

Recovery from Severe Debility Secondary to COVID-19 Induced ARDS Requiring ECMO: A Case Report

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Background

Coronavirus disease 2019 (COVID-19), notoriously known for its effects on respiratory health, primarily injures the vascular endothelium and often results in systemic disease. Although the clinical course of COVID-19 varies, patients with comorbidities or pre-existing respiratory conditions may experience a form of lung injury, acute respiratory distress syndrome (ARDS), which is associated with a high mortality. COVID-19 induced ARDS can result in respiratory failure with profound hypoxemia requiring endotracheal intubation and mechanical ventilation. In extreme cases, critically ill patients that do not respond to conventional management of COVID-19 induced ARDS may require prolonged pulmonary support with venovenous extracorporeal membrane oxygenation (vv-ECMO). Thus far, the limited studies on patients with COVID-19 requiring ECMO have demonstrated poor survival. This case report highlights the stages of remarkable recovery and use of rehabilitation therapy in a young patient who had COVID-19 induced ARDS requiring vv-ECMO for 40 days.

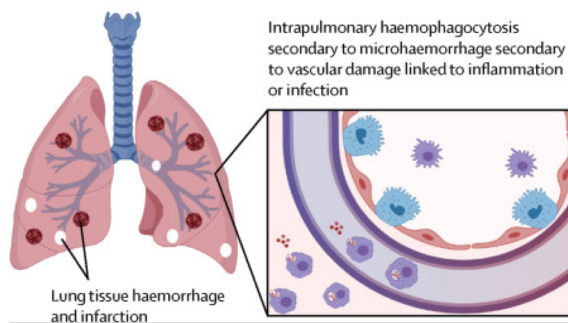


Figure 1. Pulmonary involvement typical of COVID-19 pneumonia.

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Case Description

A 28 year old Caucasian male with a history of hypertension and obstructive sleep apnea presented to the emergency department with progressively worsening fever, shortness of breath, and non-productive cough. Vital signs included a temperature of 102.7°F, heart rate of 133 beats per minute, respiratory rate of 28 breaths per minute, blood pressure of 179/99 mmHg, and oxygen saturation of 86% on room air. SARS-COV-2 swab and PCR test were both positive. Over a 4 day period, the patient showed signs of increased oxygen demand requiring intubation, mechanical ventilation, and ultimately vv-ECMO. He developed a severe gastrointestinal bleed requiring multiple endoscopies and a total of 54 units of packed red blood cells (PRBC). During hospitalization, physical and occupational therapy were implemented frequently. After 30 days on vv-ECMO, the patient's oxygenation status began to improve. On day 40, he no longer needed vv-ECMO or mechanical ventilation. During rehabilitation, he required moderate assistance for all tasks and demonstrated poor activity tolerance with limitations of endurance and general weakness. The patient was discharged to an acute inpatient rehabilitation facility and after 13 days of daily intensive physical and occupational therapy, he demonstrated independence for all basic activities of daily living (ADL) and level transfers with a forearm crutch. This patient was medically stable and on day 67 of his clinical course, he was discharged to his home.



Figure 2. Chest x-ray demonstrating improvements of severe pulmonary infiltrates in the setting of COVID-19 pneumonia.

Discussion & Conclusion

- COVID-19 often results in respiratory disease and some patients subsequently develop severe ARDS, which has a prevalence of morbidity and mortality of 26–58%.
- In extreme cases, the use of vv-ECMO respiratory support is often the final resort in management of life threatening lung failure in advanced intensive care units.
- Early incorporation of rehabilitation for this patient with COVID-19 induced ARDS requiring prolonged respiratory support improved recovery time, functional exercise capacity, and quality of life.
- Endurance and activity tolerance were important factors for this patient's recovery in the setting of COVID-19 associated pulmonary distress.
- During a patient's rehabilitation course, therapy should focus on improving activity tolerance and endurance.

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