

FEATURES OF DAMAGE TO THE NERVOUS SYSTEM OF CHILDREN UNDER 1 YEAR OF AGE, BORN TO MOTHERS WHO HAVE EXPERIENCED COVID-19

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Abstract: This article analyzed the literature on the specific relevance of the problem of studying the state of the nervous system of children born to mothers who had a new coronavirus infection at different stages of pregnancy; this poses new tasks for solving them both in observation, diagnosis, therapy and prevention of pathological conditions in newborns.

Key words: Coronavirus infection, pregnancy, children, clinic, diagnosis.

ХАРАКТЕРИСТИКА ПОРАЖЕНИЙ ЦЕНТРАЛЬНОЙ НЕРВНОЙ СИСТЕМЫ У ДЕТЕЙ ДО 1 ГОДА, РОЖДЁННЫХ У МАТЕРЕЙ, ПЕРЕНЕСШИХ COVID-19

Аннотация: В данной статье проанализировали литературные сведения об особенностях актуальности проблемы изучения состояния нервной системы детей, родившихся у матерей, перенесших новую коронавирусную инфекцию в разные сроки беременности; это ставит новые задачи по их решению как в наблюдении, диагностике, терапии так и профилактике патологических состояний у новорожденных детей.

Ключевые слова: Коронавирусная инфекция, беременность, дети, клиника, диагностика.

**COVID-19 БИЛАН КАСАЛЛАНГАН ОНАЛАРДАН ТУГИЛГАН ЁШГАЧА
БУЛГАН БОЛАЛАРДА МАРКАЗИЙ АСАБ ТИЗИМИНИНГ
ШИКАСТЛАНИШИНИНГ ХУСУСИЯТЛАРИ**

Аннотация: Ушбу мақолада ҳомиладорликнинг турли босқичларида янги коронавирус инфекциясига чалинган оналардан туғилган болаларнинг асаб тизимининг ҳолатини ўрганиш муаммосининг ўзига хос долзарблиги ҳақидаги адабиётлар таҳлил қилинди; бу янги туғилган чақалоқларда кузатув, диагностика, терапия ва патологик ҳолатларнинг олдини олишда уларни ҳал қилиш учун янги вазифаларни кўяди.

Калит сўзлар: Коронавирус инфекцияси, ҳомиладорлик, болалар, клиника, таъхислаш.

Today, no one doubts that the disease caused by the previously unknown pathogen SARS-CoV-2 is characterized by polymorphic symptoms. In addition to the main respiratory, including severe pulmonary manifestations, many patients have various signs of damage to other organs and systems [3,9,11,18]. Regarding newborns who are born to women with SARS-CoV-2, it is known that the risk of transmission of the virus during childbirth is no

more significant than in the postpartum period, but this possibility cannot be excluded (although scientists at the time of 2022 have not yet come to a common conclusion about the possibility of vertical transmission of SARS-CoV-2 from mother to child - due to conflicting data) [1,4,7,14,17,28].

According to the literature, the body of a pregnant woman, compared with women of reproductive age outside pregnancy, is more susceptible to COVID-19 due to physiological adaptive changes characteristic of pregnancy [2,5,10]. Clinical observations of pregnancy against the background of a new coronavirus infection, ending in premature birth and perinatal death of mother and fetus, were also described [6,8,13,21]. When analyzing the effects of maternal COVID-19 infection on the nervous system of infants, no relationship was found between the time or severity of Covid-19 infection in the mother and the development of the child's nervous system at the age of 6 months. The cause of the severity of the condition of newborn children may be both the direct effect of the SARS-CoV-2 virus on the fetus and a cascade of pathological reactions in the body of a pregnant woman, including hypercoagulation observed in patients with COVID-19, leading to thrombotic complications and impaired fetoplacental perfusion [15,19,22]. The fact is that during the delivery process, women with coronavirus infection are more likely to form an infected aerosol, and the immature immune system of newborns makes them sensitive to severe respiratory viral infections, which should cause some alertness [16,18,24]. Colleagues from the US Centers for Disease Control and Prevention (CDC) (2020) note that during a systematic review of 100 thousand It turned out that the possibility of vertical transmission of the virus from mother to child is 5.3%, and the birth rate of SARS-CoV-2-positive newborns is 8% (while the frequency of virus release from the placenta was recorded in 12% of cases, from the umbilical cord — in 6% of cases, from amniotic fluid — in 5.6% of cases, from breast milk — in 5.0% of cases, and from vaginal secretions — in 4.6% of cases) [4,20,25].

Based on such studies, the clinical recommendations of the Ministry of Health of Uzbekistan on the organization of medical care for pregnant women, women in labor, maternity hospitals and newborns with COVID-19 (version 6 of 30.06.2020) prescribe the actions of medical personnel to comply with precautions against airborne, drip and contact transmission of the virus. If possible, newborns should be physically separated from their mother with SARS-CoV-2 immediately after delivery and then immediately tested by polymerase chain reaction (PCR) on the first day of life. If a woman decides to stay with her child, she should be warned about the possible risk of infection of the newborn [1,2,26]. Documented neonatal cases of SARS-CoV-2 infection have so far been associated in most cases with close contact with a sick mother or other caregivers [12,25,27], therefore, despite its complexity, temporary separation of the mother and her child reduces the risk of infection of the second. The benefits of separation may obviously be more significant for mothers with severe forms of COVID-19.

It should be noted that, according to some studies [22,28], under favorable medical and social conditions and proper feeding, in particular exclusively breastfeeding up to 6 months and timely introduction of complementary foods, physical development indicators in premature infants reach the norm by the age of 5.

Currently, there is little research data showing the long-term effects of Covid-19 infection on pregnant women and their children. Research is needed to assess the impact of Covid-19 infection during pregnancy on the formation of children's personality, especially physical and neuropsychic development. When analyzing the effects of maternal COVID-19 infection on the nervous system of infants, no relationship was found between the time or severity of Covid-19 infection in the mother and the development of the child's nervous system at the age of 6 months, $p < 0.05$. 9 (11.3%) of the studied children had perinatal encephalopathy of the brain. According to ultrasound data, there was a widening of the subarachnoid space, which will further affect the neuropsychiatric development of children [13,14,28].

Factors such as the age of a woman over 35, overweight, chronic arterial hypertension, and diabetes mellitus increase the likelihood of developing a severe form of COVID-19, as well as maternal and neonatal mortality [7,11,14]. Clinical observations of pregnancies against the background of COVID-19 infection, ending in premature birth and perinatal death of mother and fetus, have also been described [4, 16]. According to the literature, physiological adaptive changes characteristic of pregnancy may be a kind of background in which the susceptibility of a pregnant woman's body to SARS-CoV-2 increases compared with non-pregnant women of reproductive age [3,14]. For example, the characteristics of immune responses against the background of immunosuppression during pregnancy make a woman vulnerable to infectious agents. Anatomical changes in the respiratory system of a pregnant woman (high diaphragm position, decrease in vertical chest volume) reduce the functional residual lung capacity, the volume of final exhalation and lead to a compensatory increase in respiratory rate, which also contribute to increased susceptibility to respiratory diseases. Muscle relaxants and progesterone dilate the respiratory tract, inhibit the activity of mucociliary clearance and ultimately lead to a decrease in local protective functions. Due to the fact that oxygen demand increases during pregnancy, pregnant women are more difficult than non-pregnant women to tolerate hypoxia of any genesis and severity. The hemostatic status during pregnancy is characterized by an increase in blood clotting potential, an increase in the structural properties of the clot, inhibition of enzymatic fibrinolytic activity, increased production of thrombin, plasminogen, VII, VIII, X coagulation factors, and increased intravascular inflammation. Hypercoagulation during pregnancy increases the risk of complications and deaths associated with infection of pregnant women with the SARS-CoV-2 virus [3,7,16,27,28]. Pregnant women are at a higher risk of developing thromboembolic complications, and with the addition of COVID-19 infection, this risk increases many times. All new data indicate that endothelial cell dysfunction plays an important role in the occurrence and progression of acute respiratory distress syndrome, which is the main cause of death in COVID-19 [3,5,6,21,29]. Given the wide range of symptoms of the new coronavirus infection, it is difficult to recognize pathology from the respiratory system during pregnancy, which complicates the timely diagnosis and initiation of treatment of COVID-19 in pregnant women. According to Baud and co-authors, changes in the placenta caused by the SARSCoV-2 virus lead to chronic placental insufficiency, fetal growth retardation or miscarriage [10,18,26].

An analysis of the studied scientific and medical documentation and state registration materials showed that further research is needed to obtain definitive data on the level of infection of newborns born to mothers with COVID-19, as well as features of their further physical and neuropsychiatric development.

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