URINARY INDICES FOR ESTIMATION OF ALBUMINURIA AND PROTEINURIA IN PATIENTS WITH CHRONIC KIDNEY DISEASE

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Introduction and Aims: For estimation of daily urinary excretion of protein and albumin, protein-to-creatinine ratio (PCR) and albumin-to-creatinine ratio (ACR) are respectively used from spot urine. Previously, urine albumin-to-protein ratio (APR) was reported to be useful in differential diagnosis of glomerular versus non-glomerular chronic kidney disease (CKD). In addition, estimated protein excretion rate (ePER) and estimated albumin excretion rate (eAER) can be calculated using estimated creatinine excretion rate (eCER). We evaluated these urinary indices to compare their usefulness in the diagnosis of proteinuric CKD.

Methods: Both 24 h-urine and spot urine were collected from 77 stable CKD patients (male, 32; age, 58 ± 18 years) for measurement of albumin, protein and creatinine, and protein electrophoresis (PEP); spot urine was obtained immediately after finishing 24 h-urine collection. Based on MDRD and CKD-EPI equation, ePER[MDRD], ePER[CKD-EPI], eAER[MDRD] and eAER[CKD-EPI] were calculated to estimate daily proteinuria and albuminuria. Glomerular CKD was defined by clinical and pathological evidences.

Results: Our patients had serum creatinine 1.7 ± 1.1 mg/dL, 24 h-urine proteinuria 1690 ± 3123 mg/d and albuminuria 1099 ± 1910 mg/d. ACR correlated very well with PCR (r²=0.94, P<0.0001), and the correlation between APR and the albumin percentage at PEP was significant but not good (r²=0.33, P<0.01). The albumin percentage at PEP was significantly higher in 59 patients with glomerulopathy than 18 with non-glomerular CKD (49 ± 24% vs. 11 ± 21%, P <0.05) whereas APR had no difference between the groups. The 24h-urine proteinuria correlated better with ePER[MDRD] (r² = 0.89, P <0.0001) and ePER[CKD-EPI] (r² = 0.86, P <0.0001) than PCR (r² = 0.78, P <0.0001), and the 24h-urine albuminuria correlated better with eAER[MDRD] (r² = 0.95, P <0.0001) and eAER[CKD-EPI] (r² = 0.95, P <0.0001) than ACR (r² = 0.90, P <0.0001).

Conclusions: Compared with APR, urine PEP may be more useful to diagnose glomerular proteinuria. To estimate daily proteinuria and albuminuria, ePER and eAER should be superior to PCR and ACR, respectively.