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Place of Hemoadsorption in Sepsis-Associated AKI: Cons

Jae Yoon Park

Dongguk University Ilsan Hospital, Republic of Korea

Introduction Sepsis-associated acute kidney injury (SA-AKI) is the most common contributor to acute kidney injury in the intensive care unit and is associated with substantial mortality. In cases requiring kidney replacement therapy, the mortality rate exceeds 50%. Against this background, hemoadsorption therapy has been introduced on the basis of biologic plausibility, with the expectation that extracorporeal removal of circulating inflammatory mediators could attenuate cytokine storm and improve organ function. However, biologic plausibility does not necessarily translate into clinical efficacy. Clinical Efficacy and Mortality Outcomes The most important limitation of the current evidence is the absence of a demonstrated mortality benefit. Large meta-analyses have not shown a reduction in mortality with hemoadsorption, and some analyses have suggested a potential signal toward harm. Moreover, the available literature is composed largely of small, single-center studies. The lack of adequately powered, multicenter randomized controlled trials limits causal inference and results in a low overall certainty of evidence. Hemodynamic and Biochemical Outcomes The effects of hemoadsorption on hemodynamic variables are also inconsistent. Reductions in vasopressor requirements and improvements in lactate levels have been reported in selected studies, but these changes have not consistently translated into clinically meaningful outcomes. Similarly, biochemical responses such as changes in inflammatory markers are heterogeneous across studies. Improvements observed in before-and-after or uncontrolled cohorts may reflect concurrent source control, antimicrobial therapy, fluid resuscitation, kidney replacement therapy, or natural recovery rather than a direct effect of hemoadsorption. Kidney-Related Outcomes Kidney-related outcomes remain a critical concern from a nephrology perspective. Clear benefits in acute kidney injury recovery, duration of kidney replacement therapy, or kidney replacement therapy independence have not been

demonstrated. Thus, the mechanistic rationale that improved hemodynamics or cytokine removal should lead to kidney recovery remains clinically unproven. Safety and Practical Considerations Another important limitation is the potential for unintended drug removal. Hemoadsorption may non-selectively adsorb antibiotics and antifungal agents, thereby reducing antimicrobial exposure and potentially compromising treatment efficacy in critically ill patients. The economic implications are also uncertain. Hemoadsorption cartridges are costly and often require repeated use; therefore, without proven clinical benefit, routine use is difficult to justify from a cost-effectiveness standpoint. Conclusion Current major guidelines do not recommend the routine use of hemoadsorption in SA-AKI, and its application should generally be limited to clinical trials or carefully selected research settings. In conclusion, hemoadsorption is a biologically appealing therapeutic strategy, but its clinical efficacy in SA-AKI has not been established and potential risks remain. A cautious and evidence-based approach is therefore warranted.

Keywords: hemoadsorption, limitation, sepsis, acute kidney injury, dialysis