Surviving Sepsis Campaign®

SURVIVING SEPSIS CAMPAIGN: GUIDELINES ON THE MANAGEMENT OF CRITICALLY ILL ADULTS WITH CORONAVIRUS DISEASE 2019 (COVID-19)

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INFECTION CONTROL & TESTING RECOMMENDATIONS TABLE

RECOMMENDATION #1	STRENGTH & QUALITY OF EVIDENCE
For healthcare workers performing **aerosol-generating procedures** on patients with COVID-19 in the ICU, we ***recommend*** using **fitted respirator masks (N95 respirators, FFP2, or equivalent**), as opposed to surgical/medical masks, in addition to other personal protective equipment (i.e., gloves, gown, and eye protection, such as a face shield or safety goggles).	Best Practice Statement

RECOMMENDATION #2	STRENGTH & QUALITY OF EVIDENCE
We ***recommend*** performing **aerosol-generating procedures** on ICU patients with COVID-19 in a negative pressure room.	Best Practice Statement

RECOMMENDATION #3	STRENGTH & QUALITY OF EVIDENCE
For healthcare workers providing usual care for non-ventilated COVID-19 patients, we ***suggest*** using surgical/medical masks, as opposed to respirator masks, in addition to other personal protective equipment (i.e., gloves, gown, and eye protection, such as a face shield or safety goggles).	• Weak • Low-Quality of Evidence

RECOMMENDATION #4	STRENGTH & QUALITY OF EVIDENCE
For healthcare workers who are **performing non-aerosol-generating procedures** on mechanically ventilated (closed circuit) patients with COVID-19, we ***suggest*** using surgical/medical masks, as opposed to respirator masks, in addition to other personal protective equipment (i.e., gloves, gown, and eye protection, such as a face shield or safety goggles).	• Weak • Low-Quality of Evidence

RECOMMENDATION #5	STRENGTH & QUALITY OF EVIDENCE
For healthcare workers performing endotracheal intubation on patients with COVID-19, we ***suggest*** using video-guided laryngoscopy, over direct laryngoscopy, if available.	• Weak • Low-Quality of Evidence

RECOMMENDATION #6	STRENGTH & QUALITY OF EVIDENCE
For COVID-19 patients requiring endotracheal intubation, we ***recommend*** that endotracheal intubation be performed by the healthcare worker who is most experienced with airway management in order to minimize the number of attempts and risk of transmission.	Best Practice Statement

LABORATORY DIAGNOSIS AND SPECIMENS

RECOMMENDATION #7.1	STRENGTH & QUALITY OF EVIDENCE
For intubated and mechanically ventilated adults with suspicion of COVID-19: For diagnostic testing, we ***suggest*** obtaining lower respiratory tract samples in preference to upper respiratory tract (nasopharyngeal or oropharyngeal) samples.	• Weak • Low-Quality of Evidence

RECOMMENDATION #7.2	STRENGTH & QUALITY OF EVIDENCE
For intubated and mechanically ventilated adults with suspicion of COVID-19: With regard to lower respiratory samples, we ***suggest*** obtaining endotracheal aspirates in preference to bronchial wash or bronchoalveolar lavage samples.	• Weak • Low-Quality of Evidence

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HEMODYNAMICS RECOMMENDATIONS TABLE

FLUID THERAPY

RECOMMENDATION #8	STRENGTH & QUALITY OF EVIDENCE
In adults with **COVID-19 and shock**, we ***suggest*** using dynamic parameters skin temperature, capillary refilling time, and/or serum lactate measurement over static parameters in order to assess fluid responsiveness.	• Weak • Low-Quality of Evidence

RECOMMENDATION #9	STRENGTH & QUALITY OF EVIDENCE
For the **acute resuscitation** of adults with **COVID-19 and shock**, we ***suggest*** using a conservative over a liberal fluid strategy.	• Weak • Very Low-Quality of Evidence

RECOMMENDATION #10	STRENGTH & QUALITY OF EVIDENCE
For the **acute resuscitation** of adults with **COVID-19 and shock**, we ***recommend*** using crystalloids over colloids.	• Strong • Moderate-Quality of Evidence

RECOMMENDATION #11	STRENGTH & QUALITY OF EVIDENCE
For the **acute resuscitation** of adults with **COVID-19 and shock**, we ***suggest*** using buffered/ balanced crystalloids over unbalanced crystalloids.	• Weak • Moderate-Quality of Evidence

RECOMMENDATION #12	STRENGTH & QUALITY OF EVIDENCE
For the **acute resuscitation** of adults with **COVID-19 and shock**, we ***recommend*** against using hydroxyethyl starches.	• Strong • Moderate-Quality of Evidence

RECOMMENDATION #13	STRENGTH & QUALITY OF EVIDENCE
For the **acute resuscitation** of adults with **COVID-19 and shock**, we ***suggest against*** using gelatins.	• Weak • Low-Quality of Evidence

RECOMMENDATION #14	STRENGTH & QUALITY OF EVIDENCE
For the **acute resuscitation** of adults with **COVID-19 and shock**, we ***suggest against*** using dextrans.	• Weak • Low-Quality of Evidence

RECOMMENDATION #15	STRENGTH & QUALITY OF EVIDENCE
For the **acute resuscitation** of adults with **COVID-19 and shock**, we ***suggest against*** the routine use of albumin for initial resuscitation.	• Weak • Moderate-Quality of Evidence

VASOACTIVE AGENTS

RECOMMENDATION #16	STRENGTH & QUALITY OF EVIDENCE
For adults with **COVID-19 and shock**, we ***suggest*** using norepinephrine as the first-line vasoactive agent, over other agents.	• Weak • Low-Quality of Evidence

RECOMMENDATION #17	STRENGTH & QUALITY OF EVIDENCE
If norepinephrine is not available, we ***suggest*** using either vasopressin or epinephrine as the first-line vasoactive agent, over other vasoactive agents, for adults with **COVID-19 and shock.**	• Weak • Low-Quality of Evidence

RECOMMENDATION #18	STRENGTH & QUALITY OF EVIDENCE
For adults with **COVID-19 and shock**, we ***recommend against*** using dopamine if norepinephrine is available.	• Strong • High-Quality of Evidence

RECOMMENDATION #19	STRENGTH & QUALITY OF EVIDENCE
For adults with **COVID-19 and shock**, we ***suggest*** adding vasopressin as a second-line agent, over titrating norepinephrine dose, if target mean arterial pressure (MAP) cannot be achieved by norepinephrine alone.	• Weak • Moderate-Quality of Evidence

RECOMMENDATION #20	STRENGTH & QUALITY OF EVIDENCE
For adults with **COVID-19 and shock**, we ***suggest*** titrating vasoactive agents to target a MAP of 60-65 mmHg, rather than higher MAP targets.	• Weak • Low-Quality of Evidence

RECOMMENDATION #21	STRENGTH & QUALITY OF EVIDENCE
For adults with **COVID-19 and shock with evidence of cardiac dysfunction and persistent hypoperfusion despite fluid resuscitation and norepinephrine**, we ***suggest*** adding dobutamine, over increasing norepinephrine dose.	• Weak • Very Low-Quality of Evidence

RECOMMENDATION #22	STRENGTH & QUALITY OF EVIDENCE
For adults with **COVID-19 and refractory shock**, we ***suggest*** using low-dose corticosteroid therapy ("shock-reversal"), over no corticosteroid. **Remark:** A typical corticosteroid regimen in septic shock is intravenous hydrocortisone 200 mg per day administered either as an infusion or intermittent doses.	• Weak • Low-Quality of Evidence

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VENTILATION RECOMMENDATIONS TABLE

VENTILATORY SUPPORT

RECOMMENDATION #23	STRENGTH & QUALITY OF EVIDENCE
In adults with COVID-19, we ***suggest*** starting supplemental oxygen if the peripheral oxygen saturation (Spo2) is < 92%, and ***recommend*** starting supplemental oxygen if Spo2 is < 90%.	• Strong • Moderate-Quality of Evidence

RECOMMENDATION #24	STRENGTH & QUALITY OF EVIDENCE
In adults with COVID-19 and **acute hypoxemic respiratory failure on oxygen**, we ***recommend*** that Spo2 be maintained no higher than 96% (strong recommendation, moderate quality evidence).	• Strong • Moderate-Quality of Evidence

RECOMMENDATION #25	STRENGTH & QUALITY OF EVIDENCE
For the **acute resuscitation** of adults with COVID-19 and shock, we ***recommend*** using crystalloids over unbalanced crystalloids.	• Weak • Low-Quality of Evidence

RECOMMENDATION #26	STRENGTH & QUALITY OF EVIDENCE
For the **acute resuscitation** of adults with COVID-19 and shock, we ***suggest*** using buffered/ balanced crystalloids over unbalanced crystalloids.	• Weak • Low-Quality of Evidence

RECOMMENDATION #27	STRENGTH & QUALITY OF EVIDENCE
In adults with COVID-19 and acute hypoxemic respiratory failure, if HFNC is not available and there is no urgent indication for endotracheal intubation, we suggest a trial of NIPPV with close monitoring and short-interval assessment for worsening of respiratory failure.	• Weak • Very Low-Quality • of Evidence

RECOMMENDATION #28	STRENGTH & QUALITY OF EVIDENCE
We were not able to make a recommendation regarding the use of helmet NIPPV compared with mask NIPPV. It is an option, but we are not certain about its safety or efficacy in COVID-19.	----------

RECOMMENDATION #29	STRENGTH & QUALITY OF EVIDENCE
In adults with COVID-19 receiving NIPPV or HFNC, we ***recommend*** close monitoring for worsening of respiratory status, and early intubation in a controlled setting if worsening occurs.	Best Practice Statement

INVASIVE MECHANICAL VENTILATION

RECOMMENDATION #30	STRENGTH & QUALITY OF EVIDENCE
In mechanically ventilated adults with **COVID-19 and ARDS**, we ***recommend*** using low tidal volume (Vt) ventilation (Vt 4–8mL/kg of predicted body weight), over higher tidal volumes (Vt > 8mL/kg).	• Strong • Moderate-Quality of Evidence

RECOMMENDATION # 31	STRENGTH & QUALITY OF EVIDENCE
For mechanically ventilated adults with **COVID-19 and ARDS**, we ***recommend*** targeting plateau pressures (Pplat) of < 30cm H_2O.	• Strong • Moderate-Quality of Evidence

PRACTICAL CONSIDERATIONS

RECOMMENDATION #32	STRENGTH & QUALITY OF EVIDENCE
For mechanically ventilated adults with **COVID-19 and moderate to severe ARDS**, we ***suggest*** using a higher PEEP strategy, over a lower PEEP strategy (weak recommendation, low-quality evidence). **Remark**: **If using a higher PEEP strategy (i.e., PEEP > 10 cm H_2O), clinicians should monitor patients for barotrauma.**	• Weak • Low-Quality of Evidence

RECOMMENDATION #33	STRENGTH & QUALITY OF EVIDENCE
For mechanically ventilated adults with **COVID-19 and ARDS**, we ***suggest*** using a conservative fluid strategy over a liberal fluid strategy.	• Weak • Low-Quality of Evidence

RECOMMENDATION #34	STRENGTH & QUALITY OF EVIDENCE
For mechanically ventilated adults with **COVID-19 and moderate to severe ARDS**, we ***suggest*** prone ventilation for 12 to 16 hours, over no prone ventilation.	• Weak • Low-Quality of Evidence

Recommendation #35.1: For mechanically Ventilated patients with COVID-19 and moderate to severe ARDS	STRENGTH & QUALITY OF EVIDENCE
We ***suggest*** using, as needed, intermittent boluses of neuromuscular blocking agents (NMBA), over continuous NMBA infusion, to facilitate protective lung ventilation.	• Weak • Low-Quality of Evidence

Recommendation #35.2: For mechanically Ventilated patients with COVID-19 and moderate to severe ARDS	STRENGTH & QUALITY OF EVIDENCE
In the event of persistent ventilator dyssynchrony, the need for ongoing deep sedation, prone ventilation, or persistently high plateau pressures, we ***suggest*** using a continuous NMBA infusion for up to 48 hours.	• Weak • Low-Quality of Evidence

RECOMMENDATION #36	STRENGTH & QUALITY OF EVIDENCE ST
In mechanically ventilated adults with COVID-19 ARDS, we recommend against the routine use of inhaled nitric oxide.	• Strong • Low-Quality of Evidence

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COVID-19 THERAPY RECOMMENDATIONS TABLE

CYTOKINE STORM

RECOMMENDATION #41	STRENGTH & QUALITY OF EVIDENCE
In mechanically ventilated adults with **COVID-19 and respiratory failure** (**without ARDS**), we ***suggest against*** the routine use of systemic corticosteroids.	• Weak • Low-Quality of Evidence

RECOMMENDATION #42	STRENGTH & QUALITY OF EVIDENCE
In mechanically ventilated adults with **COVID-19 and ARDS**, we ***suggest*** using systemic corticosteroids, over not using corticosteroids.	• Weak • Low-Quality of Evidence

RECOMMENDATION #43	STRENGTH & QUALITY OF EVIDENCE
In mechanically ventilated patients with **COVID-19 and respiratory failure**, we ***suggest*** using empiric antimicrobials/antibacterial agents, over no antimicrobials.	• Weak • Low-Quality of Evidence

RECOMMENDATION #44	STRENGTH & QUALITY OF EVIDENCE
For critically ill adults with **COVID-19 who develop fever**, we ***suggest*** using acetaminophen/paracetamol for temperature control, over no treatment.	• Weak • Low-Quality of Evidence

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RECOMMENDATION #45	STRENGTH & QUALITY OF EVIDENCE
In critically ill adults with COVID-19, we ***suggest against*** the routine use of standard intravenous immunoglobulins (IVIG).	• Weak • Very Low-Quality Evidence

RECOMMENDATION #46	STRENGTH & QUALITY OF EVIDENCE
In critically ill adults with COVID-19, we ***suggest against*** the routine use of convalescent plasma.	• Weak • Very Low-Quality of Evidence

RECOMMENDATION #47.1	STRENGTH & QUALITY OF EVIDENCE
In critically ill adults with COVID-19 we ***suggest against*** the routine use of lopinavir/ritonavir.	• Weak • Low-Quality of Evidence

RECOMMENDATION #47.2 RECOMMENDATION #15	STRENGTH & QUALITY OF EVIDENCE
There is ***insufficient evidence*** to issue a recommendation on the use of other antiviral agents in critically ill adults with COVID-19.	Insufficient

RECOMMENDATION #48	STRENGTH & QUALITY OF EVIDENCE
There is ***insufficient evidence*** to issue a recommendation on the use of recombinant rIFNs, alone or in combination with antivirals, in critically ill adults with COVID-19.	Insufficient

RECOMMENDATION #49	STRENGTH & QUALITY OF EVIDENCE
There is ***insufficient evidence*** to issue a recommendation on the use of chloroquine or hydroxychloroquine in critically ill adults with COVID-19.	Insufficient

RECOMMENDATION #50	STRENGTH & QUALITY OF EVIDENCE
There is insufficient evidence to issue a recommendation on the use of tocilizumab in critically ill adults with COVID-19.	Insufficient