Urine NGAL in Predicting Renal Recovery and Patient Outcome in Critically Ill Patients
Nithin Karakala, Nishant Bhensdadia, John M Arthur
Division of Nephrology, Department of Medicine, MUSC

Acute Kidney Injury (AKI) is an important, independent risk factor of mortality in critically ill patients. The mortality among intensive care unit (ICU) patients with AKI ranges from 20 to 50% (1-2). Serum creatinine (SCr) elevation occurs late in renal injury, and SCr levels early in AKI cannot predict the need for renal replacement therapy (RRT) or mortality. Newer biomarkers are better at diagnosing AKI early, and predicting outcome in patients with AKI. The ability to predict outcome in patients with AKI using Neutrophil Gelatinase-Associated Lipocalin (NGAL), Cystatin C, IL18 and HGF (3-4) have been validated extensively in patients after cardiac surgery, but not in medical ICU patients with more heterogenous causes of AKI.

METHODS

Urine samples were collected from patients admitted to MUSC ICU. Urine was collected on the first day of diagnosis of AKI, if patient developed AKI in the ICU, or on the day of transfer to ICU if the patient developed AKI before the transfer. All urine samples were centrifuged at 10,000 rpm for 10 min, and the supernatant and sediment were separated and stored at -80°C. Supernatant was used to measure the concentration of the biomarkers. NGAL and Cystatin C were measured separately using a multi-well ELISA kit. IL 18, and HFG were measured using a Bioplex assay.

RESULTS

Urine Biomarker CRRT/Death Recovered/ No RRT p
NGAL 835(±568.1) ng/ml 119.4(±172.77) ng/ml <0.0001
Cystatin C 5.79(±4.95) µg/ml 3.35(±3.55) µg/ml 0.952
IL 18 768(±347) pg/ml 265.3(±120) pg/ml 0.2089
HGF 1755(±338.9) pg/ml 988(±245.9) pg/ml 0.982

CONCLUSION

• Urine NGAL can predict need for renal replacement therapy and mortality in ICU patients early in the course of AKI.
• A urine NGAL concentration of greater that 250 ng/ml could predict the combined outcome of need for RRT or death (AUC 0.815, sensitivity 72%, specificity 92%, likelihood ratio 10.1).
• Urine Cystatin C, HGF, and IL18 concentrations did not correlate with the clinical outcomes.

REFERENCES