

Diagnostic Accuracy and Prognostic Valued of Plasmatic Cystatin-C in Children Undergoing Cardiac Suregry for Congenital Heart Disease

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Background: Diagnosis and treatment of acute kidney injury (AKI) is often delayed in pediatric patients undergoing cardiac surgery due to the lack of an early biomarker of renal damage. Our aim was to evaluate the diagnostic and prognostic accuracy of plasma cystatin-C, as early biomarker of AKI in pediatric cardiac surgery.

Methods: Cystatin-C and creatinine were measured pre-operatively and at 2-6-12 hours post-surgery in 248 children undergoing cardiac surgery (median age 6.5 months; IQR: 1.7-40.1 months; range 0-17 years). The primary outcomes were: AKI and a composite marker of outcome (including major complications plus extubation time > 15 days). Some risk models were taken in consideration for Cox proportional hazards regression analysis: a basal risk prediction model was fitted, including age, body surface area and Aristotle-score as continuous predictors, and then peak cystatin-C values were added to this model. Analysis to test discrimination, calibration, and reclassification were also performed.

Results: Cystatin-C post operatory values were accurate early diagnostic markers of AKI showing the best area under the ROC curve value (AUC) at 12 hours (0.746, CI 95% 0.674-0.818). Peak cystatin-C value at peak showed a significant hazard ratio (HR=2.665, CI 95% 1.750-4.059, $p < 0.001$), add significant information to the basal regression model ($p < 0.001$), and finally significantly improved the AUC ($p = 0.017$), resulting a net gain in reclassification proportion (NRI=0.417, $p < 0.001$).

Conclusions. our data show that cystatin-C is not only an accurate early biomarker of AKI, but also may improve the risk prediction in pediatric cardiac surgery, supporting its routine use in this setting.

Figure 1: The ROC curve showing diagnostic accuracy of costati-C in the diagnosis of AKI.



