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Preoperative Calcimimetic Administration Prevents Serum Creatinine Elevation after Parathyroidectomy in Kidney Transplant Recipients

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Introduction

- Hyperparathyroidism (HPT) often persist after kidney transplantation (KTx).
- Although parathyroidectomy (PTx) is an effective treatment option for post-KTx HPT, which has been reported to be associated with postoperative elevation of serum creatinine.
- We hypothesized that pre-PTx calcimimetic administration could alleviate the post-PTx increase in serum creatinine, and conducted a retrospective study.

Materials and methods

- Retrospective cohort study of KTx patients who underwent initial PTx between 2004 and 2023.
- The primary outcome was the change in eGFR 1 week after PTx.
- The cohort was divided into two groups based on the post-PTx eGFR change; a decrease in eGFR of 20% or more 1 week after PTx was defined as eGFR reduction.
- Multivariate linear regression analysis for percent eGFR 1 week after PTx was performed.

Conclusion

- Preoperative administration of calcimimetics may prevent elevated serum creatinine levels after PTx in patients with KTx.
- The tubular protective effects of calcimimetics should be further investigated in the future.

Results

- Of the 77 KTx patients who underwent PTx, eGFR reduction was observed in 24 patients (decreased eGFR group), whereas eGFR was maintained in the others (stable eGFR group) after PTx.
- Compared with the stable eGFR group, the decreased eGFR group had a significantly lower rate of pre-PTx calcimimetics administration (12.5 versus [vs.] 47.2%, $P = 0.004$) and a significantly greater post-PTx change in the intact parathyroid hormone level (256.5 vs. 153.0 pg/mL, $P = 0.001$).
- There was a positive association between pre-PTx calcimimetics administration and percent eGFR (regression coefficient estimate, 11.0; 95% confidence interval, 5.0–17.0; $P < 0.001$) 1 week after PTx.

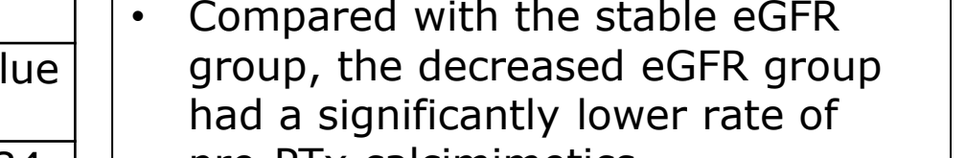
Baseline characteristics in 77 KTx patients who underwent PTx

	Reduced eGFR N = 24	Stable eGFR N = 53	*P*-value
Age (years, IQR)	52 (39–60)	52 (44–62)	0.534
Sex (male, %)	7 (29.2)	22 (41.5)	0.435
Interval between KTx and PTx (months, IQR)	14 (8–19)	13 (8–18)	0.813
Calcimimetics before PTx (%)	3 (12.5)	25 (47.2)	0.008
Lab data before PTx			
Corrected calcium (mg/dL, SD)	11.0 (0.9)	10.8 (0.9)	0.491
Phosphorus (mg/dL, IQR)	2.6 (2.5–2.8)	2.7 (2.4–3.0)	0.566
Intact PTH (pg/mL, IQR)	259(179–335)	165 (121–258)	0.002
eGFR (mL/min/1.73m^2, IQR)	48.0 (39.1–64.9)	48.1 (38.7–51.0)	0.394
Bone alkaline phosphatase (μg/L, IQR)	48.0 (32.9–74.0)	30.4 (18.6–56.5)	0.046

Postoperative outcomes

	Reduced eGFR N = 24	Stable eGFR N = 53	*P*-value
Min-PTH (pg/mL, IQR)	2.5 (2.0–5.0)	4.4 (2.0–10.9)	0.308
δ PTH (pg/mL, IQR)	256 (176–331)	153 (107–255)	0.001
eGFR at 1 week after PTx (mL/min/1.73m^2, SD)	37.8 (14.8)	43.1 (9.7)	0.062
%eGFR (%, SD)	71.4 (6.7)	93.2 (11.0)	<0.001

Min-PTH, intact PTH on the first day after parathyroidectomy; *δ PTH*, change in intact PTH from baseline to postoperative day 1.

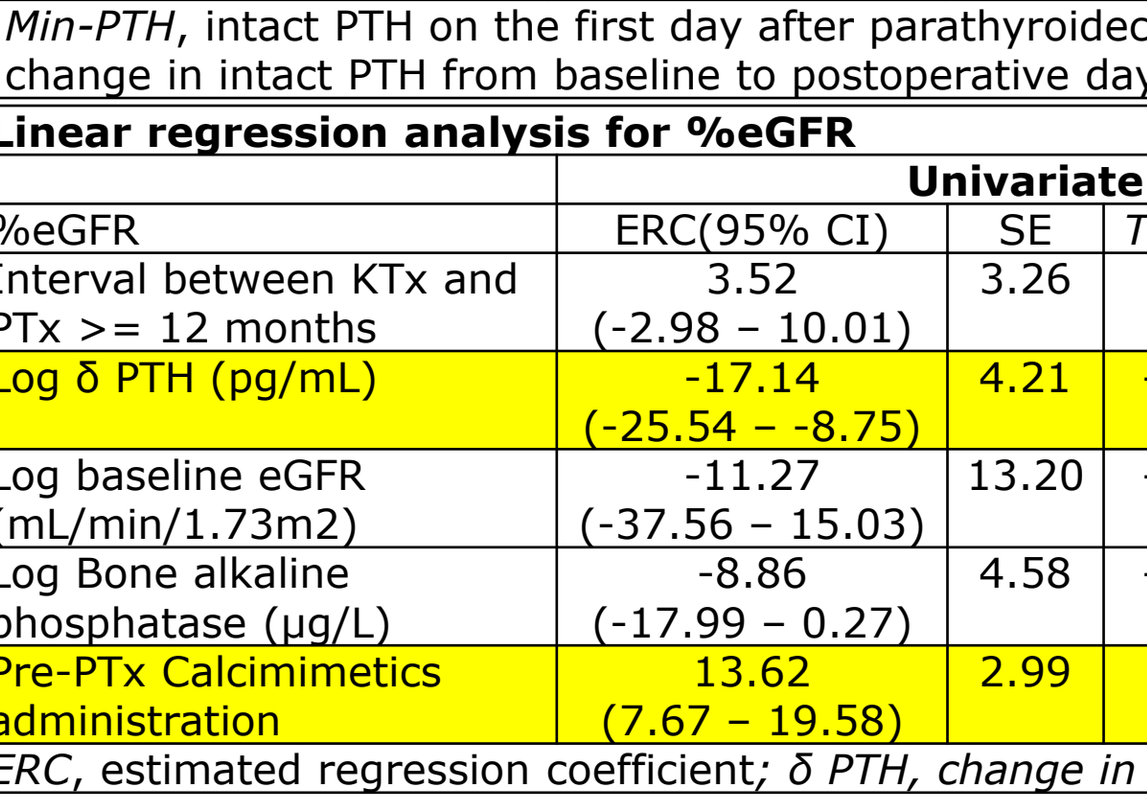


Linear regression analysis for %eGFR

	Univariate				Multivariate			R2 = 0.33
%eGFR	ERC(95% CI)	SE	*T* value	*P* value	ERC(95% CI)	SE	*T* value	*P* value
Interval between KTx and PTx >= 12 months	3.52 (-2.98 – 10.01)	3.26	1.08	0.284	-0.97 (-7.25 – 5.30)	3.15	-0.31	0.758
Log δ PTH (pg/mL)	-17.14 (-25.54 – -8.75)	4.21	-4.07	<0.001	-11.83 (-20.60 – -3.05)	4.40	-2.69	0.009
Log baseline eGFR (mL/min/1.73m2)	-11.27 (-37.56 – 15.03)	13.20	-0.85	0.396	-5.43 (-29.37 – 18.50)	12.00	-0.45	0.652
Log Bone alkaline phosphatase (μg/L)	-8.86 (-17.99 – 0.27)	4.58	-1.93	0.057	-5.42 (-14.92 – 4.08)	4.76	-1.14	0.259
Pre-PTx Calcimimetics administration	13.62 (7.67 – 19.58)	2.99	4.56	<0.001	11.00 (4.98 – 17.03)	3.02	3.64	0.001

ERC, estimated regression coefficient; *δ PTH, change in intact PTH from baseline to postoperative day 1.*

Correlation between the %GFR and urinary L-FABP



Mann–Whitney U test results for urinary L-FABP