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Association between Nephrolithiasis and Kidney Disease Progression in Autosomal Dominant Polycystic Kidney Disease Patients : a Prospective Cohort Study

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Objectives: Nephrolithiasis is a common complication in Autosomal dominant polycystic kidney disease (ADPKD) patients. A few in vitro and in vivo studies showed that kidney and ureter stone formation could accelerate renal disease progression in ADPKD. However, its association between nephrolithiasis and renal function deterioration remains unknown in ADPKD patients.

Methods: This is a study from single center prospective cohort called HOPE-PKD. A total of 410 subjects with computed tomography (CT) scan within 1 year before the enrollment were analyzed. Subjects were divided into two groups according to the CT results as follows: Patients with papillary calcification, calyceal stone, ureter stone, or renal stone were classified as a stone group (n=80, 19.5%), and patients only with renal cyst calcification or without any urinary stones were classified as a no-stone group (n=330, 80.5%). The primary outcome was defined as the initiation of renal replacement therapy due to end-stage renal disease. The secondary outcome was a composite of a 50% decline in estimated glomerular filtration rate (eGFR), doubling serum creatinine from baseline, or the initiation of renal replacement therapy. The hazard ratios (HRs) and 95% confidence interval (95% CI) for the outcome were analyzed using multivariate Cox regression analysis.

Results: During a median 5.18 [interquartile range 3.41 - 8.03] year of follow-up, the primary and secondary outcomes occurred in 51 (12.4%) and 96 (23.4%) patients, respectively. After adjusting possible confounding factors the stone group showed an increased risk of the primary and secondary outcome of HR 2.84 (95% CI 1.26 - 6.38; p-value 0.012) and HR 1.83 (95% CI 1.03 - 3.27; p-value 0.041), respectively.

Conclusions: This is the first prospective cohort study showing that nephrolithiasis is associated with poor renal outcomes in patients with ADPKD. Further clinical studies of nephrolithiasis in ADPKD patients are warranted to improve renal outcomes.

Figure 1. The survival graph of composite renal outcome from multivariate Cox regression analysis. Variables: Baseline age, sex, body mass index, estimated glomerular filtration rate, comorbidity of hypertension and diabetes, serum uric acid, phosphorous, calcium level, results of PKD1 and PKD 2 gene analysis, and Mayo classification