Commentary: Light at the end of the dialysis tunnel: Renal recovery after cardiac surgery

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Cardiac surgery–associated acute kidney injury (CSA-AKI) is a common complication with a 2 to 5% rate of needing renal replacement therapy (RRT). 1,2 Although the high perioperative mortality and morbidity are well known, far less investigated is the natural history of patients needing RRT focusing on renal recovery. To that end, Ahmad and colleagues3 from the University of Virginia provide valuable insights into the frequency, timing, and predictors of renal recovery after CSA-AKI.

Over an 11-year period, 312 patients formed the study cohort after developing new-onset renal failure needing RRT after coronary artery bypass grafting or aortic/mitral valve surgery. One-third of those patients did not survive the index hospitalization, and 41% did not survive to 1 year. Of the surviving patients, most (84%) recovered renal function and a minority (16%) remained on dialysis. The median time to renal recovery was 8 weeks postoperatively; approximately 75% of patients who did recover did so within 3 months. The significant negative predictors for recovery were increasing age and total packed red blood cell units transfused. Although most preoperative (chronic kidney disease) and intraoperative (cardiopulmonary bypass time, crossclamp time) characteristics associated with the development of CSA-AKI did not influence renal recovery, it was clear that patients experiencing multorgan dysfunction (prolonged ventilation, pneumonia) after surgery had delayed renal recovery. These observations, not surprisingly, highlight the critical relationship between postoperative events and later renal recovery. Ultimately, approximately 50% of patients will survive to 1 year and be off dialysis.

The strengths of the article include the longer follow-up period (1 year compared with 90 days for most series) and the large number of patients to provide deeper insights. Challenges include details in late follow-up that are beyond the capability of most surgical databases. In addition, although the authors excluded patients who were started on dialysis yet recovered renal function before discharge, that cohort may have provided additional information on characteristics associated with renal recovery. A large analysis of 16,986 patients demonstrated the complexity of “renal recovery” after initiation of RRT for CSA-AKI. 4 The authors identified 5 different phenotypes of recovery; these ranged from full to no recovery and various degrees of relapse and remission with partial recovery. The overall survival was closely associated with the degree of recovery. Although this level of granularity is not typically analyzed, it does reveal that “renal recovery” can take many forms.

This analysis from Ahmad and colleagues3 makes us consider the role of perioperative care on outcomes. Obviously, the first step in CSA-AKI is prevention, and to that end bundles of care have been developed to reduce its incidence. 7 Further understanding if compliance with these practice bundles is associated with earlier recovery of renal function would be worthwhile. 6 Moreover, does perioperative care at the time of initiation and early management of RRT influence later renal recovery or is it that what clinicians do once a patient is on RRT has little influence on ultimate renal recovery. Important questions to further investigate come to mind.

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Received for publication Jan 17, 2024; accepted for publication Jan 19, 2024.

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J Thorac Cardiovasc Surg 2024; ■:1-2
0022-5223/$36.00
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https://doi.org/10.1016/j.jtcvs.2024.01.031
1. Does the timing of initiation of RRT influence later renal recovery? Although some AKI trials have demonstrated a survival advantage to earlier initiation of RRT, others have not observed a difference. It is worthwhile if one approach is associated with higher rates or earlier renal recovery. It would be interesting to see whether the time to initiation of RRT conferred an advantage in renal recovery routinely or for certain subgroups.

2. Does the mode of RRT make a difference? Although some investigators have demonstrated comparable survival outcomes between different modes of RRT, others have found prolonged use of continuous RRT is associated with less chance of renal recovery among survivors.

3. What elements of perioperative management in patients on RRT for CSA-AKI influence renal recovery? The only factor in postoperative management identified by Ahmad and colleagues was packed red blood cell transfusions. It would be notable to see if other factors influenced later recovery. There is a phase III, multicenter, randomized, double-blind, placebo-controlled trial examining pharmacological protection against AKI using amino acid infusions in patients undergoing cardiac surgery, with accrual ongoing, which may help shed some light on a new tool in this area.

4. Are there newer approaches to predict and identify renal recovery? Although indications for initiating RRT are well known, there is less consensus on its discontinuation. Although urine output and reduction in azotemia are best known, other potential options include novel biomarkers. The optimal method of using these biomarkers for identifying renal recovery will be discovered to aid in rendering decision-making and minimizing time on renal replacement therapy.

Ahmad and colleagues have provided a novel report in perioperative care after cardiac surgery. To their credit, the report helps to inspire additional questions to continue to improve care. Although we understandably focus our attention on the prevention of AKI, the next horizon involves better understanding renal recovery.

Conflict of Interest Statement
S.C. has served on advisory boards for Edwards Lifesciences, La Jolla Pharmaceutical Company, Eagle Pharmaceuticals, and Baxter Pharmaceuticals. The other author reported no conflicts of interest.

The Journal policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

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