Refined prediction: Does improved accuracy enhance our ability to improve patient outcomes?

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Acute kidney injury (AKI) is unfortunately all too prevalent after cardiac surgery, with reported incidences of up to 24% to 30%^{1,2} with approximately 1% of patients requiring dialysis, often permanently.¹ Furthermore, patients who develop AKI have an time, our ability to measure renal insufficiency has been reflected in the glomerular filtration rate and the serum creatinine, which may be influenced by lean body mass, activity, and diet, as examples.

Dardashti and colleagues³ present their work investigating the utility of an alternative marker of AKI, (s)-cystatin C, in the prediction of mortality after coronary artery bypass grafting (CABG) surgery. In their analysis, Dardashti and colleagues³ examine a single institution dataset of 1638 patients who underwent CABG. The patients had serum (s)-cystatin C levels measured and were followed for a median of 3.5 years (range, 2-5 years) to measure outcomes and mortality. In that cohort, the 30-day mortality was a very respectable 0.8%. The authors are to be commended on their excellent outcomes and their comprehensive follow-up over time that was no doubt a result of their ability to follow an integrated (health and tax) system.

In this analysis, (s)-cystatin C, a low-molecular-weight protein byproduct that is filtered by the glomeruli and is elevated in the serum with decreased filtration, was measured perioperatively in addition to serum creatinine level and estimated glomerular filtration rate. Dardashti and colleagues³ demonstrate that (s)-cystatin C level—and the estimated glomerular filtration rate based on that measurement—is a precise predictor of 30-day and long-term mortality. Although (s)-cystatin C has some shortcomings (on which the authors comment), it was a more accurate predictor of mortality when measured pre-CABG and during the perioperative period. In their receiver operating curve analysis, a preoperative (s)-cystatin C cutoff value of 0.9 demonstrated 96.4% sensitivity and 79% specificity in discriminatory accuracy for mortality. Although controversial,⁴ if (s)-cystatin C is indeed a marker of renal dysfunction that has a high

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Central Message

Novel biomarkers may allow for more sensitive prediction of preoperative function and we are challenged to translate them into clinical use and the ability to predict outcomes.

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accuracy of predicting mortality, are we able to use that information to implement known renal-protection measures before, during, and after surgery?¹ (s)-Cystatin C is an evolving biomarker and tool for measuring AKI that appears to be more sensitive than s-creatinine. (s)-Cystatin C appears to be better either alone or in combination with (s)-creatinine. (s)-Cystatin C would appear to be less influenced by lean body mass and other factors than creatinine. If these data can be translated into a reproducible, cost-effective metric that allows for active intervention to correct or prevent AKI, then preoperative (s)-cystatin C measurement becomes a powerful clinical tool.

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