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Urinary biomarkers for early prediction of acute kidney injury

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Objectives: Acute kidney injury (AKI) is one of the most common postoperative complications of pediatric cardiac surgery. Serum creatinine has limitations as a diagnostic marker of AKI. Therefore, new biomarkers are being evaluated to overcome these limitations and to detect AKI at an early stage after cardiac surgery. The purpose of this study was to investigate the clinical usefulness of these biomarkers.

Methods: In total, 30 patients with congenital heart disease who had undergone cardiac surgery using cardiopulmonary bypass (CPB) were selected, and their urine and blood samples were collected at baseline and 6, 24, and 48 hours after surgery.

Results: Of the 30 patients, 12 developed AKI within 48 hours after cardiac surgery, and the operative perfusion time was significantly higher in the AKI patients. Moreover, urine concentration of kidney injury molecule-1 (KIM-1) at 6 hours after surgery was significantly higher in the AKI patients. Furthermore, KIM-1 and interleukin-18 concentrations peaked at 24 and 6 hours after surgery, respectively.

Conclusions: We suggest that a prolonged perfusion time is a significant risk factor for AKI and urine KIM-1 concentration could be a useful biomarker for AKI after pediatric cardiac surgery using CPB.