

Adult Veno-Venous (VV) Extracorporeal Membrane Oxygenation (ECMO) Eligibility Criteria for COVID-19 Pneumonia

9/28/2021

This guidance was created by the Minnesota Extracorporeal Membrane Oxygenation Consortium.

Inclusion Criteria¹

Acute respiratory distress syndrome (ARDS)

- Does the patient fulfill oxygenation and/or ventilation criteria?
 - On $\text{FIO}_2 \geq 80\%$, $\text{PEEP} \geq 10$, and $\text{VT} \leq 6 \text{ mL/kg PBW}$
 - $\text{PaO}_2/\text{FIO}_2 < 50$ for more than 3 hours
 - $\text{PaO}_2/\text{FIO}_2 < 80$ for more than 6 hours
 - $\text{pH} < 7.25$, $\text{PaCO}_2 > 60 \text{ mm Hg}$ with $\text{RR} > 35$ for more than 6 hours
- Has mechanical ventilation been optimized, including trial of neuromuscular blockade and prone position?

¹ Adapted from the EOLIA trial (DOI: [10.1056/NEJMoa1800385](https://doi.org/10.1056/NEJMoa1800385)) and Bullen et al (DOI: [10.1016/j.chest.2020.04.016](https://doi.org/10.1016/j.chest.2020.04.016))

Exclusion Criteria²

- Positive pressure ventilation prior to consideration of ECMO
 - > 7 days of invasive mechanical ventilation
 - > 10 days of invasive mechanical ventilation + non-invasive mask ventilation (e.g. CPAP, BiPAP)
- Age
 - > 60 years if otherwise healthy
 - > 50 years if co-morbidities present (diabetes, hypertension, etc.)
- BMI > 40 kg/m²
- Unacceptable risk of hemorrhage with therapeutic anticoagulation
- Marker(s) of poor short-term prognosis in relation to underlying disease
 - Multi-system organ failure
 - Cardiac arrest prior to consideration of ECMO
- Premorbid conditions that would limit life expectancy to less than a few years and/or preclude a reasonable chance of recovery after ECMO
 - Advanced malignancy
 - Advanced chronic organ failure (e.g. liver, kidney, lung)
 - Progressive neurodegenerative diseases (e.g. ALS, Alzheimer's dementia)
 - Chronic immunocompromising condition



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² For evidence of the prognostic implications of exclusion criteria in the setting of COVID-19, see Ramanathan et al (DOI: [10.1186/s13054-021-03634-1](https://doi.org/10.1186/s13054-021-03634-1)).