Review Article

Pregnancy and Childbirth in Women with Confirmed COVID-19

Djabbarova Yulduz Kasimovna[1], Ismoilova Shoira Tolkunovna[2], Yuldasheva Gulchekhra Rakhimovna[3]

[1]*Republican Perinatal Center of the Ministry of Health of the Republic of Uzbekistan*

[2]*Ferghana Institute of Public Health, head of obstetric department of Fergana city medical association*

[3]*Ferghana Regional Perinatal Center, obstetrician-gynecologist, Fergana region, Uzbekistan*

*Corresponding author
Djabbarova Yulduz Kasimovna, Republican Perinatal Center of the Ministry of Health of the Republic of Uzbekistan

Abstract
Introduction: *A new viral infection, dubbed "COVID-19" in the spring of 2020, became pandemic. Data on the impact of Covid-19 on pregnant women and childbirth are scarce and contradictory.*
Purpose: to study the peculiarities of the course and outcome of labor in women with positive results from COVID-19.

Materials and Methods: *An analysis of 222 birth histories of women with laboratory-confirmed COVID-19 PCR directed to delivery to the specialized obstetric department of the Fergana city medical association for October-December 2020 is presented.*

Results: *A mild form of infection was in 70,2%, moderate - in 21.2%, severe - in 8.1%, and critical - in 0.5%. The frequency and nature of the upper and lower respiratory tract lesions, SPO2 parameters and lung damage, as well as the age of pregnant women, parity, the presence of somatic and obstetric pathology are presented. The frequency of delivery by weight section was 25.2%, preterm birth - 9.5%.*

Conclusions: *In most pregnant women the severe form of COVID-19 is characterized by bilateral pneumonia with ARS and anemia in 100% of cases, the frequency of miscarriage in them is high and reaches 37%. The condition of pregnant women with COVID-19 aggravated the development of severe preeclampsia, premature placental abruption, and multiple pregnancy.*

Keywords: COVID-19, Severity, Pregnancy, Childbirth, Women.

Introduction

Pregnancy is a unique physiological phenomenon of the progeny. From the position of reproductive immunology, the fetus is an allograft in the mother's body. Normally, the placenta, amniotic membranes and amniotic waters create a barrier preventing the rejection of the fetus from the mother's body. In cases of hormonal disorders, inflammatory, especially viral, and other placental lesions, fetal antigens begin to enter the blood of the mother in excessive amounts and an immunological conflict develops, which clinically manifests as complications of pregnancy (abortion, miscarriage, preterm labor, preeclampsia, fetal growth retardation, etc.). In this aspect, it is of scientific and practical interest to study the effect of COVID-19 on the body of a pregnant woman and the outcome of childbirth.

The spread of the new viral infection COVID -19 in 2020 has taken on a pandemic character [1-3]. According to statistical data, pregnant women, people over 60 years old, patients with severe somatic diseases (lung, heart, diabetes) are the most susceptible to this virus [4, 5]. There are few publications on the effects of COVID-19 on the gestational period, the fetus, and the newborn [6-9]. However, a number of protocols for the management and treatment of pregnant women with COVID-19 have been developed in the leading countries of the world [10-13]. Despite the presence of the works devoted to this problem, a significant number of deaths in severe, transient form of the disease complicated by total bilateral pneumonia have been noted. In our region, the issues of adverse effects of COVID-19 virus infection on the course of pregnancy and labor remain understudied.

Purpose: to study the peculiarities of the course and outcome of labor in COVID-19-positive women.

Materials and Methods

We performed a clinical analysis of 222 deliveries of women with laboratory-confirmed PCR for COVID-19, who were referred for delivery to the specialized obstetric unit of the City Medical Association of Fergana in October-December, 2020. COVID-19 was diagnosed by polymerase chain reaction (PCR) [14-16]. Clinical and laboratory examination, lung radiography, obstetric examination, consultations with therapist, pulmonologist, intensive care physician and other specialists were performed if necessary. The findings were processed by calculating Student's t-test and the significance of $p<0.05$.

Results and Discussion

Of 222 women admitted for delivery, viral infection was mild in 70.2% (156), moderate in 21.2% (47), severe in 8.1% (18), and critical in 0.5% (1). Our data are close to those of other researchers. Thus, according to WHO-China, 8% of pregnant women had a severe infection, 1% had a critical course, 92% had mild to moderate infection, and according to the RCOG, 86% of pregnant women had mild to moderate SARS-CoV-2 infection, 9% had a severe course, and 5% had a critical course, the mild course of COVID-19 was characterized by signs of rhinitis and rhinopharyngitis ($2.6\pm0.9\%$), bronchitis ($3.2\pm1.4\%$) [17, 18]. At the moderate course of infection, tracheobronchitis ($27.7\pm6.5\%$), bronchitis ($14.9\pm5.2\%$) and pneumonia, DIS was diagnosed more frequently in $2.0\pm2.0\%$. The severe form revealed bilateral pneumonia in 94.7% of pregnant women and ORS in 63.2%.

Oxygen saturation (SPO2) in mild infection averaged 97.2 (90-99), in moderate form - 94.1 (88-98), in severe form - 88.9 (50-97). Radiologically, pulmonary involvement averaged 6.7% (5-10%) in the mild course, 26.2% (5-35%) in the moderate course, and 46.3% (30-65%) in the severe course. In moderate and severe lesions, oxygen support was administered. In the moderate COVID-19 form, oxygen support through a nasal cannula/mask was administered at a rate of 5-10 L/min in 42.6% of the pregnant women, and noninvasive CPAP ("constat positive airway pressure") - in 2.1%. In the severe form, 81.8% of pregnant women received oxygen support up to 10 liters/min, with conversion to noninvasive CPAP, and 18.2% of pregnant women with 65% of lung injury received ventilatory ventilation.

Pregnant women were aged 19 to 38 years, primarily in the 20-29 years range, and accounted for 2/3 ($62.6\pm3.3\%$) of all admissions; those over 30 years of age accounted for 1/3 ($33.4\pm3.2\%$). Analysis of the age composition of pregnant women according to the severity of COVID-19 revealed a significant increase in the number of pregnant women aged over 35 years in the severe form to $31.6\pm10.7\%$ vs. those with mild ($10.3\pm2.4\%$, $p=0.05$) and moderate form ($19.2\pm5.7\%$, $p>0.05$).

Analysis of birth parity revealed a similar trend: women with III-IV labor and more in the group with mild form of infection had $29.5\pm3.7\%$, with moderate form - $48.9\pm7.3\%$ ($p<0.05$), and with severe form - $57.9\pm11.3\%$ ($p<0.05$). Of somatic pathology, iron deficiency anemia was the most frequently diagnosed - 98.7%,

which was before pregnancy, varicose veins were noted in 5.9%, obesity in 3.6%, bronchial asthma, urinary tract infection, diabetes, and endemic goiter in 1.4% each. Of the pregnancy complications, the incidence of severe preeclampsia was noteworthy: 14.9% (33), uterine scar after cesarean section 14.9% (33), antenatal rupture of membranes 12.2% (27), large fetus 5.9% (13), placenta detachment 1.4% (3), twins 2.3% (5), etc. The incidence of severe pre-eclampsia tended to increase with increasing severity of COVID-19. Thus, this complication tended to increase 2.4-fold with a severe course and 2.2-fold with a moderate form in relation to a mild course ($26.3\pm10.0\%$, $23.4\pm6.1\%$, and $10.9\pm2.5\%$, respectively, $p>0.05$).

In the mild form, pregnancy was more often complicated by antenatal rupture of fetal membranes (14.1%), multiple pregnancy (3.2%), and placenta previa (1.9%). At the same time, premature detachment of the normally located placenta was observed only in moderate and severe forms (4.3% and 5.3%, respectively). $74.8\pm2.9\%$ of cases were delivered through natural birthways; $25.2\pm2.9\%$ of patients were delivered by cesarean section. The mode of delivery did not depend on the severity of the course of COVID-19. The results of caesarean section in women of 2 groups were analyzed: the first was 55 pregnant women with confirmed clinically and laboratory COVID-19 delivered by abdominal route. Of these, 39 (70.9%) had a mild form, 12 (21.8%) had a medium heavy form and 4 (7.3%) had a heavy form. The second - comparison group was 21 pregnant women without a viral infection who underwent a caesarean section. By age, the patients of both groups did not differ from each other, for example, in the main group aged 19-29 years there were 61.8%, in the comparison group - 71.4% ($p > 0.05$) and over 30 years old - 38.2% and 28.6%, respectively. According to parity, in the first group 3 delivery and more were found 8 times more often than in the second group ($38.2 \pm 6.5 \%/4.8 \pm 4.7\%$, $p < 0.05$).

Indications for caesarean section in both groups were identical. Among them, obstetric causes prevailed: irritability of the scar on the uterus after the previous caesarean section (45.5% and 47.6%), severe preeclampsia (14.6% and 4.8%), premature detachment of the normally located placenta (7.3% and 4.8%), inconclusive fetal condition (7.3% and 23.8%). Acute respiratory syndrome in severe COVID-19, combined with severe preeclampsia, was an indication of emergency operative delivery only in 1 (1.8%) case, which was in accordance with RCOG recommendations [19]. Prematurely born children from mothers with positive COVID-19 were born 4 times more often than in the comparison group ($20.0 \pm 5.4\%$ and $4.8 \pm 4, 7\%$, $p < 0.05$).

Timely delivery occurred in $90.5\pm1.9\%$ of women, and premature delivery in $9.5\pm1.9\%$. According to the literature, SARS-CoV-2 infection during pregnancy may increase the risk of preterm birth or fetal growth retardation [20]. In our data, the proportion of preterm births was significantly increased 5.7-fold ($36.8\pm11.0\%$, $p<0.05$) in the severe form compared with the mild form ($6.4\pm1.9\%$, $p<0.05$) and 4.6-fold compared with the moderate form ($8.5\pm4.2\%$, $p<0.05$). Fatal outcome was 1 (0.45%) case.

As for fetal outcome, 227 (5 twins) babies were born, of which 17% (37) were premature, 96% (218) were alive, and 4.0% (9)

were dead. The most frequent complications were intrauterine infection 13.3% (29), low birth weight 8.3% (18), hypoxic-ischemic encephalopathy, CNS depression syndrome 5% (8), pneumonia 2.8% (6). On examination at day 1, all neonates were PCR negative, indicating that there was no transplacental transmission of COVID-19 from mother to newborn. One child died in the early neonatal period (0.46% of live births). Perinatal losses were 4.4% (10/227).

We agree with the opinion of other researchers that early detection of COVID-19, hospitalization and treatment can improve pregnancy outcomes and reduce potential obstetric complications (preterm delivery, preeclampsia, etc.) [21, 22]. The data we obtained are preliminary. It is our opinion that further studies on the problem in question, in view of the presence of regional pathology, somatic diseases, high birth parity, a poor obstetric history, and other factors that adversely affect the immune system of a pregnant woman and increase the risk of COVID-19 infection, should be continued.

Conclusions
The study has identified the following features. In the majority of pregnant women, the clinically severe form of COVID-19 is characterized by bilateral pneumonia with acute respiratory syndrome against a background of hypochromic anemia in 100% of cases. The severe form of COVID-19 more often developed in pregnant women aged 35 years and older for the third and more deliveries. The incidence of preterm births increased significantly with increasing severity of infection and reached 37% in the severe form. In COVID-19, the development of severe pre-eclampsia, premature placental detachment, and multiple placental abnormalities, which were often indications for abdominal delivery, aggravated the condition of pregnant women. Late hospitalization of pregnant women with severe COVID-19 is a high risk of maternal mortality.

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