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A Pregnant Patient with COVID-19 Induced Colitis and Spontaneous Preterm Birth

Tania Luthra[1*], Prabhpreet Hundal[2], Jennifer Galdon[3], John Cena[4], Katherine Ross[5] and Roger Turnell[6]

[1]Obstetrics and Gynecology, PGY-4, University of Alberta

[2]Obstetrics and Gynecology, PGY-5, University of Alberta

[3]MD FRCSC, Obstetrics & Gynecology

[4]MD FRCSC, General Internal Medicine

[5]MD FRCSC, Obstetric Medicine, Assistant Professor University of Alberta

[6]Emeritus Professor and Specialist in Maternal Fetal Medicine, Adjunct Professor of Global Health, Division of Community Engagement, FOMD, Lois Hole Hospital for Women, University of Alberta at the Royal Alexandra Hospital Site

ABSTRACT

Background: Although COVID-19 infection typically presents with respiratory symptoms, gastrointestinal symptoms are a part of the disease spectrum.

Case: An otherwise healthy pregnant patient presented with diffuse abdominal pain at 24+1 weeks gestation. She was diagnosed with COVID-19 infection and diffuse colitis. Her symptoms worsened despite treatment, and she delivered a live male fetus at 24+2 weeks.

Conclusion: COVID-19 infection can adversely affect maternal and fetal status in pregnancy due to its inflammatory response and resulting vascular dysfunction. COVID-19 infection should be suspected in a pregnant patient with gastrointestinal symptoms to avoid delay in diagnosis and treatment.

***Corresponding author**

Tania Luthra, Obstetrics and Gynecology, PGY-4, University of Alberta , 1602-10388 105th Street NW, Edmonton, AB T5J 0C2, Canada, Tel: 5879889020.

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Introduction

Since the start of the COVID-19 pandemic, we have learned a great deal about the effects of COVID-19 disease on pregnancy. As a result of the physiological and immunological changes in pregnancy, pregnant patients with COVID-19 are more susceptible to severe disease resulting in poor maternal and neonatal outcomes, including preterm birth (PTB) [1].

PTB is defined as infants born before 37 weeks gestation. PTB-related complications are the leading cause of death among children less than 5 years of age worldwide [2]. A systematic review found that compared to no infection, pregnant patients with mild and severe COVID-19 disease had a higher risk of PTB (OR of 1.82 and 4.29 respectively) [3].

While typically COVID-19 infection presents with respiratory symptoms such as cough, fever, and dyspnea, gastrointestinal symptoms such as nausea, vomiting, abdominal pain, and diarrhea have also been recognized as part of the disease spectrum of COVID-19 [4]. We discuss a case of an otherwise healthy pregnant female who presented with severe abdominal pain due to COVID-19 induced colitis, and ultimately had a spontaneous PTB.

Case

A 31-year-old G2P1 female who presented to a community hospital at 24+1 weeks gestational age with a three-day history of severe, intermittent, diffuse abdominal pain, worst in the right upper quadrant. She denied any nausea, vomiting, or diarrhea. She reported mild shortness of breath for approximately 3 days prior to presentation but no acute influenza-like illness symptoms or chest pain. She received 2 doses of the COVID-19 vaccine with her most recent dose being 1 year prior to presentation. She denied any exposure to sick contacts. She denied any contractions, vaginal bleeding or leaking of fluid. Fetal movements were reported as normal.

Her past medical history was non-contributory. Her only medication was prenatal vitamins. Her obstetrical history was significant for 1 previous term pregnancy in 2021 complicated by cholestasis of pregnancy. She delivered via a cesarean section for an abnormal fetal heart rate in labour.

At the time of presentation, her vital signs were: BP 100/60, HR 138, T 38.2oC, and SpO2 95% on room air. On exam, her abdominal pain was noted to be worse in the right upper quadrant, with some guarding. She denied any costovertebral angle tenderness. Fetal heart rate was tachycardic with a baseline

of 180 bpm and had moderate variability.

She was thought to be septic and was initially resuscitated with IV crystalloid fluid bolus and broad-spectrum antibiotics (Piperacillin-Tazobactam).

Bloodwork revealed a WBC of 4.6, hemoglobin of 90, and platelets of 108. The urinalysis revealed trace ketones and blood, 1+ protein, 21-50 WBC and >20 bacteria. Chest x-ray was normal. Abdominal/renal ultrasound demonstrated several calculi in the gallbladder with no evidence of acute cholecystitis and no urinary tract obstruction. There were changes in the right lower quadrant suggestive of an acute infectious or inflammatory process. Blood and urine cultures were pending.

General Surgery was consulted and recommended an MRI, which demonstrated moderate cecal and terminal ileum bowel wall thickening with adjacent inflammatory changes, likely representing colitis and ileitis. The appendix was normal in appearance. The gallbladder was distended with a few calculi and mild wall edema along with minimal biliary prominence.

Her COVID-19 test came back positive and she was diagnosed with COVID-19-related colitis. Unfortunately, the next morning she was noted to have increasing oxygen requirements, requiring 5L of oxygen via nasal prongs to maintain oxygen saturations >95% as suggested in pregnancy. She was started on dexamethasone 6 mg IV daily, DVT prophylaxis with tinzaparin, and tocilizumab after consultation with Internal Medicine. Considering her worsening respiratory symptoms may warrant an emergency early preterm delivery, she was transferred to a tertiary care centre.

Two hours after arrival at the tertiary hospital, she complained of contractions and vaginal bleeding. She denied any shortness of breath or chest pain. She was hemodynamically stable. Her oxygen requirements were stable on 1 L of oxygen. On examination, wheezing was noted, and the patient was felt to be quite uncomfortable with contractions. A speculum exam revealed pooling of dark red blood in the vagina and the amniotic sac could be seen. The cervix was noted to be 6 cm dilated, soft and 90% effaced. She precipitously became fully dilated and delivered a live male infant in the frank breech position en caul. Immediate cord clamping was performed, and the infant was handed to the NICU team for resuscitation. The placenta delivered spontaneously and was intact. The cord was noted to have 3 vessels. There was insufficient sample for cord blood. A second-degree perineal tear was repaired.

Following delivery, she was transferred to the internal medicine unit and continued on supplemental oxygen, antibiotics, prophylactic dose tinzaparin, dexamethasone, and started on remdesivir. Placental pathology noted a notable retroplacental hemorrhage with features of acute placental ischemia. These findings were suggestive of chronic placental abruption.

The neonatal team started resuscitation with chest compressions for an absent heart rate. The infant was intubated within the first 5 minutes of life and heart rate was detectable after 6 minutes of chest compressions. Unfortunately, there was not enough sample collected for cord gas evaluation. Birth weight was 575 grams (20%). The APGARs were 0, 0, 8 and 9 at 1, 5, 10 and 15 minutes respectively. A venous blood gas done around 1 hour of life showed the following: pH 7.22, pCO2 28, pO2 86, HCO3 12 and base excess -16. Postnatal complications include apnea of prematurity, adrenal crisis, retinopathy of prematurity, large patent ductus arteriosus, anemia, and E. faecalis urinary tract infection. Currently, the infant at 3 months of age remains in NICU with bronchopulmonary dysplasia as the most active issue.

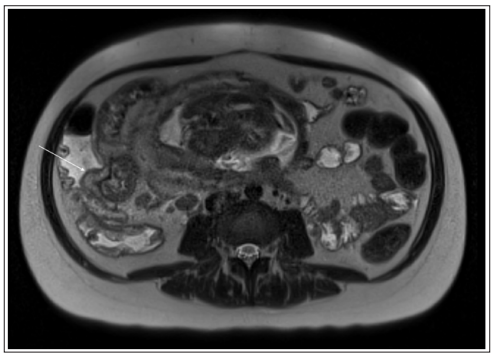

Figure 1: MR Abdomen performed using the Standard MRI pregnancy appendix protocol without Gadolinium. The arrow indicates an area of moderate circumferential cecal wall thickening measuring up to 0.7 cm involving 7 cm length of cecum. There is adjacent inflammation of the terminal ileum for an 8 cm segment with moderate bowel wall thickening measuring 0.6 cm.

Discussion

Majority of patients with COVID-19 infection present with respiratory symptoms. However, a cross-sectional, multi-centre study done in Hubei, China in 2020 found that 18.6% of COVID-19 positive patients (pregnant and non-pregnant) present to hospital with a gastrointestinal-specific symptom [5]. The most common abdominal symptoms in pregnant patients with COVID-19 are nausea and vomiting, diarrhea, abdominal pain and anorexia, while hemorrhagic colitis is a rare complication [6]. COVID-19 GI involvement may be due to an interaction between SARS-CoV-2 and angiotensin-converting enzyme 2 (ACE-2) receptors, causing an inflammatory response with the release of cytokines IL-6, IL-7 and TNF within the digestive mucosa [7].

Our patient was diagnosed with COVID-19 induced colitis. The pathophysiology of preterm birth in our patient's case is unclear. The severity of our patient's COVID-19 infection and its resultant pro-inflammatory state may have brought on preterm labour precipitously. As per the placental pathology in this case, chronic occult placental abruption may also have precipitated preterm delivery. The vascular effects of SARS-CoV-2 infection are well recognized, leading to systemic endothelial dysfunction and vasoconstriction [3]. A study found that pregnant patients with COVID-19 infection demonstrated similar clinical findings and biomarkers as pre-eclampsia.3 In addition, COVID-19 infection is strongly associated with pre-eclampsia [1]. As such, severe COVID-19 disease, as seen in this case, may increase risk of placental dysfunction. Placental histopathological findings in patients with COVID-19 delivering at term demonstrated malperfusion, which may contribute to preterm birth [3]. ACE2 receptors are widely expressed in the uteroplacental unit, which is an entry point for the SARS-CoV-2 virus into the maternal-fetal circulation and explains placental susceptibility to COVID-19 infection [8]. It is also postulated that the SARS-CoV-19 binding depletes ACE2 expression leading to placental dysfunction, similar to the placental phenotype in pre-eclampsia [8].

The adverse maternal and neonatal outcomes associated with COVID-19 infection in pregnancy are now well documented. However, the pathophysiology leading to placental dysfunction and preterm birth is still unknown. Filling the gaps in this knowledge may help us understand the true impact of COVID-19 infection on the fetus and long-term effect on infants exposed to COVID-19 in utero.

Conclusion

In the literature, there are no previously reported cases of COVID-19 induced colitis in pregnancy. This case highlights the variable nature of COVID-19 infection and how its massive inflammatory response can adversely affect maternal and fetal status in pregnancy. COVID-19 infection should be suspected in a pregnant patient with non-specific gastrointestinal symptoms when other causes are excluded to avoid delay in diagnosis and treatment. Close monitoring is vital to allow for appropriate interventions given the complications of placental dysfunction, pre-eclampsia, stillbirth, and preterm birth.

Consent: The woman whose story is told in this case report has provided signed permission for its publication.

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