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Supplemental Table 1 Competing risk regression of overall survival between the BIA group and control group

	Univariable Analysis		Multivariable Analysis	
	SHR(95% CI)	<i>p</i>	SHR(95% CI)	<i>p</i>
group0	0.24 (0.05, 1.14)	0.074	0.89 (0.12, 6.49)	0.91
age	1.11 (1.05, 1.18)	0	1.13 (1.04, 1.24)	0.005
Dialysis age	1.02 (1.02, 1.03)	0	1.02 (1.01, 1.04)	0.008
DM	1.66 (0.47, 5.82)	0.43	0.71 (0.16, 3.03)	0.64
CVD	1.21 (0.92, 1.58)	0.17	1.15 (0.68, 1.95)	0.59
SBP	0.97 (0.94, 1)	0.036	0.97 (0.94, 1)	0.083
BUA	0.78 (0.68, 0.91)	0.001	0.84 (0.69, 1.03)	0.095
ALB	1 (0.99, 1.01)	0.92	1 (0.99, 1.02)	0.68

Conclusion: The Fine and Gray's proportional subhazards model demonstrated BIA group is not different with the control group either by univariable analysis or multivariable analysis.

Supplemental Table 2 Competing risk regression of 1-year technique survival between the BIA group and control group

	Univariable Analysis		Multivariable Analysis	
	SHR(95%CI)	<i>p</i>	SHR(95%CI)	<i>p</i>
group0	0.46 (0.17, 1.2)	0.11	0.44 (0.16, 1.18)	0.1
age	1 (0.97, 1.03)	0.83	0.99 (0.97, 1.02)	0.67
Dialysis age	1 (0.97, 1.02)	0.65	1 (0.97, 1.02)	0.67
DM	1.15 (0.44, 3)	0.77	1.23 (0.48, 3.13)	0.66
CVD	0.98 (0.7, 1.37)	0.91	0.93 (0.63, 1.38)	0.72
SBP	1 (0.98, 1.02)	0.93	1 (0.98, 1.02)	0.81
BUA	1.01 (0.9, 1.13)	0.91	1 (0.89, 1.13)	0.96
ALB	1 (1, 1.01)	0.36	1 (1, 1.01)	0.32

Conclusion: the competing risk analysis demonstrated BIA group is not significantly different with the control group either by univariable analysis or multivariable analysis.

Supplemental Table 3 Competing risk regression of 3-year overall survival the BIA group and control group

Univariable Analysis			Multivariable Analysis	
	SHR(95%CI)	<i>p</i>	SHR(95%CI)	<i>p</i>
Group	0.39 (0.20, 0.74)	0.004	0.51(0.26,0.99)	0.047
Age	1.06 (1.04, 1.09)	<0.001	1.06(1.03,1.08)	<0.001
dialysis age	1.01 (1.00, 1.02)	0.220	1.01(1.00,1.02)	0.170
DM	2.46 (1.37, 4.43)	0.002	1.39(0.71,2.69)	0.330
CVD	1.20 (0.97, 1.50)	0.098	1.06(0.77,1.44)	0.730
SBP	0.99 (0.97, 1.00)	0.130	0.98(0.97,1.00)	0.030
BUA	0.94 (0.86, 1.02)	0.130	0.94(0.87,1.02)	0.140
ALB	0.99 (0.99, 1.00)	0.700	1.00(0.99,1.00)	0.610

Conclusion: The Fine and Gray's proportional subhazards model demonstrated BIA group is on a relatively lower mortality risk than the control group either by univariable analysis or multivariable analysis (adjusted for age, vintage, diabetes, CVD history, hypertension, serum albumin and serum uric acid, SHR and its 95%CI: 0.51 (0.26,0.99), p=0.047.

Supplemental Table 4 Competing risk regression of three-year technique survival between the BIA group and control group

	Univariable Analysis		Multivariable Analysis	
	SHR(95%CI)	<i>p</i>	SHR(95%CI)	<i>p</i>
Group	0.62 (0.35, 1.11)	0.110	0.59(0.32, 1.10)	0.096
Age	1.00 (0.98, 1.02)	0.920	1.00(0.98, 1.02)	0.910
Dialysis age	1.00 (0.99, 1.01)	0.730	1.00(0.99, 1.01)	0.810
DM	0.99 (0.52, 1.88)	0.990	1.04(0.53, 2.06)	0.910
CVD	0.84 (0.60, 1.16)	0.280	0.80(0.56, 1.13)	0.210
SBP	0.99 (0.98, 1.01)	0.390	0.99(0.98, 1.01)	0.380
BUA	1.01 (0.93, 1.09)	0.820	1.01(0.93, 1.09)	0.800
ALB	0.99 (0.99, 1.00)	0.900	1.00(1.00, 1.00)	0.990

Conclusions: the difference of technique failure rates was not statistically significant between BIA group and control group. Univariable Analysis showed that the SHR and its %95CI: 0.62 (0.35, 1.11), $p=0.110$. And Multivariable Analysis estimated the SHR and its %95CI: 0.59 (0.11, 0.59), $p=0.096$.

Supplemental Table 5. Clinical characteristics of patients on different outcomes at 1-year follow-up

Characteristics	Completers (n = 198)	Death (n = 10)	Transfer to HD (n = 17)	Transplant (n = 10)	Dropout (n = 5)	<i>p</i>
Age (yr)	49.53 ± 15.10	67.8 ± 9.6**	48.4 ± 16.3	36.1 ± 9.4**	45.0 ± 16.4	<0.001
Vintage (month)	31 (14, 50)	41 (31, 57) **	29 (19, 54)	30(16, 37)	36 (24, 60)	0.01
Diabetes mellitus	59 (29.8)	4 (40.0)	5 (29.4)	0 (0.0)	1 (20.0)	0.29
Systolic BP (mmHg)	142 ± 20	130 ± 18	142 ± 17	138 ± 25	149 ± 19	0.36
Diastolic BP (mmHg)	84 ± 13	77 ± 11	80 ± 14	90 ± 11	89 ± 19	0.15
History of CVD n, (%)	24 (12.1)	4 (40.0) *	3 (17.6)	1 (10.0)	1 (20.0)	0.14
History of stroke n, (%)	8 (4.0)	1 (10.0)	1 (5.9)	0 (0.0)	0 (0.0)	0.80
Comorbidity score	3 (2,5)	5 (2, 6) **	3 (2, 4)	2 (1, 3) **	3 (1,4)	0.001
ECOG activity index (1/2/3/4) n	3/115/69/11	0/1/6/3**	0/10/4/3	0/9/1/0*	0/3/1/1	0.02
NYHA classification (1/2/3) n	90/95/13	1/7/2*	3/12/2	8/2/0	2/1/2*	0.003
mGFR (ml/min/1.73 m²)	0.9 (0.2, 2.7)	0.6 (0, 0.8)	0.5 (0, 2.8)	0.1 (0.1, 0.2) *	1.3 (1.0, 2.5)	0.05
Hemoglobin (g/dL)	10.8 ± 1.7	11.9 ± 1.9	9.6 ± 2.3*	11.4 ± 2.5	10.0 ± 3.7	0.02
Serum albumin(g/dL)	3.7 ± 0.4	3.4 ± 0.4**	3.7 ± 0.3	3.8 ± 0.3	3.7 ± 0.5	0.04
Pre-albumin (mg/dl)	372 ± 90	299 ± 60**	390 ± 67	408 ± 72	392 ± 94	0.05
Uric acid (mg/dl)	4.5 ± 0.8	4.5 ± 1.4	4.8 ± 1.1	4.9 ± 0.7	4.3 ± 0.7	0.48
iPTH (pg/ml)	409 (248, 681)	411 (231, 814)	422 (260, 730)	602 (288, 781)	313 (274, 609)	0.92
hs-CRP (mg/L)	1.5 (0.6, 4.4)	4.2 (2.7, 10.6) *	1.3 (0.5, 9.4)	0.7(0.3, 1.9)	1.4 (0.9, 2.5)	0.18
NT-proBNP (pg/ml)	4106	48981	11664	3257	7865	0.16

	(1603, 12199)	(11154, 90970)	(3159, 28962)	(2000, 12255)	(1691, 17377)	
PD dosage (L/d)	8 (8, 8)	8 (8, 8)	8 (8, 10)	8 (8,9)	8 (8,8)	0.25
Total Kt/v	2.3 ± 0.6	1.8 ± 0.3*	1.9 ± 0.6*	2.2 ± 0.5	2.2 ± 0.2	0.05
Total Ccr (L/w)	67 ± 23	49 ± 15	59 ± 18	58 ± 15	76 ± 14	0.11
nPCR	0.8 ± 0.2	0.7 ± 0.2*	0.7 ± 0.1*	0.9 ± 0.2	0.8 ± 0.1	0.02
Total body water (L)	37.0 ± 7.1	36.1 ± 4.8	43.8 ± 10.7**	35.6 ± 10.8	39.2 ± 7.7	0.009
Extracellular water (L)	15.2 ± 3.1	14.9 ± 2.1	18.1 ± 4.4**	14.4 ± 4.5	16.5 ± 4.1	0.01
Intracellular water (L)	21.8 ± 4.4	21.2 ± 2.8	25.6 ± 6.2**	21.2 ± 6.3	23.1 ± 4.3	0.02
Extracellular wate//total body water (× 10e2)	40.5 (40.0,41.2)	40.6 (40.2, 41.0)	40.8 (40.2, 41.5)	40.2 (40.0, 40.8)	40.6 (40.2, 40.9)	0.88

Note: values for continuous variables are given as mean ± standard deviation or median [interquartile range] . Post hoc multiple comparisons were conducted between “death, transfer to HD, transplant and dropout” and “completers” respectively. *p < 0.05; **p < 0.01

Abbreviations: BP, blood pressure; CVD, cardiovascular disease; NYHA, New York Heart association 1 as grade I, 2 as grade II, 3 as grade III; mGFR, measured glomerular filtration rate; iPTH, intact parathyroid hormone; hs-CRP, high-sensitivity C-reactive protein; NT-proBNP, N-terminal pro-natriuretic peptide; PD, peritoneal dialysis; Ccr, creatinine clearance; nPCR, normalized protein clearance rate.

Supplemental Table 6. Clinical characteristics of patients on different outcomes at 3-year follow-up

Characteristics	Completers (n = 86)	Death (n = 44)	Transfer to HD (n = 46)	Transplant (n = 42)	Dropout (n = 22)	<i>p</i>
Age (yr)	50.1 ± 14.2	60.8 ± 13.9 **	49.3 ± 14.7	36.1 ± 10.1 **	50.5 ± 14.2	< 0.001
Vintage (month)	32 (16, 46)	25 (18, 45)	31 (17, 50)	30 (16, 40)	33 (6,41)	0.85
Diabetes mellitus	25 (29.1)	21(47.7)	13(28.3)	2(4.8) **	8(36.4)	< 0.001
Systolic BP (mmHg)	143 ± 21	137 ± 21	140 ± 17	139 ± 18	156 ± 19 *	0.007
Diastolic BP (mmHg)	83 ± 12	77 ± 11 **	82 ± 14	90 ± 10 **	88 ± 15	< 0.001
History of CVD n, (%)	7 (8.1)	12 (27.3) **	6 (13)	3 (7.1)	5 (22.7)	0.02
History of stroke n, (%)	3 (3.5)	2 (4.5)	2 (4.3)	1 (2.4)	2 (9.1)	0.41
Comorbidity score	3(2,5)	6 (3,7) **	3(2,6)	2 (2,3) **	3(2,6)	< 0.001
ECOG activity index (1/2/3/4) n	2/51/30/3	1/12/23/8**	0/29/13/4	0/36/6/0*	0/10/9/3	< 0.001
NYHA classification (1/2/3) n	41/40/5	11/25/5*	18/26/2	28/12/2	6/11/5*	0.001
mGFR (ml/min/1.73 m²)	1.1 (0.2, 3.6)	1.0 (0.9, 1.6)	0.5 (0, 2.8)	0.2 (0, 1.1) **	0.7 (0.1, 2.9)	0.08
Hemoglobin (g/dL)	10.8 ± 1 .8	11.1 ± 1 .6	10.8 ± 2 .2	10.7 ± 1 .8	9.8 ± 2 .3*	0.15
Serum albumin(g/dL)	3.7 ± 0.4	3.6 ± 0.4	3.7 ± 0.4	3.8 ± 0.2	3.7 ± 0.4	0.62
Pre-albumin (mg/dl)	368 ± 96	324 ± 89	388 ± 68	411 ± 74 **	383 ± 73	< 0.001
Uric acid (mg/dl)	4.6 ± 1.0	4.5 ± 1.0	4.5 ± 0.8	4.6 ± 0.7	4.4 ± 1.1	0.93
iPTH (pg/ml)	421 (234, 701)	459 (281, 588)	387 (224, 690)	478 (288, 842)	386 (248, 502)	0.30
hs-CRP (mg/L)	1.5 (0.2, 4.4)	2.7 (1.2, 7.8)	1.8 (0.5, 6.2)	0.8 (0.2, 1.8)	2.6 (0.8, 10.3)	0.006

NT-proBNP (pg/ml)	4147 (2106, 14188)	2993 (1986, 9019)	4066 (1419, 13145)	4788 (1980, 14556)	12317 (3620, 23102)	0.34
PD dosage (L/d)	8 (8,8)	8 (8,8)	8 (8,8) *	8 (7,8)	8 (8,8)	0.72
Total Kt/v	2.3 ± 0.6	2.2 ± 0.7	2.1 ± 0.6 *	2.2 ± 0.5	2.2 ± 0.3	0.15
Total Ccr (L/w)	71 ± 25	63 ± 24	61 ± 17	62 ± 23	64 ± 15	0.14
nPCR	0.9 ± 0.1	0.8 ± 0.2	0.8 ± 0.1	0.8 ± 0.1	0.8 ± 0.2	0.26
Total body water (L)	37.1 ± 7.3	35.4 ± 7.1	40.0 ± 8.8 *	36.8 ± 7.7	38.6 ± 5.9	0.05
Extracellular water (L)	15.1 ± 3.2	14.8 ± 2.4	16.5 ± 4.0 *	15.0 ± 3.4	16.1 ± 3.0	0.08
Intracellular water (L)	21.9 ± 4.3	21.1 ± 3.5	23.1 ± 6.3	21.8 ± 4.7	22.7 ± 3.4	0.31
Extracellular water//total body water (×10e2)	40.4 (40.1,41.1)	41.0 ** (40.4,41.9)	41.0** (40.4, 41.8)	40.3 (40.1, 40.9) *	40.7* (40.3, 41.2)	0.008

Note: values for continuous variables are given as mean ± standard deviation or median [interquartile range] . Post hoc multiple comparisons were conducted between “death, transfer to HD, transplant and drop-out” and “completers” respectively. *p < 0.05; **p < 0.01

Abbreviations: BP, blood pressure; CVD, cardiovascular disease; NYHA, New York Heart association 1 as grade I, 2 as grade II, 3 as grade III; mGFR, measured glomerular filtration rate; iPTH, intact parathyroid hormone; hs-CRP, high-sensitivity C-reactive protein; NT-proBNP, N-terminal pro-natriuretic peptide; PD, peritoneal dialysis; Ccr, creatinine clearance; nPCR, normalized protein clearance rat.

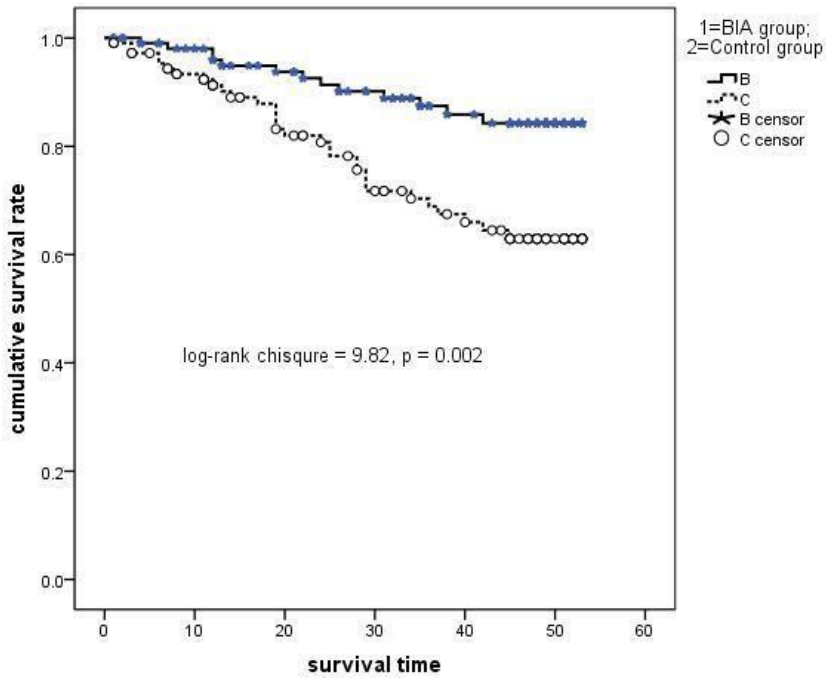
Supplemental Table 7 Cox regression analysis of groups associated with all-cause death and technique failure

Factors	All-cause death				Technique failure			
	Univariable		multivariable		univariable		multivariable	
	HR (95%CI)	<i>p</i>	HR (95%CI)	<i>p</i>	HR (95%CI)	<i>p</i>	HR (95%CI)	<i>p</i>
At 1 year								
Group (BIA vs. control)*	2.71(0.72, 10.24)	0.14	2.27(0.59, 8.68)	0.23	1.95(0.94, 4.04)	0.07	1.73(0.83, 3.62)	0.14
At 3 years								
Group (BIA vs. control)**	0.37(0.19, 0.72)	0.003	0.39(0.20, 0.76)	0.006	1.08(0.60, 1.93)	0.78	1.06(0.58, 1.91)	0.84

Abbreviation: BIA, bioimpedance analysis; CVD, cardiovascular disease; SBP, systolic blood pressure

* Adjusted by NYHA classification

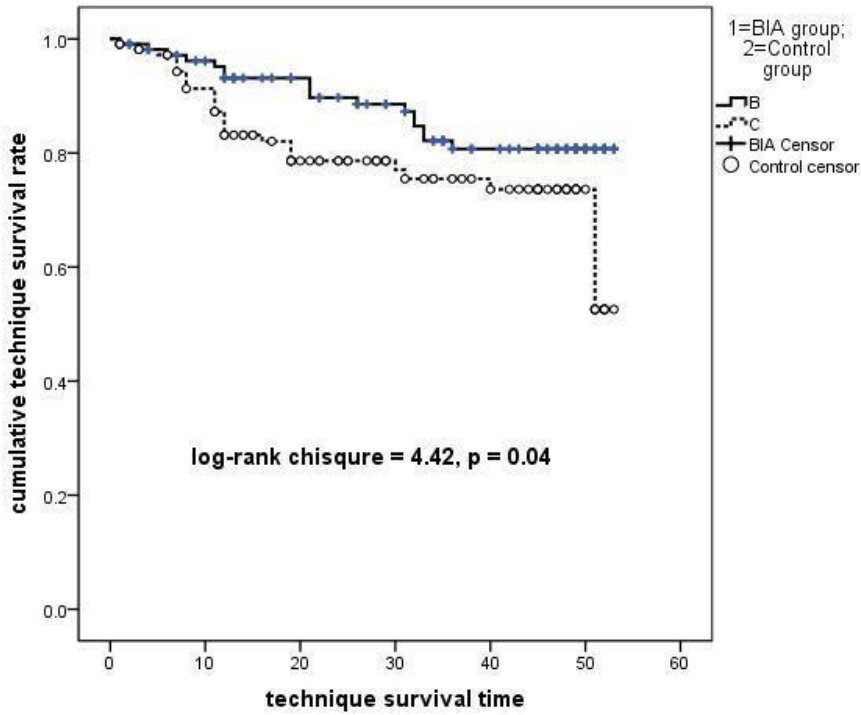
** Adjusted by systolic BP, NYHA classification, hemoglobin (g/L), and ECW/TBW ratio



Number at risk

BIA group	120	110	89	76	60	25
Control group	120	110	77	62	52	21

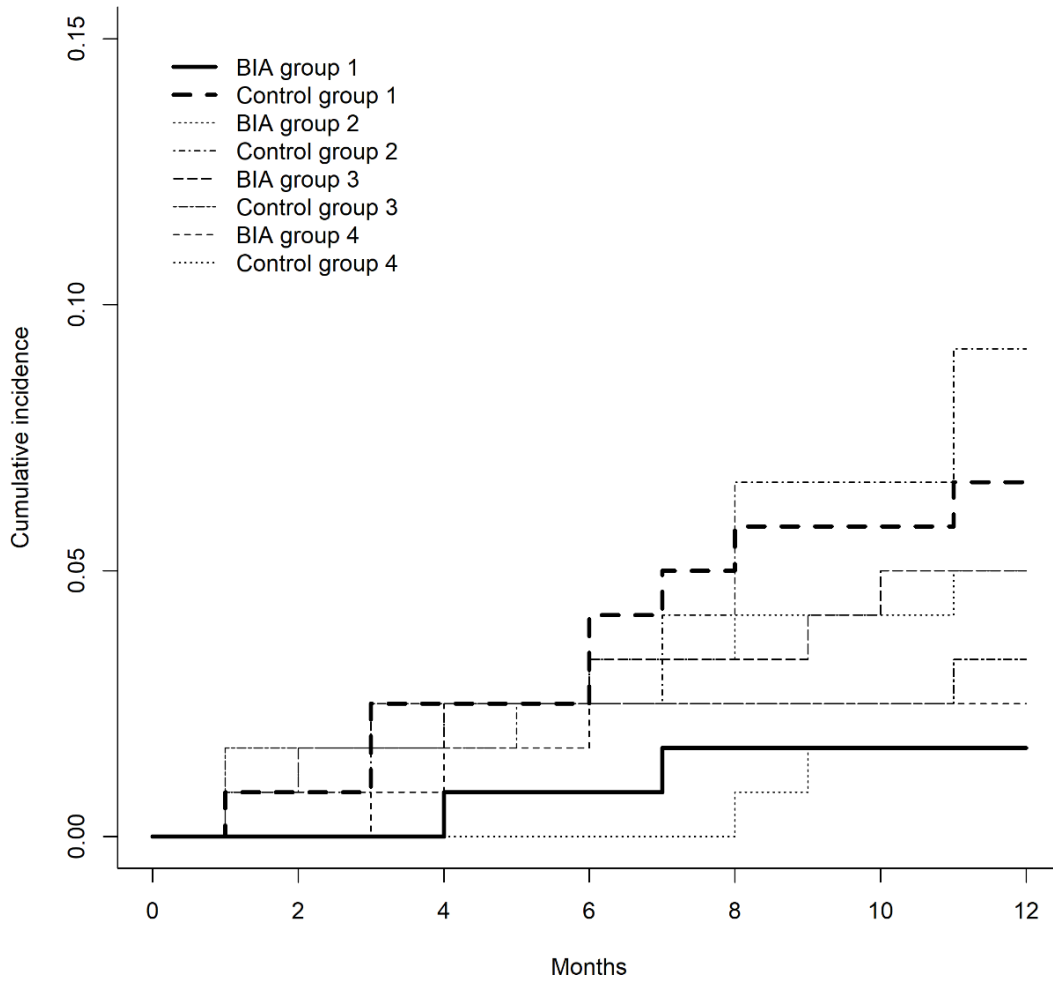
Supplemental Figure 1 Kaplan Meier curve of comparison of the BIA group and the control group in terms of patient survival based on per-protocol population (excluded: poor adherence to treatment regimen = 22; main indicator missing at baseline = 0; taking prohibited drugs = 0)



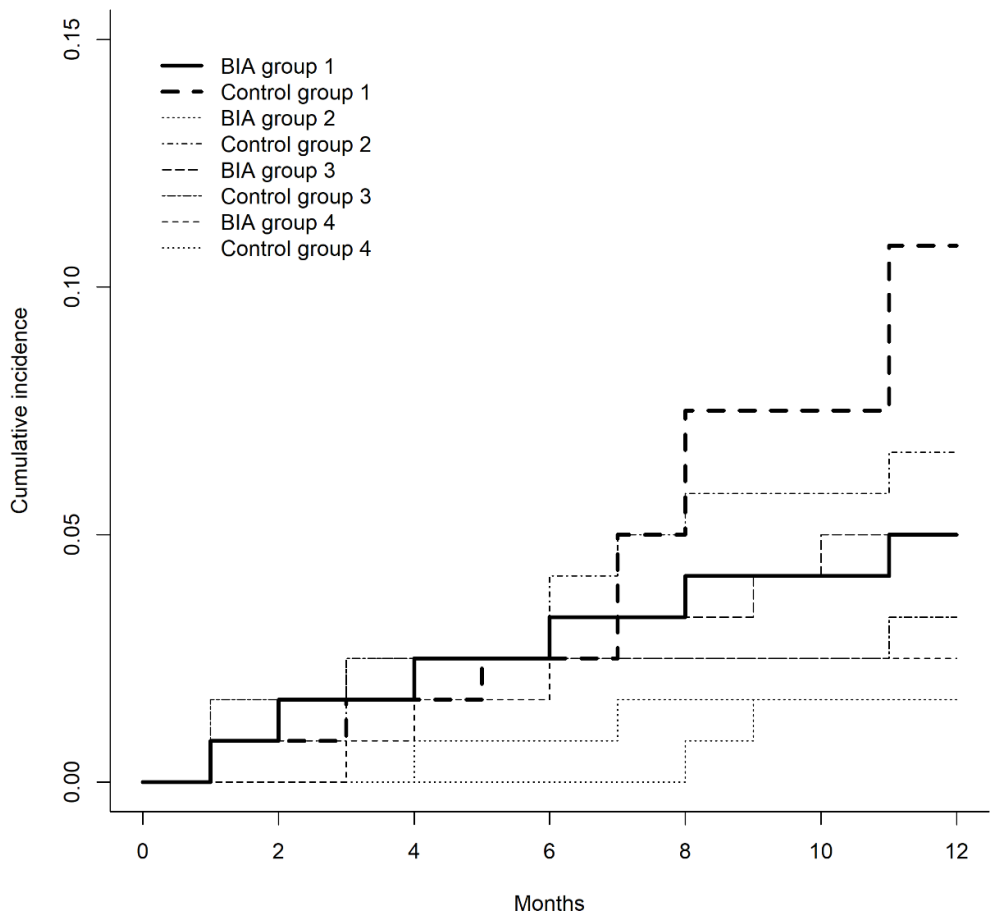
Number at risk

BIA group	120	104	89	76	60	25
Control group	120	98	72	62	47	16

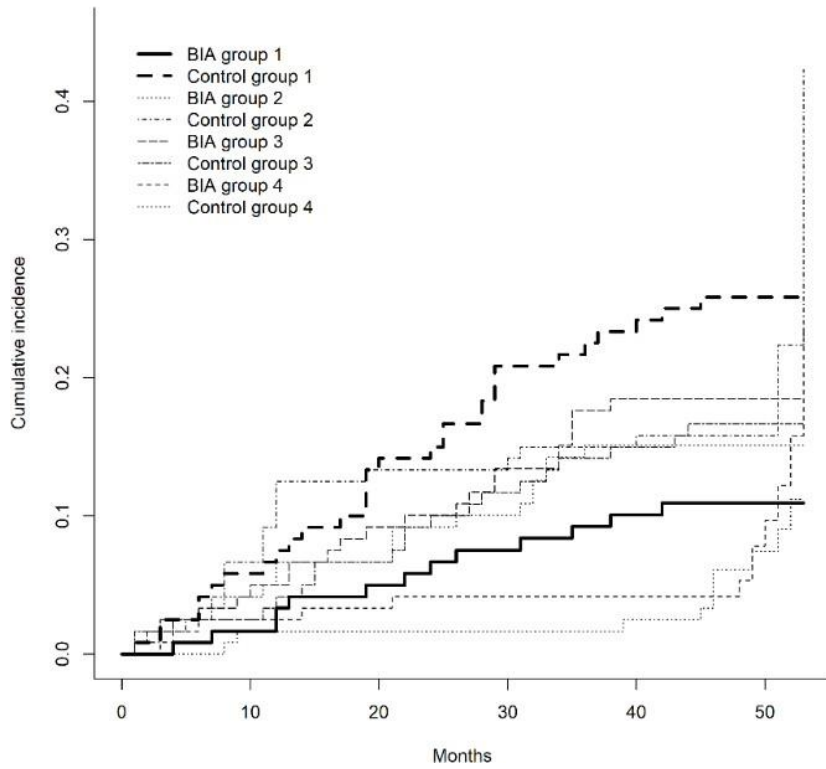
Supplemental Figure 2 Kaplan Meier curve of comparison of the BIA group and the control group in terms of technique survival based on per-protocol population (excluded: poor adherence to treatment regimen = 22; main indicator missing at baseline = 0; taking prohibited drugs = 0)



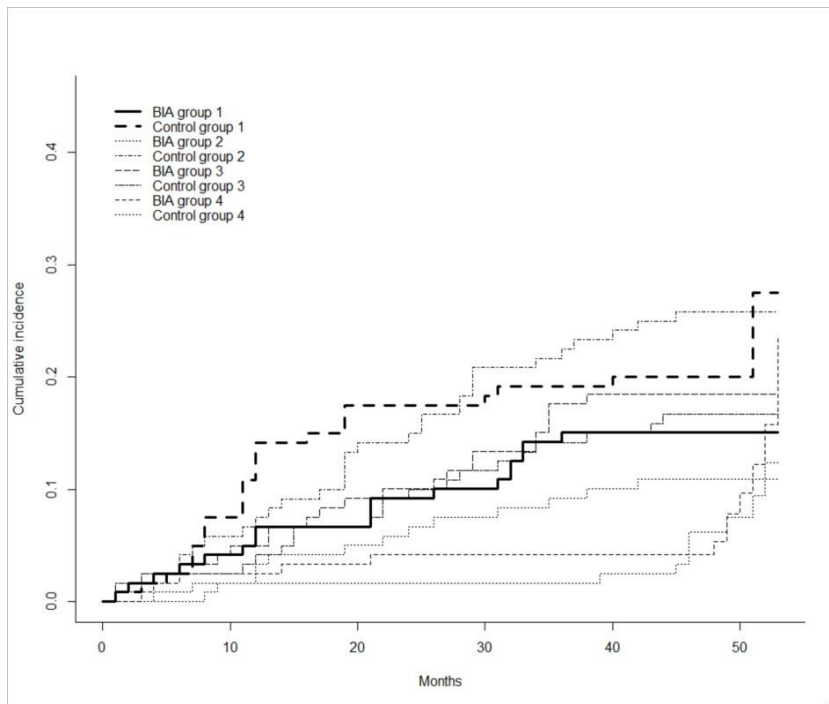
Supplemental Figure 3 Competing risk analysis on 1-year survival
 Cumulative incidence plot of the event and competing events, in which 1 = transfer to HD (technique failure), 2 = death, 3 = transplantation, 4 = withdraw due to poor adherence.



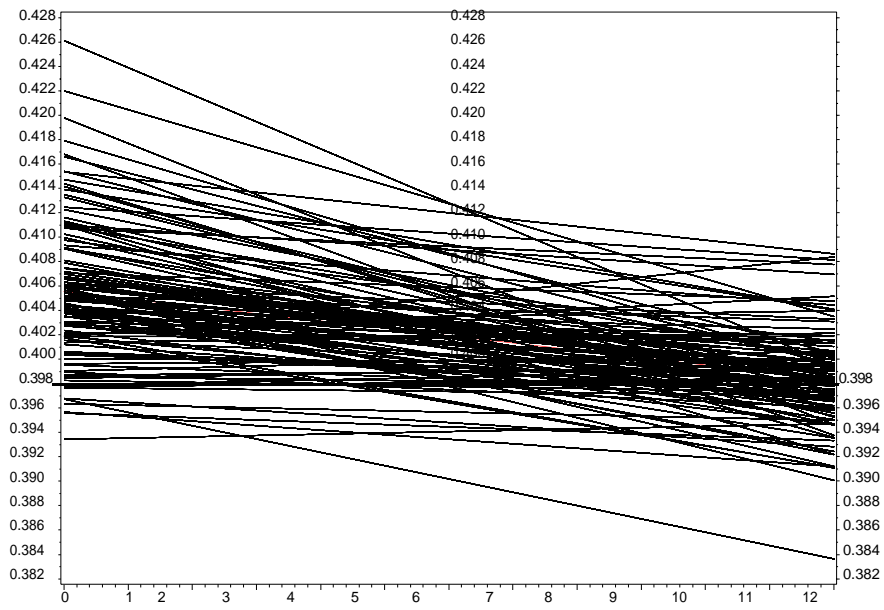
Supplemental Figure 4 Competing risk analysis on 1-year technique survival
 Competing events recorded as censor in the database are “0 = complete trial, 1 = transfer to HD (technique failure), 2 = death, 3 = transplantation, 4 = withdraw due to poor adherence”.



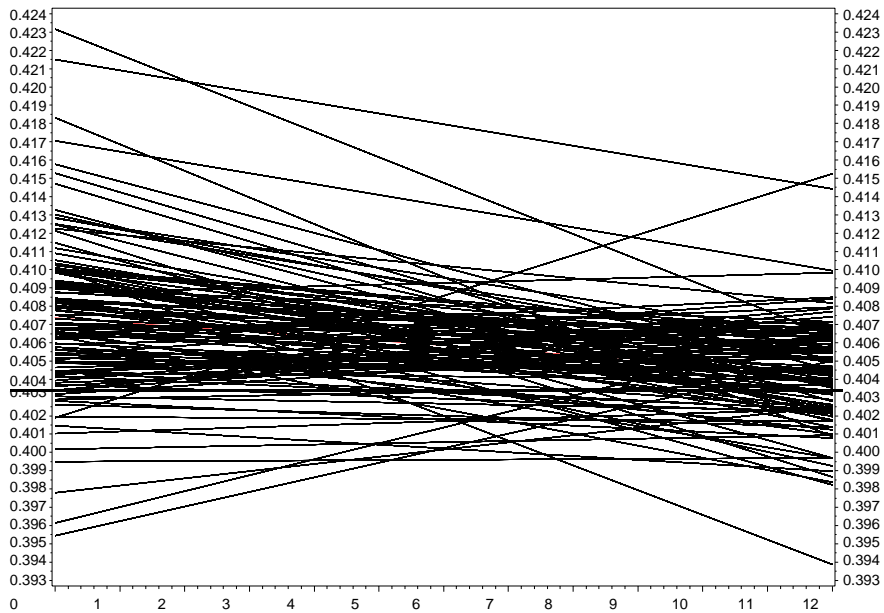
Supplemental Figure 5 Competing risk analysis on 3-year survival
 Cumulative incidence plot of the event and competing events, in which 1 = transfer to HD (technique



Supplemental Figure 6 Competing risk regression of 3-year technique survival
 Competing events recorded as censor in the database are “0 = complete trial, 1 = transfer to HD (technique failure), 2 = death, 3 = transplantation, 4 = withdraw due to poor adherence”.



(a)



(b)

Figure 7 Comparison of the decline rate of the ECW/TBW ratio by 0.001 unit (per month) in the BIA and control group through one year intervention after multiple imputation (a) BIA group; (b) control group.

Supplemental Appendix 1

The sample size estimation was based on Log Rank Test Power Analysis of Numeric Results in Terms of Sample Size when the Test was Two-Sided using PASS software 11.0. The per-group sample size required for BIA-guided fluid management to show a significant increase (10%) in one year in patient survival (power of 90%, α error of 0.05) was calculated using a significance test. Surviving rates in BIA group and control group were set as 85% [17,18] and 95% [19-21], separately. The necessary sample size was 108 for each group as per the equal-sample-size bunch design. Allowing for a 10% drop out rate, the total sample size required was 240. The trial was extended to 3 years follow-up based on 1-year analysis for the following reasons: first, we found there were differences in both patient survival (96% and 90%) and technique survival (95% and 89%) during 1-year follow-up time (Fig 2-a, b, c), although no significant statistical difference was found; second, 1-year patient survival rate of BIA group and control group were 96% and 90% respectively, which was higher than the patient survival we used to calculate sample size with 1-year observation time (95% and 85%). Therefore, the number of events for the primary endpoint (death) by the end of one year was 11 which was much less than we assumed at initial design (24 cases). Therefore, we extended to 3-year follow up in order to get more events to show the difference of long-term survival.

Supplemental Appendix 2

The primary outcome for the survival analysis was a recorded event of “patient death” coded as 1. Competing events included kidney transplantation coded as 2, transfer to HD as 3, loss to follow-up as 4. Those who completed the trial and did not die by the end of follow up was censored. To evaluate the association of intervention group and transfer to HD (i.e. technique failure), competing events in the model were defined as “death coded as 2, transplantation as 3, and withdraw due to poor adherence as 4”. Those who completed the trial and did not die by the end of follow up was censored. Analysis was performed by the package of cmprskin R software.