

Kidney Injury in Liver Disease



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KEYWORDS

• Acute kidney injury • Cirrhosis • Liver transplant • Hepatorenal syndrome

KEY POINTS

- Acute kidney injury (AKI) occurs frequently in patients with liver disease and increases morbidity and mortality.
- Hepatorenal syndrome (HRS) is a common cause of AKI in patients with decompensated cirrhosis and is due to alterations in systemic and renal hemodynamics.
- Serum creatinine based estimation of kidney function is a key component of the Model for End-stage Liver Disease score in liver transplant candidates.
- Continuous renal replacement therapy is used in critically ill patients with liver failure and AKI.
- Simultaneous liver–kidney transplantation (SLK) may be required in patients with liver failure and prolonged AKI. Identification of appropriate candidates for SLK remains controversial.

DEFINITION OF ACUTE KIDNEY INJURY

Acute kidney injury (AKI) describes the abrupt decrease in renal function. AKI represents a broad clinical syndrome that entails numerous etiologies, which are classified by their location into prerenal, intrarenal, and postrenal. Hypovolemia, acute tubular necrosis, acute interstitial nephritis, acute glomerular diseases, and acute obstructive nephropathies represent the most common underlying causes. Established consensus criteria rely on only 2 easily obtainable clinical variables to diagnose and stage AKI, namely, (changes in) serum creatinine and urine output (**Fig. 1**).^{1–3}

AKI continues to be a serious clinical challenge that carries high morbidity and mortality rates. Depending on its severity, AKI is associated with a 2- to 6-fold increase in

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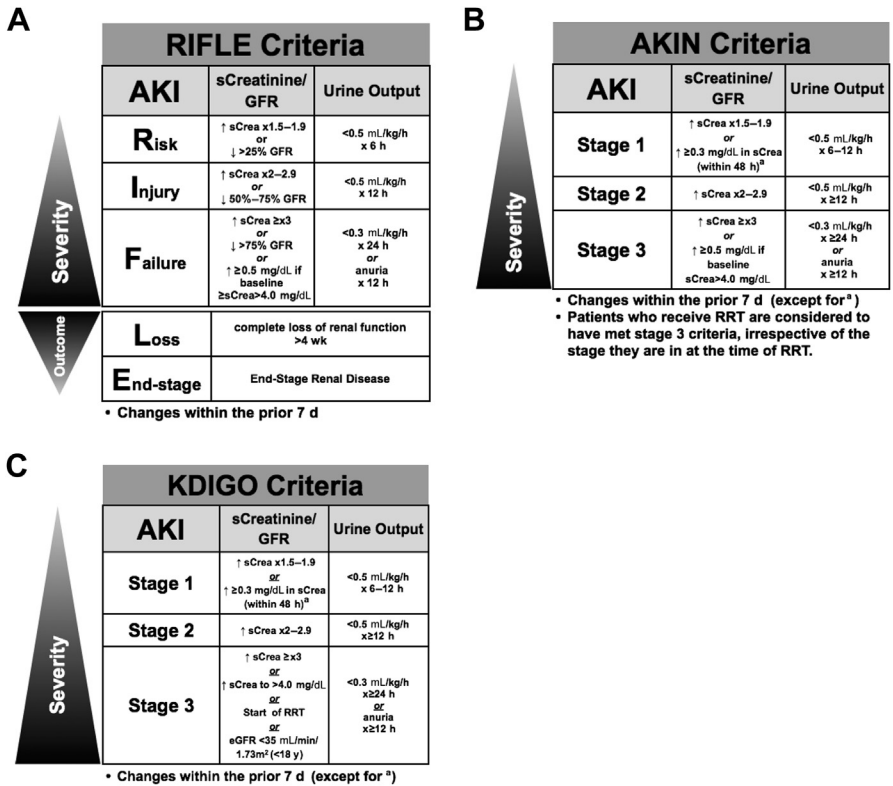


Fig. 1. Direct comparison of (A) risk of renal dysfunction, injury to the kidney, failure or loss of kidney function, and end-stage kidney disease (RIFLE),¹ (B) ACUTE KIDNEY INJURY NETWORK (AKIN)² and (C) kidney disease: improving global outcomes (KDIGO) foundation criteria³ to classify AKI. GFR, glomerular filtration rate; RRT, renal replacement therapy; sCREA, serum creatinine. (Data from Refs. 1–3)

risk of death.⁴ AKI at all stages also negatively affects duration of hospital stay, readmission rates, and development of chronic kidney disease. The clinical presentation of AKI is the same regardless of the underlying etiology.

EPIDEMIOLOGY AND ETIOLOGY OF ACUTE KIDNEY INJURY IN LIVER DISEASE

Acute Kidney Injury and Acute Liver Failure

AKI develops in up to 80% of patients with acute liver failure (ALF).^{5,6} Approximately 30% to 50% of these patients will require renal replacement therapy (RRT). The majority of AKI cases occur in patients with ALF owing to ischemic hepatitis or acetaminophen intoxication. These patients also require RRT more often than patients with other etiologies of ALF. Irrespective of the underlying etiology, AKI represents a crucial risk factor that significantly lowers the rate of spontaneous survival. The need for RRT further decreases transplant-free survival rates in patients with ALF. However, fewer than 5% of the survivors develop end-stage renal disease and require long-term dialysis.

The etiology of underlying AKI in patients with ALF is often multifactorial and encompasses insults also seen in the general AKI population, for example, sepsis, nephrotoxins, ischemia/hypoperfusion, and hypovolemia.⁴

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