

Surgical Treatment of Hyperparathyroidism Secondary to Chronic Renal Failure: Our Experience with the 7/8 Subtotal Parathyroidectomy Technique

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Abstract

Introduction: Surgical management takes place, after a certain period of evolution, on particularly severe forms of secondary hyperparathyroidism, resistant to medical treatment. Subtotal parathyroidectomy is an effective technique in the treatment of these disorders. **Method:** Our study is retrospective of 33 cases of hyperparathyroidism secondary to chronic renal failure in dialysis patients operated by the 7/8 technique. Identified over a period of 10 years (January 2010 to December 2019), in the ENT department of the Fann University Hospital. **Results:** Out of 33 cases of secondary hyperparathyroidism, the average age of our patients was 51.24 years with a sex ratio of 0.43. Causal nephropathy was dominated by nephro-angiosclerosis, which was found in 27.27% of cases. Bone pain found in 23 patients or 69.69% was the predominant clinical sign. The average calcemia was 92.7 mg/l. Parathormone was dosed in all our patients and the average was 1611.05 ng/l. The consequences were clinically marked by recurrent paresis in one patient. No case of hematoma or postoperative infection was found. On the biological level 10 patients or 30.30% had a transient hypocalcaemia. The results were marked by a drop in PTH in 23 patients or 78.78% of cases. **Conclusion:** Subtotal parathyroidectomy remains an effective and beneficial therapeutic method for kidney failure patients with secondary hyperparathyroidism.

Keywords

Secondary Hyperparathyroidism, 7/8 Parathyroidectomy, Transient Hypocalcemia, Persistent Hyperparathyroidism

1. Introduction

Secondary hyperparathyroidism (sHPT) is one of the mineral-bone disorders seen in patients with chronic kidney disease (CKD-MBD) [1]. It is characterized by abnormally high levels of parathyroid hormone (PTH) and is associated with an increased risk of cardiovascular morbidity and mortality in dialysis patients [2].

The surgical management intervenes, at the end of a certain period of evolution, on particularly severe forms of secondary hyperparathyroidism, resistant to medical treatment, and aims at a maximum reduction of the parathyroid parenchyma. It is a particularly meticulous and demanding surgery, to be entrusted to a specialized surgeon.

The notion of remaining parenchyma takes on as important a value as that of removed parenchyma. The persistence of stimuli, induced by renal failure, on parathyroid hormone secretion will be the cause of persistence and recurrence after initial surgery.

Surgical management of patients with secondary hyperparathyroidism was centered in the ENT department of the Fann University Hospital.

The objective of this study was to evaluate our experience with the 7/8 technique in the surgical management of hyperparathyroidism secondary to chronic kidney disease and to assess the short- and long-term evolution of this treatment.

2. Material and Methods

Our study is a retrospective study of 33 cases of secondary hyperparathyroidism to chronic renal failure in dialysis patients operated for secondary and tertiary hyperparathyroidism by the 7/8 technique which consisted of excision of the 3 parathyroids and half of the fourth gland which seemed to be the most normal. Surgical exploration of the parathyroid compartments for hyperplastic or nodular lesions under general anesthesia was performed in all of our patients. It allowed the localization of the 4 parathyroids in their compartments in all our patients and this allowed the possibility of the realization of the 7/8 technique. It was conducted over a period of 10 years (January 2010 to December 2019) in the ENT department of the Fann University Hospital. We studied the following parameters: Age, gender, etiology of renal failure, length of time on dialysis, clinical signs, biological data, imaging, surgical procedure as well as evolutionary modalities.

3. Results

This study included 23 women for 10 men, *i.e.* a sex ratio of 0.43 (Figure 1). The mean age of our patients was 51.24 years (Figure 2). The causal nephropathy

was dominated by nephro-angiosclerosis which was found in 9 patients, *i.e.* 27.27% of cases. Clinical symptoms were dominated by bone pain found in 23 patients (69.69%) followed by muscular signs found in 27.27% (09 patients). The average calcemia was equal to 92.7 mg/l with extremes of 64 and 131 mg/l. Four patients had hypercalcemia (12.12% of cases). Parathyroid hormone was measured in all our patients and the average was 1611.05 ng/l with extremes of 431 ng/l and 5000 ng/l (**Figure 3**). Cervical ultrasound was performed in all our patients (100%) and found parathyroid nodules in 69.69% of cases (23 patients). Thyroid scintigraphy was performed in 2 patients and was in favor of a right inferior parathyroid hypertrophy in one of the patients and normal in the other case.

A subtotal parathyroidectomy of 7/8th was performed in all our patients. The consequences were clinically marked by recurrent paresia in a patient. Biologically 10 patients or 30.30% had transient hypocalcemia. PTH was dosed in all

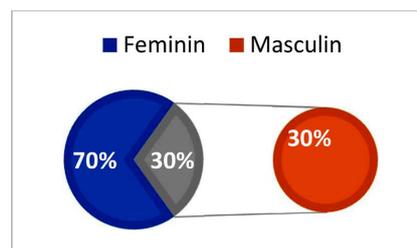


Figure 1. Sex distribution of patients who underwent 7/8 PTX.

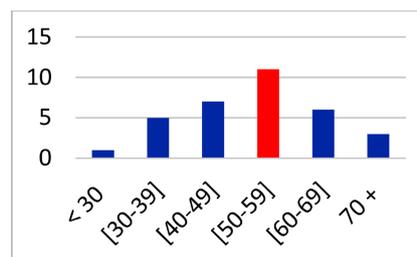


Figure 2. Age (in years) distribution of patients having undergone 7/8 PTX.

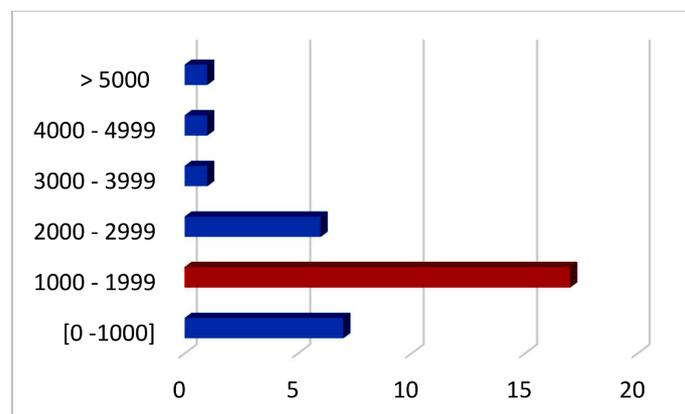


Figure 3. Distribution according to the level of PTHi (ng/l) of the patients having undergone a PTX of 7/8.

post-op patients, values had dropped by 78.78% and a persistence of hyperparathyroidism was found in 7 patients or 21.21%.

Parathyroid hyperplasia was the predominant histological type (23 patients)

4. Discussion

Hyperparathyroidism, which represents one of the aspects of mineral-bone disorders secondary to chronic renal disease, is a frequent long-term complication observed in chronic renal failure.

Parathyroidectomy is a recognized and effective therapy for the treatment of severe hyperparathyroidism when the indications are well defined.

Several types of procedures can be performed. Complete exploration of the thyroid gland with the discovery of all four parathyroid glands is the rule.

The diagnosis of HPTS is made during the follow-up of patients with chronic kidney disease at the dialysis stage. However, the clinical signs are observed in cases of frank hyperparathyroidism and are preceded by biological and radiological abnormalities [3].

Systematic evaluation of the size of the parathyroid gland helps to choose the treatment of secondary hyperparathyroidism in chronic dialysis patients. The indication for parathyroid surgery can be determined by the number of parathyroid glands with nodular hyperplasia, the location of the glands, the existence of ectopic glands, the prognosis, compliance and general condition of the patient, as well as the availability of an experienced surgeon [4]. Clinical indications for parathyroidectomy are severe hyperparathyroidism (PTH 1000 pg/mL) resistant to medical treatment in the presence of hypercalcemia, bone pain and severe hyperparathyroid bone disease, metastatic calcifications, intractable pruritus or symptomatic myopathy in an unexplained way.

The enlarged parathyroid glands detected by ultrasound (glandular weight greater than 500 mg) are very frequently nodular hyperplastic glands and hyperparathyroidism may be refractory to medical treatment [5].

In our study, the indication was given to all patients with biological hyperparathyroidism or in the presence of severe symptoms related to hyperparathyroidism and/or in the presence of nodules or hyperplasia of the parathyroid tissues, but also in the intraoperative discovery of four parathyroid glands in a patient with chronic renal failure on dialysis.

The reduction of the parathyroid parenchyma required must be sufficient to avoid its recurrence, and without being too deleterious, in order to avoid prolonged hypocalcemia and permanent hypoparathyroidism [6].

Thus, exploration of the 4 parathyroid sites appears essential for the initial surgical strategy. The 7/8th PTX shows efficacy in terms of survival without reoperation and postoperative PTH goals and control, possibly at the expense of calcium homeostasis. Veyrat demonstrated a significant decrease in PTHi levels of approximately 86% for the 7/8th parathyroidectomy group of patients [7].

For Song Kim [8] this procedure is more advantageous because it has a lower

rate of hypoparathyroidism compared to total parathyroidectomy alone, and is considered a better choice for patients waiting for a kidney transplant. Subtotal parathyroidectomy may also be the preferred approach in predialysis patients, as it results in less postoperative transient hypoparathyroidism, thus causing less deterioration of kidney function than with total parathyroidectomy.

In the literature, studies comparing the post-operative PTH level between a group of patients who underwent 3/4 parathyroidectomy and a group who underwent 7/8th parathyroidectomy concluded that a 3/4 parathyroidectomy in HPT2 achieves a PTH level higher than a 7/8th PTX, avoiding the occurrence of hypoparathyroidism with its risk of adynamic bone and excess mortality in Perrié's study [9].

In our study one patient (3.03%) presented with recurrent paresis. In the literature, the overall risk of occurrence of a recurrent lesion is estimated between 1 and 5% [10]. The occurrence of hypocalcemia after parathyroid surgery is variable in the literature. In our study, transient hypocalcemia was found in 30.30% of the cases corrected by oral or parenteral calcium supplementation.

Studies have shown that despite careful cervical exploration and subtotal parathyroidectomy, persistent or recurrent hyperparathyroidism cannot be avoided in a number of cases [11]. For Arcerio [12], the persistence of hyperparathyroidism corresponds, in most cases, to a failure of the initial surgery to reduce the parathyroid parenchyma, because of the difficulties caused by the topographical variations.

The rate of reintervention ranges from 2.5 to 14% after subtotal parathyroidectomy. We obtained in our study a decrease in PTHi in 78.78% of cases and a persistence or recurrence of hyperparathyroidism was noted in 7 of our patients (21.21%). According to some authors [13] [14] [15], over large retrospective series, the rate of definitive hypoparathyroidism varies between 2 and 17% after subtotal PTX, over a heterogeneous follow-up period of 18 to 58 months. No cases of hypoparathyroidism have been found in our series.

5. Conclusion

Complete exploration of the thyroid gland with discovery of the four parathyroid glands is the rule. The parathyroidectomy of the 7/8 remains the technique of choice to be developed in similarity with the new techniques which are the intra-operative dosage of the PTH and the extemporaneous anatomopathological examination.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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