Abstract Type : Oral presentation
Abstract Submission No.: A-0025
Abstract Topic : Pediatric Nephrology + Inherited Kidney Disease

The risk of end-stage kidney disease associated with cystic kidney disease among adults: a cohort study

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Objectives : Cystic kidney disease in adults is primarily caused by autosomal-dominant polycystic kidney disease (ADPKD) and acquired kidney cysts (AKCs). Kidney prognosis in this population, particularly for those with AKCs, remains unexplored, hindering effective care planning. We assembled a large cohort of adults with cystic kidney disease (ADPKD and AKCs) to analyze their risk of developing end-stage kidney disease (ESKD).
Methods : Patients with ADPKD and AKCs were retrospectively identified from the National Taiwan University Hospital Integrated Medical Database and propensity score-matched to controls for demographics, comorbidities, medications, and laboratory data. Multivariate Cox regression was used to evaluate risk of ESKD associated with ADPKD or ACKs, adjusted for confounders, including estimated glomerular filtration rates (eGFRs).
Results : In total, 1,141 patients with ADPKD (mean 55.5 ± 16.2 years; eGFR 61.0 ± 36.7 mL/min/1.73 m^2) and 10,782 with AKCs (mean 63.6 ± 14.9 years; eGFR 74.9 ± 28.9 mL/min/1.73 m^2) were included and matched to 4,564 (at 1:4 ratio) and 14,312 (at 1:2 ratio) controls. No significant differences were found in demographics, comorbidities, frailty, medications, or laboratory data. ADPKD increased the ESKD risk by 40% (hazard ratio (HR) 1.40, 95% confidence interval (CI) 1.19–1.64), while AKCs showed no such association (HR 0.95, 95% CI 0.84-1.08) (Table 1). These findings remained consistent after adjusting for competing mortality risks, with no differences by age or sex.
Conclusions : In patients with cystic kidney disease, ADPKD substantially increased ESKD risk, while AKCs did not. Sharing prognostic information helps patients make informed decisions and assists physicians in planning appropriate care for this population. For individuals with incident findings of AKCs, clinicians can be reassured that the associated risk of progression to ESKD is minimal and should direct attention to the space-occupying effects and rare malignant transformation potential of such findings.

Table 1.png

Table 1. Incidence and risk of end-stage kidney disease according to types of cystic kidney disease

Variables	Events	P	PYs	Cumulative incidence	Incidence density*	Crude		Model 1#		Model 2&		Model 3%	
						HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI
ADPKD													
Matched control	664	4,564	20,740.7	14.55%	32.01	1.00		1.00		1.00		1.00	
ADPKD	202	1,141	4,776.0	17.7%	42.30	1.32	1.13-1.55†††	1.40	1.19-1.64†††	1.39	1.18-1.64†††	1.52	1.29-1.79†††
AKC													
Matched control	1,017	14,312	66,450.1	7.11%	15.30	1.00		1.00		1.00			
AKC	342	7,156	35,015.0	4.78%	9.77	0.64	0.57-0.72†††	0.95	0.84-1.08	0.99	0.87-1.13	1.05	0.93-1.19

ADPKD, autosomal dominant polycystic kidney disease; AKC, acquired kidney cyst; CI, confidence interval; eGFR, estimated glomerular filtration rate; HR, hazard ratio; P, population; PY, person-year

* per 1000 patient-year

Incorporating demographic data, comorbidities, medications, frailty severity, and eGFR

& Incorporating model 1 variables, with death as a competing risk

% Incorporating model 1 variables, with multiple imputation of missing lab data

††† $p < 0.001$