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A PROSPECTIVE OBSERVATIONAL STUDY OF POST-THYROIDECTOMY HYPOCALCEMIA AT TERTIARY CARE CENTER.

General Surgery

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ABSTRACT

Introduction: Postoperative hypocalcemia is the most common metabolic complication following thyroid surgery. It results primarily from transient or permanent hypoparathyroidism due to parathyroid gland injury or devascularization. Early identification and treatment with calcium and vitamin D supplements will reduce morbidity. **Aim And Objectives:** To evaluate the incidence of hypocalcemia after thyroid surgery. To classify it into transient and permanent types and analyze its association with the extent of thyroid surgery. **Materials And Methods:** This prospective observational study included 55 patients undergoing thyroid surgery at a tertiary care center, Rajkot. Serum calcium was measured preoperatively and postoperatively at 24 hours, on day 7, 1month and after 6 months. **Results:** Hypocalcemia occurred in 12 patients (21.8%). Transient hypocalcemia was observed in 11 patients (20%), while permanent hypocalcemia occurred in 1 patient (1.8%). The incidence was higher following total thyroidectomy, particularly when combined with neck dissection. **Conclusion:** Postoperative hypocalcemia remains a frequent complication of thyroid surgery. Early biochemical monitoring and prompt supplementation significantly reduce morbidity.

KEYWORDS

Thyroid surgery, Hypocalcemia, Hypoparathyroidism.

INTRODUCTION

Thyroidectomy is widely performed for benign thyroid diseases, differentiated thyroid carcinoma, and compressive goiters. Despite refinements in surgical technique, postoperative hypocalcemia remains the most common early complication, reported in 7–50% of cases depending on the definition and extent of surgery [1–3].

The parathyroid glands are particularly vulnerable during thyroid surgery because of their small size, variable location, and delicate blood supply derived from the inferior thyroid artery. Injury, inadvertent excision, or devascularization of these glands can result in hypoparathyroidism, leading to hypocalcemia [4].

Postoperative hypocalcemia may be biochemical or symptomatic, transient or permanent. Transient hypocalcemia usually results from reversible parathyroid ischemia, while permanent hypocalcemia reflects irreversible gland damage [5].

Hypocalcemia presents with symptoms like muscle spasm, paresthesia, trembling, positive Chvostek sign and Trousseau's sign, and cardiac arrhythmia. Post operative hypocalcemia requires treatment with vitamin D and calcium. This study aims to early identification based on serum calcium levels and treatment, reducing mortality.

METHODOLOGY:

This prospective observational study includes 55 patients undergoing thyroid surgery at Tertiary Care Center, Rajkot during study period of Jan -2023 to Jan-2025 after obtaining informed written from patients.

Inclusion Criteria:

Patients age more than 18 years, giving consent for study, with normal s. calcium level considered for study. Surgery included is hemithyroidectomy, near total thyroidectomy, total thyroidectomy with or without neck dissection.

Exclusion Criteria:

Patients with previous thyroid surgery, neck radiation, parathyroid disorder, chronic kidney disease, bone metabolic disorders or patients on vitamin D and calcium supplement are excluded from surgery.

Data Collection:

Patients included in study underwent pre op laboratory investigations of thyroid function test and s. calcium level. Patients underwent surgical treatment according to requirement categorised in hemithyroidectomy, total thyroidectomy with or without neck dissection. S. calcium level was checked after 24 hrs, on day 7, 1 month and after 6 months. Patients with symptoms like muscle spasm, paraesthesia, tingling and numbness will suggest for hypocalcemia. S. calcium level less than 8.5 mg/dl considered as hypocalcemia. Asymptomatic patients with s. calcium less than 8.5 mg/dl were treated with oral calcium and vitamin D supplement. Severely complicated patients were treated with inj. Calcium gluconate and inj. Vitamin D. patients were discharged after symptoms relief and normalisation of s. calcium level. Patients were followed for next 6 months for hypocalcemia. After 6 months from surgery, patients divided in two groups 1) transient hypocalcemia and 2) permanent hypocalcemia.

Statistical Analysis:

- Data were entered into Microsoft Excel 2019 and analysed using standard statistical methods.
- Categorical variables were expressed as frequencies and percentages.
- The chi-square (χ^2) test was applied to evaluate the association between the type of surgery and postoperative hypocalcemia.
- A p-value <0.05 was considered statistically significant.

RESULT

In the study, mean age group was 42.4 years, being thyroid disease more common in females – 46 (83.6%) and male – 9 (16.4%)

During study period, 55 patients were included, among them, 12(21.8%) patients had developed s. calcium less than 8.5mg/dl.

Table 1: Incidence Of Hypocalcemia

Outcome	Number	Percentage
Hypocalcemia present	12	21.8%
Hypocalcemia absent	43	78.2%
Total	55	100%

Out of 12 patients, 11 patients had transient hypocalcemia, who were treated with calcium and vitamin D supplement and cured from hypocalcemia within 1 months of time. One patient had developed permanent hypocalcemia who had to continue treatment after 6 months.

Table 2: Type Of Hypocalcemia

Type	Number	Percentage
Transient hypocalcemia	11	91.7%
Permanent hypocalcemia	1	8.3%

3 patients developed hypocalcemia within 24 hrs of surgery, while 9 patients had symptoms by the end of first week. After treatment at the end of one month, 11 patients were having s. calcium more than 8.5 mg/dl and free from symptoms. Only one patient was having hypocalcemia which continued for more than 6 months.

Table 3: Laboratory Test Of S. Calcium

Time of test	Number of Patients with serum calcium < 8.5 mg/dl
Postoperative Day 1	3
Postoperative Day 7	9
At 1 month	1
At 6 months	1

Among 55 patients, 28 patients underwent Hemithyroidectomy, 21 underwent total thyroidectomy without neck dissection and 6 patients underwent total thyroidectomy with neck dissection.

Table 4: Type Of Surgery And Hypocalcemia

Type of Surgery	Total no. of patients	No. of patients with Hypocalcemia
Total thyroidectomy + neck dissection	6	4(66.6%)
Total thyroidectomy (without ND)	21	7(33.3%)
Hemithyroidectomy	28	1(3.5%)
Total	55	12

Highest number of patients with hypocalcemia went for total thyroidectomy with neck dissection (66.6%) followed by total thyroidectomy alone (33.3%) than hemithyroidectomy (3.5%)

Here, we applied chi square test for statistical significance, that had p value <0.001 and degree of freedom- 2 which shows there is significant association between type and extent of surgery and postoperative hypocalcemia.

DISCUSSION

The overall incidence of hypocalcemia in this study was 21.8%, which is comparable to previously reported rates ranging from 19–38% [6–8]. Variations in reported incidence are attributed to differences in definitions, timing of calcium measurement, and extent of surgery.

In the present study, transient hypocalcemia (20%) was far more common than permanent hypocalcemia (1.8%). This finding aligns with large cohort studies reporting permanent hypocalcemia rates between 0.5% and 3% [10–12].

Transient hypocalcemia is usually due to temporary ischemia of parathyroid glands, surgical manipulation and edema and reversible suppression of parathyroid hormone secretion. Permanent hypocalcemia reflects irreversible parathyroid damage or inadvertent excision [13].

The risk of hypocalcemia increased with the extent of thyroidectomy, with the highest incidence observed in patients undergoing total thyroidectomy with neck dissection. This observation is consistent with findings by Sitges-Serra et al. and Thomusch et al., who identified extensive surgery and central neck dissection as independent risk factors [14,15].

Neck dissection increases the risk of hypocalcemia due to increased manipulation of parathyroid gland, compromised vascular supply and accidental removal of parathyroid gland.

Hemithyroidectomy showed minimal risk, supporting the protective effect of preserving contralateral parathyroid glands.

Early postoperative calcium monitoring at 24 hours and day 7 allowed prompt detection and early supplementation, preventing severe symptomatic hypocalcemia and help to reduce morbidity.

CONCLUSION

Hypocalcemia is the most common metabolic complication following thyroid surgery. The risk is significantly influenced by the extent of surgical intervention, with total thyroidectomy—especially when combined with neck dissection—carrying the highest risk. The majority of cases are transient and resolve with appropriate calcium and vitamin D supplementation. Early postoperative calcium monitoring is essential to reduce morbidity and improve patient outcomes.

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