



EVALUATION OF SERUM PTH LEVELS IN POST-TOTAL THYROIDECTOMY PATIENTS.

General Surgery

Dr. Akhil Sampath Sai Duvvi Senior Resident, Department Of General Surgery, Konaseema Institute Of Medical Sciences, Amalapuram, Andhra Pradesh, India.

Dr. Praneeth Reddy Gouravaram MBBS Graduate, NRI Institute Of Medical Sciences, Sangivalasa, Visakhapatnam, Andhra Pradesh, India. (Independent Research Collaborator)

Dr. Susnigdha Kotaru* MBBS Graduate, NRI Institute Of Medical Sciences, Sangivalasa, Visakhapatnam, Andhra Pradesh, India. (Independent Research Collaborator) *Corresponding Author

ABSTRACT

Background: For a variety of thyroid problems, thyroidectomy has become the standard procedure, whether it be a partial, whole, or hemi thyroidectomy. One of the biggest issues after a complete thyroidectomy is postoperative hypocalcemia. **Objective:** This study aims to evaluate the serum Parathyroid Hormone (PTH) levels in patients who have undergone total thyroidectomy, in order to assess the incidence of hypoparathyroidism and its clinical implications. **Methods:** A cohort of patients who underwent total thyroidectomy for various thyroid pathologies was studied. Serum PTH levels were measured preoperatively and at regular intervals postoperatively. Data on calcium levels, clinical symptoms of hypercalcemia, and any need for calcium and vitamin D supplementation were also collected. Statistical analysis was performed to identify the relationship between PTH levels and the development of postoperative hypercalcemia or hypoparathyroidism. **Results:** The findings revealed a significant variation in serum PTH levels postoperatively, with a notable proportion of patients developing transient or permanent hypoparathyroidism. A correlation between lower PTH levels and the onset of hypercalcemia was observed, with early PTH measurement proving to be a predictive marker for postoperative complications. **Conclusion:** Serum PTH measurement is a useful tool in the early detection of hypoparathyroidism following total thyroidectomy. Timely intervention based on PTH levels can help in managing postoperative calcium imbalances, improving patient outcomes, and minimizing the need for long-term supplementation. Further prospective studies are recommended to refine the clinical application of PTH testing in thyroidectomy patients

KEYWORDS

Thyroidectomy, Hypocalcemia, Serum Parathyroid hormone, Post-Operative Hypocalcemia, Hypoparathyroidism

INTRODUCTION

For a variety of thyroid problems, thyroidectomy has become the standard procedure, whether it be a partial, whole, or hemi thyroidectomy. One of the biggest issues after a complete thyroidectomy is postoperative hypocalcemia.

It necessitates intravenous calcium therapy, when severe since it can cause deleterious complications such laryngeal stridor and seizures.

Up to 50% of cases of transient hypocalcemia have been reported; these cases are frequent in individuals with Graves' disease and those undergoing concurrent total thyroidectomy with central and lateral neck dissections.

There are about 5% of cases of post-thyroidectomy hypercalcemia, and this condition resolve in 80-85% of those cases in about a year.

It's crucial to identify individuals who are at risk of having hypercalcemia for reducing postoperative complications, hospital stays, and facilitate early discharge.

Measurements of blood calcium and serum PTH in the immediate postoperative period are reliable and practical techniques.

Despite the fact that many recent sources support the utilization of parathyroid hormone as an early indicator of hypercalcemia, this is not always the case because of differences in testing standards and the timing of parathyroid hormone measurement after surgery.

In order to standardize the test to predict postoperative hypercalcemia, our study intends to ascertain whether measuring the level of parathyroid hormone in individuals who have undergone complete thyroidectomy could predict hypercalcemia.

Aims And Objectives -

- To assess parathyroid hormone at the second hour following complete thyroid surgery.
- To assess the serum calcium levels prior to and 24 hours after a complete thyroidectomy.
- To correlate serum calcium levels with levels of parathyroid hormone.

MATERIALS AND METHODS:

This was a hospital based prospective study conducted on patients presenting to General Surgery Department in KIMS AMALAPURAM between September 2022 to April 2023.

Inclusion Criteria-

- Patients who are over 18 years old and diagnosed with a thyroid condition, and need a total thyroidectomy.
- Study participants who have given written informed permission

Exclusion Criteria -

- Surgery or Radiotherapy for the thyroid previously.
- Coexisting parathyroid disease with renal impairment are both present.
- Patients on Calcium supplements

Data Collection And Procedure:

- Thorough clinical assessment and patient history. Thyroid disease, serum albumin, calcium levels, and all other regular investigations confirmed prior to surgery.
- With the patient's previous, informed consent Within two hours of surgery, parathormone levels were measured Postoperatively using a chemiluminescent immunoassay method.
- After 24 hours and 72 hours post thyroidectomy, serum calcium, albumin levels, and rectified serum calcium levels were collected.
- Statistical analysis was performed using Paired T-tests to compare pre-operative and post-operative values.

RESULTS:

- This was a hospital based prospective study conducted on patients presenting to General Surgery Department in KIMS AMALAPURAM between September 2022 to April 2023.
- Out of 50 patients 36% of patients had hypocalcemia 24 hours after complete thyroidectomy, of whom 12% had symptoms. 72 hours after surgery, 68% of patients had hypocalcemia.

Calcium And PTH Analysis:

- Preoperative calcium-mean=9.02 mg/dl +0.39
- Postoperative calcium (24hrs)-mean = 8.25mg/dl +0.50 (p <0.001)

3. Postoperative calcium (72hrs)-mean=7.8mg/dl+0.97 (p=0.002)
4. Postoperative PTH(2hrs): Mean=9.40+ 3.9pg/ml

Statistically significant correlation was found between postoperative PTH at 2hrs and hypercalcemia development at 24hrs and 72hrs (p <0.04) (Table 1)

Table 1: Comparison between post-operative PTH at 2 hrs and post-operative calcium levels at 24hrs and 72 hrs:

	Post-op PTH at 2hrs	Post-op calcium at 24hrs	Post-op PTH at 2hrs	Post-op calcium at 72hrs
Mean	9.405	8.25	9.405	7.8
Standard Deviation	3.9	0.5025	3.9	0.97

Table 2: Comparison of post op PTH with diagnosis:

Diagnosis	Normal	Decreased
Papillary Carcinoma	0	7
Follicular Carcinoma	0	2
Graves Disease	1	0
Multi-Nodular Goiter	34	6

- It was discovered that malignant thyroid disorders had a higher frequency of postoperative hypocalcemia. With a P value of 0.03, a statistically significant difference between postoperative PTH and diagnosis was observed. (Table 2)
- In our investigation, neither age nor sex produced statistically significant results.
- In patients who experienced postoperative hypocalcemia, the hospital stay was longer.
- Patients who saw a large decline in serum Parathormone levels two hours after complete thyroidectomy were more likely to develop hypocalcemia.

Table 3: Preoperative and postoperative calcium comparison at 24 hour

	Mean	Standard Deviation
Pre-op Calcium	9.02	0.394
Post-op Calcium	8.25	0.502

Preoperative calcium had a mean of 9.02 and postoperative calcium had an average of 8.25 with P value of <0.001, which was statistically significant.

DISCUSSION:

The result of the study reinforces previous findings that postoperative hypercalcemia is a frequent complication of total thyroidectomy. The significant decrease in serum calcium levels postoperatively depicts the importance of close monitoring.

A rapid decline in PTH 2hrs postoperatively correlate strongly with the development of hypercalcemia. This supports the existing literature that early PTH level measurement is an effective predictor of post thyroidectomy hypercalcemia.

Patients with thyroid malignancies exhibit a greater incidence to hypercalcemia which could be due to extensive dissection and lymph node removal.

Routine measurement of serum PTH levels immediately after thyroidectomy can help in early identification of patients at risk.

Timely calcium and vitamin-D supplementation can reduce symptom severity and hospitalization duration.

limitations :

Single center study with relatively small sample size.
Longer follow up is needed to assess permanent hypoparathyroidism.

CONCLUSION:

Patients undergoing total thyroidectomy should have their serum PTH levels checked 2hours after surgery.

This is because serum PTH levels are a reliable early indicator of hypercalcemia, even before serum calcium levels fall, which takes at least 24 to 48 hours.

A significant statistical difference was observed between the postoperative serum calcium level and the preoperative blood calcium

level, regardless of the patient's symptomatology, was correlated with the postoperative serum PTH levels, indicating that decrease in PTH levels is an early indicator of hypercalcemia in patients undergoing complete thyroid removal.

REFERENCES:

- Merke. History and iconography of endemic goitre and cretinism. 1984 MTP Press Lancaster, England
- Sakorafas GH. Historical Evolution of Thyroid Surgery: From the Ancient Times to the Dawn of the 21st Century. World J Surg. 2010;34:1793.
- Am J Surg. 2008 Aug;196(2):285-8. doi: 10.1016/j.amjsurg.2007.06.036. Epub 2008 May 7.PMID: 18466858
- Schwartz's. Principles of Surgery 10th ed.: McGraw-Hill Education 2015
- Expert Rev Med Devices. 2008 Nov;5(6):699-704. doi: 10.1586/17434440.5.6.699. PMID: 1902534