrhea. Kawasaki disease?

In the general blood test, leukocytosis up to 29.4 109 / l without a significant neutrophilic shift, thrombocytosis up to 450 thousand, in a biochemical analysis - a decrease in the level of total protein to 49.9 g / l, an increase in the level of C-reactive protein to 66.6 mg /l, while the level of ferritin did not exceed age-related values - 64.8 ng/ml (7-140 ng/ml), procalcitonin was negative. The following indicators were recorded in the coagulogram: PTI - 61.7% (78.1–123.3%), INR -1.25 (0.9–1.27), APTT - 27.5 s (21.6–28 .7 s), TB - 18 s (15.5–19.4 s), D-dimer - 656 µg/l (up to 440 µg/l).

Determination of DNA/RNA of causative agents of acute respiratory viral infections and enteroviruses by PCR in a wash from the nasopharynx gave a negative result; Enterovirus RNA was also not found in feces; rotavirus antigen was not found in feces. The results of the study of feces for pathogenic intestinal microflora and blood for sterility were negative. The result of the determination of SARS-CoV-2 RNA in

swabs from the nasopharynx is negative. IgG to SARS-CoV-2 was found in the child's blood. he obtained clinical and laboratory data of the patient correspond to the multisystem inflammatory syndrome. X-ray of the chest: increased lung pattern. Electrocardiography: sinus rhythm, heart rate 131 beats/min; normal position of the electrical axis of the heart; violation of intra-atrial conduction; increased electrical activity of the myocardium of the left ventricle. Echocardiography: hydropericardium.

The examination made it possible to establish a clinical diagnosis: a condition after COVID-19. Postcovid syndrome. Late hemorrhagic disease of the newborn. reactive pericarditis. The child received detoxification therapy with glucose-salt solutions, dexamethasone, intravenous immunoglobulin, antibacterial drugs (amoxiclav), symptomatic therapy drugs. The child was discharged in a relatively satisfactory condition on the 21st day of hospitalization.

Conclusion

Thus, we will see a lot of conditions similar to the multisystem inflammatory syndrome in the near future. It is also obvious that any symptomatology of mucocutaneous lesions in our time should be considered primarily as a variant of coronavirus infection. Patients should receive treatment taking into account this phenomenon. Numerous own observations and descriptions in the literature once again demonstrate that the post-COVID syndrome has become a kind of pattern of exanthemic diseases in a child. Of course, such situations should always be evaluated in terms of the characteristic course and potential complications.

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