Abstract

Background. Alterations in DNA methylation may be involved in disease progression in patients with chronic kidney disease (CKD). Recent studies have suggested that 5-methyl-2'-deoxycytidine (5MedC) may be a marker of hypermethylation of DNA. Currently, there is no information available regarding the urine levels of 5MedC and its association with progression of CKD.

Method. We examined the urine levels of 5MedC in spot urine samples from 308 patients with CKD (median age: 56 years, male: 53.2%, glomerulonephritis: 51.0%) using a competitive enzyme-linked immunosorbent assay and investigated the relationships among urine 5MedC, urine albumin, urine α1-microglobulin (α1MG) and the laboratory parameters associated with CKD. The patients were followed for three years to evaluate renal endpoints in a prospective manner.

Results. The urine 5MedC level was significantly increased in later stages of CKD compared to the early to middle stages of CKD. In multiple logistic regression models, urine 5MedC was significantly associated with the prediction of later CKD stages. Urine 5MedC (median value, 65.9 μmol/gCr) was significantly able to predict a 30% decline in the estimated GFR or a development of end-stage renal disease when combined with macroalbuminuria or an increased level of urine α1MG (median value, 5.7 mg/gCr).

Conclusion. The present data demonstrate that the urine 5MedC level is associated with a

reduced renal function and can serve as a novel and potent biomarker for predicting the renal outcome in CKD patients. Further studies will be necessary to elucidate the role of urine DNA methylation in progression of CKD.