IMPROVING RISK-PREDICTION FOR DIALYSIS AFTER CARDIAC SURGERY

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INTRODUCTION

Pre-existing renal dysfunction is an independent predictor of dialysis following cardiac surgery. Plasma creatinine (Cr) may be an insensitive measure of renal dysfunction due to its variation with age, gender, and muscle mass. This study evaluated the predictive performance of a simple alternative measure of renal function: creatinine clearance (CrCl) estimated by the Cockcroft and Gault formula.

METHODS

Following REB approval, data were prospectively collected on 10,751 cardiac surgery patients (1999 - 2004) at an academic hospital. Patients who were dialysis-dependant or had severe renal dysfunction (Cr > 300 $\mu\text{mol/L}$) preoperatively were excluded. Cubic spline analyses found that the risk for postoperative dialysis rose substantially when $\text{CrCl} \leq 60 \text{ mL/min}$ (Figure). Preoperative renal function was therefore categorized: mild-moderate dysfunction (Cr > 133 $\mu\text{mol/L}$); occult dysfunction (Cr $\leq 133 \mu\text{mol/L}$ and $\text{CrCl} \leq 60 \text{ mL/min}$); and normal (Cr $\leq 133 \mu\text{mol/L}$ and $\text{CrCl} > 60 \text{ mL/min}$).^{1,2} Multivariable logistic regression was used to determine the association of preoperative renal function with dialysis.

RESULTS

Postoperative dialysis occurred in 1.3% of patients. The prevalence of mild-moderate dysfunction and occult dysfunction were 6.0% and 19.5% respectively. After adjustment for preoperative risk factors, both mild-moderate dysfunction (odds ratio [OR] 12.53; 95% CI 8.20 – 19.15; $P < 0.0001$) and occult dysfunction (OR 2.85; 95% CI 1.81 – 4.49; $P < 0.0001$) were independently associated with dialysis.

DISCUSSION

Approximately 20% of cardiac surgery patients have significant renal dysfunction that is not evident by Cr measurements. The inclusion of a simple risk criterion ($\text{CrCl} \leq 60 \text{ mL/min}$) in preoperative assessments may improve clinicians' ability to identify patients at risk for postoperative dialysis.

REFERENCES

1. *Kidney Int.* 55:1057-1062.
2. *J Thorac Cardiovasc Surg.* 121:1083-1089.