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The association between plasma neutrophil gelatinase-associated lipocalin and non-albumin proteinuria in patients with chronic kidney disease

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Objectives: Several studies reported that neutrophil gelatinase-associated lipocalin (NGAL) is associated with the tubulointerstitial damage in CKD patients. 'Non-albumin' proteinuria is also known to reflect the tubulointerstitial damage in CKD patients. In this study, we investigate the association between the plasma NGAL and the non-albumin proteinuria in CKD patients.

Methods: This study included 829 CKD patients with proteinuria. The subjects were into categorized into a CKD stage 1, 2 group (estimated glomerular filtration rate [eGFR] ≥ 60 ml/min/1.73m^2, n = 258) and a CKD stage 3, 4, 5 group (eGFR < 60 ml/min/1.73m^2, n = 571). Proteinuria was quantitated by the random urine protein to creatinine (PCR) and albumin to creatinine (ACR). The albumin and non-albumin fraction of total proteinuria were expressed as %Albuminuria (ACR/PCR x 100) and %Non-albuminuria (100-%Albuminuria), respectively.

Results: The urine ACR and PCR levels, and %Albuminuria are significantly higher in CKD stage 3, 4, 5 group than in CKD stage 1, 2 group. %Non-albuminuria was lower (in other words, %albuminuria was higher) in CKD 3, 4, 5 group than in CKD stage 1, 2 group. In CKD stage 1, 2 group, the plasma NGAL levels were independently associated with the %Non-albuminuria (β = 0.475, P < 0.001). The eGFR, urine ACR, and PCR were not associated with the plasma NGAL levels. In CKD stage 3, 4, 5 group, the plasma NGAL levels were independently associated with the %Non-albuminuria (β = 0.274, P < 0.001). In addition, the eGFR (β = -0.360, P < 0.001) and hsCRP (β = 0.120, P < 0.001) were independently associated with the plasma NGAL levels. The urine ACR and PCR were not associated with the plasma NGAL levels.

Conclusions: Increased plasma NGAL levels are independently associated with the increased non-albumin proteinuria in patients with CKD, irrespective of CKD stage.