Case Report

Induction of Labor in an Intubated Patient With Coronavirus Disease 2019 (COVID-19)

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BACKGROUND: In the global coronavirus disease 2019 (COVID-19) pandemic, to date, delivery of critically ill pregnant patients has predominantly been by cesarean.

CASE: A 27-year-old pregnant woman was admitted to a 166-bed community hospital at 33 weeks of gestation with acute hypoxemic respiratory failure secondary to COVID-19. She underwent mechanical ventilation for 9 days. While ventilated, she underwent induction of labor, resulting in a successful forceps assisted-vaginal birth. She was extubated on postpartum day 5 and discharged on postpartum day 10. The neonate was intubated for 24 hours but was otherwise healthy and discharged home at 36 2/7 weeks postmenstrual age.

CONCLUSION: Critically ill patients requiring mechanical ventilation, in this case due to COVID-19, may undergo induction of labor and vaginal delivery when carefully selected.

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Teaching Points

1. Vaginal birth should be considered in carefully selected patients who are critically ill or unable to push in the second stage of labor.
2. Vaginal birth in the intensive care unit can be implemented to limit exposure to coronavirus disease 2019 (COVID-19).

The mode of delivery in pregnant patients with severe coronavirus disease 2019 (COVID-19) has predominantly been cesarean.[1–3] In a cohort study of critically ill pregnant women with COVID-19 in the United States, the cesarean delivery rate was 94%.[4] In patients with limitations in their ability to push during the second stage of labor, such as those with paraplegia, spina bifida, or cardiac disease, spontaneous vaginal birth is still possible but may need to be an operative vaginal birth.[5] As such, vaginal birth should be considered in patients with severe COVID-19 who are on mechanical ventilation. From severe acute respiratory syndrome and Middle East respiratory syndrome, it is known that transporting patients with such a highly contagious disease puts hospital workers and patients at high risk of exposure.[6] Therefore, transporting patients out of the intensive care unit (ICU) for delivery should be limited. Here we present a case of successful induction of labor and instrumented vaginal birth in an intubated patient with severe COVID-19 in the ICU.

CASE

A 27-year-old woman, G2P1, with a short-interval pregnancy at 33 weeks of gestation age was admitted to a 166-bed community hospital with COVID-19. She was admitted to labor and delivery for continuous fetal monitoring, and the internal medicine service was consulted for comanagement. She became progressively ill and was transferred to the ICU, where she underwent intubation. The patient was noted to have worsening anemia and underwent transfusion with 1 unit of packed red blood cells and was started on prophylactic low-dose heparin.

On hospital day 5, the patient was becoming more difficult to ventilate. The ICU team was considering the use of prone positioning or transfer to another facility for extracorporeal membrane oxygenation, which were complicated by her pregnancy. The decision was made to proceed with delivery to improve maternal oxygenation. The unoccupied room adjacent to the patient in the ICU was used to store supplies for both vaginal and cesarean birth. Thus, if there were a maternal or fetal indication for emergent delivery, this could be performed in the ICU (Appendix 1, available online at http://links.lww.com/AOG/B976).

The patient was on prophylactic anticoagulation with low-dose subcutaneous heparin. This was not held during induction of labor. It was felt that the heparin would have minimal effect on bleeding but also could be reversed if necessary.

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Corticosteroids were not administered to the patient for fetal lung maturity. In the setting of viral pneumonia, the team decided the maternal risks outweighed the fetal benefits at 33 5/7 weeks of gestation. Evidence at the time of this case stated that steroids were not recommended for a gestational age greater than 32 weeks.[1]

Although the patient's status was worsening, it was felt that she was an appropriate candidate for an induction of labor. This decision was based on the patient's history of an uncomplicated term vaginal delivery 11 months prior and the fact that she was contracting on her own and had had cervical change from 0 to 3 cm dilated.

On the morning of induction, a vertex presentation was confirmed by ultrasound scan, and 25 micrograms of misoprostol was placed intravaginally. This was followed 5 hours later by dinoprostone because the patient had experienced tachysystole with the misoprostol without cervical change. The ability to remove the dinoprostone in the event of recurrent tachysystole or fetal intolerance of labor was considered a benefit. During the latent phase of labor, there was fetal tachycardia, with variable decelerations for 11 minutes. Fetal heart tones returned to baseline with accelerations with repositioning.

During labor the patient was deeply sedated with propofol, midazolam, and fentanyl and did not require additional sedation. Seven hours after dinoprostone placement, amniotomy was performed when the patient was 5 cm dilated, 80% effaced, and −1 station. An internal pressure catheter was placed. A fetal scalp electrode was not placed because the fetus was easily monitored. The patient made progress without needing oxytocin augmentation, and 3.5 hours later was 9 cm dilated, 90% effaced, and 0 station with fetal variable decelerations.

The fetus then had another variable, with a nadir of 60 beats per minute with a return to baseline over 90 seconds. With the next contraction, the variables persisted, with a nadir of 70 beats per minute. A cervical examination was performed that showed the cervix was completely dilated and effaced, with the occiput engaged between +1 and +2 station. The fetal heart rate tracing showed repetitive variable decelerations. The patient was placed in a frog leg position. An orthopedic wedge pillow was available in the room for delivery, but it was felt that there was adequate room for maneuvers due to maternal habitus. Anticipating the placement of forceps, the patient received a bolus dose of fentanyl. The fetus was occiput anterior, and 12-inch Simpson forceps were easily applied. The neonate was easily delivered with a single pull over an intact perineum. The critical care and labor and delivery nurses attending the delivery noted that the patient responded to the forceps delivery by raising her hand and opening her eyes briefly. A tight nuchal cord was noted at delivery. The neonate was handed off to the waiting neonatal team. Apgar scores were 3 at 1 minute, 5 at 5 minutes, and 5 at 10 and 15 minutes; the fetal weight was 2,430 grams. Only a venous cord blood gas was able to be obtained, with a pH of 7.39.

The total length of time from induction to delivery was 14.5 hours. The patient's husband was not permitted to attend the delivery in the ICU owing to hospital COVID-19 visitor restrictions.

The neonate was intubated after birth for approximately 24 hours. Administration of surfactant was not required. Neonatal testing for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection was negative at 24 and 48 hours of life. Findings of a chest X-ray were normal. Amniotic fluid, placental surface, and breast milk tested negative for SARS-CoV-2 infection. The patient's husband was able to visit the neonatal intensive care unit after he and the neonate both tested negative for SARS-CoV-2 infection. Our institution required the mother to have subsequent negative SARS-CoV-2 test results 24 hours apart before having contact with the newborn in the neonatal intensive care unit. This occurred 22 days after her initial positive test result. The neonate was discharged home at 36 2/7 weeks postmenstrual age.

It is noted that the patient's ventilator support was stable throughout labor and delivery, varying from 45% to 50% FIO_2. This improved within 1 hour after delivery, with an FIO_2 of 35%. The patient had 4 more days of ventilator support, having completed 9 days of mechanical ventilation. She was discharged on hospital day 16 on enoxaparin prophylaxis for 4 weeks.

DISCUSSION

Selection for induction of labor in critically ill patients needs to be considered carefully. In this case, the patient had a recent uncomplicated vaginal delivery, adequate pelvis, and favorable cervical examination. The duration of induction that would be considered safe would ultimately depend on changing status of maternal and fetal factors.

Although deliveries occur in the ICU throughout the United States, they are uncommon in community hospitals. Transporting critically ill patients with COVID-19 from the ICU to the operating room for delivery should be avoided if possible to reduce the risk of exposure to hospital personnel. To prevent this, we developed protocols for both vaginal and cesarean delivery within the ICU (Appendix 1, http://links.lww.com/AOG/B976). Simulations of vaginal and cesarean delivery were performed with the physician, nursing staff, and labor and delivery technicians to improve preparation and comfort in this novel situation.

The mother experienced an excellent outcome in this case, with an easier recovery because of a vaginal birth. This case provides reassurance that vaginal birth can occur in critically ill pregnant patients with COVID-19.

REFERENCES

1. Boelig RC, Manuck T, Oliver EA, Di Mascio D, Saccone G, Bellussi F, et al. Labor and delivery guidance for COVID-19. Am J Obstet Gynecol MFM 2020;2:100110.

2. 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. Lancet 2020;395:809–15.
3. Rasmussen SA, Smulian JC, Lednicky JA, Wen TS, Jamieson DJ. Coronavirus disease 2019 (COVID-19) and pregnancy: what obstetricians need to know. Am J Obstet Gynecol 2020;222: 415–26.
4. Pierce-Williams RAM, Burd J, Felder L, Khoury R, Bernstein PS, Avila K, et al. Clinical course of severe and critical COVID-19 in hospitalized pregnancies: a US cohort study. Am J Obstet Gynecol MFM 2020 [Epub ahead of print].
5. Operative vaginal birth. ACOG Practice Bulletin No. 219. American College of Obstetrics and Gynecologists. Obstet Gynecol 2020;135:e149–59.
6. Kim JY, Song JY, Yoon YK, Choi SH, Song YG, Kim SR, et al. Middle East respiratory syndrome infection control and prevention guideline for healthcare facilities. Infect Chemother 2015; 47:278–302.

PEER REVIEW HISTORY

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