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COVID-19 Vertical Transmission in Pregnancy: A Case Report

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Abstract: ***Corona Virus Disease 2019 (COVID-19) is a disease outbreak that was originally found in China and started to spread worldwide at the end of 2019. A few case reports have stated that there is a possibility of vertical infection from the mother to the carried child during pregnancy. This raises concerns regarding the risk of congenital COVID-19 infection in neonates. This case report explains the possibility of vertical transmission from a pregnant woman with COVID-19 to her unborn baby, confirmed by the positive Reverse Transcription Polymerase Chain Reaction (RT-PCR) COVID-19 resultof the baby one day after birth.***

Keywords: COVID-19, pregnancy

1. Introduction

Corona Virus Disease 2019 (COVID-19) is an acute respiratory tract disorder caused by the virus SARS-CoV-2. COVID-19 was first discovered in China and spread rapidly to other countries. In 11 March 2020, WHO officially declared COVID-19 as a global pandemic, with the ability to infect people all over the world, including pregnant women. Symptoms of COVID-19 are mostly of acute respiratory problems such as fever, cough, difficulty breathing, while in severe cases it present signs of pneumonia, acute respiratory syndrome and even causing death.

The presence of COVID-19 infection in pregnant women raises concerns considering other previous Corona virus infections such as Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) are associated with an increased risk of neonatal morbidity and mortality, as well as adverse pregnancy outcomes including miscarriage, premature birth and stillbirth.

Vertical transmission is defined as the transmission of infectious pathogens from mother to fetus during pregnancy, namely during the antepartum, intrapartum and postpartum periods through the placenta in the uterus, contact with fluids during the birthing process, and through direct contact from breastfeeding after birth.

Until today, data on vertical transmission from pregnant women infected with COVID-19 to their unborn babies is still limited. In this case report, a pregnant woman was infected with COVID-19 in the third trimester of her pregnancy. This positive result was obtained from the Antibody Rapid Test done, which was then followed by RT-PCR examination. Screening for COVID-19 is then carried out on the baby born using RT-PCR examination and gave a positive result. Some theories to date are still very limited about the vertical transmission of SARS-CoV-2 from mother to the baby carried. Further research is needed to explore regarding the transmission of COVID-19 from pregnant women to the baby they are carrying.

2. Case Report

A pregnant woman came to the emergency room at Wangaya General Hospital in January 2021 with complaints of water coming out of the birth canal since 3 hours before arrival at the hospital. Complaints of intermittent abdominal pain and blood mucus secretion were denied by the patient. Complaints of fever, cough, runny nose, loss of olfactory senses were denied. After further interviews, it was found that the patient had an obstetric history of the first child born at term by Caesarean section (C-section) weighing 3200 grams. Duringthis second pregnancy, the patient did regular check-ups to hergynecologist.

On general examination and patient's vital signs, the patient's blood pressure was 110/70 mmHg, pulse rate of 80x/minute, respiratory rate of 20x/minute, O_2 saturation 96% and body temperature 36.6˚C. On physical examination, in general, there was no abnormality found. On obstetric examination, uterine fundal height was 35 cm, 2 fingers below the xiphoid process. On Leopold's examination, it was felt that the fetal head had entered the upper door of the pelvis, uterine contractions frequency was 1-2x/10 seconds with a fetal heart rate of 152x/minute. On vaginal toucher examination,there was a 1 cm opening with 25% effacement, rupture of amniotic membrane, head palpable with transverse sagittal suture and Hodge reduction 1. Estimated delivery date based on ultrasound was February 14, 2021. On ultrasound examination it showed a head presentation with an estimated fetal weight of 3565 grams. Complete blood examination was carried out with results WBC 10.62 (Neut: 7.37, Lymp: 21.5, Mono: 6.8, Eos: 0.22, Baso: 0.3 with RNL: 3.51) HB: 12, 4, HCT 36.0, PLT 18. Based on anamnesis, physical examination and supporting examinations, the patient was diagnosed with G_2P_{1001} gestational age 37 weeks 2 days, single and alive, history of C-section, premature rupture of membranes (PROM), with suspect of COVID-19 (reactive IgG & IgM).

By a gynecologist, a schedule for C-section was planned, considering that the pregnancy was mature enough, with premature rupture of membranes and a history of C-section 1 year prior. A C-section was prepared with preoperative

prophylaxis done using antibiotic injection Ceftriaxone 2000 mg.

Patients received treatment for C-section which was carried out with COVID-19 protocol. The C-section surgery was performed in a room with negative pressure. Transmission to medical personnel via droplets or airborne in the operating room is minimized with all doctors and nurses involved using personal protective equipment, N95 masks, goggles, gowns, and sterile gloves. The patient also wore an N95 mask throughout the surgery and did not come into direct contact with the baby at birth. On January 27, 2021, a boy weighing 3000 grams was born who was immediately treated in a special isolation room for COVID-19. The mother is subjected to additional tests to confirm COVID-19 infection. The patient was treated in a special isolation room and was given injection therapy of Ceftriaxone 2 x 1000 mg, also given oral therapy of Azithromycin 1 x 500 mg and high doses of Vitamin C from a pulmonologist.

Blood coagulation tests were also performed with normal results (PT 10.5 seconds, INR 0.99 seconds, APTT 27.9 seconds), and an increase in D-Dimer was 945.8 (<500). On blood gas analysis, normal results were obtained (pH 7.41, PO_2 100 mmHg, PCO_2 37 mmHg, HCO_3 24 mmHg, SO_2 98%). Chest X-ray was taken and showed no signs of pneumonia. Heart and lung examinationswere normal.

On January 28, 2021, the RT-PCR examinationof the patient showed positive result, so the patient was confirmed to be infected with COVID-19. Nasopharyngeal swab RT-PCR examination was also performed on the baby one day later and a showed a positive COVID-19 result. The babywas treated in a special isolation room. After being treated for two days post surgery, the patient had no complaints and was allowed to return home, but continued to carry out independent isolation in a hotel determined by the local government. Meanwhile, the baby was treated at home with breastmilk substitute.

3. Discussion

We report the case of a pregnant woman with confirmed COVID-19 infection in the third trimester of pregnancy, who delivered a baby through C-section, with the baby born also confirmed COVID-19 positive after an RT-PCR examination one day after birth. There is a possibility of vertical infection from mother to baby during the antepartum and intrapartum periods. The possibility of postpartum vertical transmission was excluded given that the delivery process followed strict airborne prevention protocols and the babywas separated from the mother immediately after delivery.

During pregnancy, an immunosuppressive condition occurs in pregnant women that causes increased susceptibility to pathogens and a greater risk of being hospitalised, as well as a greater risk of dying from infection than other adults.[4] There is a concern about vertical transmission in COVID-19 cases due to several reasons. COVID-19 is known to bind to the angiotensin-converting enzyme 2 (ACE2) receptors. These receptors are found in the placenta especially in the syncytiotrophoblast, cytotrophoblast, endothelium, and vascular smooth muscle of primary and secondary villi.[2,5] In a recent systematic review, evidence was obtained that ACE2 is found in gynecological organs such as the ovaries, uterus and vagina. In addition, several recent case reports show evidence that COVID-19 can infect the placenta, which was confirmed by the discovery of RNA from the SARS-CoV-2 virus and protein in the placenta, as well as evidence of the presence of virions in syncytiotrophoblast.[2,6,7]

In a study conducted by Maksim et al, it reported a case of pregnant women with COVID-19 during third trimester. Pregnancy is terminated by C-section with strict protocols of preventing infection through airborne, droplet or maternal contact. After that, RT-PCR examinations were carried out tothe baby on days 0, 4, and 7 and positive COVID-19 results were obtained.[5] The possibility of vertical infection was supported by the absence of contact with the mother's vaginal secretions. There was no incident of premature rupture of membranes. There was also no skin contact with the mother before nasopharyngeal sampling of the baby.

Lan Dong et al reported a case of a baby born from a mother with COVID-19 confirmed 23 days before delivery. The baby was delivered by C-section with strict procedures in preventing COVID-19 transmission. From the baby born, there was an increase in levels of IgG and IgM antibodyof SARS-CoV-2 found through tests 2 hours after birth. The increase in IgM antibody indicates infection to the baby in the uterus, because IgM is not passed from mother to baby through the placenta. The baby may have been exposed for 23 days from the mother's diagnosis of COVID-19 to delivery. The laboratory test results showed the presence of inflammation and liver damage, which indirectly also supports the possibility of vertical transmission. Although the possibility of infection during delivery cannot be ruled out, IgM antibodies are not usually detected until 3-7 days after infection, while in this case, elevated IgM antibodies were detected immediately in the baby 2 hours after birth. Maternal vaginal secretions were also SARS-CoV-2 negative.[8]

In this case, we did not carry out the test for SARS-CoV-2 virus in the amniotic fluid, umbilical cord and placenta to ensure vertical transmission in the baby, but considering the delivery process which followed strict protocols to prevent airborne transmission and the immediate separation of the baby after childbirth, vertical transmission from mother to the baby is very likely. The possibility of vertical transmission of COVID-19 in pregnancy should always be considered, just like TORCH infections [Toxoplasmosis, Other (Syphilis, Varicella-Zoster and Parvovirus B19), Rubella, Cytomegalovirus, and Herpes Simplex Virus] which can be transmitted from mother to baby, and considering the risk of neonatal morbidity and mortality associated with other viral infections such as SARS and MERS.[2]

4. Conclusion

The occurrence of vertical transmission in the uterus in this case has yet to be confirmed. Clinical data regarding COVID-19 infection in newborns is still very limited. It is

also unclear whether SARS-CoV-2 can be transmitted vertically through the placenta, as well as short- and long-term side effects to the child. Therefore, it is crucial to keep an eye on the condition of pregnant women and screen for COVID-19 in mothers as well as the babies after birth. It is advisable to carry out a complete examination including pharyngeal swabs on mothers and babies, peripheral blood tests, examination of postpartum placental tissue samples, amniotic fluid, umbilical cord blood, and breast milk, to obtain data that can support further research.

5. Author Contribution

All authors contributed equally.

6. Conflict of Interests

There is no conflict of interests in this case report.

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