Fluid Therapy in Critically Ill Patients

Su Hwan Lee

Organization Yonsei University College of Medicine, Severance Hospital, Division of Pulmonology and Critical Care Medicine, Department of Internal Medicine

Current Position Associate Professor

Educational background

2009-2021 Ph.D., The Graduate School of Yonsei University, Department of Medicine

2001-2007 B.A., Yonsei University Wonju College of Medicine

Professional experience

2022-Present Associate Professor, Division of Pulmonology and Critical Care Medicine, Department of Internal Medicine, Yonsei University College of Medicine

2019-2022 Assistant Professor, Division of Pulmonology, Department of Internal Medicine, Yonsei University College of Medicine

2017-2019 Clinical Assistant Professor, Division of Pulmonary and Critical Care Medicine, Department of Internal Medicine, College of Medicine, Ewha Womans University, Seoul, Republic of Korea

2015-2017 Clinical and Research Fellowship, Severance Hospital, Division of Pulmonary, Department of Internal Medicine, Yonsei University College of Medicine

2008-2012 Residency, Severance Hospital, Department of Internal Medicine, Yonsei University College of Medicine, Seoul, Republic of Korea

Fluid therapy is an important part of intensive care, used to restore circulation and ensure adequate tissue perfusion in critically ill patients. Both fluid overload and underload can be harmful: insufficient fluids may prolong shock and contribute to organ failure, while excessive administration can result in pulmonary edema, abdominal hypertension, or delayed healing. Thus, fluid therapy should be managed as an ongoing, stepwise process rather than a single intervention.

In the initial resuscitation phase, crystalloids are usually the first choice of fluids. Balanced solutions are often preferred in recent over normal saline, though isotonic saline may be appropriate in certain conditions, such as traumatic brain injury. The total amount of fluid should be determined based on the clinical context of the patient's condition. For instance, in sepsis, early rapid boluses may be required, but frequent reassessment is critical to avoid fluid overload. In hemorrhagic states, a restrictive approach with permissive hypotension is preferred after blunt or penetrating trauma, while in cardiogenic or obstructive shock, fluids should be used carefully and only as a bridge until the main problem is fixed.

Once hemodynamic stability is achieved, the focus should move toward preventing excess accumulation and encouraging fluid removal. Active control with diuretics may be beneficial in reducing excess volume and improving recovery. However, routine use of ultrafiltration or extracorporeal fluid removal is not recommended unless there are clear reasons such as kidney failure.

Overall, fluid therapy in critical illness should be seen as a sequence of stages: initial resuscitation to restore perfusion, adjustment based on individual needs, and de-escalation to prevent harm from overload. Effective management depends on continuous bedside evaluation, thoughtful adjustment to underlying pathophysiology, and a careful balance between too little and too much. This approach helps maintain organ function, reduces complications, and improves the chances of recovery.

Reference

1. Intensive Care Med. 2024 Jun;50(6):813-831.
2. Intensive Care Med . 2025 Mar;51(3):461-477
3. Intensive Care Med . 2025 Aug 19
4. Crit Care Med. 2021 Nov 1;49(11):e1063-e1143.
5. Eur J Med Res . 2025 May 20;30:401.