

# Features of Pregnancy in Women with Placental Insufficiency During SARS-CoV-2 Infection

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**Abstract** The article studied the role of fetoplacental insufficiency (FPI) in perinatal outcomes in pregnant women with SARS-CoV-2 infection. Material and methods. The study included 160 pregnant patients hospitalized at the Republican Specialized Hospital Zangiota-1. Assessment of uteroplacental and fetal placental blood flow was carried out using fetal Doppler. For a comparative analysis of the effectiveness of those developed during the period study protocols, pregnant women with FPI due to COVID-19 were divided into two study groups.

**Keywords** Endometrial hyperplasia, Cytokine status, IL-1 $\beta$ , TNF $\alpha$ , IL-2, IL-4, IL-6, IL-8

## 1. Introduction

One of the most common and often intractable pathological conditions during pregnancy is fetoplacental insufficiency (FPI), in which various disorders occur, both from the placenta and from the fetus [1,4,6]. This is associated with a progressive decrease in the transport of oxygen and nutrients across the placenta from mother to fetus, resulting in the development of gestational hypertension (GG), preeclampsia (PE), stillbirth, spontaneous abortion, fetal growth restriction (FGR), and developmental disorders of the child's nervous system. According to WHO, the prevalence of FPN is 1-5 per 10,000 female population of fertile age, and its frequency ranges from 22% to 45% of all pregnancies [2].

When pregnancy is not carried to term, FPN occurs in 50–77%, with gestosis – in 32%, and when pregnancy is combined with extragenital pathology – in 25–45% [3]. Most often, in more than 60% of cases, FPN is observed in pregnant women who have had a viral and bacterial infection. This problem was particularly acute for women at various stages of the perinatal period, from conception to childbirth, as well as in the postpartum period during the COVID-19 pandemic [5].

It has now been proven that the incidence of COVID-19 in pregnant women was higher than in the general population, and the mortality rate from infection in pregnant women reached 25%, the rate of premature birth was 4.3-25.0%, preeclampsia - 5.9%, miscarriages – 14.5%, premature rupture of membranes – 9.2% and fetal growth restriction – 2.8-25% [7,8].

In connection with the above, the need for a more detailed

study with an assessment of the morphofunctional features of FPN in women with COVID-19 infection will allow a more in-depth consideration of this pathology. Thus, today, research is actively continuing on the consequences of SARS-CoV-2 and all variants of the course of this disease for implantation, placental formation, fetal growth and development, delivery and the health of newborns. This will allow us to determine rational tactics for managing such pregnancies with a risk of pregnancies and improve perinatal outcomes.

## 2. Purpose of the Study

To conduct a comparative analysis of the effectiveness of the treatment of pregnant women with FPI against the background of COVID-19.

## 3. Materials and Research Methods

The main group included 80 consecutive pregnant women for the period from August 1 to September 15, 2021, which were managed according to optimized algorithms. The comparison group also consisted of 80 pregnant women who were statistically comparable with the main group of patients according to the initial selection criteria. (period from June 1 to July 31, 2021). In most cases, both in the comparison group (82.5%; 66 out of 80) and in the main group (77.5%; 62 out of 80), the age of pregnant women ranged from 18 to 30 years. In terms of gestation, also in most cases, pregnant women were in the third trimester, namely, in terms from 32 to 36 weeks of pregnancy - 65.0% (52 out of 80) in the comparison group and 70.0% (56 out of 80) in the main

group. More than 3 pregnancies in history were 35.0% (28 out of 80) of women in the comparison group and 37.5% (30 out of 80) in the main study group. At the same time, most women had a history of giving birth for the first time - 42.5% (34 out of 80) in the comparison group and 37.5% (30 out of 80) in the main group. A key role in the choice of obstetric tactics and the general principles of intensive care, in addition to diagnosing the severity of pneumonia, was fetal Doppler with the determination of the severity of disorders of the uteroplacental and fetal-placental blood flow.

## 4. Research Results

All patients were diagnosed with FPI and all of them were delivered within 5-10 days of hospital stay, which contributed to obtaining high rates of preterm birth. The proportion of cesarean section was high (77.5%; 124 out of 160) due to the diagnosis of fetal distress and severe maternal clinical condition. Labor induction was performed in 76.25% (122 of 160) cases. In a comparative aspect, statistically significantly lower rates of the proportion of cases with cesarean section and induction of labor were obtained in the main group. The frequency of cesarean section was reduced from 85.0% (68 out of 80) in the comparison group to 70.0% (56 out of 80) in the main group ( $p=0.023$ ). The rate of cesarean section was 100% for severe and extremely severe COVID-19, and 61.7% (36 of 94) for moderate COVID-19 ( $p<0.001$ ). Cases of independent childbirth were observed only with moderate course of COVID-19. All newborns tested negative for SARS-CoV-2 at 24 hours and 48 hours on nasopharyngeal and pharyngeal swabs. The average treatment time for pregnant women with FPI against the background of COVID-19 was  $26.4\pm 3.4$  days in the comparison group and  $18.1\pm 2.2$  days in the main group ( $p=0.042$ ). The overall maternal mortality rate was reduced from 7.5% (6 out of 80) in the comparison group to 1.25% (1 out of 80) in the main group (4.126,  $p=0.043$ ). Thus, with FPI against the background of COVID-19 pneumonia, a favorable outcome was observed in 95.6% (153 out of 160) of cases. There were 148 (92.5%) children in total. Perinatal mortality was reduced from 12.5% (10 out of 80) in the comparison group to 2.5% (2 out of 80) in the main group ( $p=0.013$ ).

## 5. Conclusions

In a comparative aspect, the optimization of obstetric tactics in the management of pregnant women with FPI against the background of COVID-19 made it possible to reduce the frequency of caesarean section from 85.0% to 70.0% ( $p=0.023$ ), the total maternal mortality from 7.5% to 1.25% ( $p=0.043$ ), perinatal mortality from 12.5% to 2.5% ( $p=0.013$ ), mean treatment time decreased from  $26.4\pm 3.4$  to  $18.1\pm 2.2$  days ( $p=0.042$ ).

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