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Acute Kidney Injury

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Clinical significances of NGAL and KIM-1 in acute kidney injury in patients with scrub typhus

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Background: The aim of this study is investigate the clinical significances of neutrophil gelatinase-associated lipocalin (NGAL) and kidney injury molecule-1 (KIM-1) in acute kidney injury (AKI) in patients with scrub typhus.

Methods: From 2014 to 2015, 145 patients were diagnosed with scrub typhus. Of these, we included 138 patients who were followed up until renal recovery or for at least three months. We initially measured serum and urine NGAL and KIM-1 of the patients with scrub typhus, and evaluated the prognostic factors affecting scrub typhus-associated AKI.

Results: Of the 138 patients, 25 had scrub typhus-associated AKI. The incidence of AKI was 18.1%; of which, 11.6%, 4.3% and 2.2% were classified as Risk, Injury and Failure, respectively. In comparison with patients in the non-AKI group, the patients in the AKI group were older (74.4 ± 9.0 vs 63.4 ± 12.7 year, $P < 0.001$), showed higher total leukocyte counts ($11.00 \times 10^3/ \text{mL}$ vs $7.00 \times 10^3/ \text{mL}$, $p = 0.01$), hypoalbuminemia (3.77 ± 0.56 mg/dL vs 3.28 ± 0.51 , $P < 0.001$), and had one or more comorbidities such as hypertension (72.0% vs 32.7%, $p < 0.001$), diabetes (40.0% vs 14.2%, $p = 0.005$), and chronic kidney disease (32.0% vs 0.9%, $p < 0.001$). In addition, serum NGAL (396.6 ± 281.3 vs 116.8 ± 78.8 ng/mL, $P < 0.001$), KIM-1 (0.80 ± 0.52 vs 0.27 ± 0.26 ng/mL, $P < 0.001$), urine NGAL/creatinine values (363.9 ± 671.1 vs 27.7 ± 39.9 ng/mg, $P < 0.001$) and urine KIM-1/creatinine values (4.04 ± 2.43 vs 2.38 ± 1.89 ng/mg, $P < 0.001$) were higher in the AKI group than in the non-AKI group. By multivariate logistic regression, serum NGAL and presence of chronic kidney disease were significant predictors of AKI.

Conclusion: Serum NGAL and presence of chronic kidney disease are significant predictors of AKI in scrub typhus. Serum NGAL could be an additive predictor for scrub typhus-associated AKI.

Keywords: Acute kidney injury, neutrophil gelatinase-associated lipocalin, scrub typhus