Commentary: Hurry up while you are operating...or, better, plan carefully before you start

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Acute renal failure (ARF) developing after cardiac surgery has long been perceived as a dreadful complication that carries a very high mortality, exceeding 60% in some reports.¹ Even if the patients survive, they have a prolonged postoperative course, often resulting in a permanent need for hemodialysis. The reported incidence of postoperative ARF varies widely, from 2% to 30%, depending on the definition used.² ARF is often a part of a rather complicated postoperative course, and factors such as low cardiac output or postoperative bleeding with the need for numerous transfusions play a role in its development and subsequent mortality. The obvious predisposing factor is preoperative renal dysfunction, as signified by a low estimated glomerular filtration rate (eGFR). In addition, a prolonged perfusion time has long been recognized as associated with higher risk of development of postoperative renal failure.²

From this point of view, the article of Axtell and colleagues³ published in this issue of the *Journal* brings little new. More than 20% of patients with a preoperative eGFR less than 30 mL/min/1.73 m² developed postoperative ARF, in contrast to fewer than 1% of those with a preoperative eGFR greater than 60 mL/min/1.73 m². The in-hospital mortality among patients with postoperative ARF requiring renal replacement therapy was 42%. The postoperative transfusion increased the risk of development of ARF 12 times. The duration of cardiopulmonary bypass (CPB) was positively associated with development of ARF, with an odds ratio of 1.06 for every 10-minute increment. In fact, the perfusion time was on average 32 minutes longer in patients with postoperative ARF, which is very close to the earlier published estimate of 25 minutes from the meta-analysis of Kumar and associates.² Still, as they say, a picture is worth a thousand words. And it is just the central image that I will remember from the article of Axtell

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Central Message

In a patient with low eGFR, the operation should be tailored with the steep relationship of cardiopulmonary bypass time and the risk of postoperative acute renal failure in mind.

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and colleagues.³ Although the odds ratio of 1.06 per 10 minutes of CPB might be difficult to imagine, and the goal of shortening the CPB by 30 minutes difficult to accomplish, the central image provided by Axtell and colleagues³ is easy to remember and speaks to the imagination. It clearly demonstrates how the risk of development of postoperative ARF rises with the increasing CPB time. And the rise seems particularly steep and early with a lower preoperative eGFR. Thus, rather than hurrying while operating on a patient with predisposing risk factors, we should think carefully on what we are actually planning to achieve while discussing the treatment's risks and benefits with the patient. And perhaps we should tailor the operation with the picture provided by Axtell and colleagues³ in mind.

References

1. Chertow GM, Levy EM, Hammermeister KE, Grover F, Daley J. Independent association between acute renal failure and mortality following cardiac surgery. *Am J Med.* 1998;104:343-8.
2. Kumar AB, Suneja M, Bayman EO, Weide GD, Tarasi M. Association between postoperative acute kidney injury and duration of cardiopulmonary bypass: a meta-analysis. *J Cardiothorac Vasc Anesth.* 2012;26:64-9.
3. Axtell AL, Fiedler AG, Melnitchouk S, D'Alessandro DA, Villavicencio MA, Jassar AS, et al. Correlation of cardiopulmonary bypass duration with acute renal failure after cardiac surgery. *J Thorac Cardiovasc Surg.* 2020;159:170-8.e2.