The cardiovascular events in autosomal dominant polycystic kidney disease patients compared with the general population in Taiwan

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Purpose

Cardiovascular problems are a major cause of morbidity and mortality in patients with autosomal-dominant polycystic kidney disease (ADPKD). Nevertheless, there have been no large-scale epidemiological studies about the risk of cardiovascular events in patients with ADPDK compared with general population. The aims of this study were to evaluate the risks for cardiovascular events (acute coronary syndrome, ischemic stroke, and hemorrhagic stroke) among ADPKD patients in comparison to a reference group in Taiwan.

Method

Using Taiwan's National Health Insurance Research Database, we conducted a retrospective cohort study. We identified patients diagnosed with ADPKD between 1997 and 2008 in the Catastrophic Illness Patient Database. Each patient with ADPKD was matched to 3 control non-ADPKD patients based on age, sex, and index year, and all patients were followed up from the index date to December 31, 2009. We used Cox regression model with adjustment for age, gender, live area, socioeconomic status, and comorbid disorders (include diabetes mellitus, hypertension, dyslipidemia, chronic renal failure, congestive heart failure, atrial fibrillation, peripheral vascular disease, cerebrovascular disease, chronic obstructive pulmonary disease, and malignancy) to assess the independent factors in determining the risk of developing cardiovascular events.

Table 1. ICD-9-CM codes used to identify clinical conditions

Diagnosis	Corresponding ICD-9-CM codes
Polycystic kidney disease	【753.12】【753.13】【753.14】【V18.61】
Diabetes mellitus	【250】
Hypertension	【401】~【405】
Dyslipidemia	【272】
Congestive Heart failure	【398.91】【402.01】【402.11】【402.91】【404.01】【404.03】【404.11】【404.13】【404.91】【404.93】【428】
Atrial fibrillation	【427.3】
Peripheral artery disease	【440.2】~【440.4】【443.9】
Cerebrovascular disease	【430】~【438】
Chronic obstructive pulmonary disease	【491】【492】【496】
Malignancy	【140】~【208】
Acute coronary syndrome	【410】
Ischemic stroke	【433】【434】
Hemorrhagic stroke	【430】【431】【432】

Table 2. Clinical characteristics between autosomal dominant polycystic kidney disease patients and age, sex, matched controls

	ADPKD patients (n= 1564)		Control (n= 4580)		P value
	n	%	n	%	
Age, years					0.969
18-39	188	12	589	12.9	
40-49	242	15.5	680	14.8	
50-59	278	17.8	789	17.2	
≧60	856	54.7	2522	55.1	
Gender					0.893
Male	923	59.0	2694	58.8	
Female	641	41.0	1886	41.2	
Area					< 0.001
City	1149	73.5	2097	45.8	
Rural area	415	26.5	851	18.6	
Socioeconomic status					0.098
Dependent	486	31.1	1420	31	
NT$ <20000	420	26.9	1063	23.2	
NT$ ≧20000	658	42.1	2097	45.8	
Comorbidity					
Diabetes mellitus	103	6.6	512	11.2	< 0.001
Hypertension	303	19.4	1302	28.4	< 0.001
Dyslipidemia	92	5.9	786	17.2	< 0.001
Chronic renal failure	111	7.1	148	3.2	< 0.001
Congestive heart failure	38	2.4	66	1.4	0.009
Atrial fibrillation	10	0.6	22	0.5	0.451
Peripheral vascular disease	18	1.2	9	0.2	< 0.001
Cerebrovascular disease	92	5.9	154	3.4	< 0.001
COPD	91	5.8	1073	23.4	< 0.001
Malignancy	81	5.2	81	1.8	< 0.001

Table 3. Cardiovascular events between autosomal dominant polycystic kidney disease and matched control

Clinical Outcome	Hazard Ratio (95% CI)	
	Unadjusted HR	Adjusted HR*
Acute coronary syndrome	1.655 (1.355-2.022)	1.760 (1.448-2.141)
Ischemic stroke	1.812 (1.407-2.332)	2.097 (1.644-2.675)
Hemorrhagic stroke	2.035 (1.198-3.456)	2.012 (1.220-3.318)

Adjusted for age, gender, live area, socioeconomic status, and comorbid disorders (diabetes mellitus, hypertension, dyslipidemia, coronary artery disease, congestive heart failure, atrial fibrillation, peripheral artery disease, cerebrovascular disease, chronic obstructive pulmonary disease, malignancy)

Result

The study group consisted of 1564 ADPKD patients, along with 4580 non-ADPKD controls. During the follow-up period, the multivariable Cox regression analysis demonstrated that the ADPKD patients as compared with their controls showed a significantly increased risk of acute coronary syndrome (adjust hazard ratio [aHR], 1.760; 95% confidence interval [CI], 1.448 to 2.141; p<0.001), ischemic stroke (aHR, 2.097; 95% CI, 1.644 to 2.675; p<0.001), and hemorrhagic stroke (aHR, 2.012; 95% CI, 1.220 to 3.318; p<0.001).

Conclusion

Patients with ADPKD were associated with increasing cardiovascular events compared with general population in Taiwan. Thus multidisciplinary teams should guide the assessment, treatment and holistic care of ADPKD patients.

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