PO0171

Prognostic Significance of Urinary Biomarkers in Patients Hospitalized with COVID-19

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Background: Acute kidney injury (AKI) is common in patients with COVID-19 and associated with poor outcomes. Urinary biomarkers have been associated with adverse kidney outcomes in other settings and may provide additional prognostic information in patients with COVID-19.

Methods: We evaluated 19 urinary biomarkers of injury, inflammation, and repair in patients hospitalized with COVID-19 at 2 academic medical centers between April and June 2020. We associated biomarkers with a primary composite outcome of KDIGO stage 3 AKI, requirement for dialysis, or death within 60 days of admission. We also compared various kidney biomarker levels in the setting of COVID-19 versus other common AKI settings.

Results: Out of 157 patients, 24 (15.3%) experienced the primary outcome. Two-fold higher levels of neutrophil gelatinase-associated lipocalin (NGAL) (HR: 1.53; 95% CI: 1.33–1.76), monocyte chemoattractant protein (MCP-1) (HR: 1.86; 95% CI: 1.48–2.33), and kidney injury molecule-1 (KIM-1) (HR: 2.32; 95% CI: 1.69–3.18) were associated with the highest risk of the primary outcome. Higher epidermal growth factor (EGF) levels were associated with a lower risk of the primary outcome (HR: 0.52; 95% CI: 0.40–0.69).

Conclusions: Urinary biomarkers are associated with severe kidney complications in patients with COVID-19 and provide valuable information to monitor kidney disease recovery and progression.

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Urine Test Predicts Kidney Injury and Death in COVID-19

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Background: Kidney injury is a common feature of COVID-19 infection, but serum creatinine (Scr) is not a sensitive or specific marker of kidney injury. We hypothesized that measurement of molecular markers of tubular injury can diagnose COVID-19 associated kidney injury and predict a poor prognosis.

Methods: This is a prospective cohort study of 444 consecutive COVID-19 patients in a New York City Emergency Department recruited in March and April, 2020. Urine and blood were collected simultaneously at hospital admission (median time of day 0, IQR 0-2 days) and within 1 day of a positive SARS-CoV-2 test in 70% of patients. Urine NGAL and KIM-1 assays were blinded to clinical data. Primary outcomes included the diagnosis of Acute Kidney Injury (AKI) as defined by AKIN criteria, as well as its duration and severity. Secondary outcomes included death, dialysis, shock, respiratory failure, and length of hospital stay. Kidney biopsies from COVID-19 patients were examined for biomarker gene expression.

Results: Elevated urinary NGAL (uNGAL) levels were associated with Scr based AKI (267±301 vs. 96±139 ng/mL; P=1.6x10^-6). uNGAL level >150 ng/mL had 80% specificity and 75% sensitivity to diagnose AKIN stage 2 AKI or higher. Higher uNGAL levels were associated with sustained AKI [aOR per SD of uNGAL (95%CI): 2.67 (1.81-4.06), P=1.8x10^-4], need for dialysis (aOR: 3.67 (1.89-7.57), P=2.2x10^-3), shock (aOR: 1.64 (1.26-2.15), P=2.9x10^-3), prolonged length of stay (aHR: 1.22 (1.09-1.36), P=4.8x10^-4), and death [aOR=1.62 (1.19-2.24), P=2.5x10^-3], independent of baseline Scr and pre-existing co-morbidities. These associations were also preserved after adjusting for proteinuria measured in the same urine sample. NGAL is typically transcribed by distal nephron segments but in COVID-19 kidney biopsies with widespread histopathologic acute tubular injury (ATI), NGAL mRNA expression included proximal tubules.

Conclusions: Elevated uNGAL in patients admitted with acute COVID-19 was associated with the development of AKI, increased severity and duration of AKI, the degree of histopathologic acute tubular injury, shock, prolonged hospitalization, need for dialysis, and death.

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Readmissions After AKI in Colorectal Carcinoma Are Associated with Adverse Outcomes: Findings from the National Readmission Database

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Background: Acute kidney injury (AKI) is common in critically ill cancer patients with poor outcomes. Colorectal carcinomas (CRC) are frequently associated with AKI, due to complications of disease or treatment. AKI in CRC remains a well-known but under-represented topic in current literature. We aim to analyze and quantify the impact, healthcare burden, readmission rates and predictors of metastatic CRC with AKI.

Methods: We conducted a retrospective cohort study of the 2017 National Readmission Database (NRD) of adult patients readmitted within 30 days after an index admission for AKI with a comitant diagnosis of CRC. ICD 10 codes were used to identify diagnoses and procedures.

Results: A total of 2,239 patients with metastatic colorectal cancer were admitted with AKI. The 30-day readmission rate was 27.9%. Main causes for readmission were sepsis, progression of malignancy, hypovolemia and recurrent AKI. Readmitted patients were associated with higher in-hospital mortality (0.1% vs. 1.5%; p=0.01), mechanical ventilation need (4.7% vs 1.5%; P=0.01) and chronic kidney disease (CKD) diagnosis (44.6% vs 36.1%; P<0.01). The total healthcare in-hospital economic burden was $2,247,777,653.

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