



ECMO Cannulation and Emergent Cesarean for a COVID Positive Mother: A Case Report



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Introduction

Extracorporeal membrane oxygenation (ECMO) has been increasingly utilized in patients with acute respiratory distress syndrome (ARDS) over the last few years and even more so during the ongoing COVID pandemic. Many case reports have been done with COVID positive patients undergoing successful EMCO cannulation, but only a handful of pregnant patients have been reported. This is a case involving multidisciplinary care of an otherwise healthy parturient with COVID pneumonia requiring ECMO to bridge to successful operative delivery and resolution of hypoxic respiratory failure.

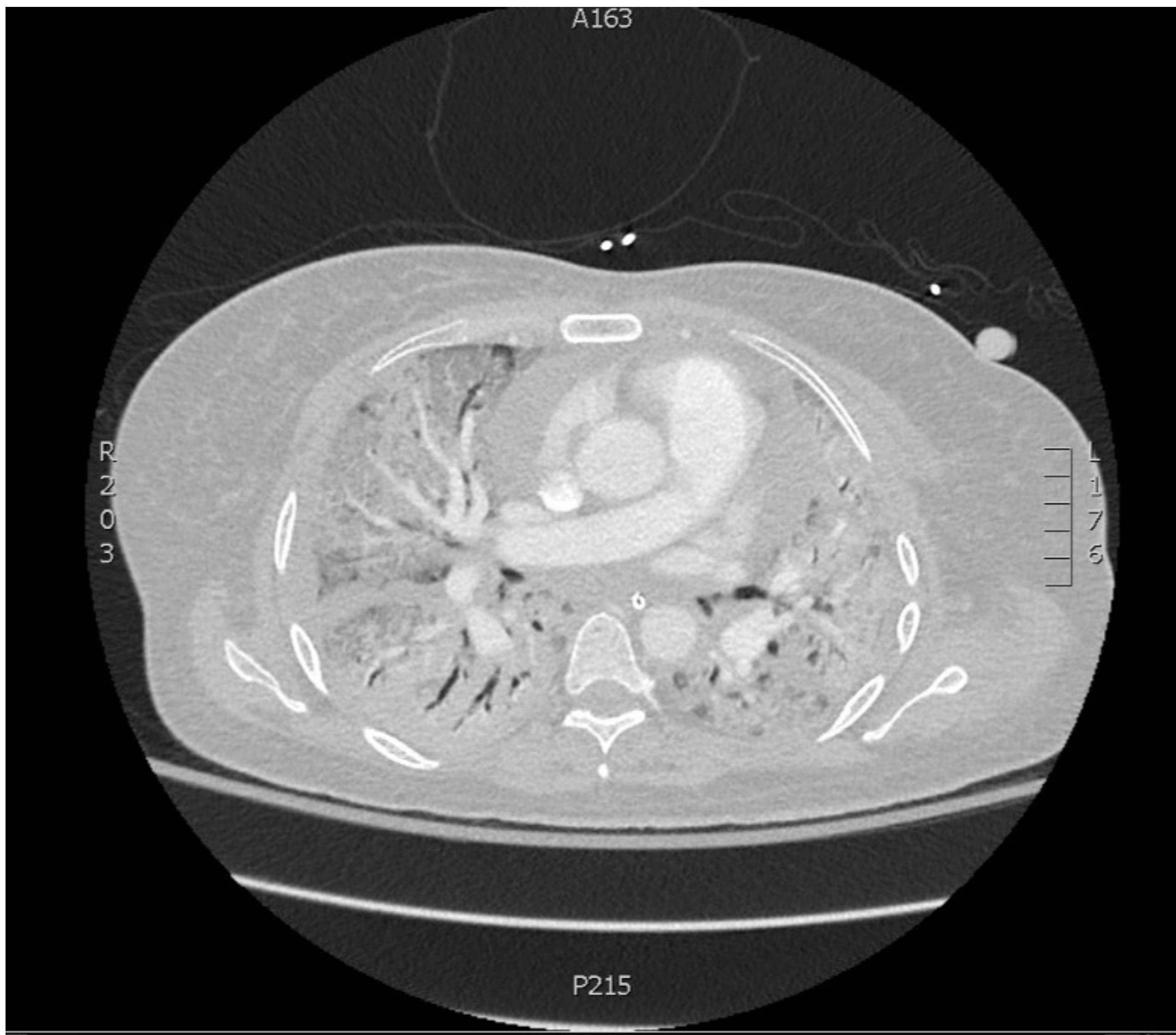


Figure 1. Diffuse ground glass opacities throughout bilateral lungs secondary to the patient's COVID pneumonia

Case Report

Initial Presentation

36-year-old gravid patient (G8P5), 29 weeks pregnant, presented to the hospital with dyspnea, nausea/vomiting, and mild hypoxemia. She was tested for COVID three days prior to admission and was found to be positive. Upon admission, she was placed on high-flow nasal cannula to help with oxygenation. Her respiratory status decompensated over the next two days. She was then transferred to the medical intensive care unit (MICU) where she was intubated for acute hypoxemic respiratory failure.

ICU Management

In the ICU, the patient had fluctuating improvements in her oxygenation and, ultimately, required paralysis followed by proning. Despite those efforts, her hypoxemia did not improve, in turn was reflected by intermittent decelerations on fetal heart rate tracing. A multidisciplinary approach between anesthesia, obstetrics, the medical intensivist, the ECMO team, pediatrics, and maternal fetal medicine was conducted to identify the optimal care plan for the patient and her unborn child. The team decided to cannulate the patient first and then immediately follow with a cesarean.

Cannulation Day

After discussion, it was decided that the patient would be cannulated in the ICU for VV ECMO and the c-section would also be performed in the ICU. Maternal steroids were given and completed. The patient was on three sedation medications (Fentanyl, Propofol, and Ketamine) and one vasopressor (Levophed) on the morning of cannulation. Given the multiple sedating agents and pressor requirements, the choice was made to continue medications during cannulation by anesthesia. A slight increase in fentanyl and propofol along with 8mg of Midazolam was given prior to cannulation to allow for stable hemodynamics. Upon cannulation patient saturations improved significantly. The c-section was uncomplicated and successful. The newborn was intubated and was transported to the pediatric intensive care unit (PICU) for continued care.

Post Operative

As the hypoxemia resolved, the patient was slowly weaned off the ventilator and eventually extubated in the ICU. She remained on ECMO for once month and was later successfully discharged. Her baby had to stay several weeks longer in the PICU. but was also successfully discharged.

Discussion

ECMO has been the cornerstone in helping patients with cardiopulmonary complications. However, there is limited literature regarding ECMO and management in pregnant patients. While there are many cases that show ECMO survival rates among gravid patients to be greater than 70%, there are only a handful of case reports on fetal survival. Net, little is known about the impact of ECMO on fetal outcomes.

With our patient, the decision to cannulate was taken after the multidisciplinary team reviewed the impacts for the mother and child. And the decision to proceed with a c-section was agreed because:

1. The fetus was gestationally viable
2. The fetus had signs of distress indicated through decelerations
3. Concern of secondary complications that could occur from ECMO

There are now case reports of patients cannulated at early gestations who recovered from ARDS, and later successfully delivered vaginally. Nonetheless, data about fetal outcomes at the time of delivery is lacking and it is even less on post-partum follow-up. After nearly nine months post delivery, our patient and her baby continue to do well without significant morbidity.

Regarding anesthetic management, it was important to provide controlled hemodynamic during the cannulation and cesarean. As the patient was already on sedating medications, the choice was made to give a benzodiazepine to ensure no recall and to titrate her other sedation medications and pressors as needed.

As more data and case reports are collected, a multidisciplinary approach is recommended to optimize successful outcomes for gravid patients and their fetuses.

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