



Guideline Name:	ECMO Initiation for COVID-19 Patients
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In December, 2019 a novel coronavirus (SARS-CoV-2) emerged causing a severe respiratory disease that rapidly lead to a global pandemic. ECMO has been used as salvage therapy in a small number of the sickest COVID-19 patients suffering from cardiopulmonary failure. Most of these patients have been supported with VV-ECMO (95%). We put forth the following guidelines for utilization of ECMO for patients with COVID-19. These guidelines are subject to change as more information regarding COVID-19 becomes available.

Indications for VV-ECMO:

1. PaO₂:FiO₂ ratio < 80 mm Hg for more than 6 hours, despite optimal management listed below:
 - a. Optimized PEEP (Best PEEP trial, esophageal balloon, PV tool)
 - b. Neuromuscular blockade
 - c. Inhaled pulmonary artery vasodilator
 - d. Prone positioning
 - i. only contraindication to proning is spinal cord instability (elevated BMI is not a contraindication)
2. P_{plat} > 30 cm H₂O on lung protective ventilation
3. pH < 7.2 and PaCO₂ > 80 mm Hg for more than 3 hours
4. Assumes no trend towards improvement or other rapidly intervenable pathology (such as pulmonary edema)

**Indications for VA-ECMO (all criteria must be present):**

1. Refractory cardiogenic shock manifested by:
 - a. Persistent tissue hypoperfusion (greater than 12 hours)
 - i. Lactate > 3 mg/dL
 - ii. $CVO_2 < 50\%$
 - and**
 - b. $MAP < 60$ mm Hg or Cardiac Index < 2.2 L/min/m² while receiving
 - i. Levophed > 0.3 mcg/kg/min
 - ii. dobutamine > 20 mcg/kg/min
 - iii. epinephrine > 0.3 mcg/kg/min
 - iv. or other vasopressor/inotrope equivalent
2. Respiratory failure is present as well. If isolated cardiac failure, consider other form of mechanical support
3. Not a candidate for or has failed other mechanical support (TandemHeart, Impella)

Absolute contraindications:

1. Multiorgan failure (excluding cardiopulmonary)
2. Inability to tolerate anticoagulation for initiation of therapy (active hemorrhage)
3. Receipt of mechanical ventilation for 10 days or longer (7 days if on high ventilatory settings; $FiO_2 > 70\%$, $P_{plat} > 30$ cm H₂O)
4. Irreversible neurologic injury or unknown neurologic status
5. Expected life expectancy < 6 months
6. ECPR
7. Significant baseline comorbidities including but not limited to the following:
 - a. Active solid or liquid malignancy
 - b. CKD (eGFR < 45 mL/min/1.73m²)
 - c. Advanced chronic heart failure
 - d. Cirrhosis
 - e. Severe neurologic disability/dementia
 - f. Long-term chronic respiratory insufficiency treated with oxygen therapy
 - g. Unable to perform ADL's



Relative contraindications:

1. Age > 65
2. Thrombocytopenia (Plt < 50)
3. Neutropenia (ANC < 500)
4. BMI > 35
5. Total body weight > 300 lbs
6. For VV-ECMO - High grade shock (Levophed > 0.3 mcg/kg/min)