

# KAWASAKI-LIKE SYNDROME ASSOCIATED WITH COVID-19 IN CHILDREN

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The ongoing COVID-19 coronavirus infection pandemic has revealed an easier course of the disease and less susceptibility of children to SARS-CoV-2 [1]. This is associated with less damage to the respiratory tract by unfavorable environmental factors, a lower burden of infectious effects on the respiratory organs, and also with the peculiarities of the functioning of type 2 angiotensin converting enzyme in children, which serves as a cellular receptor for coronaviruses. But these hypotheses have no proof [2]. Low morbidity in children is explained by higher levels of circulating ACE2 and / or existing features of innate immunity, which disappear during ontogenesis [3,4]. At the same time, on April 27, 2020, a position paper was sent out in the UK, in which it informed the global pediatric and parenting community about the increasing number of children with severe disease associated with positive tests for SARS-CoV-2. Further, such cases were registered among children in the USA, France, Italy, Russia, and this was observed during a high rise in the incidence of COVID-19.

In Kazakhstan, since the beginning of the epidemic process of a new coronavirus infection, according to statistics from the Ministry of Health of Kazakhstan, as of October 4, 108,236 people have been involved, of which children are 2.27% of the total number of infected. The news also reported 31 cases of multisystem inflammatory syndrome (MCI) associated with COVID-19 in children. The severe form of COVID-19 in adults is associated with a cytokine storm, by analogy with those pathological variants of the immune response that are triggered by MAS - macrophage activation syndrome or primary and secondary HLH - primary and secondary hemophagocytic lymphohistiocytosis, when a systemic inflammatory response is activated, manifested by damage to many organs and systems, in children - MVS or Kawasaki-like syndrome.

Under our supervision there were 3 children with Kawasaki-like syndrome associated with COVID-19: R. 4 years old, A. 13 years old and B. 16 years old, who were admitted to the AMC "Children's Hospital" in August 2020. Analysis of complaints, anamnesis of the disease, a combination of clinical examination, results of laboratory and instrumental examination showed multiple organ lesions with a pronounced general intoxication syndrome. Children were admitted 4-5 days from the onset of the disease. They were characterized by: acute onset of the disease with a rise in temperature within 39.5-40 ° C along with other symptoms of intoxication: weakness, loss of appetite, sleep disturbance, headache. In the anamnesis of the disease, febrile fever 39.0 - 39.5 - 40 ° C for 5 to 9 days, poorly stopping antipyretics (paracetamol). On the 3rd (for two) - 4th day (one), abdominal syndrome joined, as well as stool retention in combination with intestinal dysfunction in the form of liquefied feces up to 1-2 times a day without pathological impurities and 1-2 times vomiting and / or persistent nausea.

On examination, attention was paid to pasty face, puffiness under the eyes, conjunctivitis with photophobia, scleritis with subconjunctival hemorrhages and rash. The exanthema syndrome appeared on the first day of the illness with a gradual spread throughout the body (in a 4-year-old child R.) and on 3-4 days simultaneously throughout the body in the other two. By nature: papular, maculopapular, petechial, polymorphic. A 13-year-old girl had a rash of the type of exudative erythema multiforme with lesions of the elbow and knee joints of the type of Rosenberg erythema. The rash lasted from 10 to 16 days with symptoms of vasculitis on the face. The mucous membranes of the oropharynx were hyperemic with granularity of the posterior pharyngeal wall. The tongue was coated with a thick coating with hypertrophied papillae.



The syndrome of multiple organ failure consisted in the involvement of the respiratory organs in the pathological process with the development of respiratory failure of varying degrees, the cardiovascular system with myocarditis, and gastrointestinal manifestations. All were diagnosed with radiological bilateral lower-lobe pneumonia, CT of the lungs showed lung parenchyma with areas of irregular compaction with indistinct contours of the "ground glass" type due to infiltration, areas of pulmonary fibrosis, regional lymphadenopathy. A 4-year-old child R. was also found to have exudative bilateral pleurisy and pericarditis, an effusion in the abdominal cavity.

Heart damage was manifested by myocarditis. The data of ultrasound of the heart are indicative, for example, in adolescent B., 16 years old. Conclusion No. 1 dated 08/03/2020: "The cavity of the left ventricle is enlarged. There is no myocardial hypertrophy. The pumping and contractile functions of the left ventricle are reduced. EF 52%. Diffuse hypokinesis of the LV myocardium. Mitral regurgitation of the 1st degree. Minor tricuspid regurgitation. Regurgitation on the PA valve is minimal. Insignificant pulmonary hypertension RSDLa 30 mm Hg. In the pleural cavities on the left 1.4 cm, on the right 0.6 cm of fluid." Exhibited by a cardiologist: acute myocarditis of viral and bacterial etiology. SNFC II degree. Pulmonary hypertension. In the course of therapy, the condition improved and in the conclusion of ultrasound of the heart No. 2 dated 08/11/2020: "The pumping and contractile functions of the heart are preserved. EF 67%. Mitral and LA regurgitation is minimal, tricuspid regurgitation. Insignificant pulmonary hypertension RSDLa 34 mm Hg". A similar picture of heart damage was observed in the remaining two patients.

Gastrointestinal syndrome with a leading abdominal syndrome, manifested by abdominal pain of a constant nature with severe muscle pain up to severe local tactile hyperesthesia. Moreover, in all patients, due to severe pain in all parts of the abdomen with positive symptoms of peritoneal irritation, diagnostic laparoscopy was performed in order to avoid surgical pathology with a diagnosis: nonspecific mesenteric adenitis. Changes were also noted in urine: proteinuria, slight hematuria in a 13-year-old patient.

The results of laboratory tests are also indicative: on the day of admission, the child R., 4 years old: hemoglobin -  $10^9$  g / l, leukocytes -  $6.4 \times 10^9$  / l, lymphocytes-12.5%, platelets- $66 \times 10^9$  / l, ESR - 18mm / hour; PTVV-14.9 ", INR-1.28, APTT-65.7 ", fibrinogen-6.1 g / l, total protein 49.4 g / l, blood albumin 22 g / l, CRP - 191, 6 mg / l, procalcitonin - 19.

Patient B., 16 years old on the day of admission: hemoglobin-105 g / l, leukocytes - $22.4 \times 10^9$  / l, lymphocytes-2.1%, platelets- $127 \times 10^9$  / l, clotting time - 6 min, PTV-19 , 3 ", INR-1.64, APTT-75.8 ", fibrinogen-5.9 g / l, total protein 45 g / l, albumin in the blood 20 g / l, CRP - 216 mg / l, procalcitonin - 17, D-dimers -1740.

Upon admission, all patients with express diagnostics of ELISA for COVID-19 are negative; PCR for nasal and oropharyngeal swabs - negative; ELISA blood samples taken on the 10th day of illness - antibodies to the SARS-Cov-2 IgG + coronavirus with a positivity coefficient of 13.48 (R.) and 14.05 (B.). These results of specific diagnostics of COVID-19 are consistent with the literature data [5]. The authors believe that the systemic inflammatory response triggered by SARS-CoV-2, apparently, proceeds in 2 waves: the first is active viral shedding, but the symptoms are not expressed, the second - the symptoms are determined by inflammatory changes in different organs and systems - "cytokine storm ", but virus emission at this moment can already be minimized.

The therapy was carried out in accordance with the clinical protocol of diagnosis and treatment of revision 10: oxygen therapy with pron-position, anticoagulant (LMWH - heparin 5U / kg / h); glucocorticoid (dexamethasone), hemostatic therapy (etymzilate sodium 12.5%, calcium gluconate 10%), detoxification (glucose 5%, NaCl 0.9%), immunoglobulin therapy (octagam or kiovig), antibacterial antifungal (fluconazole), NSAIDs (paracetamol), cardiac glycosides (digoxin) and other syndrome-symptomatic therapy.

**Conclusion:** Children have a predominantly asymptomatic and mild course of the novel coronavirus infection COVID-19. We have observed cases of COVID-19 in favor of a multisystem inflammatory response of the Kawasaki type - a similar syndrome triggered by SARS-CoV-2, in which symptoms are determined by inflammatory

changes in various organs and systems - a "cytokine storm", without virus secretion, but with the production of antibodies ... The debut may begin with abdominal syndrome with intestinal dysfunctions, which is associated with the maximum expression of ACE2 in the human body in the cells of the small intestine than in the valveocytes of the lungs. Kawasaki - a similar syndrome involving damage to the vascular endothelium in COVID-19 requires emergency hospitalization and the use of anti-cytokine and immunocorrective therapy.

In this regard, in the context of the ongoing pandemic, it is necessary to take urgent measures to limit contacts of children with patients from high-risk groups, which will reduce the number of severe forms and unfavorable outcomes of the disease [6,7].

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