

Plasmapheresis in Conjunction with Extracorporeal Membrane Oxygenation in a Patient with COVID-19 Pneumonia

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[Supplemental Video](#)

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Introduction: Patients with COVID-19 experience a myriad of complications, including severe acute respiratory disease and neurological conditions that may benefit from various extracorporeal techniques. We present the first reported case of a patient with COVID-19 safely treated with venovenous extracorporeal membrane oxygenation (ECMO) and plasmapheresis simultaneously.

Case Presentation: A 29-year-old unvaccinated male patient with no significant medical history aside from Class I obesity presented to an outside hospital with acute hypoxic respiratory failure secondary to COVID-19 pneumonia. Initial treatment included steroids, remdesivir and tocilizumab. His condition worsened requiring intubation and transfer to a tertiary center for venovenous ECMO. During transportation, oxygen saturation was as low as 60%. Physical exam noted for excessive abdominal fat and bilateral lower extremity trace edema. The patient was cannulated with flow and sweep peaked as high as 5 L/min and 7 L/min respectively. Sedation was minimized and ECMO weaned to minimal settings as low as 2 L/min and 2 L/min, but neurological status did not improve. Physical exam revealed pupils 6 mm bilaterally and reactive to light. Oculocephalic reflex, corneal, gag, and cough reflex were positive without response to painful stimuli. CT head without contrast demonstrated patchy and confluent areas of decreased density in the periventricular and subcortical white matter.

Working Diagnosis: The abnormal neurological exam was suspected to be leukoencephalopathy secondary to COVID-19 versus anoxic brain injury. Magnetic resonance imaging (MRI) and lumbar puncture was not pursued due to the ECMO circuit requirement and safety. Neurology recommended empiric plasmapheresis every other day for 5 treatments with 5-day course of methylprednisolone 1g IV.

Outcome: The patient tolerated simultaneous ECMO and plasmapheresis without complication. He was successfully decannulated but failed to improve neurologically. Lumbar puncture and NMDA antibody were unrevealing, but MRI brain revealed anoxic encephalopathy. The patient was transitioned to comfort measures and passed peacefully. While the patient had a poor outcome, this case report demonstrates that patients with COVID-19 can safely tolerate plasmapheresis while being managed on ECMO. Use of ECMO should not preclude pursuing other extracorporeal techniques. In severe cases of COVID-19, further investigation should be pursued to determine efficacy and tolerability.

Learning Objectives

Recognizing differential diagnoses for abnormal neurological status in the setting of COVID-19 pneumonia.

Evaluating simultaneous use of extracorporeal treatment modalities for patients with COVID-19 pneumonia.

References and Resources

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