DOI: https://doi.org/10.17816/JOWD48672

Specific features of pregnancy and delivery in HIV-infected women

© Olga L. Mozalyova[1], Anna V. Samarina[1, 2]

[1] The Center for the Prevention and Control of AIDS and Infectious Diseases, Saint Petersburg, Russia;
[2] Academician I.P. Pavlov First St. Petersburg State Medical University, Saint Petersburg, Russia

HIV-infected women have a higher risk of complications during pregnancy and delivery (chronic placental insufficiency, anemia, placental abruption, preterm birth) compared with HIV-negative women, especially in case of opportunistic infections, immunodeficiency and a high viral load in the blood. The obstetrical pathologies are hard to study in these women because the above conditions are associated with a range of confounding factors that are not directly related to HIV infection but are often present, such as drug addiction, weight deficit, and chronic viral hepatitis coinfection. The literature review provides data from domestic and international studies on the correlation between HIV infection and the frequency of complications during pregnancy, delivery and the postpartum period, as well as the effect of the infection on the condition of newborns. The article cites current recommendations on the choice of delivery types for HIV-infected women.

Keywords: HIV-infected pregnant women; rates for pregnancy and childbirth complications; mother-to-child HIV transmission prevention.

To cite this article:
Mozalyova OL, Samarina AV. Specific features of pregnancy and delivery in HIV-infected women. *Journal of Obstetrics and Women's Diseases.* 2021;70(3):103–113. DOI: https://doi.org/10.17816/JOWD48672

Received: 28.10.2020 **Accepted:** 11.03.2021 **Published:** 30.06.2021

УДК 618.2/.4-06:616.98:578.828HIV
DOI: https://doi.org/10.17816/JOWD48672

Особенности течения беременности и родов у ВИЧ-инфицированных женщин

© О.Л. Мозалева[1], А.В. Самарина[1, 2]

[1] Центр по профилактике и борьбе со СПИД и инфекционными заболеваниями, Санкт-Петербург, Россия;
[2] Первый Санкт-Петербургский государственный медицинский университет им. акад. И.П. Павлова, Санкт-Петербург, Россия

ВИЧ-инфицированные женщины подвергаются значительно большему риску развития осложнений беременности и родов (хроническая плацентарная недостаточность, анемия беременных, отслойка нормально расположенной плаценты, преждевременные роды) по сравнению с неинфицированными ВИЧ беременными, особенно при присоединении оппортунистических инфекций, наличии иммунодефицита и высокой вирусной нагрузки в крови. Сложность изучения акушерской патологии у пациенток данной группы обусловлена широким спектром отягощающих факторов, непосредственно не связанных с ВИЧ-инфекцией, но часто ее сопровождающих: активным потреблением наркотических средств, дефицитом массы тела, коинфицированием хроническими вирусными гепатитами. В обзоре литературы приведены данные российских и международных исследований о влиянии ВИЧ-инфекции на частоту осложнений беременности, родов, послеродового периода и состояние новорожденных. Представлены современные рекомендации по выбору метода родоразрешения у ВИЧ-инфицированных женщин.

Ключевые слова: ВИЧ-инфицированные беременные; частота осложнений беременности и родов; профилактика перинатальной передачи ВИЧ.

Как цитировать:
Мозалева О.Л., Самарина А.В. Особенности течения беременности и родов у ВИЧ-инфицированных женщин // Журнал акушерства и женских болезней. 2021. Т. 70. № 3. С. 103–113. DOI: https://doi.org/10.17816/JOWD48672

Рукопись получена: 28.10.2020 **Рукопись одобрена:** 11.03.2021 **Опубликована:** 30.06.2021

Aspects of obstetric pathology in women with human immunodeficiency virus infection

While antiretroviral therapy (ARVT) was not yet used in pregnant women with HIV infection, these patients had a high incidence of complications during pregnancy, childbirth, and postpartum compared with the general population [1]. Since the introduction of highly active antiretroviral therapy (HAART) in pregnancy, the incidence of complications has decreased but remains above that of the general population. Several studies have demonstrated that even the use of HAART in pregnant women with HIV infection does not rule out an increased risk of adverse pregnancy and childbirth outcomes, although this pattern has been noted not many researchers [2–4]. Several authors believe that the incidence of complications of pregnancy and childbirth in women with HIV infection is higher in countries with a low standard of living, where HAART is less available [5]. In general, markers of more advanced stages of HIV infection, such as a low level of CD4 lymphocytes, and presence of opportunistic infections in pregnant women can increase the incidence of obstetric complications [6].

Most studies have shown that the incidence of sexually transmitted diseases (STDs) is higher in pregnant women with HIV infection than in the general population. STDs during pregnancy are often accompanied by inflammatory changes in the placenta and increase the risk of pregnancy termination, preterm delivery, and perinatal HIV transmission by disrupting the protective mechanisms of the fetoplacental complex [7, 8]. A study published in 2012 performed a comparative analysis of two groups of pregnant women with HIV infection, namely, those who had perinatal HIV transmission and those who gave birth to children without HIV infection. The authors revealed that a combination of bacterial–viral lesions in the placenta with signs of chronic placental insufficiency and acute decompensation developed in patients with STDs who infected their children with HIV during pregnancy [7].

The incidence of various STDs is higher in pregnant women with HIV infection than in HIV-seronegative women [8]. Since a significant proportion of the group of pregnant women with HIV infection is represented by patients characterized by a low adherence to monitoring in medical institutions, as well as social maladjustment, having several sexual partners, active consumption of alcohol and drugs, and disinterest in the health of the unborn child, the diagnostics and treatment of STDs in this group are complicated. In turn, untreated infections of the urogenital tract can cause damage to the placenta with the development of chorioamnionitis, chronic placental insufficiency, and antenatal HIV transmission to the fetus [9].

STDs such as herpes, cytomegalovirus, and Candida infections are detected more often in pregnant women with advanced stage of HIV infection who did not receive ARVT or had late initiation of therapy because of immunodeficiency than in the general population, and they can also be regarded as opportunistic infections, that is, conditions affecting negatively the course of HIV infection [10].

Herpes is one of the most frequent opportunistic diseases; its prevalence in pregnant women with HIV infection is steadily increasing owing to an emerging HIV pandemic and the increasing role of the heterosexual transmission route. A study revealed that the prevalence of herpetic infection in the general population of pregnant women varies from 7% to 40% [11], while it can reach 50%–90% in women with HIV infection [12]. An exacerbation of herpetic infection in early pregnancy leads to miscarriage due to infectious embryopathies and chronic endometritis caused by long-term persistence of the virus in the endometrium [13]. When the fetus passes the infected birth canal of the mother, the risk of neonatal herpes is high because of the direct contact with the infected mucous membranes of the birth canal. To prevent this complication, delivery by a well-planned cesarean section is recommended [14]. In addition, the presence of herpetic infection can greatly increase the risk of perinatal transmission of HIV during labor [12, 15].

Vulvovaginal candidiasis is one of the most common diseases during pregnancy. In the general population, *Candida* infection is detected in 30%–40% of pregnancies and can reach 45%–50% by the third trimester [16], and in women with HIV infection, it is detected in 70% of pregnancy cases [17]. In pregnant women with HIV infection, vulvovaginal candidiasis can also be regarded as an opportunistic infection. In a study conducted in India, no direct correlation was found between the levels of CD4 lymphocytes and HIV RNA in the blood plasma and the incidence of vulvovaginal candidiasis in pregnant women with HIV infection [18]. This suggests that screening for the presence of fungi of the genus *Candida* should be performed in all pregnant women with HIV infection, regardless of the term, and if vaginal candidiasis is detected, timely treatment should be prescribed according to the current recommendations. Untreated vaginal candidiasis during pregnancy may be associated with an increased risk of spontaneous miscarriage, premature rupture of membrane, premature delivery, and low birth weight [19].

Anemia is a common complication of pregnancy. The frequency of anemia in pregnant women without HIV infection ranges from 15% to 50%, with an average of 32% in Russia [20]. Anemia is registered in pregnant women with HIV infection 1.5 times more often than that in the general population [21]. Iron deficiency affects adversely the course of pregnancy, childbirth, and postpartum, as it increases the frequency of preterm delivery and weak uterine contraction. Since preterm delivery and weak uterine contraction increase the risk of perinatal HIV transmission, reducing the

DOI: https://doi.org/10.17816/JOWD48672

incidence of anemia in pregnant women with HIV infection may reduce the risk of infection in infants born from infected mothers [22]. The main causes of anemia during pregnancy include a decrease in iron intake; deficiencies in folic acid, B vitamins, and proteins; chronic gastrointestinal diseases; a burdened obstetric history (i.e., frequent childbirth, history of spontaneous miscarriages, bleeding in previous births, and depletion iron reserve); and complications of the current pregnancy (i.e., multifetal pregnancy, bleeding during pregnancy of various localizations, and placenta previa). In pregnant women with HIV infection, these factors may be associated with chronic viral inflammation of the bone marrow, and intake of antiretroviral drugs such as zidovudine and phosphazide. During pregnancy, patients with HIV infection are prone to malabsorption, which appears to be caused by HIV infection [23]. To diagnose anemia in pregnant women with HIV infection, a comprehensive examination is necessary to identify the cause of anemia.

Thrombocytopenia in pregnant women with HIV infection occurs at all stages of the disease, and its incidence ranged from 10% to 15%, with a tendency to increase in case of progressive immunodeficiency [24]. During pregnancy, childbirth, and postpartum, thrombocytopenia is associated with a risk of bleeding. Thrombocytopenia that develops in HIV infection is referred to as secondary immune-acquired thrombocytopenia. The immune response underlying the development of thrombocytopenias is a complex multistep cyclic process involving B-lymphocytes, T-lymphocytes, natural killer cells, macrophages, and cytokines. Antiplatelet antibodies accelerate the clearance of platelets from the circulation. The binding of antibodies to platelets leads to Fcγ receptor (FcγR)-mediated destruction of platelets by phagocytes [25]. In HIV infection, impaired production of platelets also occurs. Given the damaging effect of HIV in the bone marrow, the production of megakaryocytes, which are precursors of platelets, is reduced, and their differentiation is impaired. Thrombocytopenia can be an indicator of advanced progressive liver disease, such as chronic viral hepatitis, often associated with HIV infection. In this case, increased destruction of platelets is associated, in addition to the autoimmune mechanism, with hypersplenism syndrome and portal hypertension, resulting in a delay and destruction of the formed elements in the hypertrophied spleen [26]. Some studies have confirmed the effect of certain antiretroviral drugs on lowering platelet levels. Thus, in the initial weeks of taking non-nucleoside reverse transcriptase inhibitors, owing to their toxic effect on the liver, fibrinolysis is activated, and the production of antiplasmin decreases [27].

Given the significant proportion of the parenteral transmission of HIV infection, the frequency of coinfection with chronic viral hepatitis B and C in pregnant women with HIV infection remains high. In total, 61.9 thousand cases of hepatitis B and C were registered in the Russian Federation (with 65.1 and 68.1 thousand cases in 2017 and 2016, respectively). The incidence rates of chronic hepatitis B differ sharply across the constituent entities of the Russian Federation, so the prevalence ranges from 1.85 to 128.69 per 100 thousand populations. This value depends to a certain extent on the quality of diagnostics and completeness of registration of these diseases as well as on the geographical aspects of the region with rampant narcotic drug trafficking [28]. The prevalence of chronic viral hepatitis B among pregnant women in the Russian Federation reaches 0.5% [29]. However, data on the prevalence of chronic viral hepatitis C in pregnant women in Russia are insufficient. Several authors claim that the incidence rate ranges from 8% to 15% [30]. In pregnant women with HIV infection, the prevalence of chronic hepatitis C reached 60% by the end of 2016 [31]. Threatened miscarriage is one of the most common obstetric complications in patients with both hepatitis B and HIV. The frequency of its development is higher with an increase in the activity of hepatic transaminases; therefore, the dynamic determination of alanine aminotransferase activity during pregnancy can be a criterion for predicting the risk of threatened miscarriage [32].

A study conducted in St. Petersburg in 2013 reported that the most common complications in pregnant women with HIV infection were chronic placental insufficiency in 35.5% of the cases (10%–24% in the general population), preeclampsia of varying severities in 27.5% (12%–22% in the general population), and premature rupture of membranes in 24.2% (up to 18% in the general population) [33–36]. Threatened miscarriage, polyhydramnios, and abnormal placenta location were diagnosed less commonly. Every third pregnant woman (33.4%) had a combination of these complications of pregnancy [33].

Selection of delivery method in pregnant women with HIV infection

Choosing the delivery method in pregnant women with HIV infection is important in terms of reducing the risk of perinatal transmission of HIV and resolving the emerging obstetric situations. In 1999, the American Congress of Obstetricians and Gynecologists recommended elective cesarian section at week 38 of gestation for all women with HIV infection and plasma viral load higher than 1000 copies/ml. These recommendations were based on the results of a meta-analysis that included 15 studies from six European countries [37]. These studies analyzed the frequency of perinatal HIV transmission in women with different methods of delivery. HIV infection was diagnosed in 8.8% of children born by a cesarean section performed after rupture of the membranes, in 10.2% of cases during vaginal delivery, and in 2.4% of cases with elective caesarian

section. Thus, researchers concluded that elective cesarean section can reduce the risk of fetal HIV infection by 50% [38].

Currently, the preferred method of delivery in women with HIV infection is based on the presence or absence of epidemiological indications for a cesarean section as well as obstetric and/or somatic indications for surgical delivery. The presence of HIV infection in a pregnant woman is not an indication for a cesarean section. Surgical delivery in pregnant women with HIV infection is preferable only in cases when it objectively reduces the risk of intrapartum transmission of infection (in a planned manner, before the onset of labor while maintaining the integrity of the fetal bladder) in women with a high or unknown HIV viral load or in the presence of obstetric and somatic indications. The frequency of surgical delivery in both pregnant women with and without HIV infection varies among countries, as it is 25% of the total number of births in the UK, 30% in the USA, up to 70% in Brazil, and ≥20% in Russia [39, 40]. The proportion of surgical delivery in pregnant women with HIV infection remains higher than that in the general population, which is most likely due to the higher incidence of pathology in pregnancy and childbirth, as well as the higher incidence of somatic pathology in these patients. In the Russian Federation, the frequency of cesarean section reaches 45% in pregnant women with HIV infection [33].

Complications during delivery and postpartum period in women with HIV infection

Several researchers have revealed that the incidence of preterm delivery in patients with HIV infection is significantly higher than that in the general population, regardless of the presence or absence of ARVT during pregnancy [5, 41]. This is primarily due to the presence of a chronic viral infection as well as the greater prevalence of genital tract infections and other risk factors for preterm delivery (such as low social and economic status, smoking, and drug addiction) [42]. Scientists have different opinions about the effect of ARVT on the rate of preterm delivery in women with HIV infection; the prescription of HAART at the stage of pregnancy planning can reduce the level of HIV RNA in the blood, reduce the systemic inflammatory process, and restore the immune system, which in turn should lead to a reduction in the frequency of preterm delivery. By contrast, several authors have indicated an even greater proportion of preterm deliveries among patients with HIV infection who received ARVT for a long time and with persistent suppression of viremia [2, 3, 43]. In a Swiss study of HIV infection in mothers and children, women who received HAART before pregnancy had an almost two times higher risk of preterm delivery than patients who received zidovudine monotherapy from the third trimester of pregnancy [44]. Researchers suggested that ARVT during pregnancy can cause an imbalance in the Th1/Th2 immune response, induce chronic placental insufficiency, and reduce progesterone levels, which is the trigger for early delivery [45]. A recent study revealed a relationship between long-term intake of protease inhibitors (saquinavir/ritonavir, lopinavir/ritonavir) and increased incidence of preterm delivery [43]. In another study, the authors believe that these drugs lead to a decrease in the level of interleukin-10, an anti-inflammatory cytokine produced by monocytes and macrophages, which plays an important role in pregnancy maintenance [46].

Many studies have noted a number of complications, and the frequency of which is higher in pregnant women with HIV infection and puerperas, including preterm discharge of amniotic fluid, labor abnormalities with a predominance of weak uterine contraction, chronic and acute intrauterine fetal hypoxia, and significantly greater blood loss during childbirth [42, 47]. However, the relationship between these obstetric complications and the course of HIV infection, viral load, and immune status during pregnancy has not been investigated. According to Russian researchers, preeclampsia and chronic placental insufficiency are diagnosed three times more often and 1.5 times more often in pregnant women with HIV infection than in the general population [48]. The causes of the increased incidence of preeclampsia are not fully understood. The suggestion was that the rate of migration of trophoblasts decreased and that the uterine vessels retained the same structure as in the absence of pregnancy, which resulted in the rapid development of endotheliosis [49, 50].

The incidence of postpartum complications is higher in puerperas with HIV infection than in the general population [51, 52]. The causes of the increase in the incidence of complications are multifactorial and are associated with social and behavioral characteristics, presence of concomitant infections of the urogenital tract, and a high frequency of delivery by cesarean section. Many authors reported that HIV infection in combination with a low social status increased the risk of uterine subinvolution twofold [53].

Women with HIV infection have an increased risk of postoperative complications (such as endometritis, infiltration, and suppuration of the postoperative scar, perineal suture infections, and sepsis) compared with women without HIV infection. Probably, the frequency of complications correlates with the degree of immunosuppression [54]. The influence of the level of viremia in postpartum women on the incidence of postpartum complications has not been established.

Conditions of newborns born to mothers with HIV infection

When the placental tissue is infected with HIV, signs of chronic placental insufficiency with pronounced nonspecific involutive-dystrophic changes and acute circulatory disorders are evident [55]. Functional inconsistency of the

placenta is the main cause of intrauterine hypoxia, fetal growth retardation, and its damage during childbirth [56].

Among pathologies of children born to mothers with HIV infection, the most frequent are perinatal lesions of the central nervous system (37.3%), varying degrees of undernutrition (26.1%), and asphyxia at birth (28.4%) [22]. Neonatal abstinence syndrome is often observed, which severity depends directly on the time of the mother's last intake of psychotropic substances [47].

Studies of the effect of antiretroviral drugs taken during pregnancy on the condition of the newborn have shown that HAART does not affect significantly the fetus, but there may be toxic effects on the hematopoietic system (zidovudine) or hyperbilirubinemia (atazanavir). In exceptional cases, liver damage (hepatotoxic effect of nevirapine), kidney damage (nephrotoxic effect of tenofovir), or hyperlipidemia associated with ritonavir-boosted lopinavir are diagnosed [57]. Babies whose mothers received HAART throughout their pregnancy are usually born with a lower weight than the population and gain weight more slowly during the neonatal period. Subsequently, no significant differences were found in the physical development of children [58]. Several studies in Africa have shown that children born to mothers with HIV infection are at increased risk of neonatal and infant mortality. Most likely, this is due to availability of ARVT both for prophylaxis during pregnancy and for the treatment of a child with perinatal HIV transmission [6].

CONCLUSIONS

The course of pregnancy, childbirth, and postpartum in women with HIV infection is accompanied by a higher frequency of complications and adverse outcomes than in the general population. The most common obstetric complications in these patients are bacterial–viral lesions of the placenta with the formation of chronic placental insufficiency, preterm delivery, high frequency of surgical delivery, and birth of newborns with body weight inappropriate for the gestational age. The main risk factors for the pathological course of pregnancy and childbirth in patients with HIV infection are the high prevalence of STDs, chronic hepatitis, anemia, thrombocytopenia and, in some cases, intake of antiretroviral drugs with proven toxic effects. A high level of HIV RNA in the mother's blood and a low level of CD4 lymphocytes can be associated with several comorbidities associated with HIV, complicating pregnancy, childbirth, and postpartum.

The social and behavioral characteristics of pregnant women with HIV infection, such as active use of psychoactive drugs and/or alcohol, unsafe sexual behaviors contributing to STD infection, chronic viral hepatitis, as well as low adherence to monitoring and chemoprophylaxis, have a significant effect on the course of pregnancy. The causes of the increased incidence of obstetric complications in women with HIV infection are multifactorial.

REFERENCES

1. Ross A, van der Paal L, Lubega R, et al. HIV-1 disease progression and fertility: the incidence of recognized pregnancy and pregnancy outcome in Uganda. *AIDS*. 2004;18(5):799–804. DOI: 10.1097/00002030-200403260-00012

2. Chen JY, Ribaudo HJ, Souda S, et al. Highly active antiretroviral therapy and adverse birth outcomes among HIV-infected women in botswana. *J Infect Dis*. 2012;206(11):1695–1705. DOI: 10.1093/infdis/jis553

3. Ezechi OC, Gab-Okafor CV, Oladele DA, et al. Pregnancy, obstetric and neonatal outcomes in HIV positive Nigerian women. *African J Reprod Health*. 2013;17(3):160–168.

4. Massad LS, Springer G, Jacobson L, et al. Pregnancy rates and predictors of conception, miscarriage and abortion in US women with HIV. *AIDS*. 2004;18(2):281–286. DOI: 10.1097/00002030-200401230-00018

5. Uthman OA, Nachega JB, Anderson J, et al. Timing of initiation of antiretroviral therapy and adverse pregnancy outcomes: a systematic review and meta-analysis. *Lancet HIV*. 2017;4(1):e21–e30. DOI: 10.1016/S2352-3018(16)30195-3

6. Zijenah LS, Moulton LH, Iliff P, et al. Timing of mother-to-child transmission of HIV-1 and infant mortality in the first 6 months of life in Harare, Zimbabwe. *AIDS*. 2004;18(2):273–280. DOI: 10.1097/00002030-200401230-00017

7. Kolobov AV, Niauri DA, Musatova EV, et al. The significance of morphological study of placentas from the hiv-infected women. *VIČ-infekciâ i immunosupressii*. 2012;4(1):42–50. (In Russ.)

8. Kustova MA. Papillomavirus and genital co-infections in pregnant hiv-negative and hiv-positive women. *Problemy zdorov'ya i ekologii*. 2012;32(2):77–84. (In Russ.)

9. Niauri DA, Kolobov AV, Tsinzerling VA, et al. The placenta as the epidemic factor of vertical hiv transmission risk in conditions of comorbidity. *VIČ-infekciâ i immunosupressii*. 2016;8(4):7–16. (In Russ.)

10. Belyakov NA, Rassohin VV. Komorbidnye sostoyaniya pri VICH-infekcii. CHast' 1. Osnovy problem. Saint Petersburg: Baltijskij medicinskij obrazovatel'nyj centr; 2018. (In Russ.)

11. Tyutyunnik VL, Kan NE, Mikhailova OI. Patogenetic aspects of herpes infection and its influence on the course of pregnancy. *Akusherstvo i ginekologiya: Novosti. Mneniya. Obucheniya*. 2016;(2):39–43. (In Russ.)

12. Chun HM, Carpenter RJ, Macalino GE, Crum-Cianflone NF. The role of sexually transmitted infections in HIV-1 Progression: A comprehensive review of the literature. *J Sex Transm Dis*. 2013;2013:176459. DOI: 10.1155/2013/176459

13. Shakhverdyan YG, Zhukova LI. Herpes zoster in hiv-infected pregnant women. *Kubanskij nauchnyj medicinskij vestnik*. 2016;(6):145–150. (In Russ.)

14. Klinicheskie rekomendacii. VICh-infekcija: profilaktika perinatal'noj peredachi virusa immunodeficita cheloveka. Ed. by E.E. Voronin, L.Yu. Afonina, I.B. Latysheva et al. Moscow; 2017. (In Russ.). [cited 2021 Apr 25]. Available from: https://medi.ru/klinicheskie-rekomendatsii/vich-infektsiya-profilaktika-perinatalnoj-peredachi-virusa-immunodefitsita_14330/#part_5

15. Chen KT, Segú M, Lumey LH, et al. Genital herpes simplex virus infection and perinatal transmission of human immunodeficiency virus. *Obstet Gynecol*. 2005;106(6):1341–1348. DOI: 10.1097/01.AOG.0000185917.90004.7c

16. Strizhakov AN, Belotserkovtseva LD, Budanov PV. A systemic approach to choosing a clinical solution for vulvovaginal infections. *Voprosy ginekologii, akusherstva i perinatologii*. 2014;13(1):60–66. (In Russ.)

17. Rakhmanova AG, Bubochkin AB, Vinogradova AN, et al. Candidiasis in patients with HIV / AIDS. *HIV Infection and Immunosuppressive Disorders*. 2015;7(1):60–68. (In Russ.). DOI: 10.22328/2077-9828-2015-7-1-60-68

18. Bhattar S, Bhalla P, Rawat D, et al. Correlation of CD4 T cell count and plasma viral load with reproductive tract infections/sexually transmitted infections in HIV infected females. *J Clin Diagn Res*. 2014;8(10):DC12–DC14. DOI: 10.7860/JCDR/2014/10266.5049

19. Kokoeva DN, Medzidova MK, Lomova NA, et al. Prevention of premature birth in pregnant women with vaginal candidiasis. *Meditsinsky Sovet*. 2019;(7):52–56. (In Russ.). DOI: 10.21518/2079-701X-2019-7-52-56

20. Korotkova NA, Prilepskaya VN. Anaemia in pregnant women. Principles of therapy today. *Meditsinskiy Sovet*. 2015;(XX):58–63. (In Russ.). DOI: 10.21518/2079-701X-2015-XX-58-63

21. Phillips UK, Rosenberg MG, Dobroszycki J, et al. Pregnancy in women with perinatally acquired HIV-infection: outcomes and challenges. *AIDS Care*. 2011;23(9):1076–1082. DOI: 10.1080/09540121.2011.554643

22. Belokoneva TS, Tezikov YV, Lipatov IS, Agafonova OV. Retrospective analysis of pregnancy and its outcomes in women with hiv infection. *Tavricheskij mediko-biologicheskij vestnik*. 2018;21(2–2):14–19. (In Russ.)

23. Krugova LV, Vartanov VYa, Hutorskaya NN, et al. Korrekciya anemii u VICH-inficirovannyh beremennyh, poluchayushchih antiretrovirusnye preparaty. *Anesteziologiya i reanimatologiya*. 2012;(6):17–21 (In Russ.)

24. Hajretdinov RK, Davydkin IL, Kurtov IV, et al. Trombocitopeniya pri VICH-infekcii. *Vestnik RUDN. Seriya: Medicina*. 2010;(3):129–132. (In Russ.)

25. Swinkels M, Rijkers M, Voorberg J, et al. Emerging concepts in immune thrombocytopenia. *Front Immunol*. 2018;9:880. DOI: 10.3389/fimmu.2018.00880

26. Bakulin IG, Sharabanov AS, Molyarenko EV, YAkovleva EV. Trombocitopenii u bol'nyh hronicheskim gepatitom C. *Experimental and clinical gastroenterology*. 2010;(5):52–60. (In Russ.)

27. Omoregie R, Adeghe JE, Ogefere HO, et al Haemorheologic and fibrinolytic activity in Nigerian HIV infected patients. *Afr Health Sci*. 2008;8(4):217–219.

28. Rospotrebnadzor. O sostojanii sanitarno-jepidemiologicheskogo blagopoluchija naselenija v Rossijskoj Federacii v 2018 godu: Gosudarstvennyj doklad. Moscow: Federal'naja sluzhba po nadzoru v sfere zashhity prav potrebitelej i blagopoluchija cheloveka; 2019. (In Russ.). [cited 2021 Apr 25]. Available from: https://www.rospotrebnadzor.ru/upload/iblock/798/gosudarstvennyy-doklad-o-sostoyanii-sanitarno_epidemiologicheskogo-blagopoluchiya-naseleniya-v-rossiyskoy-federatsii-v-2018-godu.pdf

29. Belopolskaya MA, Avrutin VYu, Ostankova YuV. et al. Prevalence and genetic variants of virus hepatitis b in pregnant women. *HIV Infection and Immunosuppressive Disorders*. 2017;9(4):55–64 (In Russ.). DOI: 10.22328/2077-9828-2017-9-4-55-64

30. Mozes KB, Mozes VG, Zaharov IS, et al. Hepatitis C in pregnancy – modern approaches to screening, treatment and prevention of complications. *Mat' i ditja v Kuzbasse*. 2019;3(78):4–9. (In Russ.)

31. Gutova LV. Kliniko-immunologicheskaya harakteristika zhenshchin reproduktivnogo vozrasta na fone lecheniya koinfekcii VICH i HGS. [dissertation]. Saint-Petersburg; 2019. (In Russ.). [cited 2021 Apr 25]. Available from: https://www.dissercat.com/content/kliniko-immunologicheskaya-kharakteristika-zhenshchin-reproduktivnogo-vozrasta-na-fone-leche

32. Belopol'skaya MA. Osobennosti techeniya beremennosti, rodov i sostoyanie novorozhdennyh u zhenshchin s hronicheskim virusnym gepatitom C i VICH-infekciej. [dissertation]. Moscow; 2003. (In Russ.). [cited 2021 Apr 25]. Available from: https://www.dissercat.com/content/osobennosti-techeniya-beremennosti-rodov-i-sostoyanie-novorozhdennykh-u-zhenshchin-s-khronic

33. Niauri DA, Yakovlev AA, Penchuk TE, et al. Clinical characteristics and obstetrical principals at HIV-infected women in Saint Petersburg. *Journal of obstetrics and women's diseases*. 2014;63(5):64–72. (In Russ.). DOI: 10.17816/JOWD63564-72

34. Guzhvina EN, Mamiev OB. Placentarnaya nedostatochnost' s pozicii koncepcii o tipah adaptacii materi i ploda k rodovomu stress. *Vestnik Rossijskoj Voenno-medicinskoj akademii*. 2012;3(39):81–85. (In Russ.)

35. Glukhova TN, Chesnokova NP, Rogozhina IE, Sergeeva ON. Modern understanding of the pathogenesis of preeclampsia as a set of sample pathological process and pathological conditions, complicated pregnancy. *Scientific Review. Medical Sciences.* 2016;(2):12–32. (In Russ.)

36. Bolotsky VM. Premature rupture of membranes in term pregnancy: prognosis, pathogenesis, management of pregnancy and labor. *Journal of obstetrics and women's diseases*. 2013;62(6):12–18. (In Russ.). DOI: 10.17816/JOWD62612-18

37. Townsend CL, Tookey PA, Newell ML, Cortina-Borja M. Antiretroviral therapy in pregnancy: balancing the risk of preterm delivery with prevention of mother-to-child HIV transmission. *Antivir Ther*. 2010;15(5):775–783. DOI: 10.3851/IMP1613

38. European Mode of Delivery Collaboration. Elective caesarean-section versus vaginal delivery in prevention of vertical HIV-1 transmission: a randomised clinical trial. *Lancet*. 1999;353(9158):1035–1039. DOI: 10.1016/s0140-6736(98)08084-2
39. Radzinskij VE. Akusherskaya agressiya. Moscow: Status Prezens; 2011. (In Russ.)
40. Stepanova RN. Problems of delivery after cesarean section. *Ulyanovsk Medico-Biological Journal*. 2018;(3):19–28. (In Russ.). DOI: 10.23648/UMBJ.2018.31.17211
41. Delicio AM, Lajos GJ, Amaral E, et al. Adverse effects in children exposed to maternal HIV and antiretroviral therapy during pregnancy in Brazil: a cohort study. *Reprod Health*. 2018;15(1):76. DOI: 10.1186/s12978-018-0513-8
42. Marinkin IO, Pozdnyakov IM, Luzan OD, et al. Features of gestation course and labors at HIV-seropositive women. *Journal of Siberian Medical Sciences*. 2015;(3):71. (In Russ.)
43. Watts DH, Williams PL, Kacanek D, et al. Combination antiretroviral use and preterm birth. *J Infect Dis*. 2013;207(4):612–621. DOI: 10.1093/infdis/jis728
44. European Collaborative Study; Swiss Mother and Child HIV Cohort Study. Combination antiretroviral therapy and duration of pregnancy. *AIDS*. 2000;14(18):2913–2920. DOI: 10.1097/00002030-200012220-00013
45. Papp E, Mohammadi H, Loutfy MR, et al. HIV protease inhibitor use during pregnancy is associated with decreased progesterone levels, suggesting a potential mechanism contributing to fetal growth restriction. *J Infect Dis*. 2015;211(1):10–18. DOI: 10.1093/infdis/jiu393
46. Hanna N, Bonifacio L, Weinberger B, et al. Evidence for interleukin-10-mediated inhibition of cyclo-oxygenase-2 expression and prostaglandin production in preterm human placenta. *Am J Reprod Immunol*. 2006;55(1):19–27. DOI: 10.1111/j.1600-0897.2005.00342.x
47. Novikova ON, Shvets EM. Risk factors and features of pregnency, deliviries and the fetus condition in HIV-infected women. *Mother and Baby in Kuzbass*. 2017;(3):16–20. (In Russ.)
48. Gorlenko AV, Voroshilina ES, Konovalov VI, et al. Kliniko-immunologicheskie osobennosti techeniya beremennosti i rodov pri VICH-infekcii. *Ural'skij medicinskij zhurnal*. 2004;(4):13–15. (In Russ.)
49. Ioannidi EA. Osobennosti klinicheskogo techeniya VICH-infekcii u beremennyh. *Byulleten' Volgogradskogo nauchnogo centra RAMN*. 2006;(1):6–7. (In Russ.)
50. Alekhina AG, Blesmanovich AE, Petrov YA. Pregnancy, childbirth, a fetus and newborn from mothers with papillomaviruses infection. Modern problems of science and education. 2018;(3). (In Russ.). [cited 2021 Apr 25]. Available from: http://www.science-education.ru/ru/article/view?id=27538
51. Konnov DS, Goliusova MD, Konnov VV, et al. Evaluation of the effectiveness and safety of chemoprophylaxis for vertical HIV transmission, by using the regimens of monotherapy and highly active antiretroviral therapy. *Epidemiology and Infectious Diseases*. 2010;15(3):46–51. (In Russ.). DOI: 10.17816/EID40487
52. Zavalko AF, Kotelnikov VV. Ways of preventing mother-to-child vertical hiv transmission. *Journal of New Medical Technologies*. 2016;23(4):287–293. (In Russ.)
53. Kotelnikov VV, Zavalko AF, Tselkovich LS. Analysis of the postpartum period in hiv-infected women from various social groups. *Vestnik medicinskogo instituta "Reaviz": reabilitaciya, vrach i zdorov'e*. 2018;(34):75–79. (In Russ.)
54. Donnelly M, Davies JK. Contemporary management of human immunodeficiency virus in pregnancy. *Obstet Gynecol Clin North Am*. 2014;41(4):547–571. DOI: 10.1016/j.ogc.2014.08.003
55. Kolobov AV. The morphogenesis of the human placenta and its morphofunctional state in the pathology of pregnancy. *Vestnik of Saint Petersburg University. Series 11. Medicine*. 2015;(2):5–18. (In Russ.)
56. Arzhanova ON, Kosheleva NG, Gromyko GL. Placentarnaya nedostatochnost': diagnostika i lechenie: uchebnoe posobie. Saint Petersburg: Izd-vo N-L; 2001. (In Russ.)
57. Blanche S. Mini review: Prevention of mother-child transmission of HIV: 25 years of continuous progress toward the eradication of pediatric AIDS? *Virulence*. 2020;11(1):14–22. DOI: 10.1080/21505594.2019.1697136
58. Castetbon K, Ladner J, Leroy V, et al. Low birthweight in infants born to African HIV-infected women: relationship with maternal body weight during pregnancy: Pregnancy and HIV Study Group (EGE). *J Trop Pediatr*. 1999;45(3):152–157. DOI: 10.1093/tropej/45.3.152

СПИСОК ЛИТЕРАТУРЫ

1. Ross A., van der Paal L., Lubega R. et al. HIV-1 disease progression and fertility: the incidence of recognized pregnancy and pregnancy outcome in Uganda // AIDS. 2004. Vol. 18. No. 5. P. 799–804. DOI: 10.1097/00002030-200403260-00012
2. Chen J.Y., Ribaudo H.J., Souda S. et al. Highly active antiretroviral therapy and adverse birth outcomes among HIV-infected women in Botswana // J. Infect. Dis. 2012. Vol. 206. No. 11. P. 1695–1705. DOI: 10.1093/infdis/jis553
3. Ezechi O.C., Gab-Okafor C.V., Oladele D.A. et al. Pregnancy, obstetric and neonatal outcomes in HIV positive Nigerian women // African. J. Reprod. Health. 2013. Vol. 17. No. 3. P. 160–168.
4. Massad L.S., Springer G., Jacobson L. et al. Pregnancy rates and predictors of conception, miscarriage and abortion in US women with HIV // AIDS. 2004. Vol. 18. No. 2. P. 281–286. DOI: 10.1097/00002030-200401230-00018
5. Uthman O.A., Nachega J.B., Anderson J. et al. Timing of initiation of antiretroviral therapy and adverse pregnancy outcomes: a systematic review and meta-analysis // Lancet HIV. 2017. Vol. 4. No. 1. P. e21–e30. DOI: 10.1016/S2352-3018(16)30195-3
6. Zijenah L.S., Moulton L.H., Iliff P. et al. Timing of mother-to-child transmission of HIV-1 and infant mortality in the first 6 months of life in Harare, Zimbabwe // AIDS. 2004. Vol. 18. No. 2. P. 273–280. DOI: 10.1097/00002030-200401230-00017

7. Колобов А.В., Ниаури Д.А., Мусатова Е.В. и др. Значение структурных изменений плаценты у ВИЧ-инфицированных женщин // ВИЧ-инфекция и иммуносупрессии. 2012. Т. 4. № 1. С. 42–50.

8. Кустова М.А. Папилломавирусная и сопутствующая инфекция гениталий у беременных с ВИЧ-отрицательным и ВИЧ-положительным статусом // Проблемы здоровья и экологии. 2012. Т. 32. № 2. С. 77–84.

9. Ниаури Д.А., Колобов А.В., Цинзерлинг В.А. и др. Плацента человека как эпидемический фактор риска вертикальной передачи ВИЧ в условиях коморбидности // ВИЧ-инфекция и иммуносупрессии. 2016. Т. 8. № 4. С. 7–16.

10. Беляков Н.А., Рассохин В.В. Коморбидные состояния при ВИЧ-инфекции. Ч. 1. Основы проблемы. Санкт-Петербург, 2018.

11. Тютюнник В.Л., Кан Н.Е., Михайлова О.И. Патогенетические аспекты герпетической инфекции и ее влияние на течение беременности // Акушерство и гинекология: Новости. Мнения. Обучение. 2016. № 2. С. 39–43.

12. Chun H.M., Carpenter R.J., Macalino G.E., Crum-Cianflone N.F. The role of sexually transmitted infections in HIV-1 Progression: A comprehensive review of the literature // J. Sex. Transm. Dis. 2013. Vol. 2013. P. 176459. DOI: 10.1155/2013/176459

13. Шахвердян Ю.Г., Жукова Л.И. Опоясывающий герпес у ВИЧ-инфицированных беременных женщин // Кубанский научный медицинский вестник. 2016. № 6. С. 145–150.

14. Клинические рекомендации. ВИЧ-инфекция: профилактика перинатальной передачи вируса иммунодефицита человека / под ред. Е.Е. Воронин, Афонина Л.Ю., И.Б. Латышева и др. Москва, 2017. [дата обращения 25.04.2021]. Доступ по ссылке: https://medi.ru/klinicheskie-rekomendatsii/vich-infektsiya-profilaktika-perinatalnoj-peredachi-virusa-immunodefitsita_14330/#part_5

15. Chen K.T., Segú M., Lumey L.H. et al. Genital herpes simplex virus infection and perinatal transmission of human immunodeficiency virus // Obstet. Gynecol. 2005. Vol. 106. No. 6. P. 1341–1348. DOI: 10.1097/01.AOG.0000185917.90004.7c

16. Стрижаков А.Н., Белоцерковцева Л.Д., Буданов П.В. Системный подход к выбору клинического решения при вульвовагинальных инфекциях // Вопросы гинекологии, акушерства и перинатологии. 2014. Т. 13. № 1. С. 60–66.

17. Рахманова А.Г., Бубочкин А.Б., Виноградова А.Н. и др. Кандидоз у больных с ВИЧ/СПИДом // ВИЧ-инфекция и иммуносупрессии. 2015. Т. 7. № 1. С. 60–68. DOI: 10.22328/2077-9828-2015-7-1-60-68

18. Bhattar S., Bhalla P., Rawat D. et al. Correlation of CD4 T cell count and plasma viral load with reproductive tract infections/sexually transmitted infections in HIV infected females // J. Clin. Diagn. Res. 2014. Vol. 8. No. 10. P. DC12–DC14. DOI: 10.7860/JCDR/2014/10266.5049

19. Кокоева Д.Н., Меджидова М.К., Ломова Н.А. и др. Профилактика преждевременных родов у беременных с вагинальным кандидозом // Медицинский совет. 2019. № 7. С. 52–56. DOI: 10.21518/2079-701X-2019-7-52-56

20. Короткова Н.А., Прилепская В.Н. Анемия беременных. Принципы современной терапии // Медицинский совет. 2015. № XX. С. 58–63. DOI: 10.21518/2079-701X-2015-XX-58-63

21. Phillips U.K., Rosenberg M.G., Dobroszycki J. et al. Pregnancy in women with perinatally acquired HIV-infection: outcomes and challenges // AIDS Care. 2011. Vol. 23. No. 9. P. 1076–1082. DOI: 10.1080/09540121.2011.554643

22. Белоконева Т.С., Тезиков Ю.В., Липатов И.С., Агафонова О.В. Ретроспективный анализ течения беременности и ее исходов у женщин с ВИЧ-инфекцией // Таврический медико-биологический вестник. 2018. Т. 21. № 2–2. С. 14–19.

23. Кругова Л.В., Вартанов В.Я., Хуторская Н.Н. и др. Коррекция анемии у ВИЧ-инфицированных беременных, получающих антиретровирусные препараты // Анестезиология и реаниматология. 2012. № 6. С. 17–21.

24. Хайретдинов Р.К., Давыдкин И.Л., Куртов И.В. и др. Тромбоцитопения при ВИЧ-инфекции // Вестник РУДН. Серия: Медицина. 2010. № 3. С. 129–132.

25. Swinkels M., Rijkers M., Voorberg J. et al. Emerging concepts in immune thrombocytopenia // Front. Immunol. 2018. Vol. 9. P. 880. DOI: 10.3389/fimmu.2018.00880

26. Бакулин И.Г., Шарабанов А.С., Моляренко Е.В., Яковлева Е.В. Тромбоцитопении у больных хроническим гепатитом С // Экспериментальная и клиническая гастроэнтерология. 2010. № 5. С. 52–60.

27. Omoregie H., Adeghe J.E., Ogefere H.O. et al. Haemorheologic and fibrinolytic activity in Nigerian HIV infected patients // Afr. Health. Sci. 2008. Vol. 8. No. 4. P. 217–219.

28. Роспотребнадзаор. О состоянии санитарно-эпидемиологического благополучия населения в Российской Федерации в 2018 году: Государственный доклад. Москва: Федеральная служба по надзору в сфере защиты прав потребителей и благополучия человека, 2019. [дата обращения 25.04.2021]. Доступ по ссылке: https://www.rospotrebnadzor.ru/upload/iblock/798/gosudarstvennyy-doklad-o-sostoyanii-sanitarno_epidemiologicheskogo-blagopoluchiya-naseleniya-v-rossiyskoy-federatsii-v-2018-godu.pdf

29. Белопольская М.А., Аврутин В.Ю., Останкова Ю.В. и др. Распространенность и генетические варианты вирусного гепатита В у беременных женщин // ВИЧ-инфекция и иммуносупрессии. 2017. Т. 9. № 4. С. 55–64. DOI: 10.22328/2077-9828-2017-9-4-55-64

30. Мозес К.Б., Мозес В.Г., Захаров И.С. и др. Гепатит С при беременности — современные подходы к скринингу, лечению и профилактике осложнений // Мать и дитя в Кузбассе. 2019. № 3 (78). С. 4–9.

31. Гутова Л.В. Клинико-иммунологическая характеристика женщин репродуктивного возраста на фоне лечения коинфекции ВИЧ и ХГС: дис. ... канд. мед. наук. Санкт-Петербург, 2019. [дата обращения 25.04.2021]. Доступ по ссылке: https://www.dissercat.com/content/kliniko-immunologicheskaya-kharakteristika-zhenshchin-reproduktivnogo-vozrasta-na-fone-leche

32. Белопольская М.А. Особенности течения беременности, родов и состояние новорожденных у женщин с хроническим ви-

русным гепатитом С и ВИЧ-инфекцией: автореф. дис. ... канд. мед. наук. Москва, 2003. [дата обращения 25.04.2021]. Доступ по ссылке: https://www.dissercat.com/content/osobennosti-techeniya-beremennosti-rodov-i-sostoyanie-novorozhdennykh-u-zhenshchin-s-khronic

33. Ниаури Д.А., Яковлев А.А., Пенчук Т.Е. и др. Особенности акушерской клиники и практика родовспоможения ВИЧ-инфицированных женщин в Санкт-Петербурге // Журнал акушерства и женских болезней. 2014. Т. 63. № 5. С. 64–72. DOI: 10.17816/JOWD63564-72

34. Гужвина Е.Н., Мамиев О.Б. Плацентарная недостаточность с позиции концепции о типах адаптации матери и плода к родовому стрессу // Вестник Российской военно-медицинской академии. 2012. № 3 (39). С. 81–85.

35. Глухова Т.Н., Чеснокова Н.П., Рогожина И.Е., Сергеева О.Н. Современные представления о патогенезе гестоза как совокупности типовых патологических процессов и патологических состояний, осложняющих течение беременности // Научное обозрение. Медицинские науки. 2016. № 2. С. 12–32.

36. Болотских В.М. Преждевременное излитие околоплодных вод при доношенной беременности: прогнозирование, патогенез, тактика ведения беременности и родов // Журнал акушерства и женских болезней. 2013. Т. 62. № 6. С. 12–18. DOI: 10.17816/JOWD62612-18

37. Townsend C.L., Tookey P.A., Newell M.L., Cortina-Borja M. Antiretroviral therapy in pregnancy: balancing the risk of preterm delivery with prevention of mother-to-child HIV transmission // Antivir. Ther. 2010. Vol. 15. No. 5. P. 775–783. DOI: 10.3851/IMP1613

38. European Mode of Delivery Collaboration. Elective caesarean-section versus vaginal delivery in prevention of vertical HIV-1 transmission: a randomised clinical trial // Lancet. 1999. Vol. 353. No. 9158. P. 1035–1039. DOI: 10.1016/s0140-6736(98)08084-2

39. Радзинский В.Е. Акушерская агрессия. Москва: Status Prezens, 2011.

40. Степанова Р.Н. Проблемы родоразрешения женщин после предшествующего кесарева сечения // Ульяновский медико-биологический журнал. 2018. № 3. С. 19–28. DOI: 10.23648/UMBJ.2018.31.17211

41. Delicio A.M., Lajos G.J., Amaral E. et al. Adverse effects in children exposed to maternal HIV and antiretroviral therapy during pregnancy in Brazil: a cohort study // Reprod. Health. 2018. Vol. 15. No. 1. P. 76. DOI: 10.1186/s12978-018-0513-8

42. Маринкин И.О., Поздняков И.М., Лузан О.Д. и др. Особенности течения беременности и родов у ВИЧ-серопозитивных женщин // Медицина и образование в Сибири. 2015. № 3. С. 71.

43. Watts D.H., Williams P.L., Kacanek D. et al. Combination antiretroviral use and preterm birth // J. Infect. Dis. 2013. Vol. 207. No. 4. P. 612–621. DOI: 10.1093/infdis/jis728

44. European Collaborative Study; Swiss Mother and Child HIV Cohort Study. Combination antiretroviral therapy and duration of pregnancy // AIDS. 2000. Vol. 14. No. 18. P. 2913–2920. DOI: 10.1097/00002030-200012220-00013

45. Papp E., Mohammadi H., Loutfy M.R. et al. HIV protease inhibitor use during pregnancy is associated with decreased progesterone levels, suggesting a potential mechanism contributing to fetal growth restriction // J. Infect. Dis. 2015. Vol. 211. No. 1. P. 10–18. DOI: 10.1093/infdis/jiu393

46. Hanna N., Bonifacio L., Weinberger B. et al. Evidence for interleukin-10-mediated inhibition of cyclo- oxygenase-2 expression and prostaglandin production in preterm human placenta // Am. J. Reprod. Immunol. 2006. Vol. 55. No. 1. P. 19–27. DOI: 10.1111/j.1600-0897.2005.00342.x

47. Новикова О.Н., Швец Е.М. Факторы риска и особенности течения беременности, родов и состояния новорожденного у ВИЧ-инфицированных женщин // Мать и дитя в Кузбассе. 2017. № 3. С. 16–20.

48. Горленко А.В., Ворошилина Е.С., Коновалов В.И. и др. Клинико-иммунологические особенности течения беременности и родов при ВИЧ-инфекции // Уральский медицинский журнал. 2004. № 4. Р. 13–15.

49. Иоанниди Е.А. Особенности клинического течения ВИЧ-инфекции у беременных // Бюллетень Волгоградского научного центра РАМН. 2006. № 1. С. 6–7.

50. Алехина А.Г., Блесманович А.Е., Петров Ю.А. Беременность, роды и состояние плода и новорожденного у матерей с ВИЧ-инфекцией // Современные проблемы науки и образования. 2018. № 3. [дата обращения 25.04.2021]. Доступ по ссылке: http://www.science-education.ru/ru/article/view?id=27538

51. Коннов Д.С., Голиусова М.Д., Коннов В.В. и др. Оценка эффективности и безопасности химиопрофилактики вертикальной передачи ВИЧ-инфекции с использованием схем монотерапии и высокоактивной антиретровирусной терапии // Эпидемиология и инфекционные болезни. 2010. Т. 15. № 3. С. 46–51. DOI: 10.17816/EID40487

52. Завалко А.Ф., Котельников В.В. Пути профилактики вертикальной передачи ВИЧ инфекции от матери к плоду // Вестник новых медицинских технологий. 2016. Т. 23. № 4. С. 287–293.

53. Котельников В.В., Завалко А.Ф., Целкович Л.С. Анализ течения послеродового периода у ВИЧ-инфицированных женщин различных социальных групп // Вестник медицинского института «Реавиз»: реабилитация, врач и здоровье. 2018. № 4 (34). С. 75–79.

54. Donnelly M., Davies J.K. Contemporary management of human immunodeficiency virus in pregnancy // Obstet. Gynecol. Clin. North. Am. 2014. Vol. 41. No. 4. P. 547–571. DOI: 10.1016/j.ogc.2014.08.003

55. Колобов А.В. Морфогенез плаценты человека и ее морфофункциональное состояние при патологии беременности // Вестник Санкт-Петербургского университета. Серия 11. Медицина. 2015. № 2. С. 5–18.

56. Аржанова О.Н., Кошелева Н.Г., Громыко Г.Л. Плацентарная недостаточность: диагностика и лечение: учебное пособие. Санкт-Петербург: Изд-во Н-Л, 2001.

57. Blanche S. Mini review: Prevention of mother-child transmission of HIV: 25 years of continuous progress toward the eradication

of pediatric AIDS? // Virulence. 2020. Vol. 11. No. 1. P. 14–22. DOI: 10.1080/21505594.2019.1697136

58. Castetbon K., Ladner J., Leroy V. et al. Low birthweight in infants born to African HIV-infected women: relationship with maternal body weight during pregnancy: Pregnancy and HIV Study Group (EGE) // J. Trop. Pediatr. 1999. Vol. 45. No. 3. P. 152–157. DOI: 10.1093/tropej/45.3.152

AUTHORS INFO

***Olga L. Mozalyova**, MD;
address: 179 lit. A and B Naberezhnaya Obvodnogo Kanala, Saint Petersburg, 190103, Russia;
e-mail: mozaleva.o@yandex.ru

Anna V. Samarina, MD, Dr. Sci. (Med.), Assistant Professor;
eLibrary SPIN: 2878-7130; e-mail: avsamarina@mail.ru

ОБ АВТОРАХ

***Ольга Леонидовна Мозалева**;
адрес: Россия, 190103, Санкт-Петербург, наб. Обводного канала, д. 179 лит. А и Б;
e-mail: mozaleva.o@yandex.ru

Анна Валентиновна Самарина, д-р мед. наук, доцент;
eLibrary SPIN: 2878-7130; e-mail: avsamarina@mail.ru