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Impact of coronavirus disease (Covid-19) within the third trimester of pregnancy

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Abstract

Introduction. Assessment of pregnancy, fetal status, diagnosis of placental insufficiency (PI) in pregnant women with coronavirus COVID-19, is a topical issue in obstetric practice and is of great social value for the birth of healthy children.

The aim of our study was to analyze the impact of coronavirus disease on pregnancy and fetal status.

Methods and materials. An examination of 25 pregnant women who relapsed into Covid-2019, who were treated at Public Non-profit Enterprise Ternopil Municipal City Hospital No. 2. The control group consisted of 25 pregnant women with a physiological course of pregnancy, who gave birth to live full-term infants with mass-growth characteristics according to gestational age. The condition of the fetus was assessed according to ultrasound,

cardiotocography. Criteria for inclusion in the study were laboratory confirmed by COVID-19 by polymerase chain reaction (PCR).

Results and discussion. It was found that coronavirus disease was present in pregnant women 21 (84.0%) in mild form, 4 (16.0%) patients had pneumonia, but did not require hospitalization and did not require artificial ventilation, and were treated at home by a family doctor. The main complaints of patients were fever in 84.0% (21 pregnant women), cough - in 78.0% (19 pregnant women), myalgia - in 62.0% (15 pregnant women), headache - 84.0% (21 pregnant women) , sore throat - in 40.0% (10 pregnant women), general weakness in 70.0% (17 pregnant women). And 6 pregnant women (20%) of those surveyed had a mild asymptomatic course of the disease. The condition of the fetus was assessed by ultrasound and CTG of the fetus. Decrease in amplitude of oscillations less than 3 beats / min, absence of accelerations, emergence of decelerations, testify to the expressed signs of a hypoxia of a fruit and demand timely treatment and the decision of a question of urgent delivery.

Key words: Fetus; fetal growth retardation; Covid-19, pregnancy.

INTRODUCTION. Coronaviruses can cause a variety of diseases, from severe colds to severe respiratory illnesses and death. Currently, information on the course of COVID-19 during pregnancy is limited. However, information on diseases associated with other highly pathogenic coronaviruses (such as severe acute respiratory syndrome and MERS-CoV) may help to imagine the consequences of coronavirus infection in 2019 during pregnancy [1, 2].

COVID-19 is an infection caused by a coronavirus, virus, or microorganism similar to many single-stranded RNA-containing, unsegmented viruses that cause the common cold and severe and fatal diseases [1 - 4].

Because currently there is so little information about COVID-19 during pregnancy, so the study of this problem to reduce perinatal morbidity and mortality remains a major medical challenge for all countries [2, 3].

The course of pregnancy on the background of coronary viral infection leads to complications of pregnancy, which is the cause of antenatal and intranatal fetal mortality and leads to morbidity and mortality in the early neonatal period [4].

Therefore, the assessment of pregnancy, fetal status, diagnosis of placental insufficiency (PL) in pregnant women with coronavirus COVID-19, is a topical issue in obstetric practice and is important for the birth of future healthy generations [5, 6].

The aim of our research was to conduct a clinical and laboratory analysis of the impact of coronavirus disease on pregnancy and the condition of the fetus.

MATERIALS AND METHODS. To solve the set tasks, a study of 25 pregnant women (the main group) who relapsed with coronavirus infection COVID-19, who were treated at Public Non-profit Enterprise Ternopil Municipal City Hospital No. 2. Criteria for inclusion in the study were laboratory diagnosed inunoglobulin G to COVID-19. The control group consisted of 25 pregnant women with a physiological course of pregnancy, who gave birth to live full-term infants with mass-growth characteristics according to gestational age. All pregnant women were registered with the district obstetrician-gynecologist.

The condition of the fetus was assessed according to ultrasound, cardiotocography, determination of the biophysical profile of the fetus. Ultrasound examination of the pregnant woman, determination of the biophysical profile was performed on Voluson-730 devices. Doppler examination was performed on a Voluson-730 convex sensors with a frequency of 2 to 5 MHz, in color Doppler modes. Anthropometric parameters were determined: biparietal size (BPD), thigh length, fronto-occipital size, average diameters of the thorax and abdomen and the ratio of head circumference to fetal abdomen circumference, the ratio of femur length to abdominal circumference. Placetography evaluated the location of the placenta, its thickness and degree of maturity [7 - 9]. Cardiotocogram is a simultaneous recording of uterine contractions and fetal heart rate. This method allows you to comprehensively assess the reactivity (ability to change heart rate under the influence of various factors) of the fetal heart rate. A Cadence basic mother and baby monitor and a Qiston bT-350 LCD fetal monitor were used to record cardiotocograms. The recording was performed for 30 minutes. The scale of W. Fisher et al., 1976 was used for the analysis of cardiotocograms. The score of 8–10 points corresponds to normal CTG, 5–7 points indicate initial fetal disorders, 4 points and less may indicate severe fetal disorders [9].

Statistical processing of the results was performed on a personal computer using office programs "Microsoft Excel" using basic statistical calculation methods. The reliability of the difference between the mean values was determined by calculating the Student's criterion.

RESEARCH RESULTS AND DISCUSSION. As a result of the analysis of anamnestic data it was found that the average age of pregnant women was 27.1 ± 0.2 in the main group, and 26.9 + 0.1 years - in the control (P> 0.05). Among extragenital diseases prevailed: chronic arterial hypertension - in 2 pregnant women (8.0%); varicose veins of the lower extremities - 3 pregnant women (12.0%), kidney disease - 2 pregnant women (8.0%). A burdened gynecological history was in 2 pregnant women (8.0%). In the main group and the control percentage of primiparous and first-born was the same.

Pregnancy outcomes varied depending on the trimester of pregnancy. From the anamnesis it is known that among 4 women who became ill in the first trimester, 2 were complicated by a miscarriage that started and received therapy aimed at prolonging pregnancy. Among 6 women who fell ill in the second trimester of pregnancy, 1 pregnancy ended in premature birth. In 15 patients, coronavirus disease was diagnosed in the third trimester of pregnancy.

It was found that coronavirus disease in 21 pregnant women (84.0%) was mild, 4 (16.0%) patients had pneumonia, but did not require hospitalization and ventilation, and treatment was performed at home by a family doctor according to clinical orders. Ministry of Health of Ukraine [10, 11]. The main complaints of patients were fever in 84.0% (21 pregnant women), cough - in 78.0% (19 pregnant women), myalgia - in 62.0% (15 pregnant women), headache - 84.0% (21 pregnant women) , sore throat - in 40.0% (10 pregnant women), general weakness in 70.0% (17 pregnant women). And 6 pregnant women (20%) of those surveyed had a mild asymptomatic course of the disease. In 12 (48.0%) blood tests revealed lymphopenia.

Ultrasound fetometry at 33-34 weeks of pregnancy revealed an asymmetrical shape and symmetrical fetal developmental delay. The presence of pathological processes in the fetoplacental complex negatively affected the condition of the fetus, and led to delayed growth, leading to an increased risk of perinatal mortality. On the basis of ultrasound, fetal growth retardation was diagnosed in 3 pregnant women, which amounted to 12.0% among all examined in the main group, and 22 pregnant women (88%) were diagnosed with certain pathological changes in the placenta.

Based on the analysis of cardiotocograms, it was found that the basal rhythm in pregnant women of the main group was (125.1 ± 2.18) beats / min compared to healthy pregnant women (145.6 ± 3.12) beats / min. 01). The frequency variability for 1 minute in pregnant women of the main group before treatment was (3.14 ± 0.11), which is significantly lower compared to the control group (6.58 ± 0.13). Analyzing the cardiotocograms, we also noticed that accelerations were found in pregnant women with coronavirus disease in 59.8%, in healthy pregnant women in 100%. The number of accelerations in the main group - (2.18 ± 0.13), in the control - (5.14 ± 0.19), ($P < 0,05$). The results of the analysis of cardiotocograms are presented in table 1.

Table 1. Evaluation of cardiotocograms in pregnant women with coronavirus disease (M ± m)

Indicator		Main group (n = 25)	Control group (n = 25)
Basal rhythm beats / min		125,1±2,18*	145,6±3,12
Variability	amplitude beats / min	6,07±0,11*	19,10±0,18
	frequency for 1 min	3,14±0,11*	6,58±0,13
Acceleration in 30 minutes		2,18±0,13*	5,14±0,19
Deceleration in 30 minutes		spontaneous, early	missing
Note. * - p <0.05 reliability compared with the control group			

Cardiotocograms of pregnant women with coronavirus disease are characterized by spontaneous early decelerations and monotonous rhythm.

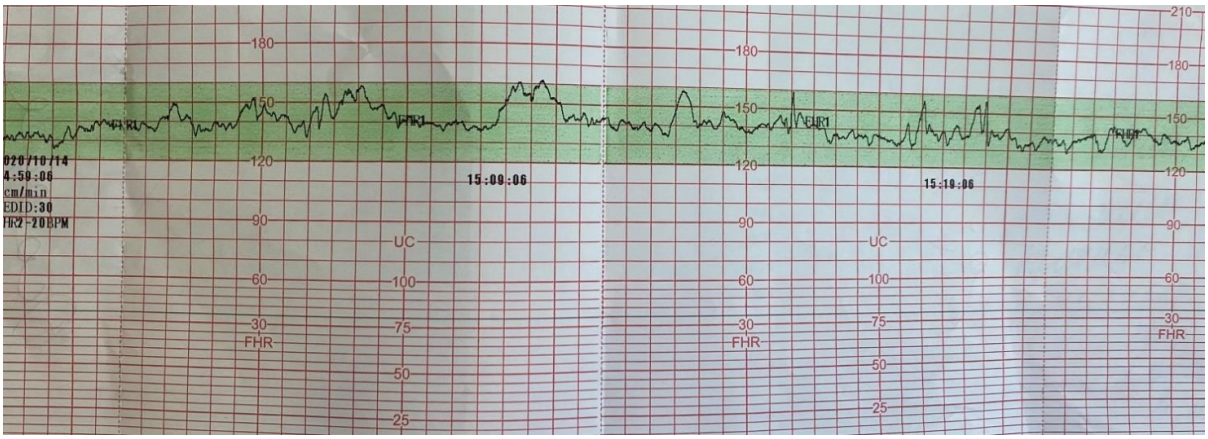

Fig. 1. Pregnancy 38 weeks. CTG score of 9 points.

Figure 1 shows the cardiotocogram at 38 weeks of pregnancy, the basal rate is 140.1 ± 0.3 beats per minute.

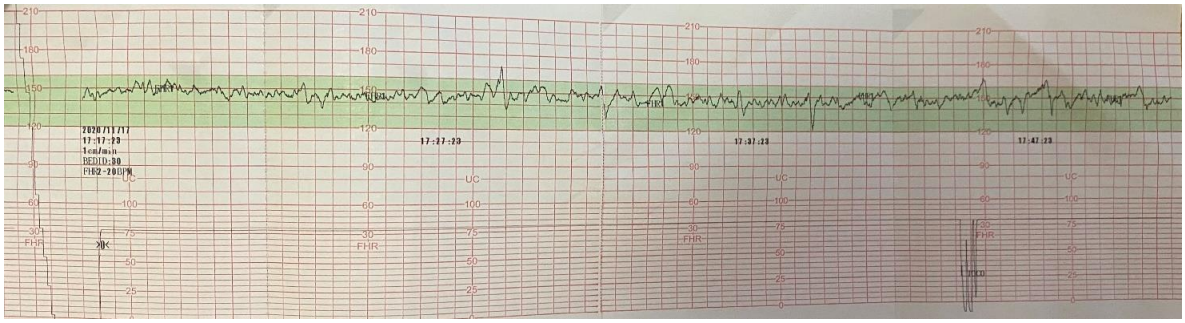

Fig. 2. Pregnancy 37 weeks. CTG score - 8 points.

The cardiotocogram presented in Figure 2 shows 137.4 ± 0.2 beats per minute, a decrease in the amplitude and frequency of oscillations, a decrease in the number of accelerations.

The analysis of cardiotocographic parameters revealed a significant difference in pregnant women with coronavirus disease compared with women in the control group. A significant decrease in the length of the stable rhythm and significant disturbances of acceleration reactions were diagnosed. The increase in the number, duration and depth of decelerations is noteworthy. All this indicates a decrease in the reactivity of the cardiovascular system of the fetus and is a characteristic feature of hypoxia.

In order to diagnose the fetal condition in pregnant women with coronavirus disease, criteria were identified that indicate the initial signs of fetal distress: a decrease in the amplitude of oscillations less than 5 beats / min, a decrease in the number of accelerations to 3 or less and the appearance of spontaneous decelerations. Signs such as a decrease in the amplitude of oscillations less than 3 beats / min, no acceleration, the appearance of decelerations, indicate severe signs of fetal hypoxia and require timely treatment and resolution of timely delivery.

Conclusions. Thus, on the basis of anamnestic data, ultrasound examination, cardiotocography revealed differences in the course of pregnancy in women who contracted coronary heart disease during pregnancy compared with healthy pregnant women, indicating a violation of feto-placental circulation and placental dysfunction.

The obtained results indicate a decrease in the reactivity of the cardiovascular system of the fetus with coronavirus disease during pregnancy is a characteristic feature of hypoxia.

The presence of COVID-19 in a pregnant patient is of concern and at risk, requires an objective assessment of the condition of the pregnant woman and the fetus, as well as the need to predict the development of possible complications during pregnancy, childbirth and perinatal complications.

PROSPECTS OF FURTHER RESEARCH. To continue work on the diagnosis and treatment of fetal disorders in pregnant women with coronavirus disease, to improve the quality of diagnosis by researching the features of the coagulation system and other new technologies.

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