

Maternal and fetal effects of covid-19 virus on a complicated triplet pregnancy. A case-report

CURRENT STATUS: POSTED



Maryam Rabiei
Arash Hospital, Tehran University of Medical Sciences

Tahereh Soori
Arash Hospital, Tehran University of Medical Sciences

Amene Abiri
Arash Hospital, Tehran University of Medical Sciences

Arshia Shizarpour
Medical School, Tehran University of Medical Sciences

Zohreh Farsi
Arash Hospital, Tehran University of Medical Sciences

Reihaneh Pirjani
Tehran University of Medical Sciences

✉ pirjani@razi.tums.ac.ir *Corresponding Author*

DOI:

10.21203/rs.3.rs-25864/v1

SUBJECT AREAS

Surgical Obstetrics & Gynecology

KEYWORDS

triplet pregnancy, Covid-19 virus, vertical transmission. case report

Abstract

Background: COVID-19 virus it is going to be pandemic all around the world. There is still limited scientific evidence on the manifestations and potential impact of this virus on pregnancy.

Case presentation She was a 38 year-old triplet pregnant with a history of primary infertility and had become pregnant by induction ovulation and a history of hypothyroidism and also a history of gestational diabetes. She was hospitalized at 29 weeks and 2 days gestational age due to elevated liver enzymes and finally based on a probable diagnosis of gestational cholestasis, she was treated with ursodeoxycholic acid. On the first day after hospitalization, a sonography was performed in which biophysical scores and amniotic fluid were found normal in all three fetuses with normal Doppler findings in two fetuses and increased umbilical artery resistance ($PI > 95\%$) in one fetus. Four days after hospitalization, she developed fever, cough and myalgia and her covid-19 test was positive. After maternal infection with the virus, exacerbated placental insufficiency occurred in two of the fetuses so that absent umbilical artery end diastolic flow occurred rapidly in two fetuses and finally, six days later, she underwent cesarean section due to rapid exacerbated placental insufficiency and declined biophysical score in two of fetuses. Covid-19 test of nasopharyngeal swabs was negative for first and third babies and positive for second baby .The first and third babies died 3 and 13 days after birth respectively due to collapsed white lung and sepsis. The second baby was discharged with a good general condition. The mother was discharged three days after cesarean section. She had no fever at discharge time and also she was in good general condition.

Conclusions: It was a complicated triplet pregnancy, in which, after maternal infection with the Covid-19 virus, exacerbated placental insufficiency occurred in two of the fetuses, and another fetus had positive covid-19 virus test after birth. It sounds wise that in pregnancy infected by corona virus, in addition to managing the mother, special attention should also be given to the possibility of acute placental insufficiency and subsequent fetal hypoxia and also probability of vertical transmission.

Background

Since early January 2020, corona virus- named Covid-19- has become epidemic in Wuhan, China(1,

2)and then the virus has spread rapidly to a number of countries globally and now it is going to be pandemic all around the world(3). But unfortunately there is still limited scientific evidence on the manifestations and potential impact of this virus on pregnancy. Previous articles on this issue has reported no vertical transmission (4-9). Only in one recent study(10), vertical transmission of the virus from mother to her fetus has been reported.According to our knowledge, none of the previous studieshave reported adverse effects of the virus on fetal intrauterine growth and placental circulation.In this article, we aim to report a complicated triplet pregnancy, in which, after maternal infection with the virus, exacerbated placental insufficiency occurred in two of the fetuses, and another fetus had positive covid-19 virus test after birth. It should be mentioned that written informed consent was obtained from the patient.

Case Presentation

On February 23th 2020, a 38 year-old triplet pregnant woman was hospitalized at 29 weeks and 2 days gestational age due to once a time high blood pressure at level 140/90 and elevated liver enzymes. A week before admission, she had been hospitalized in another hospital for 5 days.

She had a history of a two-year primary infertility and had become pregnant by induction ovulation and also, a history of hypothyroidism treated with levothyroxine. Also, she had previously been diagnosed with gestational diabetes from a month before admission treated with 16 units of insulin daily (6 unit levemir and 10 unit nevorapid). Other administered medications were aspirin and enoxaparin and also she had received a course of betamethasone for fetal lung maturation about 10 days before hospitalization.

Two weeks before hospitalization, liver enzymes increased fourfold than normal alanine aminotransferase (ALT) 218 u/l and aspartateaminotransferase (AST) 283 u/l) and due to a probable diagnosis of gestational cholestasis, she was treated with ursodeoxycholic acid (300 mg twice a day) from one week before hospitalization. Lab tests at admission time included: ALT=94 U/L, AST= 57u/l, total bilirubin= 0.7 and direct bilirubin= 0.1, LDH=276 U/L. Other tests including white blood cell count, hemoglobin, platelet,serum creatinine, and urine analysis were in normal range. She underwent a 24-hour blood pressure monitor and for all measurements, 18.8% of systolic blood

pressure and 15.6% of diastolic blood pressure, readings exceeded the set limit of 140 and 90 mmHg respectively. Echocardiographic findings were quite normal and also 24-hour urine protein was reported in normal range. On February 24th, a sonography was performed in which biophysical scores and amniotic fluid were found normal in all three fetuses but one of the fetuses had increased umbilical artery resistance (PI>95%) and estimated weight below 5%, but umbilical cord and middle cerebral arteries findings were normal in the other two fetuses. On February 27th, she developed fever and cough. On the same day, urine culture, blood culture and complete blood count test were sent. Next day, due to the persistent fever and cough and also an onset of myalgia, a real-time reverse transcriptase-polymerase chain reaction (RT-PCR) for Covid-19 nucleic acid of nasopharyngeal swabs was conducted. All steps including sample collection, processing and laboratory testing were based on World Health Organization (WHO) guidelines.

Unfortunately the result was positive, so oseltamivir and hydroxychloroquine were administered. She had a mild fever and her maximum temperature was 38.3 ° C. There was no complaint of shortness of breath and also her respiratory rates were between 18 to 20 per minute all over the time. Urine culture and blood culture were negative and serum procalcitonin was in normal range. Chest X ray and Computed Tomography Scan were not performed due to patient's lack of consent. On February 27th, a sonography was performed again: The fetus who already had an increased umbilical artery resistance showed an exacerbated condition involving absent umbilical artery end diastolic flow and one of the other fetuses featured umbilical artery resistance (PI>95%), but umbilical cord and middle cerebral arteries findings were normal in the third fetus. On March 1st, umbilical artery end diastolic flow of the second fetus also turned to absent. Therefore due to the progressive and severe increased cord resistance in the two fetuses, ultrasound was performed daily and finally, on March 3rd, the biophysical score in two of fetuses declined. Due to rapid deterioration of fetal conditions and exacerbated placental insufficiency, the woman underwent cesarean section on the same day. The first baby was born with a weight of 1320 grams and umbilical cord PH= 7.25 and her five minute Apgar score was 4, the second baby was born with a weight of 1600 grams and umbilical cord PH= 7.23 and

his five minute Apgar score was 7, the third baby was born with a weight of 1250 grams and umbilical cord PH= 7.21 and her five minute Apgar score was 6. All three were intubated after birth and were admitted to neonatal intensive care unit (NICU). RT-PCR for Covid-19 nucleic acid of nasopharyngeal swabs was carried out for all three newborns immediately after birth. The mother was discharged three days after cesarean section. She had no fever at discharge time and also she was in good general condition, but the cough was persistent.

The first and third newborns each received three doses and the second newborn received two doses of surfactant respectively. All three newborns developed clinical symptoms of sepsis and also pulmonary hemorrhage. Although pulmonary hemorrhage can occur secondary to prematurity as well as surfactant infusion, the remarkable point in these newborns was that they did not respond to surfactant, and also they had completely white lung x-rays. The primary results of Covid-19 RT-PCR were negative for all three newborns. According to bad general conditions of newborns and considering the false negative probability of the initial test, Covid-19 RT-PCR was repeated and the result was positive for the second baby whose weight was 1600 gram. It should be noted that during the period between two tests, the babies were completely isolated and had no suspected exposure, so, the possibility of vertical transmission should be considered.

The first baby died three days after birth with collapsed white lung and sepsis. The third neonate also has symptoms of sepsis and died 13 days after birth. The second neonate whose covid-19 PCR test was positive, is ameliorating and his endotracheal tube had been removed and was discharged with a good general condition.

Discussion

In spite of previous studies that none of them showed vertical transmission of covid-19 virus(4-8), in a recent report(10), vertical transmission of the virus has been reported, Although in our case, the amniotic fluid has not been tested for the virus, since the newborn's Corona virus test was positive in the first few days after birth and the baby was kept in completely isolated condition and had no suspected exposure throughout the whole period, the possibility of vertical transmission should be considered. Interestingly, it was the biggest fetus with relatively better placental circulation that had

been infected. On the other hand, rapid and progressive placental insufficiency during the last days of pregnancy in two other fetuses should be taken into account. Although this pregnancy was a complicated one and there were several possible risk factors for placental insufficiency, the conceivable and hypothetical impact of corona virus on uterine circulation and fetal hypoxia should also be considered.

There is still insufficient evidence-based data about corona virus in pregnancy. However, it sounds wise that in pregnancy infected by corona virus, in addition to assessing and managing the mother, special attention should also be given to the possibility of acute placental insufficiency and subsequent fetal hypoxia.

List Of Abbreviations

Alanine amino transferase (ALT)

Aspartate amino transferase (AST)

Reverse transcriptase–polymerase chain reaction (RT-PCR)

World Health Organization (WHO)

Neonatal intensive care unit (NICU)

Declarations

Ethics approval and consent to participate: This study was approved by the Ethics Committee of Tehran University of Medical Sciences (Ethical number IR.TUMS.VCR.REC.1398.1057). Written informed consent was obtained from the mother.

Consent for publication: This study was approved by the Ethics Committee of Tehran University of Medical Sciences (Ethical number IR.TUMS.VCR.REC.1398.1057) and also written consent to publish this information was obtained from study participant.

Availability of data and materials: Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

Competing interests: The authors declare that they have no competing interests.

Funding: There was no source of funding for this research.

Authors' contributions: All authors read and approved the final manuscript.

M.R is a perinatologist and she was the patient's chief physician.

T.S is an infectious disease specialist. She managed the patient and also contributed to writing the article.

A.A is a perinatologist and she was one of the patient's physicians.

A.Sh is a medical student and he reviewed the articles and contributed to writing the article.

Z.F is a neonatologist and managed the newborns.

R.P is a perinatologist. She was one of the patient's physicians and wrote the article.

Acknowledgements: Not applicable

References

1. Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, et al. A novel coronavirus from patients with pneumonia in China, 2019. *New England Journal of Medicine*. 2020.
2. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *New England Journal of Medicine*. 2020.
3. Gates B. Responding to Covid-19—A Once-in-a-Century Pandemic? *New England Journal of Medicine*. 2020.
4. Li Y, Zhao R, Zheng S, Chen X, Wang J, Sheng X, et al. Lack of Vertical Transmission of Severe Acute Respiratory Syndrome Coronavirus 2, China. *Emerging infectious diseases*. 2020;26(6).
5. Mullins E, Evans D, Viner R, O'Brien P, Morris E. CORONAVIRUS IN PREGNANCY AND DELIVERY: RAPID REVIEW AND EXPERT CONSENSUS. *medRxiv*. 2020.
6. Rasmussen SA, Smulian JC, Lednicky JA, Wen TS, Jamieson DJ. Coronavirus Disease 2019 (COVID-19) and Pregnancy: What obstetricians need to know. *American Journal of Obstetrics and Gynecology*. 2020.
7. Chen H, Guo J, Wang C, Luo F, Yu X, Zhang W, et al. Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant

women: a retrospective review of medical records. *The Lancet*. 2020.

8. Schwartz DA. An Analysis of 38 Pregnant Women with COVID-19, Their Newborn Infants, and Maternal-Fetal Transmission of SARS-CoV-2: Maternal Coronavirus Infections and Pregnancy Outcomes. *Archives of Pathology & Laboratory Medicine*. 2020.
9. Fan C, Lei D, Fang C, Li C, Wang M, Liu Y, et al. Perinatal Transmission of COVID-19 Associated SARS-CoV-2: Should We Worry? *Clinical Infectious Diseases*. 2020.
10. Dong L, Tian J, He S, Zhu C, Wang J, Liu C, et al. Possible Vertical Transmission of SARS-CoV-2 From an Infected Mother to Her Newborn. *JAMA*. 2020.