FEATURES OF THE PREGNANCY AND DELIVERY COURSE, FETAL AND NEWBORN STATUS IN WOMEN WITH COVID-19

V.O. BENIUK
MD, professor, head of the Obstetrics and Gynecology Department No. 3, Bogomolets National Medical University, Kyiv
ORCID: 0000-0002-5984-3307

N.M. HYCHKA
PhD, associate professor, Obstetrics and Gynecology Department No. 3, Bogomolets National Medical University, director of the Municipal Non-Profit Enterprise “Kyiv City Maternity Hospital No. 3”, Kyiv
ORCID: 0000-0001-9863-6207

O.V. ZABUDSKYI
PhD, associate professor, Obstetrics and Gynecology Department No. 3, Bogomolets National Medical University, responsible for organizing and providing of obstetric care to patients who are in deployed intensive care beds for the treatment of patients with coronavirus disease COVID-19 of the Municipal Non-Profit Enterprise “Kyiv City Maternity Hospital No. 3”, Kyiv
ORCID: 0000-0003-1969-7031

T.M. FURSA-SOVHYRA
assistant, Obstetrics and Gynecology Department No. 3, Bogomolets National Medical University, Kyiv
deputy director for organizational and methodological work of the Municipal Non-Profit Enterprise “Kyiv City Maternity Hospital No. 3”, Kyiv
ORCID: 0000-0001-9339-881X

T.V. KOVALIUK
PhD, assistant, Obstetrics and Gynecology Department No. 3, Bogomolets National Medical University, Kyiv
ORCID: 0000-0001-9339-881X

V.F. OLESHKO
PhD, assistant, Obstetrics and Gynecology Department No. 3, Bogomolets National Medical University, Kyiv
ORCID: 0000-0003-2493-2892

A.S. CHERBOTAROVA
assistant, Obstetrics and Gynecology Department No. 3, Bogomolets National Medical University, Kyiv
ORCID: 0000-0002-8317-5737

INTRODUCTION

Coronavirus infection caused by the SARS CoV-2 virus is currently one of the main topics discussed at all levels around the world. The first cases of the disease were registered in Wuhan (China), in December 2019 [8, 10, 24]. On January 30, 2020, the World Health Organization (WHO) declared the outbreak an international public health emergency, and on March 11, it declared it a pandemic [1, 2, 5, 10, 25].

According to the WHO, over 2,234,281 cases of SARS CoV-2 coronavirus infection and over 52,295 deaths have been confirmed in Ukraine [20].

SARS CoV-2, as for any coronavirus, is characterized by seasonality of the disease. Thus, as of June 1, 2021, 2137 infected people were officially registered in Ukraine, while as of April 1, 2021, the number of infected people was 20,341 [4].

Since the beginning of the pandemic, obstetricians and gynecologists have been investing investigating the impact of the new coronavirus on pregnancy, delivery and newborns status [6, 7, 9, 13, 14, 17, 22]. Today, it is known that pregnant women have no specific clinical manifestations of COVID-19, and the diagnosis criteria, features of the clinical course and complications do not differ from those for other categories of the adult population of the corresponding age [17, 21, 22]. Data on the risks of COVID-19 during pregnancy are extremely limited. Infected pregnant women should be under dynamic monitoring, as they belong to the risk group for severe viral diseases, including those caused by other Beta-CoV viruses [12, 15]. However, the current data do not confirm the existence of such a risk in COVID-19. Any pneumonia of infectious etiology is an important cause of morbidity and mortality among pregnant women. At the same time, there is currently no reliable information on the effect of SARS CoV-2 on the fetus and newborn status [13, 16, 18, 19, 21, 25].

Pregnant women with a history of somatic diseases form the group of increased risk for severe forms of COVID-19. These diseases include chronic lung diseases, moderate and severe bronchial asthma, heart diseases, weakened immune systems, including conditions after cancer treatment, severe obesity (body mass index more than 40 kg/m²), diabetes mellitus, chronic kidney and liver diseases and anti-phospholipid syndrome [3–5, 9, 13, 18, 22, 23].

Examination of pregnant women with COVID-19 does not differ from the examination of adult patients with COVID-19. If necessary, it is possible to use X-ray diagnostic methods (survey radiography and computed tomography of the chest organs) with fetus protecting from radiation. A special obstetric examination is carried out in full in accordance with the gestational age [2–4, 7, 13, 17, 25].

Laboratory diagnostic methods in pregnant women and labor do not differ from standard methods acceptable for adult patients: performing a standard clinical and laboratory tests (clinical blood test, leukocyte formula, biochemical blood test (alanine aminotransferase, aspartate aminotransferase, urea, bilirubin, glucose, C-reactive protein, acid-base state, coagulation profile), general urine analysis) [3, 9, 11, 13, 17, 25].

Laboratory testing for COVID-19 in the maternity hospitals/perinatal centers should be organized for all pregnant women, women in labor, including in case of emergency hospitalization, and if there was no pre-hospital examination [2, 5, 13].

Research objective. To evaluate the features of pregnancy and delivery course, fetal and newborn status in women with confirmed COVID-19.

MATERIALS AND METHODS

A retrospective clinical and statistical analysis of 106 pregnancy and delivery case histories and medical records of newborn from women with a gestation period of 22–41 weeks with a confirmed diagnosis of COVID-19 was carried out. These women were treated and delivered on the temporarily converted beds for providing obstetric care to pregnant women, women in labor and postpartum women with suspected and infected COVID-19 and gynecological patients at the Municipal Non-Profit Enterprise “Kyiv City Maternity Hospital No. 3” from September 2020 to May 2021.

Statistical analysis of results was carried out with methods of descriptive and variational statistics.

RESULTS

Temporarily converted beds for providing obstetric care to pregnant women, women in labor and postpartum women with suspected and infected COVID-19 at the Municipal Non-Profit
Enterprise “Kyiv City Maternity Hospital No. 3” were organized in April 2020 and closed in May 2021. During the study, 372 women were hospitalized, including 106 pregnant women with a gestation period of 22–41 weeks. The delivery took place in 48 women.

The dynamics of hospitalization of pregnant women to the Municipal Non-Profit Enterprise “Kyiv City Maternity Hospital No. 3” is shown in the Fig. 1.

Since September 2020, the number of pregnant women with COVID-19 has had a steady upward trend with a significant predominance of patients in February and March 2021 compared to September 2020 and May 2021 (p < 0.05).

The average age of pregnant women ranged from 21 to 39 years and was $33 \pm 2.4$ years, but significantly prevailed women aged 30–35 years (p < 0.05). 63 pregnant women were married (59.4%), 21 (19.8%) – single, 22 (20.8%) – in a civil marriage (p < 0.05).

Information about blood types and rhesus (Rh) factor of pregnant women is given in Table 1. Among the examined women, women with A (II) second blood group and Rh positive factor significantly prevailed – 51 (48.1%) and 85 (80.2%) respectively (p < 0.05).

At the same time a more thorough analysis of the Rh factor and blood type revealed that pregnant women with 0 (I) first blood group (12, 57.2%) and A (II) second (5, 23.8%) blood groups dominated among women with a negative Rh factor (p < 0.05) (Table 2).

Assessing the state of somatic health, we noticed that 68 (64.2%) pregnant women considered themselves healthy (p < 0.05). At the same time, 38 (35.8%) pregnant women had somatic pathology, including the combined pathology – 6 (15.8%). The structure of the existing extragenital pathology was dominated by diseases of the cardiovascular system – 8 (21.1%), diseases of the urinary tract – 9 (23.7%) and thyroid gland dysfunction – 7 (18.4%).

The average age of menarche in the significant majority of women was within the physiological norm and ranged from 11 to 13 years – 75 (70.8%) (p < 0.05). The vast majority of women (82, 77.4%) did not have a history of gynecological diseases (p < 0.05). Gynecological diseases were noted in 24 (22.6%) women, including combined gynecological pathology – 6 (25.0%). The structure of gynecological morbidity was dominated by inflammatory diseases of the female reproductive system – 12 (50.0%), background and precancerous diseases of the cervix – 8 (33.3%) and sexually transmitted infections – 6 (25.0%).

The significant majority of women (60, 56.6%) did not have a history of delivery. The vast majority among 46 pregnant women who had pregnancies in anamnesis were women with first delivery – 35 (76.1%) (p < 0.05).

In women who have already had pregnancy in the structure of obstetric history were dominated artificial abortions – 36 (76.2%) and spontaneous miscarriages – 20 (43.5%). 8 (17.7%) women had a history of preterm birth.

The structure of complications of a current pregnancy is shown in Table 3. Pregnancy coursed against the background of placental dysfunction in almost half women (46, 43.4%), which was confirmed by ultrasound. Abnormal amounts of amniotic fluid were observed in 24 (22.6%) cases. Anemia of varying degrees was noted in 33 (31.1%) cases. 37 (34.9%) pregnant women had preeclampsia of varying severity.

Almost the half of pregnant women (55, 51.9%) was delivered to the Municipal
ВАГІТНІСТЬ І ПОЛОГИ

Non-Profit Enterprise “Kyiv City Maternity Hospital No. 3” by ambulance (Fig. 2). 34 (32.1%) pregnant women admitted for medical help on their own, 94 (88.7%) women had a positive Polymerase Chain Reaction (PCR) test, in 6 (11.3%) cases the diagnosis was confirmed by performing a rapid test in the emergency department, in 6 (11.3%) cases the test results were negative.

Leading complaints at the time of admitting (Fig. 3) to the hospital were fever, cough and fatigue in 85 (80.2%), 90 (84.9%) and 73 (68.9%) women, respectively (p < 0.05).

Dyspnoea at rest and during physical exertion was noted in 76 (71.7%) pregnant women. Characteristic neurological manifestations of SARS CoV-2 were noted by almost every third pregnant woman: headache – 44 (41.5%), anosmia – 42 (39.6%) and in every fourth pregnant woman there was parosmia (25, 23.6%) and myalgia (22, 20.8%).

Almost half of pregnant women (51, 48.1%) reported about typical manifestations of SARS CoV-2 within 1–3 days. Almost every fifth pregnant woman had the duration of the disease for a one day, from 3 to 6 days and more than 7 days – 20 (18.8%), 18 (16.9%), 17 (16.0%) cases respectively (p < 0.05).

The general status at the time of hospitalization was assessed as “satisfactory” in 81 (76.4%) pregnant women (p < 0.05) and as “moderate” and “severe” in 21 (19.8%) and 4 (3.8%) pregnant women, respectively.

Average body temperature values between 36.6–36.9 °C were measured in 21 (19.8%) pregnant women (Fig. 4).

Almost every third pregnant woman (39, 36.8%) had subfebrile body temperature values between 37.0–37.5 °C and 38.0–38.5 °C were observed in 15 (14.1%) and > 38.5 °C in 6 (5.7%) pregnant women.

The average saturation rates were in the range of 96–99% in more than half of pregnant women (67, 63.2%). The average saturation rates were in the range of 90–95% in a third of pregnant women (33, 31.1%). Less than 90% of saturation indicators were determined in 6 (5.7%) pregnant women. Respiratory failure of I and II degrees was diagnosed in 19 (17.9%) and 8 (7.5%) hospitalized patients respectively.

### Table 3. Complications of current pregnancy (according to the archive data) (n, %)

<table>
<thead>
<tr>
<th>Complications</th>
<th>Examined women (n = 106)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threatening early spontaneous abortion</td>
<td>18 (16.9)</td>
</tr>
<tr>
<td>Threatening late spontaneous abortion</td>
<td>12 (11.3)</td>
</tr>
<tr>
<td>Threatening premature delivery</td>
<td>21 (19.8)</td>
</tr>
<tr>
<td>Placental dysfunction</td>
<td>46 (43.4)</td>
</tr>
<tr>
<td>Oligohydramnios</td>
<td>8 (7.5)</td>
</tr>
<tr>
<td>Polyhydramnion</td>
<td>16 (15.1)</td>
</tr>
<tr>
<td>Anemia</td>
<td>33 (31.1)</td>
</tr>
<tr>
<td>Vaginitis</td>
<td>20 (18.8)</td>
</tr>
<tr>
<td>Pathological placental location</td>
<td>6 (5.7)</td>
</tr>
<tr>
<td>Asymptomatic bacteriuria</td>
<td>14 (13.2)</td>
</tr>
<tr>
<td>Gestational pyelonephritis</td>
<td>7 (6.6)</td>
</tr>
<tr>
<td>Gestational diabetes</td>
<td>4 (3.8)</td>
</tr>
<tr>
<td>Preeclampsia</td>
<td>37 (34.9)</td>
</tr>
</tbody>
</table>

**Figure 2. Type of hospitalization of pregnant women with COVID-19 to the Municipal Non-Profit Enterprise “Kyiv City Maternity Hospital No. 3”, %**

**Figure 3. Complaints at the time of hospitalization of pregnant women with COVID-19, %**
The vast majority of pregnant women (86.81.1%) did not need oxygen support (p < 0.05). Oxygen support with nasal cannulas and a 100% oxygen mask was used in 16 (15.1%) and 4 (3.8%) cases respectively.

During their stay, a “mild” course of the disease was observed in 76 (71.7%) women, “moderate” and “severe” course were noted in 24 (22.6%) and 6 (5.7%) women, respectively.

All pregnant women hospitalized the temporarily converted beds for providing obstetric care to pregnant women, women in labor and postpartum women with suspected and infected COVID-19 and gynecological patients were examined in accordance with the quality standards of medical care [4]. In all pregnant women, except for generally accepted laboratory tests, the C-reactive protein (CRP), procalcitonin, and D-dimer were examined and lung ultrasound was performed.

The average CRP value as a marker that correlates with the severity of the disease and allows assessing the prevalence of the inflammatory process and predicting the development of acute respiratory failure and sepsis, are shown in Table 4. The average values of procalcitonin in 83 (78.3%) pregnant women were within the permissible physiological norm. An increase in the average procalcitonin value was observed in 23 (21.7%) respondents.

The average D-dimer values, as a marker indicating the possibility of a disorders of the blood coagulation system in case of its increase, were within the physiological norm only in 11 (10.4%) pregnant women (Table 6). A stable or increasing acceleration in the D-dimer may indicate increased thrombosis, which is often fatal in patients with SARS CoV-2.

Analyzing the coagulogram parameters, we found no significant deviations from the norm that could correlate with the indicators of CRP, procalcitonin and D-dimer. Deviations from the norm of the prothrombin index were revealed in 7 (6.6%) cases. Fibrinogen more than 4 was found in 34 (32.1%) cases, fibrinogen B was detected in 14 (13.2%) cases.

According to the lung ultrasound, no pathology was detected in 24 (22.6%) pregnant women (Table 7). During ultrasound examination in this category of pregnant women, the image of lung tissue was displayed as uniform and gray in the intercostal spaces when the transducer was located between the cranial and caudal lobes of the lungs. A thin, bright pleural line was defined on the anterior surface of the lungs between the ribs and moved back and forth with each inhale and exhale. Usual parallel white line (A-line) behind the pleura was visualized in most cases.

### Table 4. Average CRP value in blood plasma, mg/l (n, %)

<table>
<thead>
<tr>
<th>Value</th>
<th>Examined women (n = 106)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5</td>
<td>3 (2.8)</td>
</tr>
<tr>
<td>5–20</td>
<td>40 (37.7)</td>
</tr>
<tr>
<td>20–39</td>
<td>24 (22.6)</td>
</tr>
<tr>
<td>40–59</td>
<td>13 (12.3)</td>
</tr>
<tr>
<td>60–80</td>
<td>6 (5.7)</td>
</tr>
<tr>
<td>&gt; 80</td>
<td>20 (18.9)</td>
</tr>
</tbody>
</table>

### Table 5. Average procalcitonin value, ng/ml (n, %)

<table>
<thead>
<tr>
<th>Value</th>
<th>Examined women (n = 106)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.1</td>
<td>83 (78.3)</td>
</tr>
<tr>
<td>0.1–0.2</td>
<td>14 (13.2)</td>
</tr>
<tr>
<td>&gt; 2.0</td>
<td>9 (8.5)</td>
</tr>
</tbody>
</table>

### Table 6. Average D-dimer value, mg/l (n, %)

<table>
<thead>
<tr>
<th>Value</th>
<th>Examined women (n = 106)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.5</td>
<td>11 (10.4)</td>
</tr>
<tr>
<td>0.5–0.9</td>
<td>7 (6.6)</td>
</tr>
<tr>
<td>1.0–1.5</td>
<td>16 (15.1)</td>
</tr>
<tr>
<td>1.6–1.9</td>
<td>11 (10.4)</td>
</tr>
<tr>
<td>2.0–2.5</td>
<td>11 (10.4)</td>
</tr>
<tr>
<td>2.6–2.9</td>
<td>10 (9.4)</td>
</tr>
<tr>
<td>&gt; 3.0</td>
<td>40 (37.7)</td>
</tr>
</tbody>
</table>
During the work of the temporarily converted beds for providing obstetric care to pregnant women, women in labor and postpartum women with suspected and infected COVID-19 and gynecological patients of the Municipal Non-Profit Enterprise “Kyiv City Maternity Hospital No. 3” 106 pregnant women with a gestation period of 22–41 weeks were treated, 48 women delivered. A significant number of patients were hospitalized in the department in February (20 women) and March (32 women) 2021. A significant majority of patients had A (II) second blood group and Rh+ (positive) status. 46 (43.4%) women had placental dysfunction, 33 (31.1%) women had varying degrees of anemia and 37 (34.9%) women had varying degrees of preeclampsia.

The main complaints typical for SARS CoV-2 in hospitalized pregnant women were fever (85, 80.2%), cough (90, 84.9%), fatigue (73, 68.9%) and shortness of breath at rest and during physical exertion (76, 71.7%). Characteristic neurological manifestations of SARS CoV-2 were noted by almost every third pregnant woman: headache in 44 (41.5%), anosmia in 42 (39.6%); parosmia and myalgia were noted by every fourth pregnant woman: 25 (23.6%) and 22 (20.8%) women retrospectively. In 103 (97.2%) women the average CRP values were determined to be higher than normal. Lung ultrasound is a significant diagnostic technique that allows clearly identifying the affected areas and determining the degree of damage to the lung tissue.

### REFERENCES

1. Abaturov, A.E.

2. Беженарь, В.Ф.

3. Вебер, В.Е., Акрамазян, Е.А., Зафрикер, И.Е.

4. Максимов, А.М.

5. Rekalova, O.M.

6. Турицкя, С.М.


ВАГІТНІСТЬ І ПОЛОГИ


ВАГІТНІСТЬ І ПОЛОГИ

появи SARS CoV-2, як головний біль, аносмія, мала практично кожна третя вагітна, а паросмію та міалгію – кожна четверта. У 97,2% жінок середній рівень С-реактивного білка перевищував норму. УЗД легень дозволяло чітко виявити тканини, плеврального випоту у вигляді чорних ділянок різного розміру в плевральній порожнині.

Висновки

Література

Metaoda дослідження. Оцінка особливостей перебігу вагітності, пологу, становища й новонародженого в жінок із підозрою на COVID-19.

Матеріали та методи. Проведено кількісний аналіз статистичних даних статистичних даних про стан вагітних, пологих і новонароджених, які були включено в дослідження. Усі діагнози COVID-19 надані відповідними органами охорони здоров'я.

Результати.


Ключові слова: вагітність, COVID-19, SARS CoV-2.

25

ISSN 2309-4117