Optimizing Surgical Management of Renal Hyperparathyroidism: Insights from a Single-Center Experience

Sezer AKBULUT[*], Tuğba MATLIM ÖZEL[**], Aykut ÇELİK[***], Görkem YILDIZ[****], Emrecan DENİZ[*****], Serkan SARI[******]

Abstract

Aim: Renal hyperparathyroidism is one of the most common complications in patients with end-stage renal disease and is often resistant to medical treatment. Surgical treatment remains the only definitive option in cases resistant to pharmacological management.

Method: We retrospectively reviewed 480 patients who underwent parathyroid surgery between June 2020 and June 2025. Among them, 26 had renal hyperparathyroidism, and after applying exclusion criteria, 14 patients were included in the final analysis. Demographics, surgical strategies, perioperative biochemical data, complications, and follow-up outcomes were assessed.

Results: The study population consisted of 14 patients, including 10 males and 4 females. Patient age ranged from 23 to 61 years, dialysis duration ranged from 2 to 21 years, and length of hospital stay ranged from 3 to 28 days. Surgical approaches included subtotal parathyroidectomy (n=5), total parathyroidectomy (n=4), and purge parathyroidectomy (n=5). Preoperatively, parathyroid hormone levels were markedly elevated and showed a substantial postoperative decline, accompanied by improvements in serum calcium and phosphorus levels. Recurrent laryngeal nerve palsy and disease recurrence were observed in none of the patients with long-term follow-up. Postoperative hypocalcemia requiring intravenous calcium therapy was observed in 5 patients, three of whom had undergone purge parathyroidectomy and two total parathyroidectomy.

Özgün Araştırma Makalesi (Original Research Article)
Geliş / Received: 13.02.2026 **Kabul / Accepted:** 13.04.2026
DOI: https://doi.org/10.38079/igusabder.1888692
[*] M.D., University of Health Sciences, Hamidiye Faculty of Medicine, Basaksehir Cam and Sakura City Hospital, Department of General Surgery, Division of Endocrine Surgery, Istanbul, Türkiye. E-mail: drsezerakbulut@gmail.com
ORCID https://orcid.org/0000-0003-4362-2240
[**] M.D., University of Health Sciences, Hamidiye Faculty of Medicine, Basaksehir Cam and Sakura City Hospital, Department of General Surgery, Division of Endocrine Surgery, Istanbul, Türkiye. E-mail: tugbamatlim79@gmail.com
ORCID https://orcid.org/0000-0001-6305-2957
[***] M.D., University of Health Sciences, Hamidiye Faculty of Medicine, Basaksehir Cam and Sakura City Hospital, Department of General Surgery, Division of Endocrine Surgery, Istanbul, Türkiye. E-mail: celikaykut91@gmail.com
ORCID https://orcid.org/0000-0002-0478-7723
[****] M.D., University of Health Sciences, Hamidiye Faculty of Medicine, Basaksehir Cam and Sakura City Hospital, Department of General Surgery, Division of Endocrine Surgery, Istanbul, Türkiye. E-mail: gorkemyildiz@live.com
ORCID https://orcid.org/0009-0003-5453-6935
[*****] M.D., University of Health Sciences, Hamidiye Faculty of Medicine, Basaksehir Cam and Sakura City Hospital, Department of General Surgery, Division of Endocrine Surgery, Istanbul, Türkiye. E-mail: dnzemrecan@gmail.com
ORCID https://orcid.org/0009-0001-2351-4467
[******] Prof. Dr., University of Health Sciences, Hamidiye Faculty of Medicine, Basaksehir Cam and Sakura City Hospital, Department of General Surgery, Division of Endocrine Surgery, Istanbul, Türkiye. E-mail: sariserkan01@gmail.com
ORCID https://orcid.org/0000-0003-2918-1776

ETHICAL STATEMENT: This study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval was obtained from the Ethics Committee of University of Health Sciences, Hamidiye Faculty of Medicine, Basaksehir Cam and Sakura City Hospital Istanbul, Türkiye (Approval No: 39, Date: 05 February 2025).

Istanbul Gelisim University Journal of Health Sciences (IGUSABDER) is indexed by TUBITAK ULAKBIM TR Index.
Web site: https://dergipark.org.tr/en/pub/igusabder
Contact: igusabder@gelisim.edu.tr

Conclusion: In this retrospective series, parathyroidectomy was associated with marked biochemical improvement in patients with renal hyperparathyroidism refractory to medical management. Surgical approaches were applied according to patient-specific clinical characteristics and intraoperative findings.

Keywords: End-stage renal disease, purge parathyroidectomy, secondary hyperparathyroidism, renal hyperparathyroidism.

Renal Hiperparatiroidizmde Cerrahi Tedavi Yaklaşımları: Tek Merkez Deneyimi

Öz

Amaç: Sekonder ve tersiyer hiperparatiroidizm, son dönem böbrek yetmezliği olan hastalarda sık görülen ve çoğu zaman medikal tedaviye dirençli olan önemli komplikasyonlardır. Farmakolojik tedaviye yanıt alınamayan olgularda cerrahi tedavi tek seçenek olmaya devam etmektedir.

Yöntem: Haziran 2020 ve Haziran 2025 tarihleri arasında paratiroid cerrahisi uygulanan 480 hasta retrospektif olarak incelendi. Bu hastaların 26'sında renal hiperparatiroidizm mevcuttu. Dışlama kriterleri uygulandıktan sonra 14 hasta çalışmaya dahil edildi. Hastaların demografik özellikleri, uygulanan cerrahi yöntemler, perioperatif biyokimyasal veriler, komplikasyonlar ve takip sonuçları değerlendirildi.

Bulgular: Çalışmaya 10'u erkek, 4'ü kadın olmak üzere toplam 14 hasta dahil edildi. Hastaların yaşları 23–61 yıl arasında değişmekte olup, cerrahi öncesi diyaliz süreleri 2–21 yıl, hastanede yatış süreleri ise 3–28 gün arasında saptandı. Uygulanan cerrahi yaklaşımlar subtotal paratiroidektomi (n=5), total paratiroidektomi (n=4) ve purge paratiroidektomi (n=5) idi. Cerrahi öncesi paratiroid hormon düzeylerinin belirgin derecede yüksek olduğu ve cerrahi sonrası dönemde anlamlı bir düşüş gösterdiği, buna eşlik eden serum kalsiyum ve fosfor düzeylerinde düzelme izlendi. Uzun dönem takibi bulunan hastaların hiçbirinde rekürren laringeal sinir paralizisi veya hastalık nüksü saptanmadı. İntravenöz kalsiyum tedavisi gerektiren postoperatif hipokalsemi beş hastada gözlendi; bu hastaların üçüne purge paratiroidektomi, ikisine ise total paratiroidektomi uygulanmıştı.

Sonuç: Bu retrospektif seride, paratiroidektomi medikal tedaviye dirençli renal hiperparatiroidizm hastalarında belirgin biyokimyasal iyileşme ile ilişkili bulunmuştur. Cerrahi yaklaşımlar, hasta-özgü klinik özellikler ve intraoperatif bulgular doğrultusunda uygulanmıştır.

Anahtar Sözcükler: Purge paratiroidektomi, renal hiperparatiroidizm, son dönem böbrek yetmezliği, sekonder hiperparatiroidizm.

Introduction

Renal hyperparathyroidism (HPT) is characterized by impaired calcium homeostasis and compensatory elevations in serum parathyroid hormone (PTH) levels, primarily resulting from progressive chronic kidney disease (CKD). Tertiary hyperparathyroidism refers to the autonomous development of hypercalcemia in patients with long-standing renal HPT, most commonly following kidney transplantation[1].

Secondary hyperparathyroidism (SHPT) is highly prevalent among patients undergoing dialysis, and the associated alterations in mineral and bone metabolism constitute a major, independent risk factor for all-cause mortality and adverse cardiovascular outcomes[2]. Clinically, SHPT is associated with a wide spectrum of complications, including bone pain, cardiomyopathy, fractures, and vascular or valvular calcification,

Istanbul Gelisim University Journal of Health Sciences (IGUSABDER) is indexed by TUBITAK ULAKBIM TR Index.
Web site: https://dergipark.org.tr/en/pub/igusabder
Contact: igusabder@gelisim.edu.tr

which collectively impair quality of life and increase mortality[3]. Although kidney transplantation is the definitive treatment for SHPT[4], unfortunately, a large proportion of patients do not have access to it. While medical treatment can control the disease in the early stages, surgical intervention becomes necessary in the long term because biochemical control cannot be achieved[5].

The need for parathyroidectomy (PTX) increases over time; approximately 15% of patients require it at 10 years of dialysis, and almost 38% at 20 years[6]. PTX is known to reduce PTH and serum calcium levels and has also been shown to improve clinical symptoms and reduce the risk of stroke and cardiovascular mortality[7].

Despite the benefits of surgery in SHPT, the most appropriate surgical strategy remains unclear. Surgical management requires striking a balance between disease control and persistent postoperative hypocalcemia. However, even after Total Parathyroidectomy (TPTX), persistent disease and recurrence rates of 2-20% have been reported within two years[8]. This may be related to continued growth of residual parathyroid tissue or the presence of ectopic or supernumerary glands resulting from embryologic migration[9]. Surgery for persistent or recurrent diseases is extremely challenging, especially due to postoperative changes, and is associated with high morbidity[10].

Currently, the principal surgical strategies for SHPT include subtotal parathyroidectomy (SPTX), TPTX, and total parathyroidectomy with autotransplantation (TPTX+AT). The choice of procedure is largely determined by the surgeon's expertise, clinical judgment, and patient-specific factors[11].

To address these challenges, an extended surgical approach known as purge parathyroidectomy (PPTX) has been proposed. This technique involves the removal of identifiable parathyroid tissue, including potential ectopic or supernumerary glands, along with cervical fibro-fatty tissue and the thymic tongue. PPTX has been described in the literature as a feasible option in selected patients with severe secondary hyperparathyroidism[12].

Multiple surgical techniques have been described for the management of renal hyperparathyroidism; however, consensus on the optimal approach remains lacking. In real-world clinical practice, the choice of surgical procedure is rarely standardized and is often influenced by patient-specific factors, disease severity, transplant eligibility, and intraoperative findings. Rather than undertaking a formal comparison of surgical methods, this study shares our institutional experience with secondary and tertiary hyperparathyroidism and highlights how operative strategies are selected in routine practice.

Istanbul Gelisim University Journal of Health Sciences (IGUSABDER) is indexed by TUBITAK ULAKBIM TR Index.
Web site: https://dergipark.org.tr/en/pub/igusabder
Contact: igusabder@gelisim.edu.tr

Material and Methods

Study Design

This study included patients who underwent surgery for secondary and tertiary hyperparathyroidism between June 2020 and June 2025. This study was designed as a descriptive, real-world clinical series and was not intended to compare surgical techniques. During this period, 480 patients underwent parathyroid surgery at the study center and were evaluated preoperatively through multidisciplinary collaboration involving nephrology, endocrinology, and radiology specialists.

Among them, 26 patients were diagnosed with renal hyperparathyroidism. After applying predefined exclusion criteria—including age below 18 years, previous neck or parathyroid surgery, non-renal causes of hyperparathyroidism, incomplete clinical or laboratory data, and insufficient follow-up—14 patients with medically refractory symptomatic disease formed the study cohort. The primary objective of this study was to evaluate postoperative biochemical outcomes, with a particular focus on changes in parathyroid hormone (PTH) levels, in patients undergoing surgery for renal hyperparathyroidism

Preoperative Assessment

Preoperative neck ultrasonography was carried out by an experienced radiologist with concurrent evaluation for coexisting thyroid pathology. Technetium-99m sestamibi scintigraphy was used when assessing for possible ectopic parathyroid tissue, and vocal cord function was evaluated before surgery. Patients with end-stage renal disease underwent dialysis one day prior to the procedure as part of routine preparation. Baseline laboratory parameters—including serum parathyroid hormone (PTH) and calcium, phosphorus, and alkaline phosphatase (ALP) levels—along with dialysis duration, were documented.

Surgical Procedure

The operation began with a Kocher collar incision of approximately 6 cm, followed by elevation of the subplatysmal flaps. Access to the thyroid bed was achieved through the avascular midline plane between the strap muscles. During mobilization of the thyroid lobe, intraoperative nerve monitoring was applied with attention to preserving the recurrent laryngeal nerve and parathyroid glands. The contralateral side was explored using the same approach, and drain was placed routinely.

The choice among subtotal parathyroidectomy (SPTX), total parathyroidectomy (TPTX), and purge parathyroidectomy (PPTX) was guided by clinical factors such as transplant candidacy, comorbidities, and intraoperative findings. Subtotal parathyroidectomy was generally selected for patients with tertiary hyperparathyroidism or those considered likely candidates for future kidney transplantation. In these cases, part of the selected gland was preserved and marked with a metal clip for future identification. When

Istanbul Gelisim University Journal of Health Sciences (IGUSABDER) is indexed by TUBITAK ULAKBIM TR Index.
Web site: https://dergipark.org.tr/en/pub/igusabder
Contact: igusabder@gelisim.edu.tr

feasible, an inferior parathyroid gland was retained and secured to the tracheal fascia to facilitate possible reintervention.

In patients with secondary hyperparathyroidism and significant comorbid conditions, TPTX was more commonly chosen than PPTX. When parathyroid tissue could not be located within the thyroid bed, TPTX combined with bilateral cervical thymectomy was performed to address potential ectopic glands.

For patients undergoing PPTX, total parathyroidectomy was combined with bilateral central neck dissection and bilateral cervical thymectomy. The fibro-adipose tissue of the central compartment, extending from the thyroid cartilage to the innominate artery, was removed en bloc with careful hemostasis. If a suspicious thyroid nodule was identified either preoperatively or intraoperatively, thyroid lobectomy was performed concurrently[12].

Postoperative Management

Postoperatively, serum PTH, calcium, phosphorus, and ALP levels were monitored, and length of day was recorded. Complications, including bleeding, hypocalcemia, and recurrent laryngeal nerve palsy, were systematically evaluated. Serum calcium, magnesium, and PTH were measured at 6-12 hours after surgery.

Patients presenting with symptoms of hypocalcemia or with serum calcium below 7.2 mg/dL (reference: 8.6-10.0 mg/dl) received intravenous calcium gluconate infusion (1–2 mg elemental calcium/kg). In patients able to tolerate oral intake, calcium carbonate (1–2 g three times daily) with calcitriol (up to 2 μg/day) were administered, with dosages adjusted to maintain normocalcemia.

Persistent secondary hyperparathyroidism was as a serum PTH level exceeding three times the upper limit of the reference range on the third postoperative day (institutional reference range: 15–65 pg/mL). Permanent hypoparathyroidism was as persistently low PTH levels (<15 pg/mL) one-year follow-up.

Ethical Statement

This study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval was obtained from the Ethics Committee of University of Health Sciences, Hamidiye Faculty of Medicine, Basaksehir Cam and Sakura City Hospital, Istanbul, Turkey (Approval No.: 39, Date: 05 February 2025).

Statistical Analysis

Due to the limited sample size and the descriptive design of the study, analysis remained at the observational level. Continuous data are presented as intervals, and categorical variables are presented as frequencies. Since the study was not designed to compare surgical approaches, no comparative statistical analysis was performed.

Istanbul Gelisim University Journal of Health Sciences (IGUSABDER) is indexed by TUBITAK ULAKBIM TR Index.
Web site: https://dergipark.org.tr/en/pub/igusabder
Contact: igusabder@gelisim.edu.tr

Results

Patient Characteristics

A total of 14 patients were analyzed, 10 males and 4 females, with ages from 23 to 61 years. The duration of dialysis prior to surgery ranged from 2 to 21 years, and the length of day ranged from 3 to 28 days. Preoperatively, 11 patients were classified as ASA III, two as IV, and one as II (Table 1).

Table 1. Demographic and clinical data of all patients

Variable	SPTX (n = 5)	TPTX (n = 4)	PPTX (n = 5)
Sex (male/female), n	2 / 3	3 / 1	5 / 0
Age, years (range)	29–61	23–53	26–43
ASA, median (range)	3 (2–3)	3 (3–4)	3 (3–4)
Duration of dialysis, years (range)	4–21	8–14	2–10
Length of day (range)	3–7	3–15	6–28
Postoperative bleeding requiring reoperation, n	0	0	2
Recurrent laryngeal nerve palsy, n	0	0	0
Recurrence, n	0	0	0
Persistent SHPT, n	0	0	1
Intravenous calcium supplementation, n	0	2	3
Follow-up, months (range)	6–41	3–36	1–46

SPTX: subtotal parathyroidectomy, TPTX: total parathyroidectomy, PPTX: purge parathyroidectomy, ASA: American Society of Anesthesiologists, SHPT: secondary hyperparathyroidism

Surgical Outcomes and Complications

Surgical procedures included SPTX in 5 patients, TPTX in 4 patients, and PPTX in 5 patients. Among patients treated with SPTX, two had tertiary hyperparathyroidism and two were candidates for kidney transplantation. In one patient with concomitant thyrotoxicosis requiring bilateral total thyroidectomy, SPTX was performed.

Of the four patients who underwent TPTX, two had obesity and two had congestive heart failure. Purge parathyroidectomy was performed in five patients with markedly elevated preoperative PTH levels and clinical features suggesting a higher risk of persistent disease. In total, 52 parathyroid glands were evaluated histopathologically. In one patient who underwent TPTX, one ectopic parathyroid gland was identified within the

Istanbul Gelisim University Journal of Health Sciences (IGUSABDER) is indexed by TUBITAK ULAKBIM TR Index.
Web site: https://dergipark.org.tr/en/pub/igusabder
Contact: igusabder@gelisim.edu.tr

thymus. Among patients treated with PPTX, one parathyroid gland was located intrathyroidally, and incidental papillary thyroid microcarcinoma was detected in one case.

Postoperative hemorrhage occurred in two patients following purge parathyroidectomy, both of whom required reoperation. No patients with postoperative recurrent laryngeal nerve palsy were observed. Long-term follow-up was unavailable in four patients. Among those with available follow-up, no early disease recurrence was observed. Persistent secondary hyperparathyroidism was identified in one patient after purge parathyroidectomy, while permanent hypocalcemia developed in one patient. Intravenous calcium supplementation was required in three patients in the purge parathyroidectomy group and in two patients in the total parathyroidectomy group.

Biochemical Outcomes

Biochemical assessment demonstrated postoperative improvement in mineral metabolism across the study population. Preoperative parathyroid hormone levels were markedly elevated and showed a substantial decline following surgery (Table 2). In one patient who underwent purge parathyroidectomy, postoperative PTH levels failed to decrease despite histopathological confirmation of four resected parathyroid glands. No ectopic parathyroid tissue was identified intraoperatively, and additional postoperative imaging with four-dimensional computed tomography did not reveal any further parathyroid localization; therefore, the patient was managed conservatively with medical therapy.

Postoperative serum calcium and phosphorus levels demonstrated a consistent decline compared with preoperative values. Alkaline phosphatase levels showed variable postoperative changes, with an initial elevation observed in some patients, consistent with postoperative bone turnover dynamics (Table 2).

Table 2. Effect of surgical technique on laboratory parameters

Parameter	SPTX (n = 5)	TPTX (n = 4)	PPTX (n = 5)
Preoperative PTH, pg/mL (range)	1011–3463	694–4440	2065–3562
Postoperative PTH, pg/mL (range)	13–218	5.21–35.4	25–1991
Preoperative calcium, mg/dL (range)	8.01–11.62	7.40–10.63	8.52–10.02
Postoperative calcium, mg/dL (range)	8.02–10.11	7.10–9.15	6.42–9.60
Preoperative phosphorus, mg/dL (range)	2.36–6.03	4.96–6.03	3.84–7.88
Postoperative phosphorus, mg/dL (range)	1.85–5.18	1.73–4.65	3.94–6.70
Preoperative ALP, U/L (range)	177–1004	81–817	173–1546
Postoperative ALP, U/L (range)	185–973	65–1249	172–1479

PTH: parathyroid hormone, Ca: calcium, P: phosphorus, ALP: alkaline phosphatase, SPTX: subtotal parathyroidectomy, TPTX: total parathyroidectomy, PPTX: purge parathyroidectomy *Reference ranges:* PTH, 15–65 pg/mL; calcium, 8.6–10.0 mg/dL; phosphorus, 2.5–4.5 mg/dL; ALP, 35–104 U/L.

Istanbul Gelisim University Journal of Health Sciences (IGUSABDER) is indexed by TUBITAK ULAKBIM TR Index.
Web site: https://dergipark.org.tr/en/pub/igusabder
Contact: igusabder@gelisim.edu.tr

Discussion

Secondary and tertiary hyperparathyroidism remain major complications in patients with end-stage renal disease, leading to profound disturbances in mineral metabolism and increased cardiovascular morbidity and mortality. Disturbances in calcium, phosphorus, and alkaline phosphatase levels are related to poorer clinical outcomes, such as increased mortality and fracture risk. In this context, effective biochemical control achieved through parathyroidectomy plays a pivotal role in improving metabolic stability and long-term prognosis[13,14].

KDOQI guidelines, parathyroid hormone levels should be maintained between 150 and 300 pg/mL in patients receiving long-term dialysis[15]. Komaba et al. demonstrated that severe secondary hyperparathyroidism in patients is independently associated with increased cause and cardiovascular mortality, whereas this excess risk was not in patients who had undergone parathyroidectomy[2]. These findings highlight secondary hyperparathyroidism as a systemic disorder with consequences extending beyond bone disease to cardiovascular morbidity and mortality. Elevated parathyroid hormone levels promote cardiac fibrosis and accelerate atherosclerotic processes through endothelial dysfunction[16]. Disturbances in mineral balance can facilitate vascular calcification and may contribute to arterial stiffness, ventricular remodeling, and compromised myocardial perfusion. By effectively reducing parathyroid hormone levels and improving calcium–phosphorus balance, parathyroidectomy may attenuate extraosseous calcification and represent a key mechanism underlying its favorable effects on survival and cardiovascular outcomes[17].

Surgical treatment is assuming an increasingly role in the management of secondary hyperparathyroidism, parathyroidectomy is recommended by most current literature for refractory disease[5]. However, the optimal surgical approach remains a matter of debate[3]. In the present study, we retrospectively evaluated 14 patients who underwent surgical treatment for renal hyperparathyroidism at our institution. Consistent with previous reports, surgery resulted in a marked postoperative reduction in parathyroid hormone levels, accompanied by improvements in calcium and phosphorus homeostasis. Notably, these biochemical improvements were observed across all surgical subgroups (SPTX, TPTX, and PPTX), in different clinical settings[18].

The surgery for renal hyperparathyroidism should aim to balance the extent of parathyroid resection with the prevention of persistent or recurrent disease while minimizing the risk of permanent hypoparathyroidism. Regardless of the surgical approach, the primary objective remains effective elimination of parathyroid hormone excess[1]. Although long-term follow-up was limited in some patients, no early disease recurrence was observed among patients with available follow-up, supporting the feasibility of surgical management in this retrospective cohort[19]. The relatively higher rate of postoperative bleeding observed in the PPTX group may be associated with the more extensive surgical dissection inherent to this approach. However, given the small sample size, this finding should be interpreted with caution and does not allow for definitive conclusions. Based on our clinical experience, patient-related factors—such as

Istanbul Gelisim University Journal of Health Sciences (IGUSABDER) is indexed by TUBITAK ULAKBIM TR Index.
Web site: https://dergipark.org.tr/en/pub/igusabder
Contact: igusabder@gelisim.edu.tr

comorbidities and overall disease burden—may have played a more prominent role in the development of complications. Secondary hyperparathyroidism is associated with increased fracture risk, cardiovascular morbidity, and higher all-cause and cardiovascular mortality, reflecting the substantial impact of underlying patient-related factors and overall disease burden[20]. Postoperative bleeding is known to occur more frequently in renal hyperparathyroidism than in primary hyperparathyroidism[21].

Reoperations for persistent or recurrent renal hyperparathyroidism are relatively common, particularly following subtotal parathyroidectomy or total parathyroidectomy with autotransplantation, and are associated with significant morbidity due to scar formation, technical difficulty, and an increased risk of recurrent laryngeal nerve injury[22]. Data from large cohorts, including the North American renal registry, indicate that one-year mortality rates following reoperation may approach 10%[23]. Furthermore, even during total parathyroidectomy, complete identification of all parathyroid tissue may be challenging because of ectopic or supernumerary glands, which remain well-recognized obstacles in the surgical management of renal hyperparathyroidism[24].

Given these considerations, surgeons may be cautious about early reoperation for persistent or recurrent secondary hyperparathyroidism. In clinical practice, some centers have explored more extensive surgical clearance during the primary operation. In this context, purge parathyroidectomy combined with muscular or subcutaneous autotransplantation has been described as a feasible approach intended to address potentially unrecognized parathyroid tissue[25]. Our experience reflects its application in selected patients with severe biochemical disease.

Histopathological examination identified a total of 52 parathyroid glands, including one ectopic intrathymic gland and one intrathyroidal gland. Additionally, incidental papillary carcinoma was detected in one patient, consistent with coexistence rates previously reported in the literature[26].

In our clinical practice, total parathyroidectomy and purge parathyroidectomy were applied in selected patients with secondary hyperparathyroidism who were not eligible for kidney transplantation. Given the relatively young age of many patients in our cohort, strategies that may provide durable biochemical control while minimizing the need for reintervention are preferred.

These findings should be interpreted with caution. The small cohort size and retrospective single-center design may limit the generalizability of the results. In addition, the limited follow-up duration and the absence of long-term data in four patients restrict the ability to accurately assess long-term recurrence. Furthermore, clinically relevant outcomes such as bone mineral density and cardiovascular parameters were not evaluated. Although the study was conducted in a high-volume center where 480 parathyroidectomies were performed, the retrospective design and limited sample size remain important limitations. Larger, prospective multicenter studies with long-term follow-up are needed to better define optimal surgical strategies.

Istanbul Gelisim University Journal of Health Sciences (IGUSABDER) is indexed by TUBITAK ULAKBIM TR Index.
Web site: https://dergipark.org.tr/en/pub/igusabder
Contact: igusabder@gelisim.edu.tr

Conclusion

Surgical techniques for treating renal hyperparathyroidism are challenging and can only be performed in experienced centers. At our clinic, we determine our surgical strategy based on individual patient comorbidities and transplant candidacy. We believe that surgical treatment can be determined on a patient-by-patient basis, and that purge parathyroidectomy is also an option.

REFERENCES

1. Lorenz K, Bartsch DK, Sancho JJ, Guigard S, Triponez F. Surgical management of secondary hyperparathyroidism in chronic kidney disease—a consensus report of the European Society of Endocrine Surgeons. *Langenbecks Arch Surg*. 2015;400(8):907-927.

2. Komaba H, Taniguchi M, Wada A, Iseki K, Tsubakihara Y, Fukagawa M. Parathyroidectomy and survival among Japanese hemodialysis patients with secondary hyperparathyroidism. *Kidney International*. 2015;88(2):350-359. doi: 10.1038/ki.2015.72.

3. Hou J, Shan H, Zhang Y, et al. Network meta-analysis of surgical treatment for secondary hyperparathyroidism. *American Journal of Otolaryngology*. 2020;41(2):102370.

4. Evenepoel P. Recovery versus persistence of disordered mineral metabolism in kidney transplant recipients. *Seminars in Nephrology*. 2013;33(2):191-203.

5. Ketteler M, Block GA, Evenepoel P, et al. Executive summary of the 2017 KDIGO Chronic Kidney Disease–Mineral and Bone Disorder (CKD-MBD) guideline update: What's changed and why it matters. *Kidney International*. 2017;92(1):26-36.

6. Schneider R, Slater EP, Karakas E, Bartsch DK, Schlosser K. Initial parathyroid surgery in 606 patients with renal hyperparathyroidism. *World J Surg*. 2012;36(2):318-326.

7. Schlosser K, Bartsch DK, Diener MK, et al. Total parathyroidectomy with routine thymectomy and autotransplantation versus total parathyroidectomy alone for secondary hyperparathyroidism: Results of a nonconfirmatory multicenter prospective randomized controlled pilot trial. *Annals of Surgery*. 2016;264(5):745-753.

8. Liang Y, Sun Y, Ren L, Qi XW, Li Y, Zhang F. Short-term efficacy of surgical treatment of secondary hyperparathyroidism. *Eur Rev Med Pharmacol Sci*. 2015;19(20):3904-3909.

9. Phitayakorn R, McHenry CR. Incidence and location of ectopic abnormal parathyroid glands. *The American Journal of Surgery*. 2006;191(3):418-423.

10. Chang LC, Liu SI, Liang TJ. Neck reoperation for recurrent or persistent renal hyperparathyroidism. *World Journal of Surgery*. 2023;47(11):2784-2791.

11. Chen J, Zhou QY, Wang JD. Comparison between subtotal parathyroidectomy and total parathyroidectomy with autotransplantation for secondary hyperparathyroidism in patients with chronic renal failure: A meta-analysis. *Horm Metab Res*. 2015;47(09):643-651.

12. Shan CX, Qiu NC, Zha SL, et al. A novel surgical strategy for secondary hyperparathyroidism: Purge parathyroidectomy. *International Journal of Surgery*. 2017;43:112-118. doi: 10.1016/j.ijsu.2017.05.062.

13. Turan U. Clinical features of hypercalcemic crisis in primary hyperparathyroidism. *Acta Endo (Buc)*. 2021;17(4):493-497. doi: 10.4183/aeb.20212.493.

14. Fang L, Wu J, Luo J, et al. Changes in bone mineral density after total parathyroidectomy without autotransplantation in the end-stage renal disease patients with secondary hyperparathyroidism. *BMC Nephrol*. 2018;19(1):142. doi: 10.1186/s12882-018-0934-1.

15. Uhlig K, Berns JS, Kestenbaum B, et al. KDOQI US Commentary on the 2009 KDIGO Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of CKD–Mineral and Bone Disorder (CKD-MBD). *American Journal of Kidney Diseases*. 2010;55(5):773-799. doi: 10.1053/j.ajkd.2010.02.340.

16. Rashid G, Bernheim J, Green J, Benchetrit S. Parathyroid hormone stimulates endothelial expression of atherosclerotic parameters through protein kinase pathways. *American Journal of Physiology-Renal Physiology*. 2007;292(4):F1215-F1218.

17. Hamano T, Matsui I, Mikami S, et al. Fetuin-mineral complex reflects extraosseous calcification stress in CKD. *Journal of the American Society of Nephrology*. 2010;21(11):1998-2007. doi: 10.1681/ASN.2009090944.

18. Jia X, Wang R, Zhang C, Cui M, Xu D. Long-term outcomes of total parathyroidectomy with or without autoimplantation for hyperparathyroidism in chronic kidney disease: A meta-analysis. *Therapeutic Apheresis and Dialysis*. 2015;19(5):477-485.

19. Schlosser K, Zielke A, Rothmund M. Medical and surgical treatment for secondary and tertiary hyperparathyroidism. *Scand J Surg*. 2004;93(4):288-297.

20. Tsai SH, Kan WC, Jhen RN, et al. Secondary hyperparathyroidism in chronic kidney disease: A narrative review focus on therapeutic strategy. *Clin Med (Lond)*. 2024;24(5):100238. doi: 10.1016/j.clinme.2024.100238.

21. Tang JA, Salapatas AM, Bonzelaar LB, Friedman M. Parathyroidectomy for the treatment of hyperparathyroidism: Thirty-day morbidity and mortality. *The Laryngoscope*. 2018;128(2):528-533. doi: 10.1002/lary.26604.

22. Frequency of Ectopic and Supernumerary Intrathymic Parathyroid Glands in Patients with Renal Hyperparathyroidism: Analysis of 461 Patients Undergoing Initial Parathyroidectomy with Bilateral Cervical Thymectomy - Schneider - 2011 - World Journal of Surgery - Wiley Online Library. Accessed August 23, 2025. https://onlinelibrary.wiley.com/doi/10.1007/s00268-011-1079-6.

23. Ishani A, Liu J, Wetmore JB, et al. Clinical outcomes after parathyroidectomy in a nationwide cohort of patients on hemodialysis. *Clinical Journal of the American Society of Nephrology*. 2015;10(1):90. doi: 10.2215/CJN.03520414.

24. Okada M, Tominaga Y, Yamamoto T, Hiramitsu T, Narumi S, Watarai Y. Location frequency of missed parathyroid glands after parathyroidectomy in patients with persistent or recurrent secondary hyperparathyroidism. *World Journal of Surgery*. 2016;40(3):1.

25. Conzo G, Della Pietra C, Tartaglia E, et al. Long-term function of parathyroid subcutaneous autoimplantation after presumed total parathyroidectomy in the treatment of secondary hyperparathyroidism. A clinical retrospective study. *International Journal of Surgery*. 2014;12:S165-S169. doi: 10.1016/j.ijsu.2014.05.019.

26. Cinamon U, Levy D, Marom T. Is Primary Hyperparathyroidism a Risk factor for papillary thyroid cancer? An Exemplar Study and Literature Review. *Int Arch Otorhinolaryngol*. 2014;19(01):042-045. doi: 10.1055/s-0034-1396520.

Istanbul Gelisim University Journal of Health Sciences (IGUSABDER) is indexed by TUBITAK ULAKBIM TR Index.
Web site: https://dergipark.org.tr/en/pub/igusabder
Contact: igusabder@gelisim.edu.tr