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Subcutaneous Forearm Injection of Parathyroid Tissue after Total Parathyroidectomy for Secondary Hyperparathyroidism

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Introduction

Secondary hyperparathyroidism (SHPT) is prevalent in end-stage renal disease (ESRD) patients, and when medical management fails, operative intervention becomes necessary, with approximately 5–15% of these patients eventually requiring surgery. Total parathyroidectomy (TPX) with autotransplantation (AT) effectively reduces parathyroid hormone (PTH) while preserving essential parathyroid tissue. Various surgical approaches and site selections for parathyroid AT exist. This study aims to report outcomes and analyze the effectiveness of injecting parathyroid tissue into the subcutaneous forearm area following total parathyroidectomy in refractory SHPT patients.

Materials and method

The prospective cross-sectional study included SHPT patients undergoing total parathyroidectomy with subcutaneous forearm injection between June 2013 and May 2023. Surgical techniques, postoperative management, and follow-up were detailed. Statistical analysis was conducted to assess patient characteristics and outcomes.

Results

The study comprised 228 patients (mean age: 55.294 ± 12.06 years). Serum intact parathyroid hormone levels were monitored postoperatively. At 6 weeks, 96/228(42.1%) had functional autotransplanted tissue, increasing to 128/228(56%) at 12 weeks. PTH changes over time were significant, with a median PTH of 52 pg/mL at 12 weeks. Eleven patients with recurrence underwent autograftectomy successfully during follow-up. Comparisons were made to our database of intramuscular implantation techniques. There was no significant difference in clinical and biochemical characteristics. Kaplan–Meier plots showed no significant difference in the time to normalization and recurrence of iPTH levels between the groups.

Discussion/Conclusion

Subcutaneous injection of parathyroid tissue into the forearm following total parathyroidectomy for SHPT is a feasible and effective method. This technique offers simplicity, safety, and efficacy, allowing for easy control of graft function and potential autograft removal in case of recurrence.

Figure 1. Demonstration of the preparation of parathyroid tissue and autoimplantation into the forearm area using the subcutaneous injection technique.

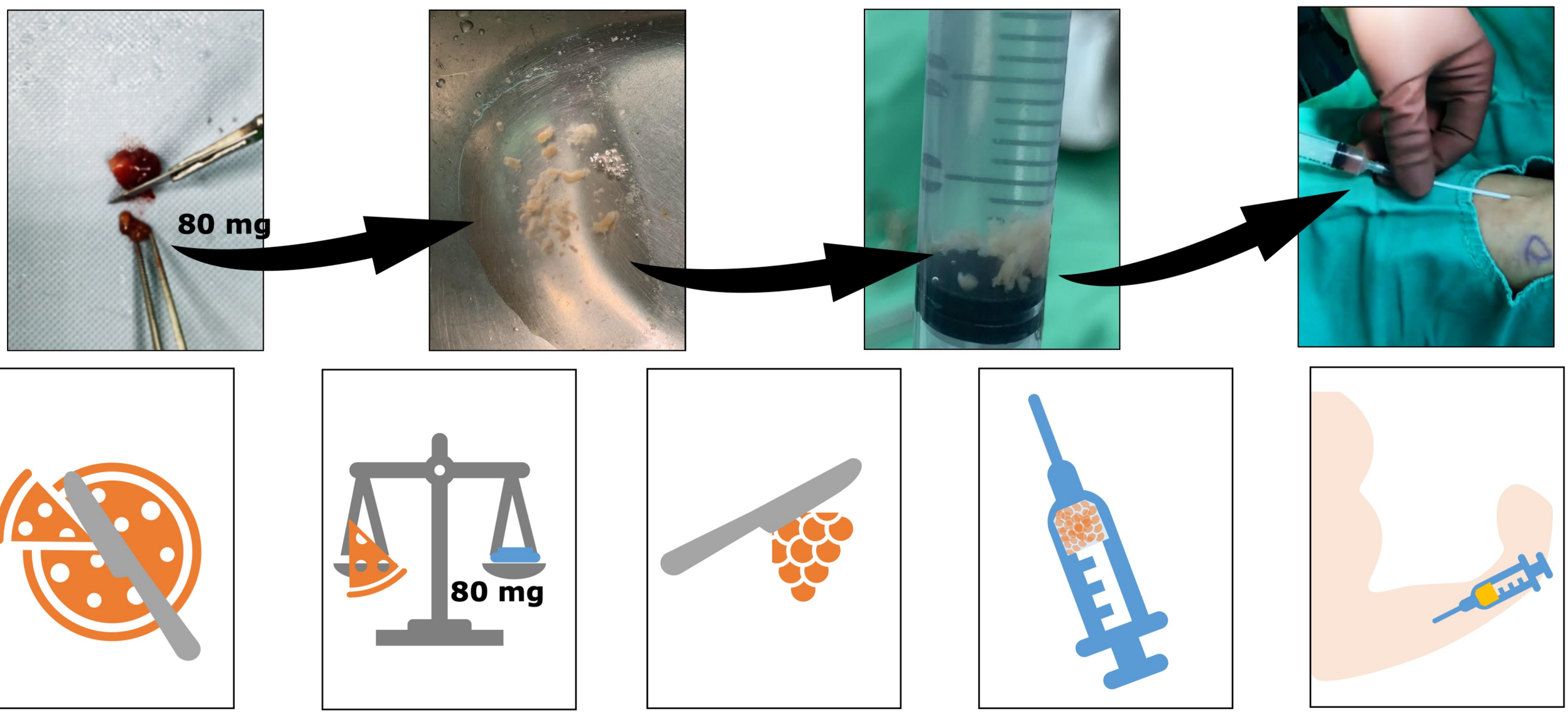

Table 1. Clinical and biochemical characteristics of patient (n=226) who undergone total parathyroidectomy with autotransplantation between June 2013 and May 2023

Patient characteristic	(n= 228)
Age, y	55.85 (12.10) [16.02-82.92]
Sex, male:female (%)	112:116 (49.12%:50.88%)
RRT duration, month	
Preoperative symptoms (%)	
Bone pain	59 (25.9%)
Itching	12 (5.3%)
Muscle pain	30 (13.1%)
Constipation	5 (2.3%)
Fatigue/malaise	4 (1.7%)
Insomnia/irritable	5 (2.3%)
Preoperative laboratory	
Hb, g/dL	10.70-1.90 [5.9-17.0]
iPTH, pg/mL	1686.0 (805.4) [536-6000]
BUN, mg/dL	47.26 (25.59) [11.2-117.4]
CRE, mg/dL	8.42 (4.04) [2.2-17.6]

Figure 2. An example of a patient with autograft recurrence shows that it can be easily palpable and detected (arrows) through imaging studies such as (A) ultrasound and (B) computed tomography