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MANAGEMENT OF SEVERE ACUTE KIDNEY INJURY IN CRITICALLY ILL PATIENTS WITH FLUID OVERLOAD

Teona Aivazashvili

Anesthesiology and Critical Care Medicine Resident of First University Clinic, TSMU. Tbilisi, Georgia

Background: Acute kidney injury (AKI) is characterized by an abrupt decline in kidney function occurring within 7 days. It is manifested by an increase in serum creatinine (SCr) from baseline and/or a reduction in urine output. The pathophysiology of AKI involves multiple overlapping mechanisms, including a reduction in the glomerular filtration rate (eGFR) caused by systemic or local hemodynamic disturbances, which may be accompanied by reversible tubular injury, as well as more severe tubular necrosis caused by inflammatory, ischemic, and nephrotoxic factors. Sepsis may represent an important risk factor for AKI in the intensive care unit (ICU).

Aim: The aim of this review is to summarize the current evidence on the pathophysiology, risk factors, staging, and management of severe AKI in critically ill patients with fluid overload, with particular emphasis on fluid management and kidney replacement therapy (KRT).

Methods: A literature review was conducted using PubMed/MEDLINE, KDIGO Clinical Practice Guidelines, OpenEvidence and other relevant databases, focusing on relevant studies, systematic reviews, and international guidelines addressing AKI, fluid overload, and kidney replacement therapy (KRT) in critically ill patients. Priority was given to the most recent evidence and recommendations from current clinical practice guidelines.

Results: Risk factors for AKI in critically ill patients include both modifiable and non-modifiable factors and often act concurrently. Validated risk prediction models incorporating baseline creatinine levels, APACHE II/SOFA severity scores, the presence of sepsis, and exposure to nephrotoxic drugs can be used to estimate an individual's risk of AKI and identify patients requiring more intensive monitoring. The management of AKI in the ICU is based on KDIGO staging and primarily includes early identification and correction of reversible causes, hemodynamic optimization, avoidance or minimization of nephrotoxic medications, and careful assessment of fluid balance. In cases of severe or persistent fluid overload, particularly when accompanied by life-threatening electrolyte, acid–base, or metabolic disturbances, timely consideration of KRT initiation represents an important component of management.

Conclusion: Severe AKI in critically ill patients with fluid overload requires early recognition and

an individualized, structured management strategy. Management should be based on hemodynamic optimization, prevention of further kidney injury, and careful management of fluid balance, while the decision to initiate KRT should be guided by the patient's clinical condition and the severity of fluid and metabolic disturbances. Further research is needed to determine optimal patient selection, fluid management strategies, and the optimal timing and modality of KRT.
Keywords: Acute kidney injury (AKI); Critically ill patients; Hemodynamic optimization; Fluid management; Sepsis.