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Placental abruption in a twin pregnancy at 32 weeks' gestation complicated by coronavirus disease 2019 without vertical transmission to the babies

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OBJECTIVE: Pregnant women are advised to be stringent in avoiding infection in the third trimester based on concerns of worse outcome associated with other viral infections, such as Middle East respiratory syndrome and severe acute respiratory syndrome, rather than coronavirus disease 2019 (COVID-19). Other coronavirus spectrum infections have been associated with miscarriage, preterm birth, preeclampsia, cesarean delivery, perinatal death, fetal growth restriction, and placental abruption.[1,2]

There have only been a few reports evaluating vertical transmission of COVID-19 from the mother to the baby, and it seems unlikely that it occurs. In 4 possible cases of vertical transmission reported, 2 were premature at 31 and 34 weeks' gestation.[3,4] Viral transfer has been linked to prematurity with HIV and other viral infections during pregnancy.

False-negative COVID-19 polymerase chain reaction (PCR) tests are reported and the need for and timing of repeat tests in negative symptomatic patients is unknown. This may be related to the site of sampling.[5]

We report a case of a woman with monochorionic diamniotic (MCDA) twin pregnancy who presented at 32 weeks' gestation with cough, fever, and shortness of breath and tested positive for COVID-19, having had a negative swab 2 weeks before when she initially presented with symptoms. She delivered by emergency cesarean delivery at 32^{+6} weeks owing to antepartum hemorrhage (APH), with placental abruption confirmed clinically at delivery and placental pathology demonstrating hypoperfusion, which may have been related. Both babies were negative for COVID-19 at postnatal days 3 and 5.

We present this case to highlight the following important issues: potential association between COVID-19 and placental abruption and placental pathology, the absence of vertical transmission in the context of preterm birth and placental abruption, need for repeat testing with worsening or persistent symptoms, and the importance of clinical preparedness for obstetrical emergencies in the context of COVID-19.

STUDY DESIGN: A 30-year-old gravida 2, para nought plus 1 (previous early miscarriage <12 weeks' gestation), body mass index (BMI) 23 kg/m^2, with MCDA twins presented at 30^{+4} weeks' gestation with an unprovoked APH and ongoing fresh vaginal bleeding (50 mL), associated with lower back pain. She was a nonsmoker, with no history of alcohol or recreational drug use, and was normotensive at booking (120/54 mm Hg) and on admission (103/68 mm Hg).

She had been evaluated fortnightly in the Multiple Pregnancy Clinic, and there were no concerns of shared placentation from serial growth scans (intertwin discordance 3%−4% and normal amniotic fluid, with both twins growing around the 50th percentile). The placenta was reported as anterior high. A glucose tolerance test performed at 26 weeks' gestation, owing to her ethnicity, family history of diabetes, and multiple pregnancy, was negative for gestational diabetes. In 2014, she had undergone a thyroidectomy after a papillary cell carcinoma and was clinically euthyroid on 200-μg thyroxine (which was titrated in pregnancy to her thyroid-stimulating hormone levels).

The day before she presented with APH, it was noted that her husband had visited the Accident and Emergency Department and received antibiotics for a chest infection. On arrival in the maternity assessment unit, on examination, her abdomen was soft, with clots seen on vaginal speculum examination and normal maternal observations (see Table). The hemoglobin result was 111 g/L, with rhesus positive blood group and no atypical antibodies. She was admitted, and her partner was advised to return home to self-isolate (he had not been tested for COVID-19.) His COVID-19 PCR test was subsequently sent but was negative.

Although the woman did not meet the criteria for testing, a COVID-19 PCR was sent to plan delivery, in case of contact. A course of antenatal corticosteroids for fetal lung maturity (intramuscular dexamethasone 9.9 mg) was given on March 12 and again on March 13. On the second day of her admission, she developed a sore throat and shortness of breath; her result for COVID-19 PCR test was negative (throat swab) and she was discharged home, with advice to self-isolate for 14 days.

Two weeks later, she attended the hospital for her 32-week growth scan and to discuss her birth plan. She reported some itching on that day, and blood samples were sent to rule out obstetrical cholestasis. When she was contacted later that day with blood test results in a virtual consultation, she reported feeling weak and feverish, with pink-colored urine. She was advised to return to the hospital.

RESULTS: On admission she looked unwell, with a pulse rate of 128 bpm and temperature of 37.1°C. Laboratory urinalysis was unremarkable. She gave a 1-day history of cough, fever, and mild shortness of breath. Chest x-ray examination revealed a right-sided pleural effusion and an enlarged globular heart. An echocardiogram performed on the same day showed a mild pericardial effusion, and

TABLE
Swab results and trends in blood tests and observations over time

	Timeline					
	30^{+4}	32^{+4}	32^{+6}	Day 1 postnatal	Day 3 postnatal	Day 5 postnatal
	12/3/20	26/3/20	28/3/20	29/3/20	31/3/20	02/2/20
Event	**APH (50 mL), first admission**	**Fever, pink-colored urine, second admission**	**APH (200 mL),delivery**			
Symptoms	Sore throat, shortness of breath	Feverish,cough, shortness of breath				
Maternal COVID-19 PCR	Negative	Positive				
Twin 1 COVID-19 PCR					Negative	Negative
Twin 2 COVID-19 PCR					Negative	Negative
Maternal platelets	154	108	88	104	114	191
Maternal lymphocytes	1.3	0.9	1.1	1.5	1.2	1.3
Maternal ferritin			42		119	86
Magnesium				0.62	0.63	0.61
ALT		8		11		15
Albumin		32		24		26
LDH					428	363
CRP		32	47	74	102	40
Temperature (°C)	36.8	37.1	36.5	37.5	36.8	36.2
PR (bpm)	101	128	72	90	67	58
SBP (mm Hg)	121	109	109	128	108	108
DBP (mm Hg)	64	67	69	80	64	74
RR	16	28	15	18	16	17
O_2 saturation (%)	99	99	96	94	100	98

ALT, alanine transaminase; *APH*, antepartum hemorrhage; *COVID-19*, coronavirus disease 2019; *CRP*, c-reactive protein; *DBP*, diastolic blood pressure; *LDH*, lactate dehydrogenase; *PCR*, polymerase chain reaction; *PR*, pulse rate; *RR*, respiratory rate; *SBP*, systolic blood pressure.

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N-terminal pro b-type natriuretic peptide (BNP) was 28 pg/mL (normal <100 pg/mL) (performed to rule out cardiac failure or cardiomyopathy). Her lymphocyte and platelet count had dropped (Table). On this admission, COVID-19 PCR test was repeated (nasal swab) and the test result was positive. She was nursed in isolation and did not require oxygen.

On the second day of admission, she had further vaginal bleeding (200 mL of fresh blood), and a category 2 cesarean delivery was arranged under regional analgesia. There was a delay of 110 minutes in the delivery, in part, due to the donning of full personal protective equipment (PPE; FFP3 masks, visors, long sleeve gowns, and gloves). During this period, she remained stable with no oxygen requirement and fetal heart traces were normal. During the procedure, there was clear evidence of placental abruption, with significant intrauterine clots on entry to the uterus and a 400-mL retroplacental blood clot. Blood loss was 1.7 L, excluding APH. She did not require a blood transfusion and was managed postnatally in isolation with one-to-one care.

Both twins required positive pressure respiratory resuscitation, twin 1 by endotracheal tube and twin 2 by mask. The Apgar scores were 5, 8, and 8 for twin 1 (2190 g) and 8, 9, and 9 for twin 2 (2160 g), and umbilical cord pH was as follows: twin 1, arterial, base excess (7.215, −3.2) and venous, base excess (7.319, −2.9) and twin 2 arterial, base excess (7.285, −2.9) and venous, base excess (7.30, −2.7).

Both were intubated in the neonatal intensive care unit. The mother expressed breast milk. Both babies had a negative

result for COVID-19 PCR test on postnatal days 3 and 5. The placental histology report described accelerated villous maturation with evidence of mild hypoperfusion.

CONCLUSION: We report the first case of significant placental abruption in a woman with a diagnosis of COVID-19, requiring a category 2 cesarean delivery with good maternal and neonatal outcomes.

Abruptions are rare in MCDA twin pregnancy in an otherwise normal pregnancy as was the case here (<2%).[6] The association between placental abruption and COVID-19 in pregnancy is uncertain. However, our patient had no recognized risk factors for placental abruption (30 years old, BMI of 23 kg/m^2, nonsmoker, with no history of alcohol or recreational drug use, normotensive at booking [120/54 mm Hg] and on admission [103/68 mm Hg], anterior high placenta), and cases of abruption have been reported with other coronavirus spectrum infections.[6] The abruption maybe incidental; however, given that COVID-19 can affect maternal hemostatic parameters, we advise further caution with careful surveillance of APH in positive women until more data are available.

Placental histology did not show any maternal or fetal inflammatory response or lymphocytic inclusions, as is commonly noted in acute viral infections, but there was evidence of accelerated villous maturation, suggesting hypoperfusion for days, which we believe is the first description of placental pathology in the context of COVID-19. These are nonspecific placental changes that can occur in other conditions (eg, preeclampsia), but given the absence of additional features, such as decidual vasculopathy and partial villous agglutination, often present in preeclampsia, and normal growth of both twins on serial scans, it is plausible that changes could be due to a mild COVID-19 causing abruption and hypoxic changes in the placenta.

Postnatally, the mother was relatively well and not requiring oxygen, but she had thrombocytopenia and lymphocytopenia typically associated with COVID-19, abnormal chest x-rays, and a mild pericardial effusion on echocardiogram. We believe the pericardial effusion was unrelated to COVID-19 as the BNP was normal. Neither the abruption nor preterm birth was associated with vertical transmission to the baby.

This was the first case of an obstetrical emergency where the mother was known to have COVID-19 in our hospital. Full PPE was donned but took time, and we advise training for such emergencies because placental abruption can often be associated with acute fetal distress requiring urgent delivery in minutes.

The result for the initial COVID-19 PCR test was negative when taken from the throat soon after developing typical symptoms. False-negative results have been reported with poorer positive predictive value for throat swabs (her first swab) than for nasal swabs (her second swab) (24% vs 57%, respectively).[5] Tests conducted 5−6 days after symptom onset are most likely to identify the disease. Reorganization of obstetrical care delivery in the current pandemic (eg, virtual consultations) has reemphasized the value of comprehensive history taking and triaging for a face-to-face attendance, including repeat testing, where there is any suspicion of symptom deterioration. ■

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