Minimal Changes of Preoperative Serum Creatinine Predict Outcomes after Cardiac Surgery

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Introduction: Cardiovascular morbidity and mortality is high in patients with chronic kidney disease (CKD). Even small changes in serum creatinine in the postoperative period are clinically significant.

Aims: To determine the influence of small differences in preoperative serum creatinine on postoperative complications and mortality.

Methods: This is an observational study that included adult patients undergoing cardiac surgery in which data were collected prospectively. Preoperative eGFR was estimated by the 4 component MDRD and CKD EPI equations based on preoperative creatinine levels. For analysis, patients were divided into groups depending on there preoperative creatinine and eGFR levels (every 10-15 mL/min per 1.73 m2 decrement of preoperative eGFR and every 0.2 mg/dl increment of preoperative creatinine).

Results: A total of 5340 patients were analysed. The incidence of CKD Stage III and IV was 28 and 3%, respectively, by CKD EPI equation and 29% and 4%, respectively, by MDRD formula. A significant protective effect of preoperative creatinine at low normal versus high normal values was detected (OR 0.35, 95% CI 0.3-0.45 compared to OR 0.8, 95% CI 0.6-1, P<0.0001). With preoperative creatinine more than 1.2 mg/dl, adjusted OR for in hospital mortality increases stepwise with every 0.2 mg/dl increment of creatinine. With preoperative eGFR, however, a statistically significant increment of mortality was detected in patients with eGFR less than 30 ml/min/1.73 m2.

Conclusion: Substantial increase in the hazard of death is demonstrated with minimal increments of preoperative creatinine, even within the normal range. Preoperative eGFR is less predictive at higher values, probably reflecting the limited precision of the MDRD formula in these patients.