

Cesarean Delivery in the Setting of Severe COVID-19 Pneumonia Requiring ECMO: A Case Study of Two Patients

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Introduction

- The SARS-CoV-2 virus has presented unique problems in the obstetric patient population.
- Preliminary data suggests that pregnant patients may be more likely to develop severe COVID-19 disease than nonpregnant patients,¹ with some requiring long-term extracorporeal membrane oxygenation (ECMO).
- Limited information and very few case reports are available about this specific patient population and how to best manage in the perioperative setting.

Objectives

- To provide information on the perioperative management of cesarean delivery for patients with severe COVID pneumonia requiring VV-ECMO support.

Patient Demographics

- Patient A
 - 31 year old Hispanic female, G5P2A2, BMI 36
 - PMH: of B-cell lymphoma in remission, class II obesity
 - PSH: abdominoplasty
 - Gestational age on admission: 26 weeks
- Patient B
 - 30 year old Hispanic female, G2P1A0, BMI 41
 - PMH: class III obesity, pre-eclampsia
 - Gestational age on admission: 24 weeks

Perioperative Management

- **Indications for Delivery:**
 - Scheduled for delivery on a day with no other scheduled OR procedures with maximum OB faculty and ECMO team available.
 - Patient A: 30w5d, ongoing coagulopathy without active bleeding, severe ARDS on ECMO for 18 days.
 - Patient B: 30w0d, ongoing coagulopathy with bleeding from oropharynx, requiring multiple transfusions, severe ARDS on ECMO for 36 days.
- Multi-disciplinary teams involved:
 - MFM, obstetric and cardiac anesthesiology, cardiothoracic surgery, cardiac ICU, respiratory therapy, and neonatal ICU.
- **Intraoperative events:**
 - The patients remained on their respective ICU ventilators and settings, and ECMO adjustments were made by the ECMO specialists. Induction doses of lorazepam and rocuronium were administered for incision. BIS monitor was applied. General anesthesia was maintained via total intravenous anesthesia with propofol, hydromorphone, and midazolam infusions continued from the ICU. Additional doses of ketamine, propofol, and rocuronium were given during the case. After successful deliveries of infants, both patients experienced increased blood loss due to coagulopathy and received aggressive resuscitation.
- Postoperative events:
 - Patients returned to the ICU ventilated and sedated, and postoperative course was complicated by hemoperitoneum, necessitating multiple OR visits and further resuscitation.
- Discharge:
 - Over the course of weeks, both patients were successfully de-cannulated from ECMO, weaned from the ventilator, and ultimately discharged in stable condition with inpatient rehabilitation or outpatient PT/OT.



Figure 1: Multidisciplinary team transporting patient A back to ICU following successful cesarean section

Conclusions

- The perioperative management of ECMO dependent COVID patients presents a unique challenge in obstetrics.
- Major complication of pregnant patients requiring ECMO is coagulopathy, which may require multiple trips to the operating room and aggressive resuscitation.^{2,3,4}
- Need for multi-disciplinary approach and coordination between OB-GYN, obstetric and cardiac anesthesiology, cardiothoracic surgery, cardiac ICU, respiratory therapy, and neonatal ICU.

References

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