

## **Evaluating the Predictive Ability of a New Biomarker for Acute Kidney Injury in Patients Undergoing Major Cardiac Surgery: Time Dependent ROC.**

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Diagnosis and classification of acute kidney injury (AKI) are still based on serum creatinine and diuresis. However increases in serum creatinine are typically delayed by 48 hours or even more after injury. This is especially true after cardiac surgery due to positive fluid balance related to cardiopulmonary bypass. The aim of this study was to determine the utility of routine postoperative biomarker levels to predict an AKI event one or two days in advance, in patients undergoing major cardiac surgery.

In a random sample of 2457 patients operated of major cardiac surgery between 2002 and 2010, we explored the predictive ability of routine renal function biomarkers, for the diagnosis of AKI following Acute Kidney Injury Network criteria. Time dependent ROC curves using dynamic specificity and cumulative sensitivity were used, considering the three stages of AKI severity and three moments after surgery, (on the day of surgery, one day, and two days after surgery).

Of the total of patients, 673 (27.4%) developed an AKI event after surgery. One of the biomarkers considered showed a good performance for AKI prediction, with values for the area under the ROC curve between 0.682 and 0.913. Different cutoff values for this biomarker were obtained depending on the three degrees of AKI severity as well as on the time elapsed between surgery and biomarker measurement for a fixed sensitivity. Analyses were also done using change from baseline in serum creatinine. It showed low sensitivities in all cases and consequently, to achieve a reasonable value (sensitivity around 80%) very low values of the biomarker need to be considered with unacceptable values of specificity, as expected.

Keywords: Acute Kidney Injury, Prediction, Time Dependent ROC.