

The influence of peritoneal dialysis modality on the 1-year rate of decline of residual renal function

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OBJECTIVES

The influence of different peritoneal dialysis (PD) modalities on the decline in residual renal function (RRF) is unclear due to inconsistencies among studies.

In particular, the effect of automated peritoneal dialysis (APD) modalities [continuous cyclic peritoneal dialysis (CCPD) and nightly intermittent peritoneal dialysis (NIPD)] on RRF has not been examined in a large cohort.

Table 1. Baseline demographic, clinical, and biochemical characteristics at the time of PD initiation.

Variable	CCPD (n = 34)	NIPD (n = 36)	CAPD (n = 72)	P-value
Age (years)	46.3±13.9	49.2±11.5	53.0±11.8	0.150
Male (n, %)	23 (67.6%)	21 (58.3%)	39 (54.2%)	0.673
Body mass index (kg/m ²)	23.6±3.7	23.4±3.5	23.9±3.4	0.892
Mean arterial pressure (mmHg)	97.9±11.9	95.6±10.4	95.6±9.4	0.726
Modified Charlson Comorbidity Index	4.4±2.7	4.3±2.2	4.5±2.5	0.813
Cardiovascular comorbidities* (n, %)	8 (23.5%)	4 (11.1%)	21 (29.2%)	0.194
LVH on ECG	18 (52.9%)	16 (44.4%)	32 (44.4%)	0.807
Primary kidney disease (n, %)				0.063
Diabetes mellitus	8 (23.5%)	13 (36.1%)	39 (54.1%)	
Hypertension	12 (35.3%)	11 (30.5%)	12 (16.7%)	
Glomerulonephritis	5 (14.7%)	10 (27.8%)	4 (5.6%)	
Others	9 (26.5%)	2 (5.6%)	17 (23.6%)	
Medication use (n, %)				
RAS blockers	22 (64.7%)	25 (69.4%)	55 (76.4%)	0.752
Diuretics	18 (52.9%)	19 (52.8%)	39 (54.2%)	0.894
Hemoglobin (g/dL)	10.0±1.5	9.9±1.5	10.4±1.1	0.313
Blood urea nitrogen (mg/dL)	48.8±14.4	54.1±19.8	46.3±13.3	0.195
Creatinine (mg/dL)	7.4±2.9	7.0±2.0	6.8±2.5	0.203
Albumin (g/dL)	3.4±0.6	3.4±0.5	3.4±0.5	0.137
Total cholesterol (mg/dL)	159.0±37.3	172.6±39.4	161.7±36.3	0.485
Residual renal function (mL/min/1.73m ²)	3.53±2.83 (2.57) [†]	5.31±3.09 (4.44) [†]	4.61±2.54 (3.79) [†]	0.149
Urine volume (mL/day)	907.8±573.4 (580) [†]	1363.7±1017.9 (1075) [†]	966.2±513.1 (805) [†]	0.079

Figure 1. Decline of residual renal function in CCPD patients (a), NIPD patients (b), and CAPD patients (c) from baseline to 1-year after PD initiation.

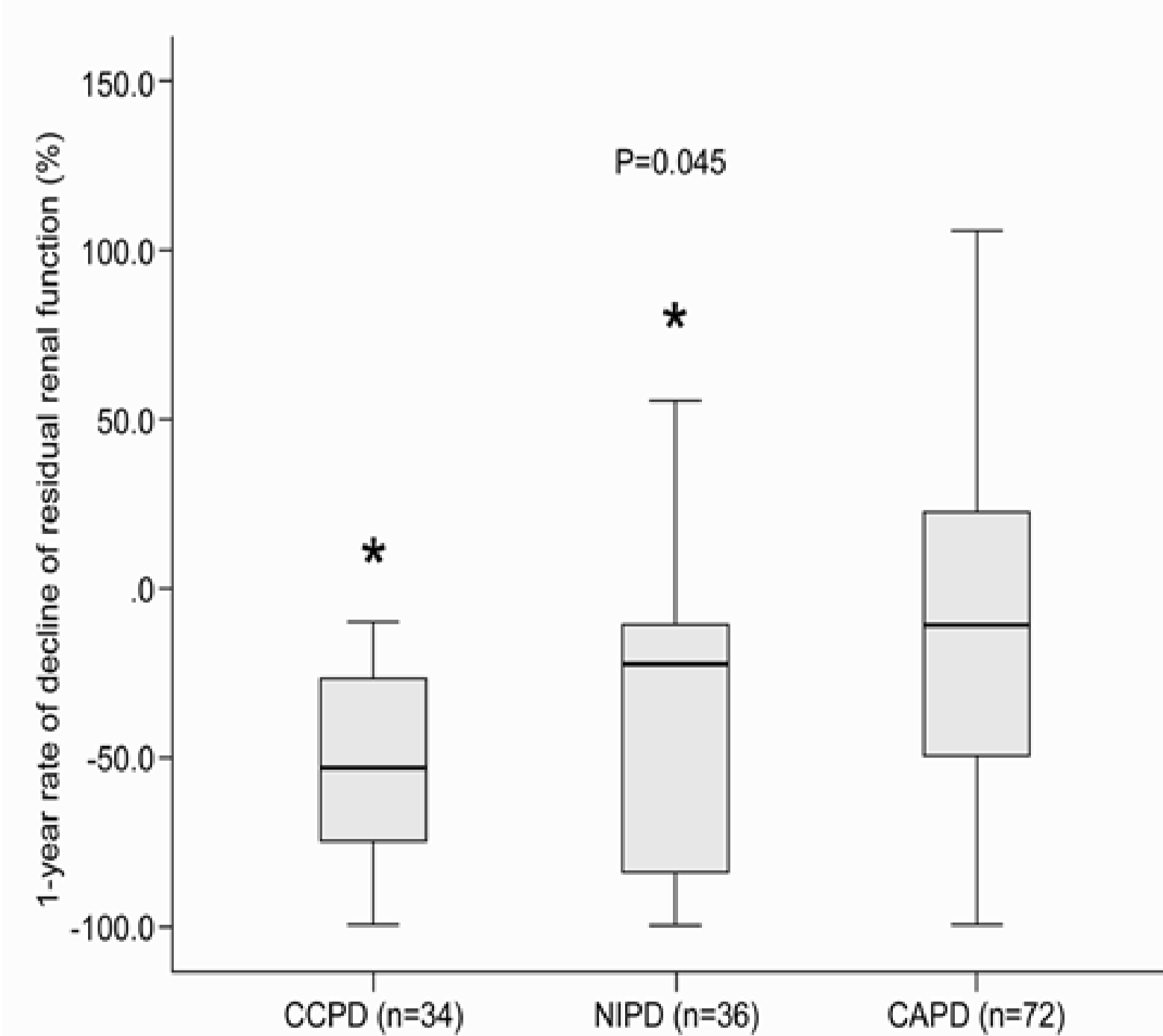
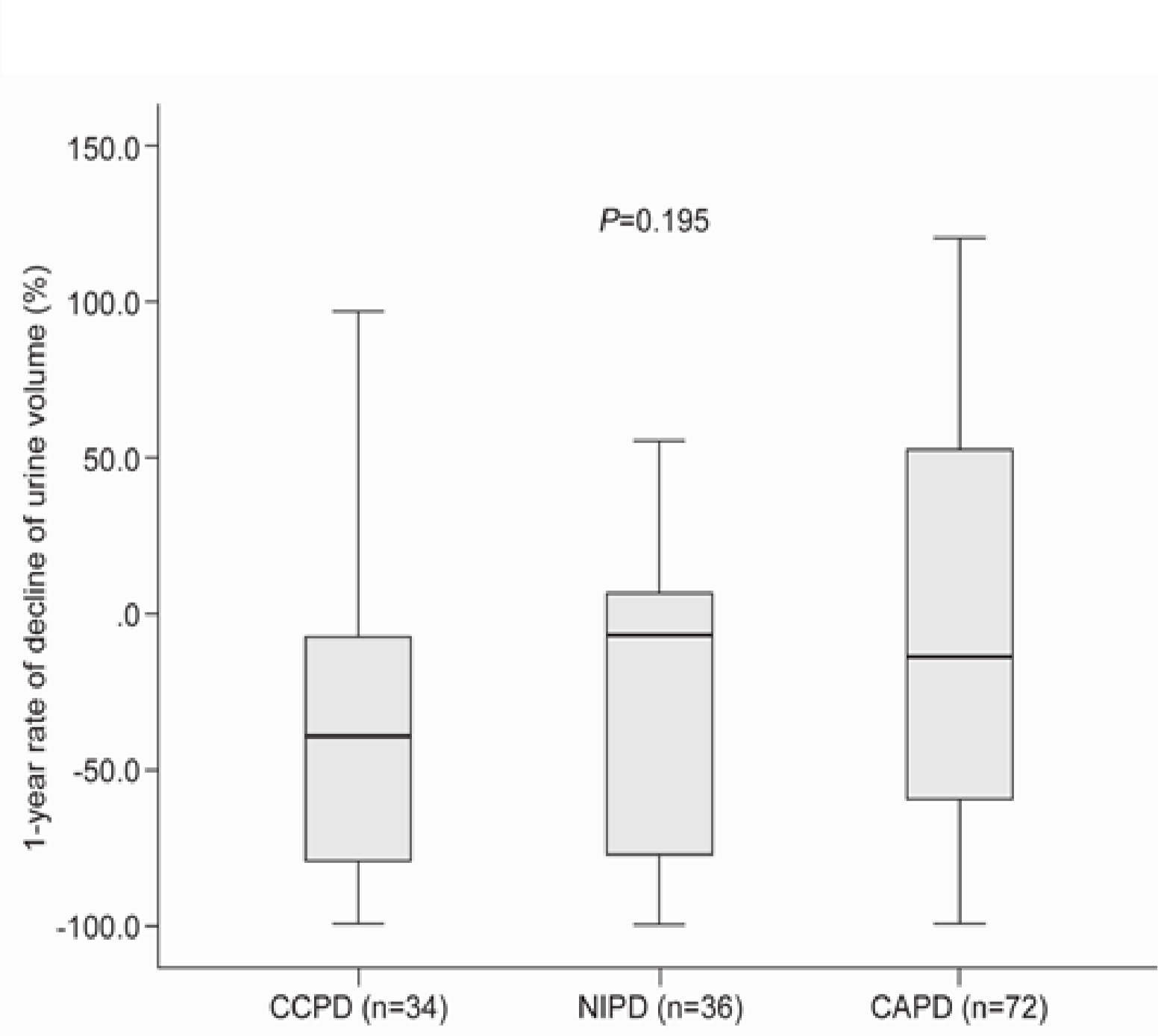


Figure 2. Comparison of the 1-year rate of decline of residual renal function among the three groups.



METHODS

We conducted a single-center retrospective study to investigate the association between PD modalities and decline in RRF in 142 incident PD patients (34 on CCPD, 36 on NIPD, and 72 on CAPD). RRF was measured within 2 months from PD start and at 1 year after PD initiation.

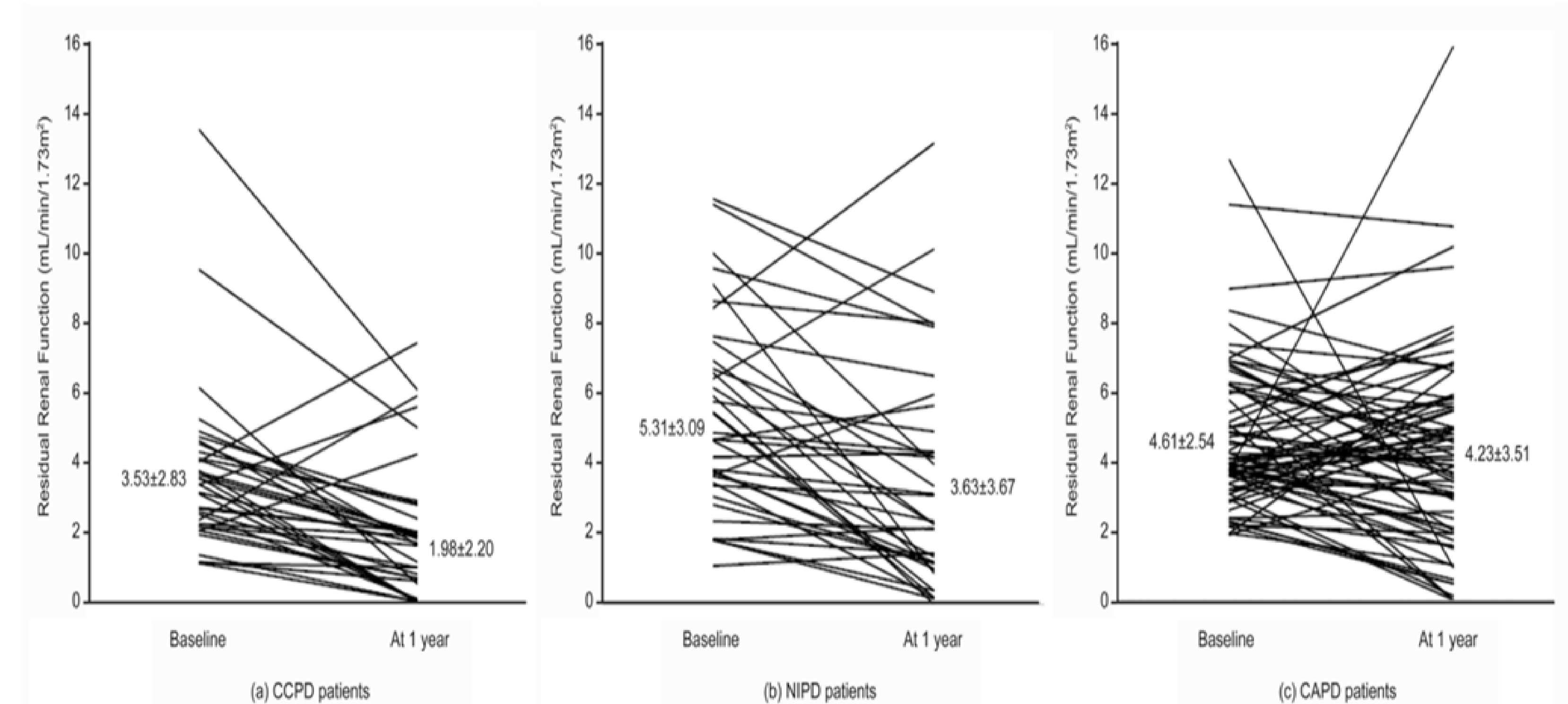
Table 2. Multiple linear regression analysis of variables affecting the 1-year decline rate of RRF.

Variables	β	95% CI	P-value
Age (year)	-1.40	-2.96 to 0.17	0.089
Male (versus female)	-1.24	-36.71 to 34.28	0.946
DM (versus non-DM)	32.01	-6.82 to 70.85	0.105
Body mass index (kg/m ²)	3.39	-2.03 to 8.80	0.217
Albumin (g/dL)	18.99	-16.66 to 54.64	0.292
Peritonitis episode	-4.37	-52.43 to 43.69	0.857
Baseline RRF (mL/min/1.73m ²)	0.08	-7.54 to 7.69	0.984
Baseline urine volume (mL/day)	-0.51	-1.06 to 0.05	0.061
APD (CCPD and NIPD) vs. CAPD	-31.50	-63.61 to 0.62	0.052

RRF, residual renal function; DM, diabetes mellitus; APD, automated peritoneal dialysis; CCPD, continuous cyclic peritoneal dialysis; NIPD, nightly intermittent peritoneal dialysis; CAPD, continuous ambulatory peritoneal dialysis.

For the model, the adjusted $R^2 = 0.145$, $P = 0.014$.

Figure 3. Comparison of the 1-year rate of decline of urine volume among the three groups.



RESULTS

The RRF at 1 year after PD initiation was 1.98 ± 2.20 mL/min/1.73m² in CCPD patients and 3.63 ± 3.67 mL/min/1.73m² in NIPD patients, which were moderately lower than 4.23 ± 3.51 mL/min/1.73m² in CAPD patients ($P=0.064$). Moreover, there was no significant difference in the 1-year rate of decline of RRF between CCPD and NIPD patients, although APD patients had a faster 1-year RRF decline rate than CAPD patients (CCPD and NIPD vs. CAPD: -45.68 and -36.69 vs. 1.17% /year, $P=0.045$). APD was associated with a more rapid decline in RRF in patients with ESRD undergoing PD, although multivariate analysis attenuated the significance of this finding ($\beta = -31.50$; 95% CI, -63.61 to 0.62 ; $P=0.052$).

CONCLUSIONS

Our results suggest that CAPD might be more helpful than APD for preserving RRF during the first year of dialysis therapy, although there was no significant difference in the 1-year rate of decline of RRF between the two APD modalities.

