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Increased urinary angiotensinogen in CKD patients with high salt diet and hypertension

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Background: Urinary angiotensinogen is known to be related with intra-renal renin-angiotensin system (RAS) activity. High sodium diet is associated with volume expansion and hypertension. Increased RAS activity is suggested as its common pathomechanism of hypertension. We investigate the clinical determinant of urine angiotensinogen and determine the relationship between high salt intake and increased urinary angiotensinogen in patients with high blood pressure.

Methods: In total, 969 CKD patients were included and divided into four groups according to quartile of their 24hr - urine sodium excretion to creatinine ratio and 24-hr urine sodium-to-creatinine ratio (24HUNa/Cr): The urine angiotensinogen-to-creatinine ratio (UAGT/Cr) was specifically assayed with a commercially available enzyme-linked immunosorbent assay kit.

Results: Urine angiotensinogen was significantly higher in patients with increased 24hr - urine sodium excretion to creatinine ratio. Univariate linear regression analysis showed that the urine angiotensinogen concentrations were correlated with systolic blood pressure, the albumin-to-creatinine ratio, and 24-hr urine sodium-to-creatinine ratio. Whereas they were negatively correlated with waist hip ratio, the estimated glomerular filtration rate, serum albumin and hemoglobin levels and 24-hr urine potassium-to-creatinine ratio. Multiple regression analysis revealed that 24-hr urine sodium-to-creatinine ratio, the estimated glomerular filtration rate and waist hip ratio were independently associated with the logarithm of urine angiotensinogen levels ($r = 0.35$, $p = 0.021$).

Conclusion: Urine angiotensinogen concentrations are higher in patients with increasing 24hr - urine sodium excretion to creatinine ratio. In a group of 4th quartile systolic blood pressure and 4th quartile 24h urine-sodium excretion to creatinine ratio, the level of urine angiotensinogen was highest in a total cohort study. Urine angiotensinogen was significantly independent determinant in high blood pressure concomitant with high salt diet after adjusting other clinical factors in CKD patients.

Keywords: 24h urine-sodium excretion to creatinine ratio, Chronic kidney disease, Hypertension, Urine angiotensinogen