

Clinical Alignment Summary: Veno-venous Extracorporeal Membrane Oxygenation (ECMO)

The purpose of this summary is to display how clinical guidance from different organizations is aligned in this topic area.

RECOMMENDATIONS and STRATEGIES

There are insufficient data to recommend either for or against the routine use of extracorporeal membrane oxygenation (ECMO) for patients with COVID-19 and refractory hypoxemia (2).

- Refer to ELSO guidelines: [ECMO provision based on system capacity, Figure 2; Conventional VV ECMO for ARDS, Figure 3; Contraindications for ECMO in COVID-19 infected adults, Table 1.](#)

Cannulation strategies (1)

- Cannulation to occur bedside in the ICU.
- Femoral/Jugular Cannulation to eliminate need for guided imaging.
- Sheaths should be placed early.

INDICATIONS

- Screen intubated patients daily for ECMO eligibility (1,3)
- Presence of any of the following despite maximal conventional therapy*
 - PaO₂:FIO₂ 60-80 (1,3)
 - Respiratory instability with prolonged desaturations (1)
 - pH <7.25 with PaCO₂ >60 (3)
 - Elevated airway pressures (1,3)
 - Lung compliance <30 (1)
 - Plateau pressure >30 mmHg (3)

*Maximal conventional therapy (3):

- Low tidal volume ventilation
- PEEP optimization
- Prone positioning
- Consideration of inhaled vasodilators
- Consideration of neuromuscular blockade

SOURCES

- Last updated 5/14/20 [Massachusetts General Hospital COVID-19 ECMO Protocol](#)
- Last updated 12/17/20 [NIH COVID-19 Treatment Guidelines: Extracorporeal Membrane Oxygenation](#)
- Last updated 12/24/20 [University of Washington ECMO Support for Patients with COVID-19](#)

CONTRAINDICATIONS for COVID-19 Veno-venous ECMO

RELATIVE

- Age > 60 (1) or >65 (3)
- BMI >35 (1,3)
- Prolonged mechanical ventilation >7-10 days (3)
- Significant chronic renal (1,3), cardiac (1,3), pulmonary*(1,3), or hepatic disease (1)
 - *exception: asthma (3)
- Other significant chronic condition, including
 - dementia (3)
 - uncontrolled diabetes with chronic end-organ dysfunction (3)
 - severe deconditioning or protein calorie malnutrition (3)
 - severe peripheral vascular disease (3)
 - other pre-existing life-limiting medical condition (3)
- Refractory shock requiring >0.5 mcg/kg/min norepinephrine or equivalent (3)
- Cardiogenic shock: significant septic/stress cardiomyopathy or myocarditis, or massive pulmonary embolism (consider VA ECMO support) (3)
- Acute liver injury with synthetic dysfunction (elevated INR) (3)
- Active bleeding and inadequate hemostasis, contraindications to anticoagulation, or inability to accept blood products (3)
- Active intracranial hemorrhage, cerebral vascular accident (3)
- Recent prolonged cardiac arrest (3)
- ECPR (1)
- Immunocompromised (1,3)
- Secondary Infections with MDR organisms (1)

ABSOLUTE

- Obesity, BMI >40 (1)
- Chronic renal dysfunction (1), end stage on dialysis (3)
- Chronic hepatic disease (1), Cirrhosis (3)
- Chronic cardiac or pulmonary disease (1)
- Advanced active cancer (1,3)
- Severe intracerebral hemorrhage or massive stroke with very poor neurologic prognosis (3) or unknown neurologic status (1)
- Neutropenia: ANC < 1000 (1)
- Acute organ failure other than cardiopulmonary or renal (1)
- Severe irreversible multiorgan failure (3)

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