

*Research Article***Effect of Parathyroidectomy on Renal Performance in Chronic Kidney Diseased Patients with Secondary Hyperparathyroidism****Nasser M. Zaghloul, Osama El-Menshawy, Mohammed S. Farahat and Hossam El-Deen Sh. Sharawi Mohammed**

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**Abstract**

**Introduction:** Complications of ESRD, such as secondary hyperparathyroidism (SHPT), should be treated accordingly, as they might increase mortality and have a major impact on quality of life (QoL) in such patients. **Aim of the Work:** The aim of this study was to investigate the Effect of Parathyroidectomy on Renal Performance in Secondary Hyperparathyroidism in Chronic Kidney Diseased Patients in Minia Nephrology and Urology University Hospital. **Patients and Methods:** Patients enrolled in this study were scheduled for parathyroidectomy. The number of patients included in this study were twenty patients. The study is a retrospective and prospective study and was performed in the period from January 2017 to January 2019. **Results:** This study was performed in Minia university hospitals between January 2017 and January 2019. Twenty patients with Secondary hyperparathyroidism who underwent parathyroidectomy were included in this study. **Conclusion:** There is a large number of cases of hyperparathyroidism that shows clinical manifestations of hyperparathyroidism with failed medical treatment for long time, these cases are highly indicated for parathyroidectomy whatever the surgical technique will be with excellent improvement of complaint and disability of the patients also correction of serum PTH level which was observed in the research on short term and long term follow up post-operative.

**Keywords:** Parathyroidectomy, Chronic Kidney Disease, Secondary Hyperparathyroidism**Introduction**

Secondary hyperparathyroidism (2HPT) is a common complication in hemodialysis patients, and it is often associated with morbidity and sometimes mortality<sup>(1)</sup>.

Secondary hyperparathyroidism (sHPT), with increased volume of the parathyroid glands and increasing levels of parathyroid hormone (PTH), is a major element of CKD-MBD and it develops over time in the vast majority of patients with CKD<sup>(2)</sup>.

Complications of ESRD, such as secondary hyperparathyroidism (SHPT), should be treated accordingly, as they might increase mortality and have a major impact on quality of life (QoL) in such patients<sup>(3)</sup>.

Patients with severe and complicated renal HPT, refractory or intolerant to medical therapy and patients with specific requirements in prospect of or excluded from renal transplantation may require parathyroidectomy for renal HPT.<sup>(4)</sup>.

Advanced SHPT includes symptoms such as fatigue, bone and joint pain, pruritus and headache. In addition, some patients can develop spontaneous fractures, ectopic calcifications, and neuro- muscular and psychiatric manifestations. These problems may have an impact on QoL in SHPT patients<sup>(5)</sup>.

There are many reports that hyperphosphatemia/hypercalcemia and high levels of parathyroid hormone (PTH) contribute to mortality due mainly to vascular and valvular ectopic calcifications<sup>(6)</sup>.

The majority of patients with 2HPT can be managed by medical treatment<sup>(7)</sup>. Nevertheless, medical treatment does not achieve satisfactory adjustment of the renal HPT and correlated complications in all renal HPT patients<sup>(8)</sup>.

**Aim of the Work**

The aim of this study was to investigate the Effect of Parathyroidectomy on Renal Performance in Secondary Hyperparathyroidism in

Chronic Kidney Diseased Patients in Minia Nephrology and Urology University Hospital.

The study involved the assessment of renal function in CKD patients with 2ry Hyperparathyroidism post-parathyroidectomy to assess the effect of it on the renal performance. The purpose was to follow up patients postoperatively by clinical manifestations and investigations to get sure of improvement of the patients after surgical intervention.

It was an attempt to find out best management of such cases as regard to following them up. It was also an attempt to find the relation between parathyroidectomy and renal performance.

### Patients and Methods

Patients enrolled in this study were scheduled for parathyroidectomy. The number of patients included in this study were twenty patients. The study is a retrospective and prospective study and was performed in the period from January 2017 to January 2019. These patients were taken from Minia Nephrology and Urology University Hospital in the dialysis unit. The operation was done in surgery department in Minia University Hospital.

All patients signed a written consent, accepted and were aware about the procedure in treatment they will receive according the ethical committee of Minia University hospitals.

### Inclusion Criteria:

- 1- Age: >18 years old and <75 years old.
- 2- Serum PTH level more than 800 pg. /mL on two.  
Or more occasions (normal range 10-65 pg. /mL).
- 3- Patient diagnosed as Chronic Kidney Diseased.
- 4- Failure of Medical Treatment for over 6 months.
- 5- Hyperphosphatemia. (Normal range 2.5 to 4.5 mg/dL)
- 6- Patients with symptomatic secondary hyperparathyroidism:
  - Musculoskeletal pain.
  - Pathologic fractures.

- Bone and joint pain.
- Severe pruritus.

### Exclusion criteria:

- 1- Serum PTH level less than 800 pg. /mL on two or more occasions.
- 2- Patients taking drugs such as bisphosphonates, or anticonvulsants that might affect bone density
- 3- Patients with conditions such as thyroid cancer or multiple endocrine neoplasia–type 1 syndrome that might unduly influence the type of surgery or the outcome.
- 4- Patient unfit for anesthesia and operation as congestive heart failure (continue on medical treatment).
- 5- Patient refusing surgery at all.

### Results

This study was performed in Minia university hospitals between January 2017 and January 2019. Twenty patients with Secondary hyperparathyroidism who underwent parathyroidectomy were included in this study. The patients were taken from Minia University Nephrology and Urology Hospital from the dialysis unit. The operation was performed in Surgery Department in Minia University Hospital.

SPSS was utilized for statistical analysis. Quantitative data are presented as mean  $\pm$  SD. The chi-square test was used for comparison of qualitative data, and partition of chi-square was used for pairwise comparisons. The ANOVA test was used for analysis of quantitative data among the cases. For comparison of blood calcium and PTH at different time points, repeated measures ANOVA test was used.  $P < 0.05$  was considered statistically significant.

In the current study, there was post-operative clinical improvement in the form of relief of generalized bone pain which occurred in 8 cases (40%), improvement of Quality of Life (QoL) in 7 cases (35%), improvement of the psychological disturbance in 3 cases (15%), and no improvement was observed in 2 cases (10%) Table (1).

**Table (1): the post-operative clinical improvement of the study group**

Clinical Improvement Feature	The study group N = 20
Relief of Pain	8 (40%)
Improve Quality of Life	7 (35%)
Improve Psychological disturbance	3 (15%)
No clinical Improvement	2 (10%)

NB: Categorical data represented by number and (%)

## Discussion

Classic indications for surgery for Renal HPT include failure of medical treatment to normalize hypercalcemia and hyperphosphatemia in the presence of elevated PTH level greater than eight times the normal range with evidence of biomechanical abnormalities and calciphylaxis.<sup>(9)</sup>

Approximately 5 – 10% of patients with end-stage kidney disease (ESKD) undergo surgical PTX for severe SHPT<sup>(10)</sup>.

The rates of parathyroid surgery for patients with end-stage renal disease have varied with advances in medical management and alterations in management guidelines.<sup>(11)</sup>

The importance of surgery has been highlighted with the recognition of the association of elevated PTH with decreased CV survival<sup>(12)</sup>.

In the current study, there was post-operative clinical improvement in the form of relief of generalized bone pain which occurred in 8 cases (40%), improvement of Quality of Life (QoL) in 7 cases (35%), improvement of the psychological disturbance in 3 cases (15%), and no improvement was observed in 2 cases (10%), while in (Albuquerque, R. et al., 2018), bone pain was controlled in 100% of patients, also Quality of Life improved and the psychological disturbance decreased in patients submitted to parathyroidectomy.

## Conclusion

There is a large number of cases of hyperparathyroidism that shows clinical manifestations of hyperparathyroidism with failed medical treatment for long time, these cases are highly indicated for parathyroidectomy whatever the surgical technique will be with excellent improvement of complaint and disability of the patients also correction of

serum PTH level which was observed in the research on short term and long term follow up post-operative.

In the current study, Post-operative IV & oral calcium was essential to be administrated for avoidance of bone hanger syndrome presented by tetany.

In the current Study, most of the cases improved clinically post-parathyroidectomy, regarding the bone pain, quality of life, daily activities and generalized weakness.

There has been a controversy surrounding the effect of parathyroidectomy on the renal performance. In the current research, there is no statistically significant difference between GFR pre- and post-parathyroidectomy.

Based on the current research, Parathyroidectomy is now recommended for CKD patients with secondary hyperparathyroidism suffering from bone pain, generalized weakness, pathological fractures and psychological disturbance.

Further research should consider including a larger number of patients and a more extended follow-up to correlate between different results and observations to improve the long-term outcome in CKD patients with secondary hyperparathyroidism subjected to parathyroidectomy.

## References

- 1- Kang, B. H., Hwang, S. Y., Kim, J. Y., Hong, Y. A., Jung, M. Y., Lee, E. A., . . . Pyo, H. J. (2015). Predicting postoperative total calcium requirements after parathyroidectomy in secondary hyperparathyroidism. The Korean journal of internal medicine, 30(6), 856.

- 2- Liang, Y., Sun, Y., Ren, L., Qi, X., Li, Y., & Zhang, F. (2015). Short-term efficacy of surgical treatment of secondary hyperparathyroidism. *Eur Rev Med Pharmacol Sci*, 19(20), 3,904-903,909.
- 3- Bilezikian, John P, Brandi, Maria Luisa, Eastell, Richard, Silverberg, Shonni J, Udelsman, Robert, Marcocci, Claudio, & Potts Jr, John T. (2014). Guidelines for the management of asymptomatic primary hyperparathyroidism: summary statement from the Fourth International Workshop. *The Journal of Clinical Endocrinology & Metabolism*, 99(10), 3561-3569.
- 4- Apetrii, M., Goldsmith, D., Nistor, I., Siroopol, D., Voroneanu, L., Scripcariu, D., . . . Covic, A. (2017). Impact of surgical parathyroidectomy on chronic kidney disease-mineral and bone disorder (CKD-MBD)—A systematic review and meta-analysis. *PLoS one*, 12(11), e0187025.
- 5- Brunaud, L., Sime, W. N., Filipozzi, P., Nomine-Criqui, C., Aronova, A., Zarnegar, R., Ayav, C. (2016). Minimal impact of calcimimetics on the management of hyperparathyroidism in chronic dialysis. *Surgery*, 159(1), 183-192.
- 6- Fülöp, T., Koch, C. A., Farah Musa, A. R., Clark, C. M., Gharaibeh, K. A., Lengvársky, Z., . . . Dixit, M. P. (2018). Targeted surgical parathyroidectomy in end-stage renal disease patients and long-term metabolic control: A single-center experience in the current era. *Hemodialysis International*, 22(3), 394-404.
- 7- Eastell, Richard, Nickelsen, Thomas, Marin, Fernando, Barker, Clare, Hadji, Peyman, Farrerons, Jordi, . . . Gomes, Jose Melo. (2009). Sequential treatment of severe postmenopausal osteoporosis after teriparatide: final results of the randomized, controlled European Study of Forsteo (EUROFORS). *Journal of bone and mineral research*, 24(4), 726-736.
- 8- Hanna, T., & Akoh, J. A. (2016). Total parathyroidectomy in patients with chronic kidney disease: Avoiding repeat surgery. *Saudi Journal of Kidney Diseases and Transplantation*, 27(5), 950.
- 9- Fancy, Tanya, Gallagher III, Daniel, & Hornig, Joshua D. (2010). Surgical anatomy of the thyroid and parathyroid glands. *Otolaryngologic Clinics of North America*, 43(2), 221-227.
- 10- Greene, Andrew B, Butler, Robert S, McIntyre, Shannon, Barbosa, German F, Mitchell, Jamie, Berber, Eren, . . . Milas, Mira. (2009). National trends in parathyroid surgery from 1998 to 2008: a decade of change. *Journal of the American College of Surgeons*, 209(3), 332-343.
- 11- Hojaij, F., Vanderlei, F., Plopper, C., Rodrigues, C. J., Jácomo, A., Cernea, C., . . . Brandão, L. (2011). Parathyroid gland anatomical distribution and relation to anthropometric and demographic parameters: a cadaveric study. *Anatomical science international*, 86(4), 204-212.
- 12- Isaksson, E. (2017). Renal hyperparathyroidism, parathyroidectomy and transplantation. [Department of Clinical Sciences, Malmö], Lund University.
- 13- Albuquerque, R. d. F. C., Carbonara, C. E. M., Rita de Cássia, T. M., dos Reis, L. M., do Nascimento Júnior, C. P., Arap, S. S., . . . de Oliveira, R. B. (2018). Parathyroidectomy in patients with chronic kidney disease: Impacts of different techniques on the biochemical and clinical evolution of secondary hyperparathyroidism. *Surgery*, 163(2), 381-387.