

# The association between preoperative eGFR and outcomes in cardiac surgical patients

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**TO THE EDITOR:** With good reason, Foot and colleagues investigated the association between preoperative renal function and outcomes after cardiac surgery in an Australian setting.<sup>1</sup> Despite convincing investigations conducted in other countries,<sup>2,3</sup> local confirmation is needed, as the Australian cardiac surgical population has its idiosyncrasies — as previously noted in attempts to validate the EuroSCORE in Australia.<sup>4</sup> The value of local investigation of “established” results can be twofold:

- to verify their generalisability in Australia; and
- to positively influence local clinicians to incorporate worthwhile evidence into practice.

Although there has been little local research in this area, we would like to correct the claim made by Foot et al that there are “no published Australian data documenting the effect of renal impairment on perioperative outcomes in the cardiac surgical population”. Mangos and colleagues<sup>5</sup> found that the incidence of “acute renal failure” after cardiac surgery increased with poorer preoperative renal function, albeit using serum creatinine cut-off levels to define categories. Furthermore, “impaired renal function” was associated with higher mortality and prolonged hospital stay in their study.

Foot et al built on these results, and reinforced them using the eGFR (glomerular filtration rate calculated using the simplified Modification of Diet in Renal Disease equation), a currently more accepted method of measuring preoperative renal function in cardiac surgical patients.

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**IN REPLY:** We agree with Moore and Tobin that the excellent report from Mangos and colleagues from 1995<sup>1</sup> is an important and earlier contribution than our study.<sup>2</sup> Similarly, we agree that impaired renal function is an important prognostic variable in cardiac surgery outcomes, and this is supported by the inclusion of renal dysfunction in both the EuroSCORE<sup>3</sup> and Society of Thoracic Surgeons (STS)<sup>4</sup> risk prediction models. In the STS national database, most of the explained variance from the entire 28-variable model for coronary artery surgery derives from eight

They found significant independent associations between preoperative eGFR and in-hospital mortality, prolonged mechanical ventilation, and prolonged ICU and hospital stay. Moreover, the risk for adverse outcomes increased with severity of renal injury. Their results confirm those of a large US-based study ( $n = 483\,914$ ).<sup>2</sup>

Given this confirmation of results, perhaps more attention should be paid to kidney function when selecting patients for cardiac surgery. It might be appropriate to incorporate this information into surgical risk assessment tools and also into the informed consent process.

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predictors (age, surgical acuity, re-operative status, creatinine level, dialysis, shock, chronic lung disease, and ejection fraction).<sup>4</sup> Interestingly, we reported a relatively low mortality in the patient subset with dialysis-dependent renal failure.<sup>2</sup>

The Modification of Diet in Renal Disease (MDRD) calculation of glomerular filtration rate (eGFR) includes age, sex and creatinine concentration, and hence eGFR would be expected to be a powerful predictor of risk in cardiac surgery. Figure 1 in our article demonstrated that a

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serum creatinine concentration of 0.13 mmol/L can lead to an eGFR in the range 35–80 mL/min.<sup>2</sup> Mangos et al used the Cockcroft and Gault calculation of GFR, which has been superseded by the MDRD formula that we used. It should be noted that calculated GFR may be inaccurate in non-steady state conditions, as are typical in patients in a critical preoperative state.

There were substantial differences between the types of surgery performed in 1992–1993, as studied by Mangos et al,<sup>1</sup> and in 2002–2007, when we conducted our study. It is important that prognostic factors be updated as patient characteristics<sup>5</sup> and practice<sup>6</sup> change. Finally, hospital mortality has limitations as an outcome variable with changes in hospital discharge practices.<sup>7</sup> Longer-term follow-up of high-risk patients and their outcomes is required to determine the risks and benefits of surgery to incorporate into the consent process.

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