Summary Recommendations

Hemodynamics

• For adults with COVID-19 and shock, the COVID-19 Treatment Guidelines Panel (the Panel) recommends using dynamic parameters, skin temperature, capillary refilling time, and/or lactate levels over static parameters to assess fluid responsiveness (BIIa).

• For the acute resuscitation of adults with COVID-19 and shock, the Panel recommends using buffered/balanced crystalloids over unbalanced crystalloids (BIIa).

• For the acute resuscitation of adults with COVID-19 and shock, the Panel recommends against the initial use of albumin for resuscitation (BI).

• For adults with COVID-19 and shock, the Panel recommends norepinephrine as the first-line vasopressor (AI).

• For adults with COVID-19 and shock, the Panel recommends titrating vasoactive agents to target a mean arterial pressure (MAP) of 60 to 65 mm Hg over higher MAP targets (BI).

• The Panel recommends against using hydroxyethyl starches for intravascular volume replacement in adult patients with COVID-19 and sepsis or septic shock (AI).

• When norepinephrine is available, the Panel recommends against using dopamine for adult patients with COVID-19 and shock (AI).

• As a second-line vasopressor, the Panel recommends adding either vasopressin (up to 0.03 units/min) (BIIa) or epinephrine (BIIb) to norepinephrine to raise MAP to target or adding vasopressin (up to 0.03 units/min) (BIIa) to decrease norepinephrine dosage.

• The Panel recommends against using low-dose dopamine for renal protection (AI).

• The Panel recommends using dobutamine in adult patients with COVID-19 who show evidence of cardiac dysfunction and persistent hypoperfusion despite adequate fluid loading and the use of vasopressor agents (BIII).

• The Panel recommends that all adult patients with COVID-19 who require vasopressors have an arterial catheter placed as soon as practical, if the resources to do so are available (BIII).

• For adult patients with refractory septic shock who have completed a course of corticosteroids to treat COVID-19, the Panel recommends using low-dose corticosteroid therapy (“shock-reversal”) over no corticosteroid therapy (BIIa).

Oxygenation and Ventilation

• For adults with COVID-19 and acute hypoxemic respiratory failure despite conventional oxygen therapy, the Panel recommends starting therapy with high-flow nasal cannula (HFNC) oxygen; if patients fail to respond, noninvasive ventilation (NIV) or intubation and mechanical ventilation should be initiated (BIIa).

• For adults with COVID-19 and acute hypoxemic respiratory failure who do not have an indication for endotracheal intubation and for whom HFNC oxygen is not available, the Panel recommends performing a closely monitored trial of NIV (BIIa).

• For adults with persistent hypoxemia who require HFNC oxygen and for whom endotracheal intubation is not indicated, the Panel recommends a trial of awake prone positioning (BIIa).

• The Panel recommends against the use of awake prone positioning as a rescue therapy for refractory hypoxemia to avoid intubation in patients who otherwise meet the indications for intubation and mechanical ventilation (AIII).

• If intubation becomes necessary, the procedure should be performed by an experienced practitioner in a controlled setting due to the enhanced risk of exposing health care practitioners to SARS-CoV-2 during intubation (AIII).

• For mechanically ventilated adults with COVID-19 and acute respiratory distress syndrome (ARDS):
  • The Panel recommends using low tidal volume (VT) ventilation (VT 4–8 mL/kg of predicted body weight) over higher VT ventilation (VT >8 mL/kg) (Al).
  • The Panel recommends targeting plateau pressures of <30 cm H₂O (Alla).
The Panel recommends using a conservative fluid strategy over a liberal fluid strategy (BIIa).

For the routine use of inhaled nitric oxide (AIIa).

For mechanically ventilated adults with COVID-19 and moderate to severe ARDS:

The Panel recommends using a higher positive end-expiratory pressure (PEEP) strategy over a lower PEEP strategy (BIIa).

For mechanically ventilated adults with COVID-19 and refractory hypoxemia despite optimized ventilation, the Panel recommends prone ventilation for 12 to 16 hours per day over no prone ventilation (BIIa).

The Panel recommends using, as needed, intermittent boluses of neuromuscular blocking agents (NMBAs) or a continuous NMBA infusion to facilitate protective lung ventilation (BIIa).

In the event of persistent patient-ventilator dyssynchrony, or in cases where a patient requires ongoing deep sedation, prone ventilation, or persistently high plateau pressures, the Panel recommends using a continuous NMBA infusion for up to 48 hours, as long as the patient's anxiety and pain can be adequately monitored and controlled (BIII).

For mechanically ventilated adults with COVID-19, severe ARDS, and hypoxemia despite optimized ventilation and other rescue strategies:

The Panel recommends using recruitment maneuvers rather than not using recruitment maneuvers (CIIa).

If recruitment maneuvers are used, the Panel recommends against using staircase (incremental PEEP) recruitment maneuvers (AIIa).

The Panel recommends using an inhaled pulmonary vasodilator as a rescue therapy; if no rapid improvement in oxygenation is observed, the treatment should be tapered off (CIII).

Pharmacologic Interventions

In the absence of a proven or suspected bacterial infection, the Panel recommends against the use of empiric broad-spectrum antibiotics in adult patients with severe or critical COVID-19 (BIII).

As with any hospitalized patient, adult patients with COVID-19 who receive antibiotics should be reassessed daily to minimize the adverse consequences of unnecessary antimicrobial therapy (AIII).

Extracorporeal Membrane Oxygenation

There is insufficient evidence for the Panel to recommend either for or against the use of extracorporeal membrane oxygenation in adults with COVID-19 and refractory hypoxemia.

Rating of Recommendations: A = Strong; B = Moderate; C = Weak

Rating of Evidence: I = One or more randomized trials without major limitations; IIA = Other randomized trials or subgroup analyses of randomized trials; IIb = Nonrandomized trials or observational cohort studies; III = Expert opinion