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Supplementary Table 1

Inclusion criteria

1. A pre-dialysis serum phosphate level, as measured during the observation period, of either:
 - ① at least 5.0 mg/dL for those taking a phosphate binder during the observation period, or
 - ② at least 6.1 mg/dL for those not taking a phosphate binder during the observation period.
2. On dialysis for at least 3 months.
3. Clinically stable on at least three times per week hemodialysis and able to continue hemodialysis in the same manner from the start through the end of the treatment period.
4. Coronary artery calcification score of at least 30 as measured during the observation period.
5. Aged ≥ 20 and < 80 years.
6. Outpatient.
7. Any gender.

8. Provision of written consent.

Exclusion criteria

1. A pre-dialysis serum intact-PTH level, as measured 1 month before registration, of either over 800 pg/mL or over 500 pg/mL and determined to be uncontrollable.
2. History of hemochromatosis or other iron storage disorders, or a pre-dialysis serum ferritin level of over 300 ng/mL or transferrin saturation of over 50%, as measured at the initiation of observation.
3. Severe hepatic dysfunction.
4. Severe coronary artery disease.
5. Concurrent malignancy.
6. Paroxysmal nocturnal hemoglobinuria.
7. Hypersensitivity to iron-containing drug or lanthanum-containing drug.
8. History of parathyroidectomy.
9. Pregnancy or possible pregnancy.
10. Inappropriateness as a subject of this trial as determined by the investigator.

Supplementary Table 2, Patients characteristics and baseline data (safety analysis set)

We compared the baseline characteristics of the FAS-analyzed patients (n=115) with those of the excluded patients from FAS (n=41). There were no significant differences between FAS-analyzed patients (n=115) and excluded patients (n=41)

	FAS-analyzed (N=115)	Excluded from FAS (N=41)	p value
Age, yr	61.9±10.5	65.6±9.2	0.058
Phosphate (mg/dL)	5.99±0.99	6.13±0.95	0.398
Calcium (mg/dL)	8.82±0.70	8.58±0.59	0.106
Magnesium (mg/dL)	2.60±0.36	2.53±0.26	0.387
TSAT (%)	25.3±11.2	25.7±9.8	0.579
Ferritin (ng/mL)	65 [31-130]	70 [25-104]	0.393
intact PTH (pg/mL)	131 [88-186]	151[104-216]	0.334
intact FGF23 (pg/mL)	5260 [2310-10900]	4470 [946-11100]	0.337
Past history of CVD (%)	33.9	39.0	0.556
Diabetes mellitus (%)	44.3	43.9	0.961
Dyslipidemia (%)	44.3	36.6	0.338
Hypertension (%)	87.8	92.7	0.392

Data are on the basis of all randomized patients. Continuous variables are presented as mean±SD or median [interquartile range].

Wilcoxon rank sum test was used for continuous variables, and chi-square test was used for categorical variables.

Supplementary Table 3. Dosage of sevelamer hydrochloride, bixalomer or assigned drug

		Factor 1		Factor 2	
		lanthanum carbonate	sucroferric oxyhydroxide	standard	strict
number		62	53	57	58
sevelamer hydrochloride	number	8	10	6	12
	dosage	2375±2537	2725±1451	2042±529	2833±2396
	dosage of assigned drug	1938±348	1607±934	1200±764	1886±734
bixalomer	number	14	8	9	13
	dosage	3339±2239	1312±325	2250±1696	2846±2265
	dosage of assigned drug	2125±263	1625±820	1583±667	2192±356
assigned drug only	number	40	35	42	33
	dosage of assigned drug	1327±703	952±664	1038±584	1304±812

Supplementary Table 4. Percentages of active vitamin D and calcimimetics users at baseline and 12-month

		Factor 1			Factor 2		
		lanthanum carbonate	sucroferric oxyhydroxide	p value	standard	strict	p value
number		62	53		57	58	
baseline	active vitamin D	41	35	0.99	39	37	0.60
	calcimimetics	22	17	0.70	22	17	0.29
at 12 months	active vitamin D	39	33	0.94	36	36	0.90
	calcimimetics	27	21	0.67	26	22	0.40

Chi-square tests were used for categorical variables.

Supplementary Table 5. Patients characteristics and baseline data (safety assessment; N=156)

	Factor 2	
	Standard control (n=78)	Strict control (n=78)
Number (Female)	78 (29)	78 (20)
Age, yr	62.4±10.3	63.3±10.4
CACS	801 [237 - 1581] (miss=20)	711 [318 - 2365] (miss=20)
Phosphate (mg/dL)	6.06±1.07	5.99±0.87
Calcium (mg/dL)	8.80±0.66	8.70±0.69
Magnesium (mg/dL)	2.57±0.35 (miss=27)	2.59±0.32 (miss=29)
TSAT (%)	23.5±10.2 (miss=24)	27.0±11.2 (miss=16)
Ferritin (ng/mL)	45 [29 - 114] (miss=29)	73 [31 - 139] (miss=31)
intact PTH (pg/mL)	134 [100 - 215] (miss=1)	141 [86 - 189]
intact FGF23 (pg/mL)	5810 [2090 - 11800] (miss=1)	4440 [2100 - 10500]
Past history of CVD (%)	34.6	35.9
Diabetes mellitus (%)	41.0	47.4
Dyslipidemia (%)	43.6	41.0
Hypertension (%)	91.0	87.2

miss : Number of missing values

Supplementary Table 6. Sensitivity analyses with multiple imputation

#1 No logarithmic transformation, No inclusion of allocation groups

Factor2	N	Sum of scores	Expected	Std dev	t	P> t *
Standard	78	6764.6	6123	309.627	2.07	0.040
Strict	78	5481.5	6123			

* : DF=121.8

#2 Logarithmic transformation, No inclusion of allocation groups

Factor2	N	Sum of scores	Expected	Std dev	t	P> t *
Standard	78	6863.9	6123	313.510	2.36	0.020
Strict	78	5382.1	6123			

* : DF=117.8

#3 No logarithmic transformation, Inclusion of allocation groups

Factor2	N	Sum of scores	Expected	Std dev	t	P> t *
Standard	78	6974.0	6123	320.706	2.65	0.009
Strict	78	5272.0	6123			

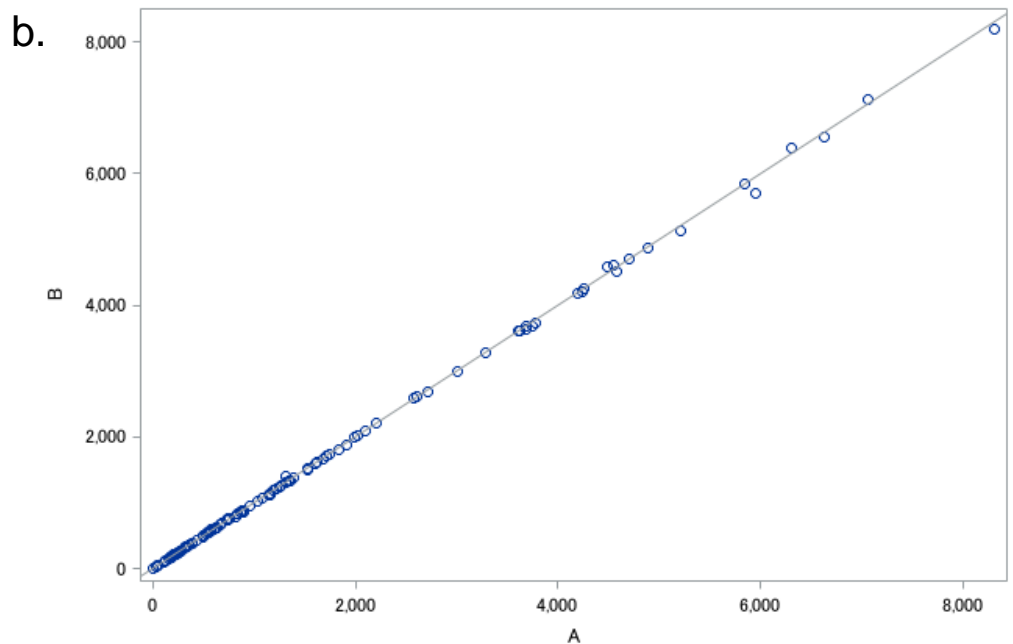
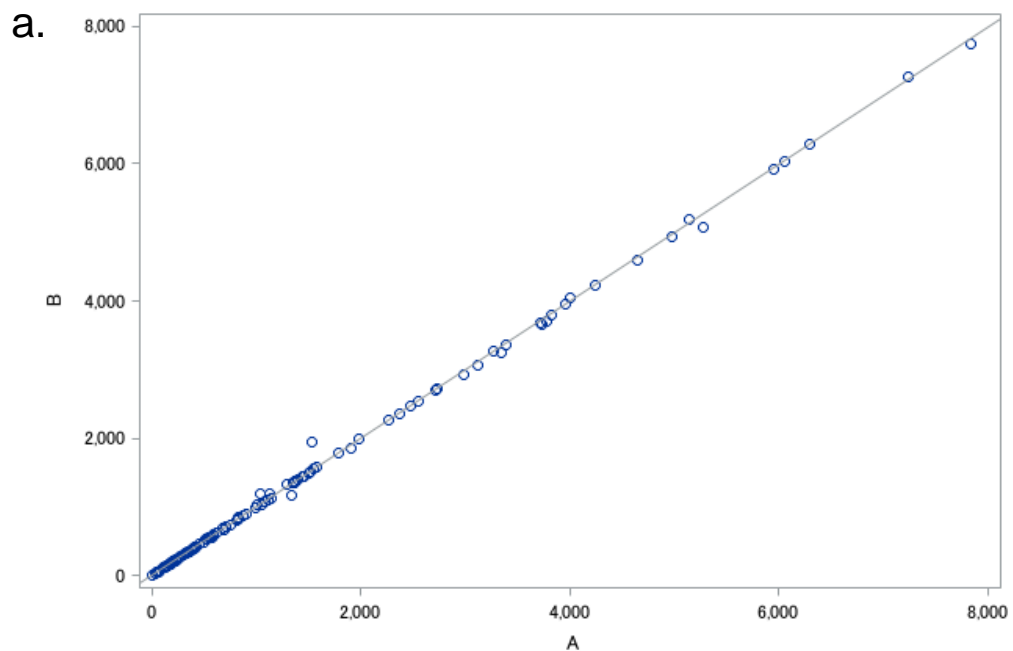
* : DF=110.9

#4 Logarithmic transformation, Inclusion of allocation groups

Factor2	N	Sum of scores	Expected	Std dev	t	P> t *
Standard	78	7014.6	6123	322.487	2.76	0.007
Strict	78	5231.4	6123			

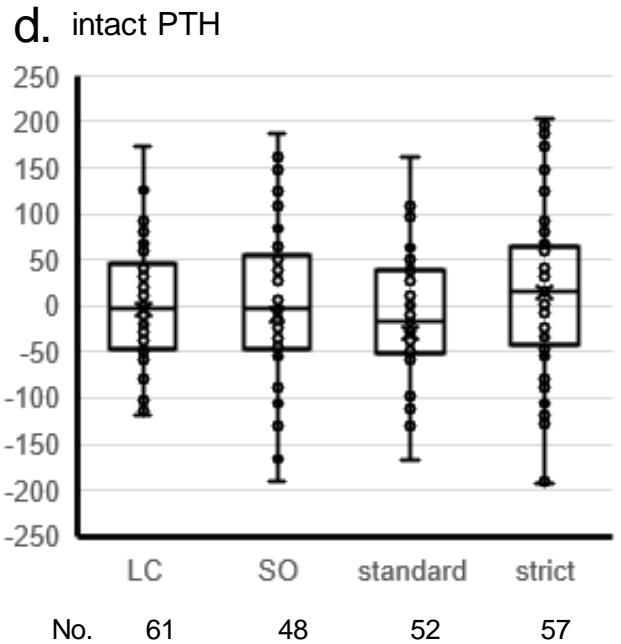
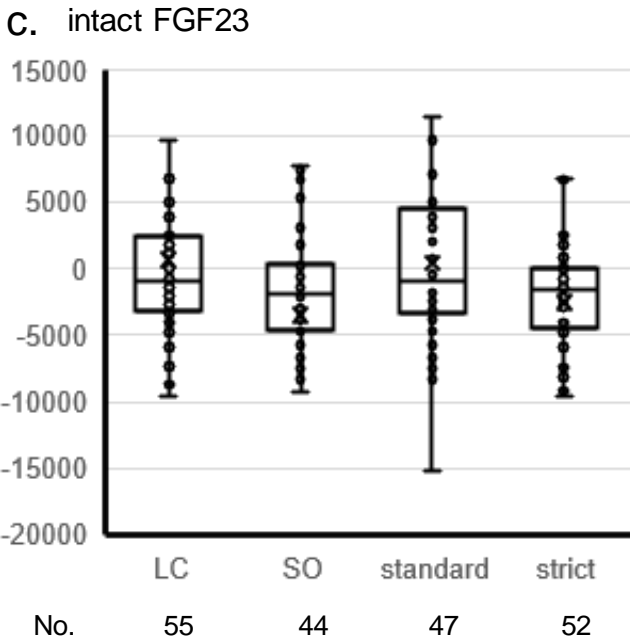
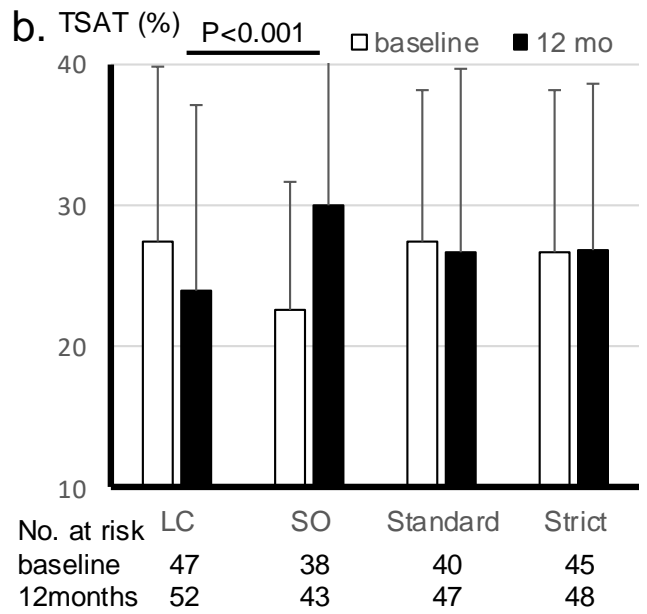
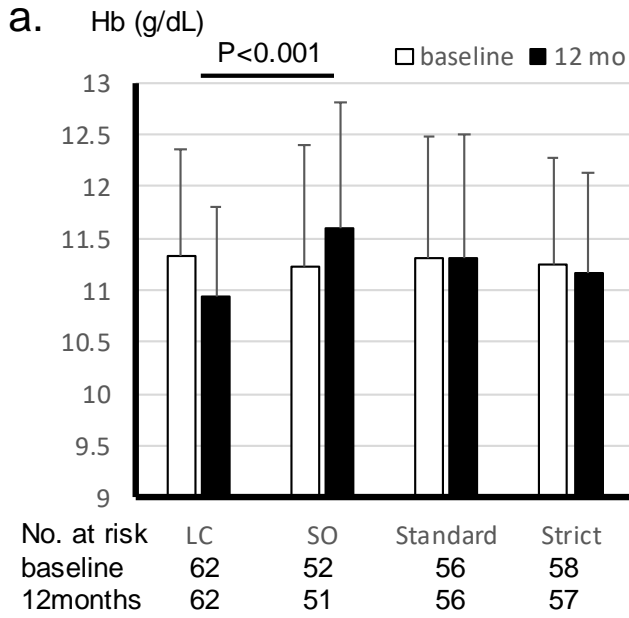
* : DF=109.3

Supplementary Fig.1



Evaluation of the concordance of the CAC scores by using intraclass correlation coefficients (ICC). ICC was 0.99954 [95%CI; 0.99934-0.99968] during observational period (a) and 0.99979 [0.99970-0.99986] at 12 months (b) after treatment as shown below.

Supplementary Fig.2



Changes in laboratory parameters. Shown are Hgb (a) and TSAT (b) levels in the lanthanum carbonate (LC), sucroferic oxyhydroxide (SO), standard, and strict groups at baseline and 12 months after treatment. The error bars indicate standard errors. There were no differences in intact FGF23 (c) or intact PTH (d) levels between groups.