



Does the Parathyroidectomy Endanger the Transplanted Kidney?

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ABSTRACT

Background. Some investigators maintain that a parathyroidectomy (PTX) performed for tertiary hyperparathyroidism may potentially cause graft malfunction or even loss of the transplanted kidney after the operation. The goal of this study was to determine if parathyroidectomy affects transplanted kidney function.

Methods. The study group consisted of 48 renal graft recipients who underwent operation due to tertiary hyperparathyroidism. Thirty-nine subtotal parathyroidectomies and 9 more selective, less than subtotal parathyroidectomies were performed. The estimated glomerular filtration rate (eGFR) was calculated retrospectively on days 2 to 3 and 4 to 5 and at 1, 3, 6, 12, 24, and 36 months after PTX; these findings were compared with preoperative values. The cumulative graft survival rate in the postoperative period was assessed.

Results. In the follow-up period, 4 of 48 patients returned to hemodialysis (after 1, 7, 22, and 57 months after PTX). In the first case, the patient had stopped taking the immunosuppressive drugs 1 month after PTX. Cumulative graft survival rate after PTX was 98.0% after 6 months, 96% after 12 months, and 93% after 2 and 3 years. The mean preoperative eGFR was 52 ± 17.15 mL/min/1.73 m², and the median was 48.28 mL/min/1.73 m². Overall and in the subtotal parathyroidectomy group, eGFR was significantly lower ($P < .001$) only on days 2 to 3. There were no differences between preoperative and postoperative eGFR values in the other follow-up periods. In the more selective, less than subtotal parathyroidectomy group, the decrease in eGFR values was nonsignificant compared with preoperative findings in the early postoperative period as well as in all follow-up periods.

Conclusions. In this study, PTX did not significantly impair transplanted kidney function, but in the early postoperative period, transient reductions in graft function did occur.

HYPERPHOSPHATEMIA, low serum concentration of calcitriol, and hypocalcemia, which can occur in patients with chronic kidney disease, cause an increased compensatory proliferation of parathyroid gland cells. This condition is called secondary hyperparathyroidism [1–3] and causes parathyroid hormone (PTH)-related hypercalcemia in 30% to 50% of patients in the early postoperative period after kidney transplantation [4]. The calcium and PTH serum concentrations normalize spontaneously in most cases. In the first 3 to 6 months after transplantation, the return process is the most intensive. Despite well-functioning graft, in some cases, autonomic PTH secretion develops as a result of monoclonal cell proliferation and

parathyroid gland hyperplasia (mainly nodular) [1,2]. This condition is called tertiary hyperparathyroidism (THPT). Treatment of THPT can be performed by parathyroid gland resection. Parathyroidectomy (PTX) is performed in 0.6% to 5.6% of kidney graft recipients [4]. Because of no evident reasoning or guidelines for surgical treatment of THPT, the choice regarding resection is difficult. Some investigators

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Table 1. Characteristics of the Study Population

| Characteristic | Value |
|--|--------------------------------|
| Sex, no. | |
| Male | 23 |
| Female | 25 |
| Age, y | 46 ± 10.8; 47 (21–73)* |
| Preoperative serum PTH, pg/mL | 338 ± 350; 219 (83–1540)* |
| Preoperative serum creatinine | 1.48 ± 0.45; 1.40 (0.88–2.53)* |
| Preoperative eGFR, mL/min/1.73 m ² | 52.38 ± 17.15 |
| Preoperative serum calcium, mmol/L | 2.98 ± 0.21; 2.94 (2.75–3.68)* |
| Preoperative serum inorganic phosphate, mmol/L | 0.86 ± 0.21; 0.82 (0.45–1.63)* |
| Time from KTX to PTX, mo | 46 ± 36; 36 (17–167)* |
| Follow-up, mo | 50 ± 35; 51 (1–144)* |

Abbreviations: eGFR, estimated glomerular filtration rate; KTX, kidney transplantation; PTH, parathyroid hormone; PTX, parathyroidectomy.

*Mean ± standard deviation; median (minimum–maximum).

maintain that PTX can potentially cause graft malfunction or even loss of transplanted kidney after operation [5,6].

The goal of the present study was to determine if parathyroid resection performed in patients with THPT after renal allotransplantation is safe for renal graft function.

PATIENTS AND METHODS

The study group comprised 48 patients operated on between 1997 and 2014. All PTX were performed for THPT (3 for persistent hyperparathyroidism). We performed 39 subtotal parathyroidectomies (sPTX) and 9 more selective, less than subtotal PTX (<sPTX). Characteristics of the study population, type of parathyroid resection performed, and details of preoperative renal graft function are presented in Tables 1–3, respectively. After the PTX, kidney function parameters were evaluated on days 2 to 3, days 4 to 5, and after 1, 3, 6, 12, 24, and 36 months. Postoperative kidney function parameters were analyzed retrospectively and compared with preoperative values. Kidney function was assessed from the estimated glomerular filtration rate (eGFR), which was calculated from serum creatinine levels by using the Modification of Diet in Renal Disease equation. The cumulative graft survival rate in the postoperative period was assessed with the Kaplan-Meier estimator.

Variables are presented as mean ± standard deviation and as medians. Because of the variable nonnormal distribution, the Wilcoxon signed-rank test was used to compare eGFR in each of the follow-up periods versus preoperative values. All statistical analyses were performed by using the Statistica 12 PL (StatSoft, Inc., Krakow, Poland) program.

Table 2. Type of Operation Performed

| Extent of Gland Resection | No. of Patients |
|--|-----------------|
| Subtotal parathyroidectomy | 39 |
| <sPTX | |
| 3 parathyroid excision | 1 |
| 2 parathyroid excision + 3rd gland partial resection | 5 |
| 2 parathyroid excision | 3 |

Abbreviation: <sPTX, more selective, less than subtotal parathyroidectomy.

Table 3. Pre-PTX Renal Graft Function

| eGFR MDRD mL/min/1.73m ² | No. of Patients |
|-------------------------------------|-----------------|
| ≥90 | 0 |
| 60–89 | 15 |
| 30–59 | 31 |
| 15–29 | 2 |
| <15 | 0 |

Abbreviations: eGFR, estimated glomerular filtration rate; MDRD, Modification of Diet in Renal Disease; PTX, parathyroidectomy.

RESULTS

Overall, in the follow-up period, 4 of 48 patients returned to hemodialysis (after 1, 7, 22, and 57 months after PTX). In 1 case, the patient made an independent decision to stop taking the immunosuppressive drugs and lost the transplanted kidney 1 month after PTX. Three other cases involved chronic renal graft deterioration. Cumulative graft survival rate after PTX was as follows: 98% after 6 months, 96% after 12 months, and 93% after 2 and 3 years (Fig 1).

The mean preoperative eGFR was 52.38 ± 17.15 mL/min/1.73 m², and the median was 48.28 mL/min/1.73 m². In 42 patients the eGFR decrease and in 6 cases the eGFR increase on days 2 to 3 after surgery was reported. Compared with preoperative values, eGFR was significantly lower ($P < .001$); mean eGFR was 44.89 ± 17.21 mL/min/1.73 m², and the median was 41.87 mL/min/1.73 m². On days 4 to 5 after surgery, the mean eGFR values increased and reached preoperative levels. The eGFR values after 1 month were even better than before the operation, although statistically insignificant. ($P > .05$) (mean, 55.31 ± 22.67 mL/min/1.73 m²; median, 50.82 mL/min/1.73 m²). There were no statistically significant differences between preoperative and postoperative eGFR values in the other follow-up periods (after 3, 6, 12, 24, and 36 months; Fig 2, Table 4).

The eGFR values after operation in the sPTX group and the <sPTX group are presented in Table 4. The differences in GFR values after sPTX observed in this study were

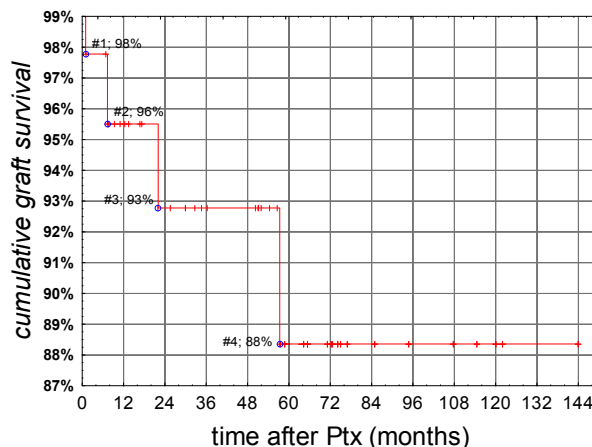


Fig 1. Cumulative renal graft survival after parathyroidectomy (PTX).

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