Guidelines for the Management of Adult Acute and Acute-on-Chronic Liver Failure in the ICU

Society of Critical Care Medicine
The Intensive Care Professionals

Cardiovascular, Endocrine, Hematologic, Pulmonary, and Renal Considerations

ACLF = acute on chronic liver failure, ALF = acute liver failure, ARDS = acute respiratory distress syndrome, HRS = hepatorenal syndrome, LMWH = low molecular weight heparin, PEEP = positive end-expiratory pressure RRT = renal replacement therapy, TEG/ROTEM thromboelastography/rotational thromboelastometry, TIPS = transjugular intrahepatic portosystemic shunt.

We Suggest or Recommend	Strength of Recommendation	Quality of Evidence
• We recommend using norepinephrine as a first-line vasopressor in patients with ALF or ACLF who remain hypotensive despite fluid resuscitation, or those with profound hypotension and tissue hypoperfusion even if fluid resuscitation is ongoing.	Strong	Moderate
• We recommend viscoelastic testing (TEG/ROTEM), over measuring INR, platelet, fibrinogen, in critically ill patients with ALF or ACLF undergoing procedures.	Strong	Moderate
• We recommend using vasopressors, over not using vasopressors, in critically ill patients with ACLF who develop HRS.	Strong	Moderate
• We recommend targeting a serum blood glucose of 110–180mg/dL in patients with ALF or ACLF.	Strong	Moderate
• We suggest targeting a mean arterial pressure of 65mm Hg in patients with ALF or ACLF, with concomitant assessment of perfusion.	Conditional	Moderate
• We suggest using albumin for resuscitation of patients with ALF or ACLF over other fluids, especially when serum albumin is low (< 3mg/dL).	Conditional	Low
• We suggest using invasive hemodynamic monitoring to guide therapy in patients with ALF or ACLF and clinically impaired perfusion.	Conditional	Low
• We suggest adding low-dose vasopressin to norepinephrine in patients with ALF or ACLF who remain hypotensive despite fluid resuscitation to increase blood pressure.	Conditional	Low
• We suggest using viscoelastic testing (TEG/ROTEM) over measuring INR, platelet, and fibrinogen in critically ill patients with ALF or ACLF.	Conditional	Low
• We suggest using a transfusion threshold of 7mg/dL, over other thresholds, for critically ill patients with ALF or ACLF.	Conditional	Low
• We suggest using LMWH, over pneumatic compression stockings for VTE prophylaxis in hospitalized patients with ACLF.	Conditional	Low
• We suggest using a low tidal volume strategy over high tidal volume strategy in patients with ALF or ACLF and ARDS.	Conditional	Low
• We suggest against using high PEEP, over low PEEP, in patients with ALF or ACLF and ARDS.	Conditional	Low
• We suggest using high-flow nasal cannula over noninvasive ventilation in hypoxic critically ill patients with ALF or ACLF.	Conditional	Low
• We suggest using stress-dose glucocorticoids in the treatment of septic shock in patients with ALF or ACLF.	Conditional	Low

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We Suggest or Recommend	Strength of Recommendations	Quality of Evidence
• We suggest using stress-dose glucocorticoids in the treatment of septic shock in patients with ALF or ACLF.	Conditional	Low
• We suggest enteral nutrition over parenteral nutrition in critically ill patients hospitalized with ALF or ACLF without contraindication for enteral feeding.	Conditional	Low
• We suggest using LMWH or vitamin K antagonists, over conservative management, in patients with portal venous thrombosis or pulmonary embolus.	Conditional	Very Low
• We suggest using RRT early in patients with ALF and AKI.	Conditional	Very Low
• We suggest treating portopulmonary hypertension with agents approved for pulmonary arterial hypertension in patients with mean pulmonary artery pressure > 35mm Hg.	Conditional	Very Low
• We recommend supportive care with supplemental oxygen in the treatment of hepatopulmonary syndrome, pending possible liver transplantation.	Best Practice Statement	---------
• We recommend placing chest tube with an attempt to pleurodesis for hepatic hydrothorax in patients in whom TIPS is not an option or as a palliative intent.	Best Practice Statement	---------
• We recommend screening patients with ALF or ACLF for drug-induced causes of liver failure. Drug that are proven or highly suspected to be the cause of ALF or ACLF should be discontinued.	Best Practice Statement	---------
• In patients with ALF or ACLF, we recommend adjusting the doses of medications that undergo hepatic metabolism based on the patient's residual hepatic function and using the best available literature. When available, a clinical pharmacist should be consulted.	Best Practice Statement	---------
We Suggest Against or Recommend Against	**Strength of Recommendations**	**Quality of Evidence**
• We recommend against using hydroxyethyl starch for initial fluid resuscitation ofpatients with ALF or ACLF.	Strong	Moderate
• We recommend against using Eltrombopag in ACLF patients with thrombocytopenia prior to surgery/invasive procedures.	Strong	Low
• We suggest against using gelatin solutions for initial fluid resuscitation of patients with ALF or ACLF.	Conditional	Low
• We suggest against using a low protein goal in patients with ALF or ACLF, but rather targeting protein goals comparable to critically ill patients without liver failure (1.2–2.0g protein/kg dry or ideal body weight per day).	Conditional	Very Low

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Insufficient Evidence is Available	Strength of Recommendation	Quality of Evidence
• There is insufficient evidence to recommend either continuing or discontinuing RRT intraoperatively (during liver transplant surgery) in patients who were receiving RRT preoperatively	Not Applicable	Not Applicable
• There is insufficient evidence to recommend either using or not using TIPS in patients with cirrhosis and refractory ascites to prevent HRS	Not Applicable	Not Applicable

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