TOPICAL ISSUE

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PERINATAL OUTCOMES OF CORONAVIRUS COVID-19 PNEUMONIA IN PREGNANT WOMEN IN 2020 ON THE BASIS OF SBI RS (Y) POLYCLINIC NO. 1

DOI 10.25789/YMJ.2021.74.17

Since the end of 2019, the problem of the coronavirus pandemic has been the most urgent, including in pregnant women. Physiological changes in the immune system, susceptibility to respiratory viral infections, including COVID-19, can lead to unfavorable perinatal outcomes, but still many questions remain controversial.

The aim of the study was to identify the relationship between adverse perinatal outcomes and coronavirus pneumonia. The material was individual cards of pregnant women and women in childbirth aged 18 - 49 years with a confirmed new COVID - 19 infection. Statistical significance was assessed using the Pearson chi-square test. Differences were considered statistically significant at p <0.05.

This article presents an analysis of perinatal outcomes in 82 patients with confirmed new COVID-19 infection, reveals an association of coronavirus pneumonia with an increased frequency of abdominal delivery (p = 0.034) and preterm birth (p = 0.006).

Keywords: pregnancy, coronavirus infection, coronavirus pneumonia, premature birth, abdominal delivery.

Introduction. Investigating the influence of the new COVID-19 infection on pregnancy and its outcomes are the most important tasks which attract big interest. It's known that clinical manifestations of the new coronavirus infection are not specific [10], the risk of severe course of acute respiratory virus infections is increased, the range of drugs is limited and there is no approved vaccine.

By the years of the investigations, it's noted that physiological changes that are happening in a pregnant woman in the

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form of immunological tolerance which is aimed at preserving the alloantigenic fetus lead to susceptibility to respiratory virus infections [1].

It's known that during pregnancy physiological changes are occurring in the respiratory and circulatory system. For example, the job of the respiratory system is complicated after the second half of gestational age due to high standing of the diaphragm occured by the result of growing uterus and necessity in strengthening lungs functions. COVID-19 pneumonia is progressing rapidly from focal to diffusive bilateral form which predisposes to fast development of respiratory distress [4].

There are few data in the literature that confirm the influence of the new COVID - 19 infection on the unfortunate perinatal outcomes [8,11,13.17], thereafter further study of this topic is logical.

Objective: to identify the relationship between adverse perinatal outcomes and coronavirus pneumonia.

To achieve this goal, the following research objectives were identified:

1. To assess the structure of extragenital morbidity, complications in childbirth, delivery routes, term of delivery and weight indicators of the newborn.

2. To identify the relationship between CT scan-signs of coronavirus pneumonia and preterm birth.

3. To identify the relationship between CT scan - signs of coronavirus pneumonia and the frequency of abdominal delivery by cesarean section.

4. Determine the relationship between CT scan - signs of coronavirus pneumonia and low birth weight.

5. To identify the presence of a link between adverse perinatal outcomes in

coronavirus pneumonia and the period in which it was recorded.

Materials and methods: The study was carried out on the basis of the GBU RS (Y) "Polyclinic No. 1" women's consultation. A retrospective study of 82 individual cards of pregnant and postpartum women aged 18 - 49 years with a confirmed new COVID - 19 infection was carried out.

Identification of the SARS-CoV-2 virus was carried out by polymerase chain reaction (PCR) in nasopharyngeal material.

The criteria for the inclusion of patients in the study groups were: pregnant women with a confirmed new COVID-19 infection, the absence of severe concomitant somatic diseases (except for pneumonia associated with SARS-CoV-2), autoimmune and genetic diseases, and multiple pregnancies.

Statistical methods were used to process the data. The assessment of the statistical significance of the differences in outcomes depending on the impact of the risk factor was performed using the Pearson chi-square test. Differences were considered statistically significant at p < 0.05.

Results:

The average age of patients was 27 years. All subjects were divided into two groups depending on the presence of CT - signs of lung damage: group - CT 0 (no signs of viral pneumonia) n = 61, CT group 1-4 (CT 1 - pneumonia less than 25 percent, CT 2 - pneumonia 25 -50%, CT 3 - pneumonia 50-75%, CT 4 - pneumonia more than 75%) n = 21.

In the structure of extragenital diseases, the following diseases were identified: anemia - 57.3% of all studied, gestational diabetes mellitus - 12.1%, pathology of



the hepatobiliary system - 1.2%, pathology of the genitourinary tract - 13.4%, gastrointestinal tract - 3.6%, cardiac - vascular system - 7.3%, respiratory system - 8.5%, respectively.

53.6% of pregnant women received outpatient treatment, 46.3% received inpatient treatment, respectively. Of the 82 infected with the new COVID-19 infection, three had a spontaneous miscarriage in the 1st trimester. Due to the severe course of the new coronavirus infection, in one case, a connection to a ventilator took place.

Picture 1. The structure of operative labor depending on the presence of CT signs of coronavirus pneumonia.

As shown in Picture 1, the total number of abdominal deliveries (AD) was 29 out of 79 deliveries, in the "CT 0" n - 17 ARs, n - 41 spontaneous deliveries (SD), "CT 1-4" n - 12 ARs, n - 9 SD, respectively.

The analysis of the structure showed that complications in childbirth, depending on the presence of CT signs of coronavirus pneumonia, as shown in Table 1, adverse perinatal outcomes were more common in the CT 1-4 group, but with a small amount of data, it is not possible to draw such unambiguous conclusions.

The total number of premature births (PB) was n - 11, very early PB n - 0, early PB n - 4, PB n - 9. In groups "CT 0" n - 4, "CT 1-4" n - 7, respectively.

As can be seen from Table 2, the authors assessed the statistical significance of the effect of coronavirus pneumonia on the term of delivery and the weight of the child using the calculation of the Pearson chi-square test using four-field contingency tables.

Then, as presented in Table 3, when comparing the two groups (CT 0 and CT 1-4), depending on the presence of CT - signs of lung damage and the type of labor (spontaneous and operative), we found a statistically significant relationship between these groups.

When assessing a statistically significant relationship between the perinatal outcomes presented (Table 4) and the trimester in which coronavirus pneumonia was recorded, using the Pearson chi-square index, it was not possible to identify a significant relationship (p > 0.05).

Discussion: Despite the accumulated experience, many aspects related to the management of pregnancy and the tactics of delivery of pregnant women with the new COVID - 19 infection are controversial, and each country has its own characteristics in the adopted algorithms for the management of pregnancy, childbirth and the postpartum period [7].



Structure of operative labor depending on the presence of CT signs of coronavirus pneumonia According to different authors, the course of pregnancy in patients with COVID-19 varies. For example, in the conclusion of studies in Italy, China and the United States, it was shown that the course of COVID-19 in pregnant women does not differ from that in the general population [12]. A systematic review in 2020 by Liu D, which included 108 pregnant women, found an increased risk of severe disease in this contingent with COVID-19 [15].

It is known that the characteristic complications of pregnancy for patients with COVID-19 are: premature birth (21.3–39%), fetal distress (10.7%), fetal growth retardation (10%) and miscarriage (2%) [3] A meta-analysis by Mascio D.D., which included 79 pregnant women, also showed that the new coronavirus infection was associated with relatively

Table 1

The structure of complications in childbirth depending on the presence of CT signs of coronavirus pneumonia.

index	Premature rupture of amniotic fluid	Severe preeclampsia	Antenatal fetal death	Bleeding	Threat of fetal asphyxiation
CT 0	3	2	0	0	0
CT 1-4	4	1	1	2	1

Table 2

Criteria for assessing the significance of differences in outcomes depending on the impact of a risk factor (CT picture of coronavirus pneumonia)

index	Delivery on time	Premature birth	Birth weight (> 2500g)	Birth weight (<2500g)	
Group CT 0	54	4	56	2	
CT group 1-4	14	7	5	16	
Fisher's exact test (two-sided)	0.00621 p<0.05		0.000 p<0.05		
X2 test	8.99		46.37		
Odds ratio	6.7 ± 0.7 (95% ДИ 1.7 – 26.3)		0.01 ± 0.88 (95% ДИ 0.002 - 0.06)		

Table 3

Criteria for assessing the significance of differences in outcomes depending on the impact of a risk factor (CT picture of coronavirus pneumonia)

Index	Spontaneous childbirth	Childbirth by caesarean section	
Group CT 0	41	17	
CT group 1-4	9	12	
Fisher's exact test (two-sided)	(0.03428 p<0.05 5.14	
X ² test "chi-square"]		
Odds ratio	3.2 ± 0.5 (95% ДИ 1.1 – 9.0)		

Index	Spontaneous childbirth	Abdominal labor	Premature birth	Delivery on time	Birth weight (> 2500g)	Birth weight (> 2500g)
1 trimester	4	1	1	5	5	2
2 trimester	16	13	4	25	25	3
3 trimester	30	15	6	38	38	6
Chi-square	1.644		0.041		1.497	
р	0.440		0.980		0.474	

Criteria for assessing the significance of differences in outcomes depending on the impact of a risk factor (trimester in which coronavirus pneumonia was recorded)

higher rates of preterm birth, caesarean section and perinatal death [13].

The results obtained in the course of our study demonstrated a significant incidence of preterm birth and, as a consequence, low birth weight, which is consistent with the works of Gao Y.J., Abourida Y., 2020 [5, 9] in pregnant women with COVID-19 pneumonia. The most likely cause of these results was severe respiratory failure of the mother with hypoxemia, which can disrupt the uteroplacental blood flow and cause premature birth [16].

In some cases, obstetricians-gynecologists are forced to carry out induction of labor according to indications from the mother.

The presence of COVID-19 pneumonia showed a significant association with an increase in the frequency of abdominal delivery, which is also consistent with the authors Liu D., Li L., Wu X [12], in a study of which 15 pregnant women with COVID-19 and pneumonia have an increase in the frequency of operative deliveries. due to the development of fetal distress syndrome. According to the authors Chen D., Yang H., Cao Y 2020 [6], this may be due to the need to avoid prolonged labor, which can aggravate the course of COVID-19 in pregnant women.

Along with the above, it should be noted that we failed to identify a significant relationship between confirmed coronavirus pneumonia in groups divided by trimesters and an increase in the frequency of caesarean section operations, and there was no connection for premature birth and low birth weight. A small sample did not allow us to identify a significant relationship.

Of 6 pregnant women who underwent COVID-19 infection in the 1st trimester, 3 pregnancies ended in spontaneous miscarriage, but given the small sample size, the data cannot be considered representative.

Conclusion: The results of our study

show a significant role of the influence of the new COVID-19 infection on perinatal pregnancy outcomes, which confirm an increase in the frequency of delivery by caesarean section, preterm birth and, accordingly, low birth weight.

To date, it can be concluded that there are risks of unfavorable outcomes in pregnant women, which undoubtedly requires their more dynamic monitoring.

It is important to take into account that patient management should be individualized, and questions about labor management tactics should be considered and accepted collectively, taking into account concomitant diseases, clinical picture, and fetal condition.

Литература

1. Артымук Н.В. Клинические нормы. Акушерство и гинекология / Н.В. Артымук, Т.Е. Белокриницкая // Справочник для врачей. – М.: ГЭОТАР-Медиа, 2018. - С. 352. [Artymuk NV, Belokrinitskaya TE. Clinical norms. Obstetrics and gynecology. *Reference book for doctors*. M: GEOTAR-Media; 2018: 352.

2. Гарднер М.О. Астма во время беременности / М.О. Гарднер, Н.М. Дойл // Акушер-Гинеколог Клин Норт Ам. - 2004. - С. 385-413. [Gardner MO, Doyle NM. Asthma during pregnancy. *Obstetrician-Gynecologist Wedge North Am.* 2004; 31: 385 - 413.

3. Методические рекомендации «Организация оказания медицинской помощи беременным, роженицам, родильницам и новорожденным при новой коронавирусной инфекции COVID-19». Версия 2 (утвержденная Минздравом РФ от 28.05.20). С. 56 [Methodical recommendations 'Organization of medical care for pregnant women, women in labor, postpartum women and newborns with a new coronavirus infection COVID-19.' Version 2 (approved by the Ministry of Health of the Russian Federation on 05/28/2020): 56.

4. Рентгенологические данные 81 пациента с пневмонией COVID-19 в Ухане, Китай: описательное исследование / Ши Х. Хан Х. Цзян Н. [et al.] // Ланцет Дис. 2020; 20: 425-434. [Shi H. Han X. Jiang N. et al. X-ray data from 81 patients with COVID-19 pneumonia in Wuhan, China: a descriptive study. *Lancet Dis.* 2020; 20: 425-434.

5. Abourida Y., Rebahi H., Oussayeh I., Chichou H., Fakhir B., Soummani A. et al. Management of severe COVID-19 in pregnancy. *Case* *Rep. Obstet. Gynecol.* 2020; 2020: 8852816. https://dx.doi.org/10.1155/2020/8852816.

6. Chen D., Yang H., Cao Y., Cheng W., Duan T., Fan C. et al. Expert consensus for managing pregnant women and neonates born to mothers with suspected or confirmed novel coronavirus (COVID-19) infection. *Int. J. Gynaecol. Obstet.* 2020; 149(2): 130-6. https://dx.doi.org/10.1002/ ijgo.13146.

7. Chen H., Guo J., Wang C., Luo F., Yu X., Zhang W. et al. Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. *Lancet.* 2020; 395(10226): 809-15. https://dx.doi. org/10.1016/S0140-6736(20)30360-3.

8. Chen L, Li Q, Zheng D, et al. Clinical characteristics of pregnant women with Covid-19 in Wuhan, China. *N Engl J Med*. 2020;382(25):e100.

 Gao Y.J., Ye L., Zhang J.S., Yin Y.X., Liu M., Yu H.B. et al. Clinical features and outcomes of pregnant women with COVID-19: a systematic review and meta-analysis. *BMC Infect. Dis.* 2020; 20(1): 564. https://dx.doi.org/10.1186/s12879-020-05274-2.

10. Jafari M., Pormohammad A., Sheikh Neshin S.A., Ghorbani S., Bose D., Alimohammadi S., Basirjafari S., Mohammadi M., Rasmussen-Ivey C., Razizadeh M.H., Nouri-Vaskeh M., Zarei M.. Clinical characteristics and outcomes of pregnant women with COVID-19 and comparison with control patients. A systematic review and meta-analysis. *Rev Med Virol.* 2021 Jan 2:e2208. doi: 10.1002/rmv.2208. Epub ahead of print. PMID: 33387448.

11. Khan MMA, Khan MN, Mustagir MG, Rana J, Haque MR, Rahman M.M. COVID-19 infection during pregnancy. A systematic review to summarize possible symptoms, treatments, and pregnancy outcomes. *medRxiv.* 2020. 10.1101/2020.03.31.20049304

12. Liu D., Li L., Wu X., Zheng D., Wang J., Yang L. et al. Pregnancy and perinatal outcomes of women with coronavirus disease (COVID-19) pneumonia: a preliminary analysis // AJR. Am. J. Roentgenol. 2020; 215(1): 127-32. https://dx.doi. org/10.2214/AJR.20.23072.

13. Liu H, Wang LL, Zhao SJ, Kwak-Kim J, Mor G, Liao AH. Why are pregnant women susceptible to COVID-19? An immunological viewpoint. *J Reprod Immunol.* 2020;139:103122.

14. Mascio D.D., Khalil A., Saccone G., Rizzo G., Buca D., Liberati M. et al. Outcome of coronavirus spectrum infections (SARS, MERS, COVID-19) during pregnancy. A systematic review and meta-analysis. *Am. J. Obstet. Gynecol.* 2020; 2(2): 100107. https://dx.doi.org/10.1016/j. ajogmf.2020.100107.

15. Tan E.K., Tan E.L. Alterations in physiology and anatomy during pregnancy. Best Pract. Res. *Clin. Obstet. Gynaecol.* 2013;



27(6): 791-802. https://dx.doi.org/10.1016/j.bpobgyn.2013.08.001

16. Wong S.F., Chow K.M., Leung T.N., Ng W.F., Ng T.K., Shek C.C. et al. Pregnancy and

perinatal outcomes of women with severe acute respiratory syndrome. *Am. J. Obstet. Gynecol.* 2004; 191(1): 292-7. https://dx.doi.org/10.1016/j. ajog.2003.11.019.

17. Yan J, Guo J, Fan C, et al. Coronavirus disease 2019 (COVID-19) in pregnant women: a report based on 116 cases. *Am J Obstet Gynecol.* 2020; 223(1):111.e1-111.e14.

I.V.Kononova, M.P.Kirillina, S.I. Sofronova, S.N. Mamaeva INTERREGIONAL ANALYSIS OF CERVICAL CANCER INCIDENCE AND MORTALITY IN THE SIBERIAN PART OF RUSSIA (2008-2019)

DOI 10.25789/YMJ.2021.74.18

The study presents the differences in cervical cancer incidence and mortality in the period from 2008 to 2019 among the state entities, including national state entities, located in Siberia and Russia as a whole. Taking into account the study results, the entities, which are characterized by a multiethnic population – Kemerovskaya oblast, Buryatia and Zabaikalski Krai are acutely, but Tyva is in critical need of cervical cancer preventive measures, including HPV vaccination.

Keywords: human papillomavirus, vaccination, health, ethnic, minorities, disparities.

Introduction. Cervical cancer (CC) is the fourth most common cancer among women worldwide, and currently more than 300,000 women die from it every year. The highest burden of CC is in low- and middle-income countries where access to public health services is limited [1].

In the Russian Federation, which belongs to countries with a middle income level [2], in the structure of the cancer incidence and mortality in 2020, the indicators of CC took the 4th place of women's cancers [3]. For example, in countries with a high income level, such as the United States and Canada, in 2020, CC incidence took the 13th place, CC mortality - the 10th and the 12th respectively [3].

Along with routine screenings HPV

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vaccination is important to prevent CC. The vaccination targets the types of HPV that are the most important CC risk factors [1].

In the United States the HPV vaccination are covered by health insurance plans [4]. In Canada all jurisdictions offer the HPV vaccination through government-funded programs [5].

In Russia the HPV vaccination has not yet been included in the national routine immunization schedule, named "The Russian national preventive vaccinations and the vaccinations by epidemic indications calendar" approved by the Order of the Ministry of Health of the Russian Federation, March 21, 2014, N 125n, and therefore is not free for the population of Russia's state entities.

Meanwhile, the HPV vaccination has been highlighted in the WHO strategy for the period 2020-2030 [1]. Therefore, there is a hope that HPV vaccines will be included in the Russian national vaccinations calendar and will become available to all Russia's citizens in the foreseeable future. When these vaccines will be free. their supplies at the start of vaccination would be limited. In the period between the inclusion of vaccines in the Russian national vaccinations calendar and their widespread distribution, it is necessary to develop a plan that figures out which people, including the territories of their residence, should get vaccines first. Accordingly, the studies highlighted the disparities in the CC incidence and mortality depending on the territories of residence, ethnicity / race, gender, etc., are of undoubted relevance [6,7].

Our previous study was devoted to the analysis of CC incidence and mortality in the national-state entities located in Siberia, in which the indigenous population and national minorities live - the republics Altai, Buryatia, Tyva, Khakassia and Sakha (Yakutia) in the period from 2007 to 2019. Taking into account its results we concluded that in Tyva and Buryatia the urgent need for HPV vaccination is.

To confirm the results of our previous study and compare them with foreign studies, which also noted an unfavorable CC situation in multiethnic territories [8,9,10], we have expanded the number of state entities in the comparison group and have included in it other state entities located in the Siberian part of Russia. The retrospective year at the beginning of this study is 2008 since the Zabaikalski Krai was formed in 2008 by the unification of the Chitinskaya Oblast and the Agin-Buryat Autonomous Okrug [11], and when its data on the CC incidence and mortality appeared. The retrospective final year of the study remained 2019, its data on cancer were marginal for access on the portal for medical and pharmaceutical workers "ONCOLOGY.ru". In this study we have also introduced analysis for other indicators - the annual changes of the CC incidence and mortality for every year of the period 2009- 2019 from 2008, which was chosen as baseline. Accordingly, the purpose of this study was to compare the CC incidence and mortality in the period from 2008 to 2019 among state entities, located in Siberia, as well as Russia as a whole.

The following tasks were set: to compare the CC incidence and mortality among these state entities, and also compare them to the all-Russian analogous indicators; to determine state entities with maximum and minimum rates of