

Fig. S1 Study design: adaption, observation, and follow-up.

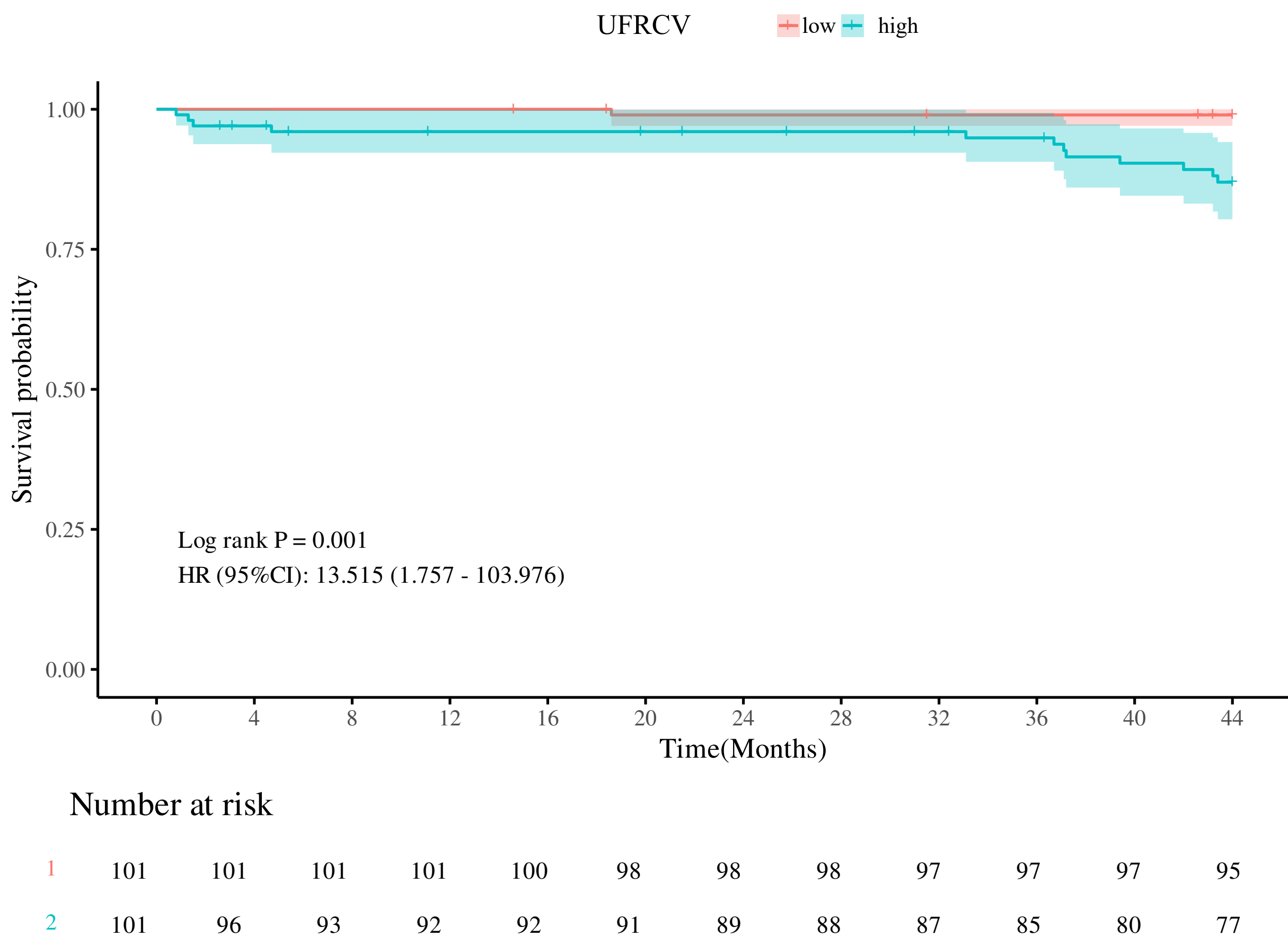


Fig. S2 Different levels of UFRCV on cardiovascular mortality.

Table S1 Cause of death in the study cohort

Cause of death	Total (n=202)	UFRCV		<i>P</i> value
		Low < 0.187	High ≥ 0.187	
		(n=101)	(n=101)	
All-cause mortality, n (%)	30 (14.85)	6 (5.94)	24 (23.76)	<0.001
Cardiovascular events, n (%)	13 (6.44)	1 (0.99)	12 (11.88)	0.002
Cerebrovascular events, n (%)	8 (3.96)	2 (1.98)	6 (5.94)	0.279
Tumors, n (%)	4 (1.98)	1 (0.99)	3 (2.97)	0.614
Severe infections, n (%)	5 (2.48)	2 (1.98)	3 (2.97)	1.000

Table S2 Cox regression models of UFRCV on cardiovascular mortality

Model	<i>P</i>	HR (95%CI)
Unadjusted (high vs. low UFRCV)	0.012	13.52 (1.76 ~ 103.98)
Model 1	0.020	11.62 (1.48 ~ 91.35)
Model 2	0.024	11.02 (1.38 ~ 88.26)
Model 3	0.019	12.29 (1.50 ~ 100.64)
Model 4	0.024	11.44 (1.38 ~ 94.99)
Model 5	0.023	12.52 (1.42 ~ 110.46)

Model 1: adjusted for demographic data (age, sex, body mass index) + current smoking + current alcohol drinking + dialysis information (residual renal function, dialysis vintage and single-pool Kt/V).

Model 2: adjusted for Model 1+ comorbid conditions (history of cardiovascular disease, hypertension, diabetes, stroke and peripheral artery disease).

Model 3: adjusted for Model 2+ biochemical data (hemoglobin, serum albumin, pre-albumin, creatinine and hsCRP).

Model 4: adjusted for Model 3+ cardiac conditions (left ventricular ejection fraction, NT-proBNP, the onset of IDH)

Model 5: adjusted for Model 4+ predialysis blood pressure variability (variabilities of predialysis systolic blood pressure and diastolic blood pressure).

HR: Hazard Ratio; CI: Confidence Interval; UFRCV: coefficient of variation of ultrafiltration rate; hs-CRP, hypersensitive-c-reactive-protein; NT-proBNP, N-terminal pro-B-type natriuretic peptide; IDH, intradialytic hypotension

current smoking: defined as having smoked ≥ 1 cigarette per day or ≥ 18 packs in the past year;

current alcohol drinking: defined as drinking alcohol at least two times per week in the past year;

residual kidney function: 24h urine output over 100mL; hypertension: primary hypertension or hypertension of unknown origin, excluding renal hypertension; cardiovascular disease: coronary heart disease, cardiac valve disease and arrhythmia.

Table S3 Demographic and clinical characteristics in the low ultrafiltration volume subgroup

Characteristics	Total(n=101)	UFRCV		P value
		Low < 0.219 (n=50)	High $\geq$ 0.219 (n=51)	
Age, years	61.79 $\pm$ 14.17	60.84 $\pm$ 13.24	62.74 $\pm$ 15.14	0.536

Characteristics	Total(n=101)	UFRCV		P value
		Low < 0.219 (n=50)	High ≥ 0.219 (n=51)	
Male, n (%)	48 (51.61)	26 (56.52)	22 (46.81)	0.349
BMI, kg/m ²	21.11 ± 7.50	21.73 ± 8.25	20.50 ± 6.72	0.432
Preserved residual kidney function ^a , n (%)	35 (34.65)	17 (34.00)	18 (35.29)	0.891
Dialysis vintage, months	64.97 ± 39.03	62.82 ± 42.28	67.31 ± 35.64	0.626
spKt/Vurea	1.48 (1.34, 1.79)	1.44 (1.35, 1.74)	1.49 (1.32, 1.81)	0.807
Dry weight, kg	55.05 (48.59, 61.56)	55.71 (50.74, 62.24)	53.02 (47.21, 59.44)	0.183
UFRCV	0.219 (18.47, 25.83)	0.183 (0.159, 0.199)	0.258 (0.242, 0.284)	<0.001
UFRSD, ml/h/kg	1.96 (1.52, 2.40)	1.68 (0.87, 1.95)	2.28 (1.97, 2.65)	<0.001
EF, %	66.82 ± 6.81	66.95 ± 6.76	66.65 ± 6.98	0.846
LVMI, g/m ^{2.7}	48.84 ± 21.54	46.14 ± 16.55	52.20 ± 26.37	0.231
NT-proBNP, pg/ml	3575.00 (1158.50, 7658.00)	3223.00 (1234.00, 7486.50)	3769.00 (1075.25, 7629.75)	0.618
Hemoglobin, g/L	106.61 ± 15.09	108.90 ± 15.15	104.32 ± 14.82	0.130
Serum albumin, g/L	39.19 ± 3.61	39.76 ± 3.50	38.60 ± 3.66	0.117
Serum creatinine, μmol/L	943.85 ± 248.42	932.61 ± 232.89	954.86 ± 264.67	0.658
iPTH, pg/ml	350.24 ± 355.51	316.66 ± 270.39	382.48 ± 421.78	0.362
hs-CRP, mg/L	2.30 (0.70, 7.15)	3.70 (0.65, 7.05)	1.90 (0.70, 7.17)	0.690

Characteristics	Total(n=101)	UFRCV		<i>P</i> value
		Low < 0.219 (n=50)	High ≥ 0.219 (n=51)	
IDH-prone patients, n (%)	39 (38.61)	15 (30.00)	24 (47.06)	0.078
Predialysis-SBPCV	0.111 ± 0.026	0.109 ± 0.027	0.114 ± 0.025	0.367
Predialysis-DBPCV	0.114 ± 0.025	0.111 ± 0.025	0.116 ± 0.025	0.386
Antihypertensive agents, tablets	2.64 ± 1.91	2.64 ± 1.81	2.65 ± 2.03	0.995
CCBs, tablets	1.07 ± 0.96	0.84 ± 0.69	1.30 ± 1.15	0.061
ARBs, tablets	0.62 ± 0.57	0.63 ± 0.49	0.60 ± 0.68	0.863
ACEIs, tablets	0.29 ± 0.51	0.27 ± 0.45	0.31 ± 0.60	0.792
α-blockers, tablets	0.33 ± 0.76	0.28 ± 0.65	0.41 ± 0.94	0.565
β-blockers, tablets	0.71 ± 0.54	0.72 ± 0.59	0.68 ± 0.48	0.807
Diuretics, tablets	0.12 ± 0.40	0.04 ± 0.20	0.27 ± 0.59	0.086
Current smoking ^b , n (%)	8 (7.92)	5 (10.00)	3 (5.88)	0.691
Comorbid conditions				
Cardiovascular disease ^c , n (%)	8 (7.92)	4 (8.00)	4 (7.84)	1.000
Myocardial infarction, n (%)	2 (1.98)	1 (2.00)	1 (1.96)	1.000
Revascularization ^d , n (%)	2 (1.98)	1 (2.00)	1 (1.96)	1.000
Hypertension ^e , n (%)	67 (66.34)	35 (70.00)	32 (62.75)	0.440
Diabetes, n (%)	14 (13.86)	8 (16.00)	6 (11.76)	0.538

Characteristics	Total(n=101)	UFRCV		P value
		Low < 0.219 (n=50)	High ≥ 0.219 (n=51)	
Stroke, n (%)	3 (2.97)	1 (2.00)	2 (3.92)	1.000
Peripheral artery disease, n (%)	1 (0.99)	0 (0.00)	1 (1.96)	1.000

Values are mean (SD) for continuous variables or median (interquartile range) and n (%) for categorical variables. *P* value, lower vs. higher UFRCV

UFRCV, coefficient of variation of ultrafiltration rate; UFRSD, standard deviation of ultrafiltration rate; BMI, body mass index; EF, ejection fraction; LVMI, left ventricular mass index; NT-proBNP, N-terminal pro-B-type natriuretic peptide; iPTH, intact parathyroid hormone; hs-CRP, hypersensitive-c-reactive-protein; IDH, intradialytic hypotension; SBPCV, coefficient of variation of systolic blood pressure; DBPCV, coefficient of variation of diastolic blood pressure; CCBs, Calcium Channel Blockers; ACEIs, Angiotensin-Converting Enzyme Inhibitors; ARBs, Angiotensin II Receptor Blockers

preserved residual kidney function ^a: 24h urine output over 100mL; current smoking ^b: defined as having smoked ≥1 cigarette per day or ≥18 packs in the past year; cardiovascular disease ^c: coronary heart disease, cardiac valve disease and arrhythmia; revascularization ^d: vascular recanalization refers to patients undergoing percutaneous coronary intervention and coronary artery bypass graft; hypertension ^e: primary hypertension or hypertension of unknown origin, excluding renal hypertension.