

Two-Year Longitudinal Trajectory Patterns of Albuminuria and Subsequent Rates of End-Stage Kidney Disease and All-Cause Death: A Nationwide Cohort Study of Biopsy-Proven Diabetic Kidney Disease

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Supplemental Table 1. Model comparison for varying numbers of latent classes.

Number of latent classes	Log-likelihood	Number of parameters	BIC	Relative entropy	Percentage of patients allocated to each latent class					Mean posterior probabilities				
					Class 1	Class 2	Class 3	Class 4	Class 5	Class 1	Class 2	Class 3	Class 4	Class 5
2	-1,732.5	23	3,529	0.285	88.8	11.2				0.80	0.75			
3	-1,712.9	29	3,512	0.620	77.2	7.3	15.5			0.81	0.84	0.79		
4	-1,703.0	35	3,516	0.595	75.7	7.3	1.8	15.2		0.81	0.80	0.90	0.76	
5	-1,698.6	41	3,530	0.569	63.8	11.3	10.3	0.9	14.0	0.78	0.70	0.51	0.86	0.74

BIC, Bayesian Information Criterion.

Supplemental Table 2. Baseline characteristics between "high-increasing" group and "high-decreasing" group.

	UACR trajectory groups		
	"high-increasing"	"high-decreasing"	P value
Number of patients (%)	254 (77.2)	24 (7.3)	
Number of UACR measurements during two year follow-up interval	9 (8, 15)	9 (8, 12)	
Number of serum creatinine measurements during two year follow-up interval	9 (8, 15)	9 (8, 12)	
Clinical characteristics at baseline			
Age (years)	60 (50, 68)	64 (49, 75)	0.461
Male (%)	72.0	66.7	0.284
BMI (kg/m ²)	23.5 (21.3, 25.9)	25.7 (23.3, 28.5)	0.007
Diabetes duration (years)	14 (10, 22)	11 (8, 19)	0.250
Hemoglobin A1c (%)	7.3 (6.3, 8.5)	7.6 (6.9, 10.3)	0.081
Hemoglobin A1c (mmol/mol)	56.3 (45.4, 69.4)	59.6 (51.9, 89.1)	0.081
eGFR (mL/min/1.73 m ²)	50.7 (41.0, 66.7)	52.5 (38.0, 65.5)	0.984
GFR categories			
eGFR ≥90	17 (6.7)	2 (8.3)	
eGFR 60-90	70 (27.6)	6 (25.0)	
eGFR 30-60	167 (65.7)	16 (66.7)	
UACR (mg/g creatinine)	1380 (654, 2502)	906 (468, 1740)	0.069
Albuminuria categories			
Normoalbuminuria (UACR <30)	0 (0.0)	0 (0.0)	
Microalbuminuria (UACR 30-300)	20 (7.9)	0 (0.0)	
Macroalbuminuria (UACR ≥300)	234 (92.1)	24 (100.0)	
Systolic blood pressure (mmHg)	142 (131, 157)	141 (132, 148)	0.708
Diastolic blood pressure (mmHg)	78 (70, 90)	82 (70, 95)	0.190
Total cholesterol (mg/dL)	202 (170, 243)	199 (172, 268)	0.872
LDL cholesterol (mg/dL)	123 (90, 148)	107 (80, 143)	0.628
HDL cholesterol (mg/dL)	44 (36, 55)	41 (31, 55)	0.427
Triglycerides (mg/dL)	147 (105, 200)	145 (120, 279)	0.439
Medication usage (%)			
RAS blocker	65.0	66.7	0.569
Glucose-lowering medication	61.0	58.3	0.997
Lipid-lowering medication	30.0	37.5	0.367
Ever having smoked (%)	53.5	54.2	0.896
History of cardiovascular disease (%)	20.1	25.0	0.522
Pathological characteristics at baseline			
RPS Diabetic Nephropathy Classification			
Glomerular classification			0.215
Class I	2.3	6.4	
Class IIa	19.0	32.3	
Class IIb	40.3	29.0	
Class III	26.9	22.6	

Class IV	11.5	9.7	
Interstitial lesions			0.221
IFTA			
0	7.1	4.2	
1	33.1	45.8	
2	33.4	41.7	
3	26.4	8.3	
Interstitial inflammation			0.169
0	13.0	8.3	
1	81.1	87.5	
2	5.9	4.2	
Vascular lesions			
Arteriolar hyalinosis			0.010
0	5.1	37.5	
1	61.0	58.3	
2	33.9	4.2	
Large vessels arteriosclerosis			0.950
0	12.6	12.5	
1	49.2	54.2	
2	38.2	33.3	

BMI, body mass index; RAS blocker, renin-angiotensin system blocker; eGFR, estimated glomerular filtration rate; UACR, urine albumin-to-creatinine ratio.
Data are expressed as the median (25th, 75th percentiles), or percentage.

Supplemental Table 3. Hazard ratios and 95% CIs of UACR trajectory groups for incident 40% decline of eGFR.

UACR trajectory groups	Model 1		Model 2		Model 3	
	HR (95% CI)	P value	HR (95% CI)	P value	HR (95% CI)	P value
"low-stable"	Reference		Reference		Reference	
"high-decreasing"	1.15 (0.46, 2.89)	0.752	1.17 (0.47, 2.95)	0.725	1.22 (0.46, 3.18)	0.683
"high-increasing"	4.52 (2.42, 8.44)	<0.001	4.35 (2.33, 8.14)	<0.001	3.46 (1.83, 6.55)	<0.001

HR, hazard ratio; UACR, urine albumin-to-creatinine ratio.

Model 1: univariable ("low-stable" group as reference).

Model 2: adjusted for demographic characteristics at baseline (age, gender, BMI, diabetes duration, systolic blood pressure, the use of RAS blocker, the use of glucose-lowering agents, the use of lipid-lowering agents, ever having smoked, and past history of cardiovascular disease).

Model 3: Model 2 + adjusted for laboratory characteristics at baseline (hemoglobin A1c, total cholesterol, eGFR, and UACR).

Supplemental Table 4. Characteristics between the current study group (n=329) and the excluded group (n=300).

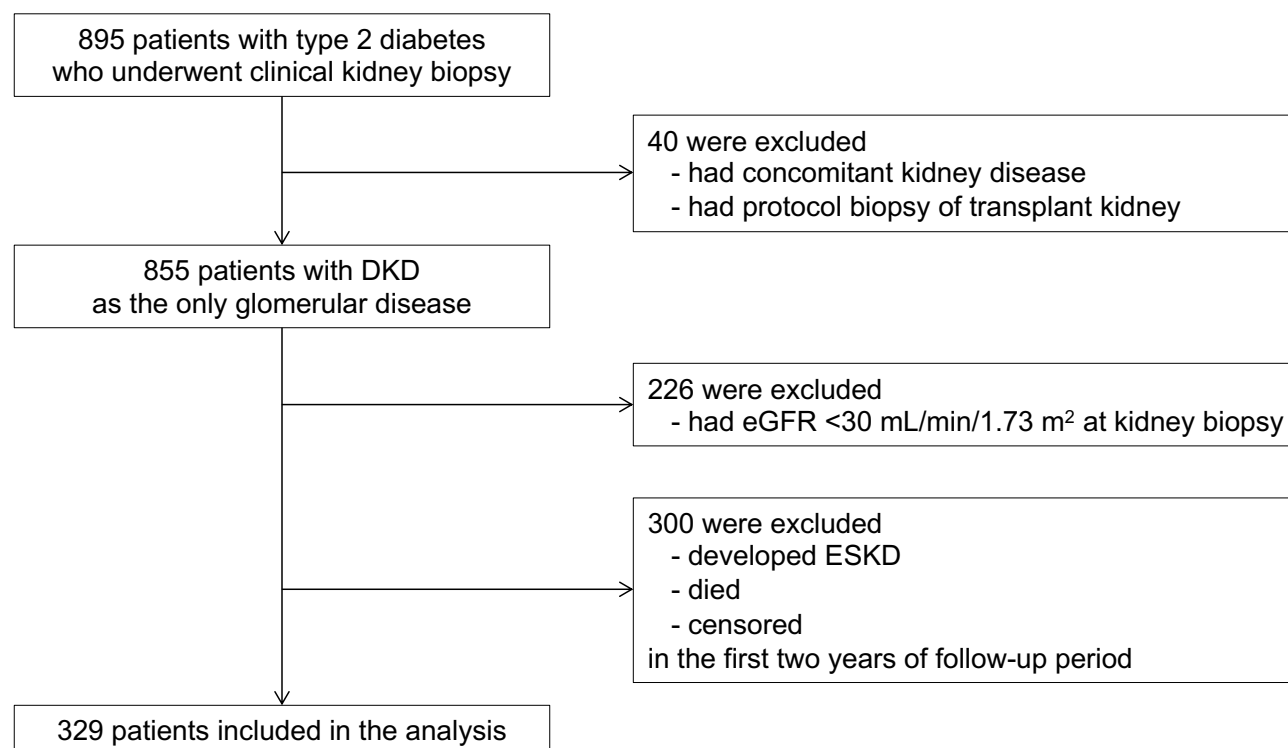
	Current study group	Excluded group	P value
Number of patients (%)	329 (52.3)	300 (47.7)	
Duration of follow-up (year)	5.0 (3.0, 6.5)	1.0 (0.2, 1.9)	<0.001
Incidence rate of composite outcome of ESKD and all-cause death (1,000 person-years)	45.4 (30.2, 68.4)	71.1 (31.9, 158.2)	0.070
Clinical characteristics at baseline			
Age (years)	60 (50, 67)	59 (40, 66)	0.284
Male (%)	71.1	60.0	0.003
BMI (kg/m ²)	23.6 (21.6, 25.8)	23.0 (20.9, 25.6)	0.138
Diabetes duration (years)	13 (9, 20)	13 (8, 20)	0.677
Hemoglobin A1c (%)	7.3 (6.4, 8.9)	7.1 (6.3, 8.7)	0.274
Hemoglobin A1c (mmol/mol)	56.3 (46.4, 73.8)	54.1 (45.4, 71.6)	0.274
eGFR (mL/min/1.73 m ²)	53.7 (41.8, 68.9)	52.1 (41.8, 67.0)	0.177
UACR (mg/g creatinine)	1078 (408, 2148)	1080 (384, 2838)	0.278
Systolic blood pressure (mmHg)	140 (128, 154)	140 (126, 158)	0.924
Diastolic blood pressure (mmHg)	77 (69, 90)	80 (70, 86)	0.709
Total cholesterol (mg/dL)	202 (169, 240)	207 (175, 250)	0.303
LDL cholesterol (mg/dL)	117 (85, 146)	120 (99, 149)	0.235
HDL cholesterol (mg/dL)	43 (35, 55)	45 (37, 58)	0.079
Triglycerides (mg/dL)	149 (107, 204)	131 (90, 198)	0.057
Medication usage (%)			
RAS blocker	64.1	60.7	0.370
Glucose-lowering medication	57.8	53.7	0.181
Lipid-lowering medication	30.4	31.3	0.799
Ever having smoked (%)	54.1	65.1	0.139
History of cardiovascular disease (%)	18.8	20.6	0.841

BMI, body mass index; RAS blocker, renin-angiotensin system blocker; eGFR, estimated glomerular filtration rate; UACR, urine albumin-to-creatinine ratio. Data are expressed as the median (25th, 75th percentiles), or percentage.

Supplemental Figure 1. Study flow and selection of study population.

Nationwide biopsy-based DKD cohort

- 18 hospitals in Japan, 1985-2016
- Retrospective design with the followed-up data including ESKD and death ascertainment



Supplemental Figure 2. Mean two-year trajectories of systolic blood pressure, diastolic blood pressure, total cholesterol, hemoglobin A1c, and BMI.

