

## New Coronavirus Infection

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**Abstract:** COVID-19 (from the English Coronavirus disease 2019) is a new epidemic infectious disease characterized by a relatively high contagiousness and the likelihood of developing life-threatening complications in the form of acute respiratory distress syndrome, acute respiratory and multiple organ failure. a retrospective analysis of the incidence, clinical course and treatment of children with COVID-19 who were treated in a specialized hospital for the treatment of patients with coronavirus infection. We conducted a retrospective analysis of the case histories of 86 children of various ages who were hospitalized with a confirmed diagnosis of a new coronavirus infection COVID-19 in September-November 2020. There were 51 (%) boys, 34 (%) girls. Depending on age, patients were divided into 4 groups: up to 1 year - 7 (%), from 1 year to 6 years - 27 (%), from 7 to 12 years - 26 (%) and over 12 years - 26 (%). Studies have shown that children with mild COVID-19 were treated on an outpatient basis and therefore were not included in the surveyed group. Children with moderate and severe forms of COVID-19 received inpatient treatment, and in our study, patients with moderate course - 57 (66.3%), and a severe course was noted in 29 (33.7%) children.

**Keys words:** COVID-19, children, cardiovascular system, myocardial damage, diagnosis

**Introduction.** COVID-19 (from the English Coronavirus disease 2019) is a new epidemic infectious disease characterized by a relatively high contagiousness and the likelihood of developing life-threatening complications in the form of acute respiratory distress syndrome, acute respiratory and multiple organ failure. The causative agent of the disease, the enveloped zoonotic RNA virus SARS-CoV-2, belongs to the Coronaviridae family, the Betacoronavirus genus, like the previously known SARS-CoV and MERS-CoV viruses that cause severe acute respiratory syndrome and Middle East respiratory syndrome, respectively. The disease in humans is caused by 4 genotypes of circulating single-stranded RNA-containing coronaviruses (HCoV2-229E, HCoV-OC43, HCoV-NL63 and HCoV-HKU1B), they are assigned to pathogenicity group II [2, 4, 8]. The virus genome encodes 4 structural proteins : spike protein (S), membrane protein (M), envelope protein (E), and nucleocapsid protein (N) [6, 8, 13].The virus uses the receptor-binding domain (RBD) of the S1 protein with an angiotensin-converting enzyme to enter the cell 2 (ACE-2). Attachment of the domain to the receptor promotes membrane fusion, while other viral proteins contribute to genome stabilization and virus replication [10]. ACE-2 receptors are mainly localized in alveolar macrophages and dendritic cells, cells of the upper and lower respiratory tract, intestinal epithelial cells, myocardium, endothelial cells, renal tubular cells, brain neurons, which determines the clinical features of the course of the disease and the route of transmission of infection . According to statistics, general susceptibility of the population to SARS-CoV-2 is assumed, severe cases of infection and deaths are typical mainly in the elderly, the proportion of children in the structure of cases is about 2%, and no deaths among children have been registered [2, 3, 8] . According to the authors, the disease in children is characterized by a milder course, complications and adverse outcomes are much less common. An analysis of 45 publications on the incidence of this infection in children showed that the incidence is 1-5% and is characterized by a mild course, and proved the absence of vertical transmission of the infection [1]. According to other authors, this figure may be somewhat higher in countries where the proportion of children and adolescents is higher [4]. The largest studies conducted by the US Centers for Disease Control and Prevention (CDC), out of 1,787,680 laboratory-confirmed cases of COVID-19 incidence in children and adolescents under 18 years old, accounted for 3.2%, manifesting themselves as less susceptibility to infection, with a milder course [12]. According to H.P. Alimova et al. (2021), the course of the infection and the development of the clinical picture depended on the premorbid background, the presence of concomitant pathology, coinfections, the nature of the immune response, and the age of the sick children [1].

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### **The purpose of the study:**

A retrospective analysis of the incidence, clinical course and treatment of children with COVID-19 who were treated in a specialized hospital for the treatment of patients with coronavirus infection ....

### **Material and research methods.**

We conducted a retrospective analysis of the case histories of 86 children of various ages who were hospitalized with a confirmed diagnosis of a new coronavirus infection COVID-19 in September-November 2020. There were 51 (%) boys, 34 (%) girls. Depending on age, patients were divided into 4 groups: up to 1 year - 7 (%), from 1 year to 6 years - 27 (%), from 7 to 12 years - 26 (%) and over 12 years - 26 (%). Depending on the severity of the course, all children were divided into 2 groups: the moderate form of the disease - 57 children and the severe form - 27 children. All patients underwent clinical and anamnestic, functional studies (plain radiography and computed tomography of the chest) and laboratory tests (general blood count with leukoformula, urinalysis, biochemical studies). The digital material was processed by the method of variation statistics.

### **Results and its discussion**

Studies have shown that children with mild COVID-19 were treated on an outpatient basis and therefore were not included in the surveyed group. Children with moderate and severe forms of COVID-19 received inpatient treatment, and in our study, patients with moderate course - 57 (66.3%), and a severe course was noted in 29 (33.7%) children.

An analysis of the characteristics of the course of COVID-19 depending on the severity showed that the average form of the disease mostly developed in boys (63.1%), in 28-33% of children from 1 to 6 years old, from 7 to 12 years old and over 12 years old, more often against the background of any diseases (Table 1). At the same time, with a severe course of a new infection, sexual dimorphism leveled out, since in our studies the incidence of boys and girls coincided. When considered in the age aspect, the frequency of severe forms of infection was 2.6 times higher in infants and was slightly higher at the age of 1-6 years than in moderate cases. The frequency of concomitant diseases also increased, which, apparently, caused a more severe course of the underlying disease. An analysis of the clinical manifestations of COVID-19 in children, depending on the severity of the disease, showed the presence of myalgia and arthralgia, the development of pneumonia, cough and shortness of breath, and a complicated course in all children with moderate and severe disease (Table 2). However, some differences have also been identified. So, the frequency of lung damage, fever, tachycardia were 1.33; 2 and 1.42 times were detected more often in children with a severe course than with an average course. Sensory system disorders were 5 times more likely to be detected in children with a severe course. The severe course of a new infection in children required the appointment of dexamethasone in 82.8% of children, which is 1.57 times more often than in children with an average course of the infectious process. This is confirmed by the lengthening of the duration of hospital treatment by 1.51 times. So, if the stay of 62.4% of children with an average course of COVID-19 was up to 7 days, then in 58.6% of children with a severe course it was more than 7 days. Our data are consistent with the literature, which shows that the moderate course of pneumonia without respiratory failure is approximately 40%, the frequency of severe course is 2.5-7.6%, and extremely severe is less than 1% [5]. According to the results of a systematic review including 1065 patients under the age of 19 years, this infection occurs in children mainly with mild respiratory and general symptoms or asymptomatic [1, 5]. Similar data are contained in the description of a series of observations of 728 Chinese children with confirmed COVID-19, of which 55% had a mild or asymptomatic disease [1, 5, 9]. According to the authors, 55% of cases were mild or asymptomatic, 40% were moderate (presence of clinical or radiological signs of pneumonia, but no hypoxemia), 5% were severe (dyspnea, cyanosis, hypoxemia), and less than 1% were critical (respiratory distress syndrome, respiratory failure, shock).

At the same time, we analyzed the features of the course of COVID-19 in children depending on age (Table 3). Studies have shown that this infection under the age of 1 year was very rare and was detected only in 7 (8.1%) of the examined children. In this group of children, background diseases were detected in 71.4% of children and were mainly manifested by the presence of two (42.9%) or one (28.6%) pathologies. The frequency of comorbidities was less (42.9%). Basically, the course of COVID-19 infection in this group of

children proceeded both in moderate (52.9%) and severe (47.1%) forms. All patients had myalgia, joint pain, cough, rapid breathing, pneumonia, lung damage, complicated course, 71.4% of children had fever and tachycardia, which required dexamethasone therapy. The duration of treatment was long and amounted to  $9.29 \pm 3.03$  days. The incidence of COVID-19 infection in children aged 1-6 years was 31.4%. Background diseases were detected in 40.1% of children, mainly in the form of monopatology. The frequency of comorbidities was 55.6%. Basically, the course of COVID-19 infection in this group of children proceeded both in moderate (51.8%) and severe (48.2%) forms. All patients had myalgia, joint pain, cough, rapid breathing, pneumonia, lung damage, complicated course, 44.4 and 66.7% of children had fever and tachycardia, which required dexamethasone therapy in 66.7% of cases. The duration of treatment was long and amounted to  $8.15 \pm 1.00$  days.

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