

A case of 2019 Novel Coronavirus in a pregnant woman with preterm delivery

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## **Abstract**

We presented a case of a 30-week pregnant woman with COVID-19 delivering a healthy baby with no evidence of COVID-19.

**Key Words:** SARS-CoV-2; Pregnant woman; Preterm delivery

## Introduction

Since December 2019, an epidemic caused by the novel coronavirus (SARS-CoV-2) infection has spread rapidly from Wuhan to different areas of China and other parts of the world<sup>1</sup>. As of February 13, 2020, over 59,000 confirmed cases of the 2019 novel coronavirus infection (COVID-19) in China have been reported, and more than 440 cases in many other countries, with an approximately 2% mortality rate<sup>2</sup>. Evidence pointing to the person-to-person transmission in hospital and family settings has been accumulating, but the modes of transmission are incompletely defined, with no effective treatments or vaccines till now<sup>3-5</sup>.

According to the previous studies<sup>6-9</sup>, pregnant women are at high risk of developing viral infection, such as influenza-A, H1N1, SARS-CoV, MERS-CoV and Ebola virus, and appear to have worse clinical outcomes including maternal mortality, stillbirth, spontaneous abortion, and preterm delivery compared to non-gravid women. However, there is only limited data about the clinical features of COVID-19 during pregnancy. In this study, we reported a case of a 30-week pregnant woman with COVID-19 and gave birth a baby with no evidence of COVID-19.

## Case report

On February 2, 2020, a 28-year-old female, who was 30 weeks pregnant, presented to a fever clinic of Suzhou Municipal Hospital with intermittent fever for one week. She disclosed that she had returned to Suzhou on January 24 after traveling to visit family in Wuhan 3 weeks ago. Given the patient's travel history and fever, two throat swab samples were collected and tested negative for SARS-CoV-2 with the Chinese Center for Disease Control and Prevention (CDC) recommended Kit (BioGerm, Shanghai, China), following WHO guidelines for quantitative RT-PCR. Chest computed tomography (CT) scan on February 4 demonstrated left-sided subpleural patchy consolidation and right-sided ground-glass opacities (Figure A). Then she went into isolation at that hospital. On February 6, the second SARS-CoV-2 RT-PCR results of her sputum came back positive, so she was then transferred to the intensive care unit (ICU) in a negative pressure isolation room of the Affiliated Infectious Hospital of Soochow University, the designated medical center for COVID-19 in Suzhou.

On admission, the physical examination revealed a body temperature of 36.2°C, blood pressure of 95/64 mmHg, pulse of 92 beats per minute, respiratory rate of 22 breaths per minute, and oxygen saturation of 97% with Venturi mask at 5 liters per minute of oxygen. Lung auscultation revealed little rhonchi over the left lower lung field. Other laboratory findings included a leukocyte count of  $10.60 \times 10^9/L$ , neutrophils of  $9.14 \times 10^9/L$ , lymphocytes of  $0.86 \times 10^9/L$ , albumin of 24.6 g/L, C-reactive protein of 19.6 mg/L, D-dimer of 840 ug/L, procalcitonin (PCT) of 0.288 ng/ml, lactate dehydrogenase (LDH) of 544 U/L, N-terminal probrain natriuretic peptide (NT-proBNP) of 318 pg/ml. Levels of creatinine and aminotransferase were within normal limits. A fetal ultrasound revealed a normally intrauterine fetus with normal anatomy of approximately 30 weeks of gestational age.

Since SARS-CoV-2 is a newly identified virus, it remains unknown whether the viral shedding during delivery occurs or the vertical transmission exists. Several multidisciplinary consultations were performed, concluding that given the current situation especially the CT scan and low levels of lymphocytes and albumin, the patient's condition might be deteriorated at any time, and she was at risk of preterm birth, so emergency scenarios for her were developed. Treatment with Arbidol (0.2g administered orally every 8 hours), Lopinavir and Ritonavir Tablets (400/100mg administered orally every 8 hours), Cefoperazone Sodium and Sulbactam Sodium (3.0g administered intravenously every 8 hours), and Human Serum Albumin (20g administered intravenously every day) were initiated, dexamethasone and magnesium sulphate as prophylaxis for the fetus were given and an emergency cesarean section was prepared. On hospital day 3 morning (February 8), a repeated chest CT scan showed bilateral multiple ground-glass opacities (Figure B), a finding consistent with severe atypical

pneumonia. In the afternoon, this patient had disappeared fetal movement and no variability of fetal heart rate monitoring, and no improvement was made on maximal ventilator support for four hours.

After a multidisciplinary consultation was performed and informed consent was obtained, an emergency cesarean section under combined spinal-epidural anesthesia was performed with an estimated blood loss of 200ml in a designated negative pressure isolation room and all personnel involved wore protective gear including gown, N 95 mask, eye protection and gloves. A preterm male infant weighing 1.83 kg was delivered uneventfully, with Apgar scores of 9 and 10 at 1 and 5 minutes, respectively. And he was kept in the isolation ICU of the neonatal nursery for observation without any contact with his mother after birth. The newborn was given formula instead of breast milk ever since. During the delivery, samples of amniotic fluid, placenta, umbilical cord blood, gastric juice and throat swabs of the infant were obtained for SARS-CoV-2 RT-PCR tests, and all results were negative. On day 3 after cesarean section (February 11), RT-PCR analyses of the neonatal throat swab and stool samples were negative. On February 15 and 17, throat swab RT-PCR tests of the mother and the infant were negative. Three chest CT scans of the mother on February 12, 15 and 18, respectively, demonstrated resolution of infiltrates of both lung fields (Figure C, D, E). All healthcare workers in contact with the infant during his delivery and subsequent care had remained asymptomatic. The patient and her infant had an uneventful postpartum and neonatal course.

## Discussion

SARS-CoV-2 is a newly identified virus, spreading quickly from Wuhan to different parts of China and the world. Respiratory droplet transmission is the main route of SARS-CoV-2, and it can also be transmitted through contact<sup>3</sup>. Several studies<sup>6-9</sup> revealed that pregnant women with different viral respiratory illness were at high risk of developing obstetric complications and perinatal adverse outcomes compared to non-gravid women, due to changes of immune responses<sup>10</sup>. According to a previous report of 10 patients with SARS in pregnancy in Hong Kong<sup>11</sup>, SARS-CoV infection could be associated with poor pregnancy outcomes, including critical maternal illness, spontaneous abortion, or maternal death, preterm birth.

In this case, we reported that a mother with COVID-19 gave birth to a healthy baby with no evidence of COVID-19 during her 30 weeks pregnancy. Our case ended up with an uneventful postpartum and neonatal course. The RT-PCR tests were all negative, suggesting the infant was unaffected by COVID-19, and all healthcare workers taking care of him had remained asymptomatic.

Several reasons might have contributed to the uneventful perinatal course. First of all, this patient was a healthy young woman without special medical history, and regular follow-ups in obstetrics clinic revealed that she and the fetus were healthy before this infection. And early detection of COVID-19 and late stage of gestation were also essential. Secondly, our medical center was a designated hospital for COVID-19 in Suzhou since the virus outbreak in China, and all the health care workers received systemic training for strict isolation and protection measures, such as use of protective equipment, hand hygiene, safe waste management, environmental cleaning, and sterilization of medical equipment, and followed the correct procedures during medical practice. Much experience has been accumulating in the past few weeks from dozens of patients infected by SARS-CoV-2, including a 19-month old boy, the youngest patient in Suzhou to date. The patient in our case was ideally cared for by a multidisciplinary medical team, including obstetrics, pediatrics, infectious diseases, anesthesia, ICU, nosocomial infection control expert, and administrative staff. Timely and effective consultations were obtained to discuss her case. Last but not least, careful transmission precautions to the infant, including contact, droplet, and airborne seem to be of great significance. Given the high infectivity and undefined transmission mode, some infection-control protocols applicable for the operating room were developed for patients with confirmed or suspected COVID-19. Some infected cases in China demonstrated viral shedding in feces, suggesting that SARS-CoV-2 might be present in other body parts, so those precautions during delivery were necessary in case transmission during delivery exists.

Our case provides an initial view of the outcome associated with pregnancy-related COVID-19, and several effective strategies for managing pregnant women with COVID-19. Comprehensive data on larger numbers of gravid women with COVID-19 are required to better understanding the overall impact of SARS-CoV-2 on maternal and birth outcomes.

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### **Author's contribution**

Xiaotong Wang and Zhiqiang Zhou, drafting or revision of the submitted article.

Jianping Zhang and Yongyan Tang, health care providers of the patient.

Fengfeng Zhu and Xinghua Shen, design of the study and revision of the submitted article.

**Informed consent** was obtained from the patient in our case.

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### **Conflict of interest**

All authors declare that they have no conflicts of interest.

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## Figure Legend

Figure: Chest CT scans (transverse plane) of the mother.

(A). February 4, 2020 (two days before hospitalization). Left-sided subpleural patchy consolidation and right-sided ground-glass opacities.

(B). February 8, 2020 (hospital day 3 morning). Obvious bilateral multiple ground-glass opacities.

(C). February 12, 2020 (hospital day 7; postoperative day 4). Bilateral multiple ground-glass opacities, with resolution of infiltrates of both lung fields comparing to Figure B.

(D). February 15, 2020 (hospital day 10; postoperative day 7). Bilateral multiple ground-glass opacities.

(E). February 18, 2020 (hospital day 13; postoperative day 10). Bilateral ground-glass opacities, with resolution comparing to Figure D.



Figure 1

