RECENT DECLINE IN CORONARY ARTERY DISEASE PREVALENCE AMONG INCIDENT HEMODIALYSIS PATIENTS

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Introduction and Aims

Chronic kidney disease has been recognized as an independent risk factor for cardiovascular disease which remains a major cause of death in maintenance dialysis patients. (Kidney Int. 65: 2380–2389, 2004) The present study aimed to examine recent changes in the prevalence of coronary artery disease (CAD) and its risk factors in incident hemodialysis patients.

Methods

We performed a retrospective analysis of 431 consecutive patients (68±13 years old, 326 [76%] male, and 236 [55%] diabetes) who started hemodialysis between 2005 and 2014 in our hospital. The patients were divided into 5 groups based on the year of dialysis initiation: Term 1 (started dialysis at 2005-06; n = 84), Term 2 (2007-08; n = 84), Term 3 (2009-10; n = 65), Term 4 (2011-12; n = 91), Term 5 (2013-14; n = 107). Multivariate logistic regression models investigated the association between the year of dialysis initiation and CAD prevalence, adjusting for risk factors. CAD was defined as a history of coronary revascularization or confirmed significant coronary artery stenosis.

Table 1. Baseline Characteristics

	Total n=431	Term 1 2005-2006 n=84	Term2 2007-2008 n=84	Term3 2009-2010 n=65	Term 4 2011-2012 n=91	Term 5 2013-2014 n=107	P value
Coexisting CAD (%)	99 (23)	21 (25)	25 (30)	16 (25)	19 (21)	18 (17)	0.29
Age (year)	68 (13)	68 (14)	67 (13)	67 (13)	68 (14)	69 (12)	0.94
Male (%)	326 (76)	61 (73)	61 (73)	55 (85)	67 (74)	82 (77)	0.42
Smoking (%)	248 (58)	41 (49)	43 (51)	45 (69)	54 (59)	65 (61)	0.084
BMI (kg/m²)	23.5 (4.1)	23.0 (4.1)	23.6 (4.1)	23.7 (4.8)	23.1 (3.7)	23.8 (4.0)	0.58
Hypertension (%)	410 (95)	79 (94)	81 (96)	64 (98)	86 (95)	100 (93)	0.59
Diabetes (%)	236 (55)	51 (61)	44 (52)	36 (55)	47 (52)	58 (52)	0.78
RAS inhibitor (%)	228 (53)	37 (44)	47 (56)	44 (68)	45 (49)	55 (51)	0.056
Beta blocker (%)	118 (27)	15 (18)	25 (30)	19 (29)	27 (30)	32 (30)	0.31
Statin (%)	148 (34)	19 (23)	24 (29)	24 (37)	34 (37)	47 (44)	0.024
ESA (%)	275 (64)	43 (51)	45 (54)	46 (71)	68 (75)	73 (68)	0.002
Antiplatelet (%)	152 (35)	30 (36)	36 (43)	27 (42)	30 (33)	29 (27)	0.16
eGFR (ml/min/1.73m²)	6.3 (3.0)	7.5 (4.1)	6.3 (2.3)	6.3 (2.7)	5.9 (2.5)	5.9 (2.9)	0.001
Hemoglobin (mg/dL)	8.7 (1.5)	8.6 (1.6)	8.8 (1.3)	8.3 (1.5)	8.7 (1.4)	9.2 (1.4)	<0.001
Corrected Ca (mg/dL)	8.5 (1.0)	8.7 (1.1)	8.5 (1.0)	8.4 (1.0)	8.4 (0.9)	8.4 (0.9)	0.133
P (mg/dL)	5.8 (1.7)	5.5 (1.8)	5.6 (1.8)	5.8 (1.9)	5.9 (1.6)	6.0 (1.7)	0.25
LDL cholesterol (mg/dL)	100 (39)	110 (36)	108 (50)	102 (36)	95 (38)	93 (34)	0.052
HDL cholesterol (mg/dL)	44 (13)	42 (11)	40 (12)	42 (13)	46 (13)	46 (14)	0.020
Total cholesterol (mg/dL)	168 (48)	175 (60)	170 (53)	165 (45)	168 (44)	161 (39)	0.42
HbA1c (%)	6.1 (1.0)	6.9 (1.1)	6.3 (1.0)	5.8 (0.9)	5.8 (0.8)	5.8 (0.8)	<0.001
Albumin (g/dL)	3.5 (0.5)	3.4 (0.6)	3.5 (0.5)	3.4 (0.5)	3.5 (0.5)	3.5 (0.5)	0.42

Ninety nine patients (23%) had coexisting CAD at dialysis initiation.
The prevalence of CAD in Term 1, 2, 3, 4, and 5 was 25%, 30%, 25%, 21%, and 17%, respectively. The use of statins and ESA increased and the level of HbA1c decreased over the decade.

Table 2. Association between the year of dialysis initiation and CAD prevalence

| | | Univariate analysis | | Multivariate analysis | | | |
| | | | | Model 1 | | Model 2 | |
		Crude OR (95%CI)	P value	adjusted OR (95%CI)	P value	adjusted OR (95%CI)	P value
Year of dialysis initiation	2005-2006	Reference		Reference		Reference	
	2007-2008	1.27 (0.64-2.51)	0.49	1.41 (0.64-3.09)	0.39	2.01 (0.83-4.88)	0.12
	2009-2010	0.98 (0.46-2.07)	0.96	0.72 (0.30-1.72)	0.46	1.13 (0.42-3.05)	0.81
	2011-2012	0.79 (0.39-1.60)	0.52	0.63 (0.28-1.46)	0.28	075 (0.29-1.96)	0.56
	2013-2014	0.61 (0.30-1.23)	0.166	0.41 (0.17-0.94)	0.036	0.58 (0.22-1.51)	0.27
Age (year)		1.03 (1.01-1.05)	0.002	1.04 (1.02-1.07)	<0.001	1.04 (1.02-1.07)	<0.001
Male		2.82 (1.47-5.40)	<0.001	3.01 (1.39-6.54)	0.005	3.28 (1.42-7.56)	0.005
Smoking		1.65 (1.03-2.64)	0.037	1.22 (0.69-2.16)	0.50	1.19 (0.64-2.20)	0.59
Family history of CAD		3.17 (1.69-5.93)	<0.001	3.81 (1.83-7.95)	<0.001	4.00 (1.84-8.68)	<0.001
Hypertension		2.94 (0.67-12.9)	0.100	2.09 (0.41-10.57)	0.37	5.11 (0.57-46.10)	0.146
Diabetes		1.80 (1.13-2.87)	0.014	1.55 (0.90-2.68)	0.11		
HbA1c (%)		1.36 (1.08-1.71)	0.010			1.41 (1.04-1.91)	0.026
Statin		3.21 (2.02-5.10)	<0.001	3.72 (2.16-6.41)	<0.001	3.60 (2.03-6.39)	<0.001
RAS inhibitor		1.03 (0.66-1.62)	0.89				
ESA		0.67 (0.43-1.06)	0.09				
Hemoglobin (g/dL)		1.19 (1.02-1.38)	0.030	1.14 (0.95-1.37)	0.16	1.18 (0.97-1.44)	0.101
eGFR (ml/min/1.73m2)		1.16 (1.08-1.24)	<0.001	1.09 (1.00-1.19)	0.038	1.10 (1.01-1.20)	0.035
LDL cholesterol (mg/dL)		1.00 (0.99-1.00)	0.44				
HDL-cholesterol (mg/dL)		0.98 (0.96-1.00)	0.100				
Total-cholesterol (mg/dL)		1.00 (0.99-1.00)	0.18				

In univariate analysis, age, male, smoking, family history of CAD, diabetes, HbA1c, statin, hemoglobin and eGFR were significantly associated with CAD prevalence.

In multivariate analysis, the patients who started dialysis in Term 5 were independently associated with lower prevalence of CAD compared to those who started in Term 1 (OR 0.41; 95%CI 0.17-0.91; p=0.036, Model 1).

However in Model 2, which incorporated the level of HbA1c into Model 1 instead of diabetes, the difference between Term 1 and 5 was no longer statistically significant (OR 0.58; 95%CI 0.22-1.51, p=0.27).

Conclusions

The prevalence of CAD declined over the decade, even considering the increase in high-risk patients with statin prescription. The difference between Model 1 and 2 suggests that improvement in diabetes control may contribute to the recent decline in CAD.