

Mother and neonate suffering from COVID-19 infection. Is there any risk of vertical transmission? A case report

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ABSTRACT

Objectives: This study was carried out to visualize possible infection of the fetus during pregnancy through vertical transmission.

Material and methods: A descriptive observational study was conducted on a 39th week pregnant woman who was suspected COVID-19. Pregnancy was ended with a caesarean section due to epidemiological reasons. The mother and newborn were examined for COVID-19 infection using PCR swabs.

Results: At first there were discrepancies between SARS-CoV-2 test results from the nasopharyngeal swabs of the mother and the neonate. The mother tested positive, whereas the newborn tested negative. However, neonate's control swab was repeated within the following 48 hours and revealed a positive test result.

Conclusions: The risk of vertical transmission with SARS-COV2 is possible, therefore it is very important to isolate pregnant women from infected people to protect mothers and newborns.

Key words: COVID-19; SARS-CoV-2; vertical transmission; coronavirus; neonate

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INTRODUCTION

SARS-CoV-2 is a novel coronavirus, first identified at the end of 2019 in Wuhan, China. Infection with the virus causes COVID-19 disease. Other known related viruses are SARS-CoV and MERS-CoV. Compared to its predecessors SARS-CoV-2 virus is characterized by high contagiousness, but low mortality. As reported by Dashraath et al. (2020) mortality of pregnant women was 0%, 18% and 25% for COVID-19, SARS and MERS, respectively. The transmission route of SARS-Cov-2 is thought to be predominantly airborne or fecal-oral. Current reports negate the presence of the virus in the amniotic fluid, umbilical cord blood or breast milk [1–3]. The symptoms of COVID-19 are flu-like, such as: fever, coughing, dyspnea, muscle pain, and in severe cases it can lead to mild or severe pneumonia or result in death [4].

In the literature, there are few described cases of women with SARS-CoV-2 infection. Majority of whom were asymptomatic or with mild course of the disease. In few cases, the patients required admission to the Intensive Care Unit. The rate of infection among pregnant women is comparable to the rest of the population, however, it changes with the

duration of the pandemic and is dependent on a variety of numerous factors [1, 5–7].

Currently, there are no conclusive data on vertical transmission of SARS-CoV-2. Up to date only a few cases of newborns with a positive RT-PCR test performed shortly after birth have been described [1, 3, 5, 8]. Inconsistency of relevant clinical data and information on an appropriate isolation makes this work only observational.

Here we describe a case of a pregnant woman infected with SARS-CoV-2 and her symptomatic newborn child with confirmed infection by RT-PCR test.

MATERIAL AND METHODS

A twenty-four-year-old primigravid female, in her 39th week of pregnancy, was transferred from a nearby Medical Centre to the Gynecological and Obstetrics Ward of the Hospital dedicated to COVID-19 infected patients in Tychy, Poland. The patient presented with regular systolic activity, bleeding from the reproductive tract and was suspected of COVID-19. During pregnancy, the primigravid patient was diagnosed with anemia, for which she was supplemented with iron

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and vitamins. Prior to hospitalization, the patient was under quarantine due to previous contact with a SARS-CoV-2 infected person. The day before the transfer, the patient developed fever (38.5°C), and a throat swab for SARS-CoV-2 test was taken.

On the day of admission, due to regular spasmodic activity and staining of the genital tract, a caesarean section was performed following epidemiological indications (suspicion of COVID-19). Subarachnoid anesthesia was used. Throughout the surgery the patient had a surgical mask on her face. Delayed clamping of the umbilical cord and skin-to-skin contact were withdrawn. The newborn, baby girl was born in good general condition, immediately isolated from her mother and rated 10 on Apgar scale in the first minute. The birth weight was 3430 g and the length 54 cm.

RESULTS

Five hours after the caesarean section, the newborn was tested for SARS-CoV-2 using nasopharyngeal swab. The next day, Mother's RT-PCR test results were positive for the presence of SARS-CoV-2 genetic material, but negative result in the newborn child.

The newborn was placed in an incubator in an isolated room. From the beginning of the care, medical personnel used personal protective equipment and followed hygiene rules. Following 48h after the birth, an RT-PCR test from the nasopharyngeal control swab collected from the newborn indicated the presence of the virus. Subsequently, samples taken on the 5th, 8th, 13th and 18th day of the newborn's life confirmed the presence of SARS-CoV-2.

The course of the neonate adaptation period was complicated by discreet general symptoms (periodic anxiety, increased body temperature to 38.0°C, single auscultatory crackling above the lungs and later sneezing reflex). Laboratory tests indicated low levels of inflammatory markers. An ultrasound of the lungs showed an increased number of B-line artifacts. The condition of the newborn was gradually improving. On the 24th day, following two negative swab tests at required intervals, the newborn was discharged home.

The mother of the newborn remained asymptomatic throughout the hospitalization period. Laboratory tests indicated thrombocytopenia (up to 89 *10³/uL), a mild increase in CRP concentration (43.5 mg/L) and hyponatremia (133 mmol/L) (Tab. 1). Seven days after the caesarean section, she was discharged home in a good general health and continued self-isolating at home.

DISCUSSION

The described above case raises several questions: How and at which point was the newborn infected with SARS-CoV-2? Is there a possibility that the first swab indicated a false negative result due to either a collection error or lack of airway colonization in the first day of the

Table 1. Summary of selected laboratory results of the patient

Test	Results	Reference interval
C-reactive protein	43.5	[0.0–5.0] mg/L
Potassium	3.8	[3.5–5.2] mmol/L
Sodium	133	[135–145] mmol/L
Total protein	59	[64–83] g/L
Platelets	89	[150–450] 10 ³ /uL
Red blood cells	3.74	[4.0–5.0] 10 ⁶ /uL
Hemoglobin	11.92	[12.0–16.00] g/dL

newborn's life? Did the infant become infected during the caesarean section, for instance by ingestion of the mother's blood or inhalation of the virus during the first breathes? Although the first test obtained five hours after the caesarean section gave a negative result, a possibility of an intrauterine infection cannot be excluded. False negative result for a SARS-CoV-2 RT-PCR appear, and their incidence can be influenced by various factors, such as sampling technique, sample transport, or phase of infection [9].

The probability of a newborn being infected by medical personnel is low due to the use of an appropriate personal protective equipment. Moreover, after the infant was discharged home, serological tests for IgG antibodies were performed among the medical personnel, and no IgG antibodies were found.

Serological test for IgM and IgG antibodies, for both the mother and the newborn described here, could provide more insight. IgM class antibodies are not transmitted through the placenta and its elevated concentration in the blood of the newborn could suggest an intrauterine infection.

Jan Dong et al. (2020) [10] reported a case of a child delivered through cesarean section while the mother was infected with SARS-CoV-2. Levels of IgM and IgG class antibodies of the infant were elevated, whereas the result of a swab test taken directly after the birth was negative for the presence of SARS-CoV2 genetic material. According to reports, IgM antibodies do not appear until the third day after contagion [10].

Serological tests are believed to be complementary in COVID-19 diagnostics but cannot be considered as the basis for confirmation or exclusion of the disease. Unfortunately, there was no possibility to perform the serological test in the case described here.

CONCLUSIONS

To our knowledge, this is the first described case in Poland and one of the few reported worldwide, that could indicate a possibility of intrauterine transmission to the fetus. However, more research on a large group of pregnant women is needed in order to unequivocally confirm the possibility of vertical transmission of the virus. It is important

to shield pregnant women from potentially infected part of the population to minimize the risk of SARS-CoV2 infection in mothers and their newborns [11].

Conflict of interest

The authors declare no conflict of interest.

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