# Acute Kidney Injury Risk in Liver Transplant Recipients Is Associated with Low Mean Arterial Pressure

By Naim Issa, Samy Riad, and Aleksandra Kukla

Acute kidney injury (AKI) is a common complication following liver transplantation and can have a negative impact on immediate and long-term transplant outcomes (1). Studies focusing on defining the risk and pathophysiology of AKI are critical to developing interventions to modify the incidence of AKI in this high-risk population.

In their recent work, Caragata et al. (2) investigated the relationship between the magnitude, stratified by different levels of mean arterial pressure (MAP), and the duration of hypotension (in minutes) during the liver transplant and risk of AKI in the first 2 days following surgery. The study included 1292 patients from a single center in Canada. The primary outcome, AKI, was defined as an increase in creatinine by 0.3 mg/dL or 1.5 times above the baseline value; in the secondary outcome, the authors divided AKI into stages based on the Kidney Disease: Improving Global Outcomes (KDIGO) definition (3). Forty percent of patients experienced AKI (based on the creatinine component only). Stage 1 AKI occurred in 28% of patients, whereas stages 2 and 3 were observed in 8.4% and 3.7% of patients, respectively. Fifty-two patients (4%) initiated hemodialysis. Prolonged intraoperative hypotension was independently associated with AKI. Patients who experienced MAP levels below 55 mm Hg and 50 mm Hg for 20 minutes or longer were at the highest risk for AKI (Figure 1). These results were consistent across different baseline estimated glomerular filtration rates (eGFRs), including patients with a preoperative eGFR greater than 60 mL/min/1.73 $m^2$. Interestingly, these patients were actually more susceptible to developing postoperative AKI. These findings are not surprising and are consistent with previous research linking intraoperative hypotension and postoperative AKI (4–6).

In the general population, hypotension is defined as a MAP below 65 mm Hg. The study by Caragata et al. (2) suggests that liver transplant recipients may be able to better tolerate low blood pressure in terms of developing AKI, unless the MAP drops below 55 mm Hg for at least 20 minutes. Experimental studies have suggested that cirrhosis is associated with disruption of renal blood flow autoregulation. These patients have low, systemic vascular resistance and, in general, have lower MAPs than other surgical patients. Therefore, they may not be as susceptible to AKI with a MAP greater than 55 mm Hg. Previous small-scale studies in liver transplant recipients have also demonstrated lower MAP thresholds for hypotension-associated kidney injury (7, 8).

Limitations in the Caragata et al. (2) study include its retrospective, single-center design and the small number of patients. Additionally, the study did not investigate the specific mechanisms underlying the association between intraoperative hypotension and AKI during liver transplant surgery. Further research involving larger prospective studies is warranted to validate this study's findings and to confirm potential benefits or harm from targeting higher or lower intraoperative MAPs during liver transplant surgery. ■

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The authors report no conflicts of interest.

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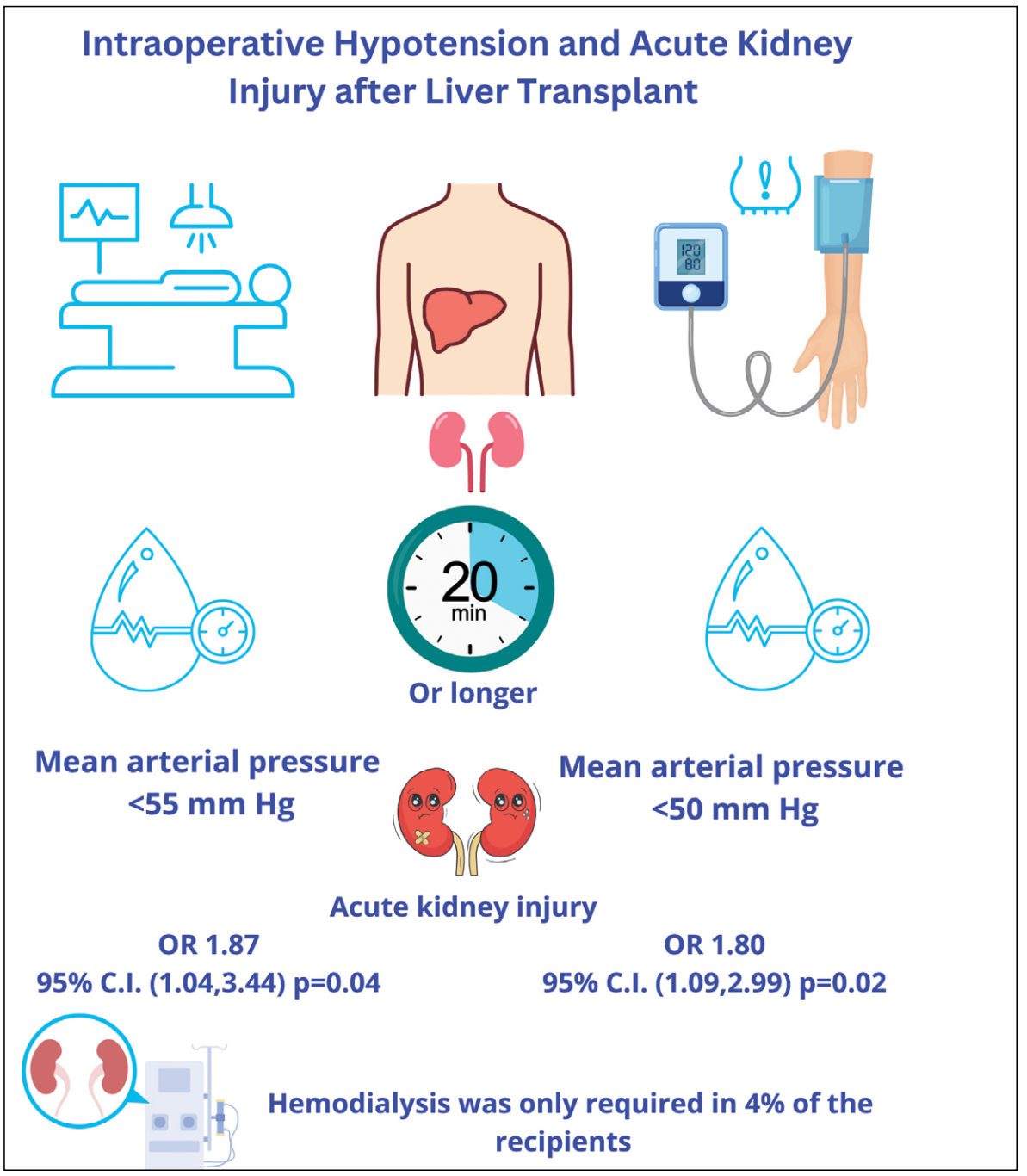
**Figure 1. Infographic summary of the study findings**




C.I., confidence interval; OR, odds ratio.