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PRESCRIBING PATTERN OF CALCIUM AND VITAMIN D SUPPLEMENTS IN POST THYROIDECTOMY PATIENTS-AN OBSERVATIONAL STUDY

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ABSTRACT

Background: Thyroidectomy is a surgical procedure involving removal of all or part of the thyroid gland and is one of the most commonly done procedures in the world. Hypocalcemia, being the most common complication in the post operative period occurs due to acute parathyroid insufficiency following damage to, or devascularization of, one or more parathyroid glands during surgery. Hence evaluation of it's prescribing pattern is necessary as it negatively impacts their quality of wellbeing and increases hospitalization time.

Methodology: A prospective observational study was conducted in 74 patients in the Department of General Surgery of Pushpagiri Medical College Hospital, Thiruvalla for a period

of 6 months. Patients who underwent thyroidectomy were included. Patient demographic details, laboratory investigations and treatment were collected from medical records. Data collected were entered in MS Excel sheet and statistical analysis was done using SPSS version 21.0 Software.

Results: A significant decrease in the serum calcium levels after thyroidectomy was obtained ($p<0.001$). Tab. Shelcal was the most commonly prescribed brand for hypocalcemia. Majority of the patients had temporary hypocalcemia. A significant improvement in quality of life ($p<0.001$) was obtained in post thyroidectomy patients after counselling. Prolonged duration of surgery ($p<0.01$), preserved parathyroid glands ($p<0.014$) showed significant association with hypocalcemia.

Conclusion: Serum calcium levels were significantly decreased after thyroidectomy. Administration of calcium and vitamin D supplements improved the calcium levels in hypocalcemic patients. Significant improvement was observed in the quality of life in post thyroidectomy patients after counselling.

Keywords: Hypocalcemia, Post-Thyroidectomy, Serum calcium levels, Quality of life, Parathyroid glands, Calcium and Vitamin D supplements

INTRODUCTION

Thyroidectomy is an operation that involves surgical removal of all or a part of thyroid gland. In recent decades, standardization of thyroidectomy and advances in perioperative management have significantly reduced all-cause mortality and morbidity. The most common complication after thyroidectomy is hypocalcemia (low calcium levels).

Most cases of hypocalcemia are transient, asymptomatic, and documented only biochemically. However, persistent hypocalcemia can be corrected for patients, resulting in lifelong dependence on oral calcium supplements and a greatly reduced quality of life **[1-4]**.

The occurrence of hypocalcemia can be due to small size of parathyroid glands (PG), their proximity and close attachment to thyroid and risk of disturbance in blood flow during surgery. Postoperative hypocalcemia remains a common complication in patients despite the expertise of surgeon leading to morbidity and impairment in HR-QOL and rising costs of the healthcare.

Postoperative hypoparathyroidism is a condition characterized by <15 pg/mL serum level of iPTH in the postoperative period, serum calcium levels values < 8.0 mg/dL (2.0mmol/L), or ionized calcium below 1.1 mmol/L (4.4 mg/dL) with or without symptoms of hypocalcemia.

Transient hypoparathyroidism usually resolves within the first 6 months after surgery.

Signs and symptoms of hypocalcemia vary according to severity and onset. In acute hypocalcemia, neurological symptoms such as paresthesias of the perioral area, hands and feet are seen; if untreated can lead to muscle spasms and hyperreflexia. Angina pectoris, Congestive Heart failure or Syncope may be seen in severe cases due to changes in cardiac contractility or electrical conduction.

The classic signs of hypocalcemia include Chvostek's sign (momentary contractions on ipsilateral side of the face when facial nerve is tapped at the angle of jaw) and Trousseau's sign (spasm of hand and forearm due to obstruction of brachial artery; when inflated with a sphygmomanometer cuff on the arm to 10 mmHg above systolic pressure for at least 2 minutes) **[5]**.

MATERIALS AND METHODS

The study design was single centered, hospital based, prospective (observational) study. The proposed study was conducted in the Department of General Surgery in Pushpagiri Medical College Hospital, Thiruvallafor a period of 6 months. The study population included Patients who had undergone thyroidectomy in the Department of General Surgery during the period of 2022-2023 and who fulfilled the inclusion and exclusion criteria.

Inclusion criteria were:

- Patients who underwent thyroidectomy and are willing to give consent to participate in this study.
- Both male and female patients with age greater than 18 years.

Exclusion criteria were :

- Patients who had a previous history of hypocalcemia.
- Patients with any GI disorders.

Assuming 95% confidence interval and 5% absolute precision based on the prevalence of the knowledge level of knowledge about the asymptomatic hypocalcemia in post thyroidectomy patients.

$$n = \frac{z_{\alpha}^2 \, p(1-p)}{d^2}$$

Sample size(n) was found to be 74.

Data collection tools includes data collection proforma, Structured Questionnaire from WHO for assessing quality of life.

OBJECTIVES

- To determine the serum calcium levels before and after thyroidectomy.
- To assess the drug therapy in post thyroidectomy hypocalcemic patients.

- To analyse the quality of life in post thyroidectomy patients.
- To determine the pattern of onset of hypocalcemia in post thyroidectomy patients.

BRIEF STUDY PROCEDURE

A Prospective Observational Study was conducted in Department of General Surgery at Pushpagiri Medical College Hospital on the topic: Prescribing pattern on calcium and vitamin d supplements in post thyroidectomy patients-an observational study. The study was started after getting Institutional Ethics Committee clearance. This was a 6 month study in which patients were recruited based on the inclusion and exclusion criteria. All patients who underwent thyroidectomy during the study period were identified. The patients or their care givers were explained about a brief introduction of the study and confidentiality of the data was strictly maintained. A written informed consent form was obtained from each patient or their care giver. A pre determined data collection form was used to assess the patient demographic details, laboratory investigations, operative findings, drug therapy administered and follow up. Pre and post operative serum calcium levels of the patients were recorded. The thyroid status of the patients was assessed by collecting T3, T4 & TSH levels prior to the surgery as a part of routine investigation. Perioperative findings such as identification of parathyroid glands & duration of surgery were also noted. During the post operative period, we carefully observed the patients for clinical symptoms such as perioral numbness, muscle spasm etc. Based on the serum calcium levels, patients were categorized into hypocalcemic (< 8.6mg/dL) and normocalcemic (≥ 8.6mg/dL). Counselling were provided to both categories of patients using different leaflets. 3 follow ups were conducted. Quality of life of all patients under study after the surgery was assessed using Structured Questionnaire from WHO.

RESULTS AND DISCUSSION

The present study aimed to evaluate the prescription pattern of calcium and vitamin D supplements in post thyroidectomy patients.

1. GENDER WISE DISTRIBUTION OF THYROIDECTOMY PATIENTS

A total of 74 thyroidectomy cases were prospectively analysed in which 61 (82%) were females and 13 (18%) patients were males. The **Table 1, Figure 1,** given below shows a female predominance.

2. DETERMINATION OF SERUM CALCIUM LEVELS BEFORE & AFTER THYROIDECTOMY

Table 2 demonstrates the comparison of serum calcium levels before and after thyroidectomy. The mean serum calcium levels before the surgery was found to be

9.28±0.47 mg/dl. The mean serum calcium levels after the surgery was found to be 8.23±0.57 mg/dl. Comparison of serum calcium levels before and after thyroidectomy was done by using paired t-test and P-value was found to be <0.001 which means there is a significant decrease in the serum calcium levels 48 hrs after thyroidectomy **(Figure 2)**.

3. DISTRIBUTION OF CALCIUM & VITAMIN D SUPPLEMENTS IN POST THYROIDECTOMY PATIENTS

Upon analysing the medications given for hypocalcemia, we found that Tab. Shelcal (35.27%) was the most commonly prescribed brand followed by Cap. Bio D3 (18.70%), Inj calcium gluconate (16.54%), Tab. Shelcal CT (10.79%), Tab. Calcium citrate maleate (CCM) (7.19%), D Rise 60 k IU Sach (6.48%), Tab. Mexcal CT (1.43%), Cap. Calsonic plus (0.71%). There were 4 patients (2.89%) with no supplements given **(Table 3, Figure 3)**.

4. ANALYSIS OF QUALITY OF LIFE IN POST THYROIDECTOMY PATIENTS

Upon analysing the quality of life of patients after thyroidectomy, the mean of total score before counselling was found to be 13.38 and after counselling was found to be 21.92. Results given in **Table 4** shows that t-value is significant at 0.01 level as the p-value is very less than 0.001. Significant t-value indicates that there exists a significant difference in the quality of life (QOL) before and after counselling. This shows that quality of life of patients has been significantly increased after counselling. The comparison of quality of life was done by using paired t-test.

5. DETERMINATION OF PATTERN OF ONSET OF HYPOCALCEMIA AMONG POST THYROIDECTOMY PATIENTS

Out of the 74 patients, 37 (50%) patients suffered from Temporary hypocalcemia, 14 (18.92%) patients had Permanent hypocalcemia. 23 (31.08%) patients were normocalcemic **(Table 5)**.

Table 1 Gender wise distribution of thyroidectomy patients

Gender	Frequency	Percentage
Female	61	82%
Male	13	18%
Total	74	100%

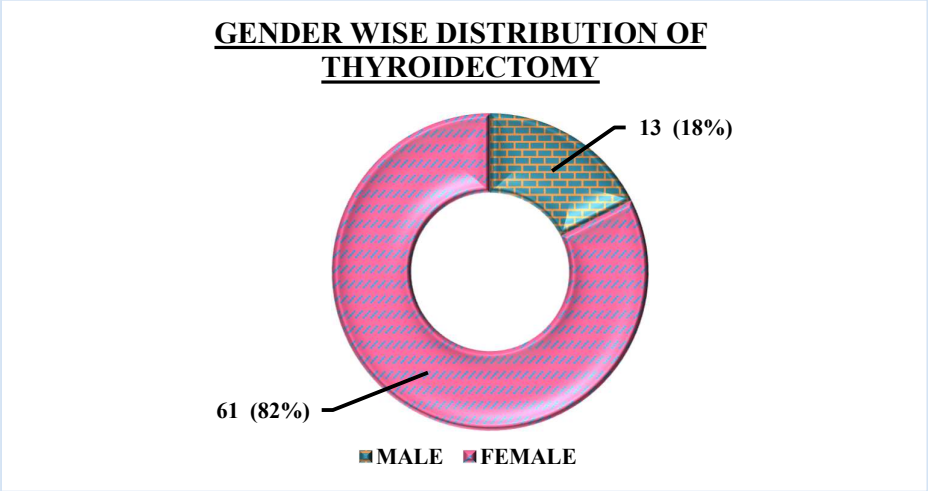

Figure 1: Gender wise distribution of thyroidectomy

Table 2: Determination of serum calcium levels before and after thyroidectomy

Serum Calcium Levels	Mean	SD	t- value	P-value
Before	9.28	0.47		
After	8.23	0.57	12.468**	<0.001

**significant at 0.01 level

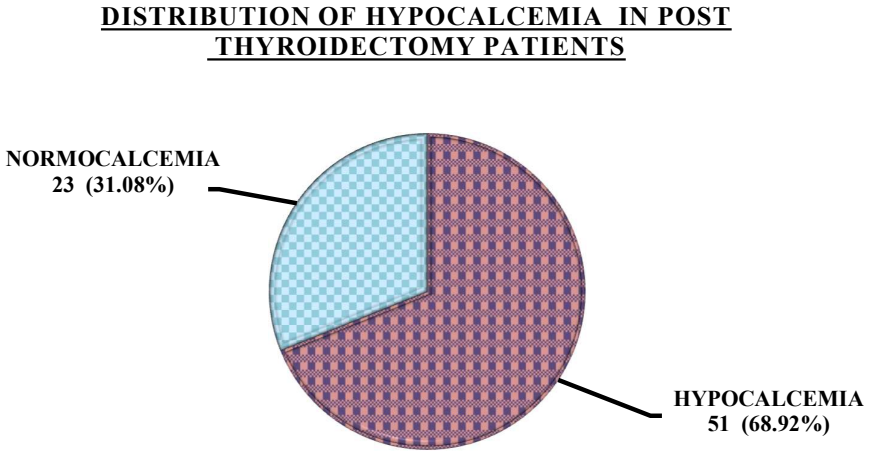

Figure 2: Distribution of hypocalcemia in post thyroidectomy patients

Table 3: Distribution of Calcium & Vitamin D supplements in post thyroidectomy patients

Name of the medication	Frequency	Percentage
Tab. Shelcal	49	35.27%
Cap. Bio D3	26	18.70%
Inj. Calcium Gluconate	23	16.54%
Tab. Shelcal CT	15	10.79%
Tab. Calcium Citrate Maleate	10	7.19%
D Rise 60 k IU Sach	9	6.48%
No supplements	4	2.89%
Tab. Mexcal CT	2	1.43%
Cap. Calsonic plus	1	0.71%
Total	139	100%

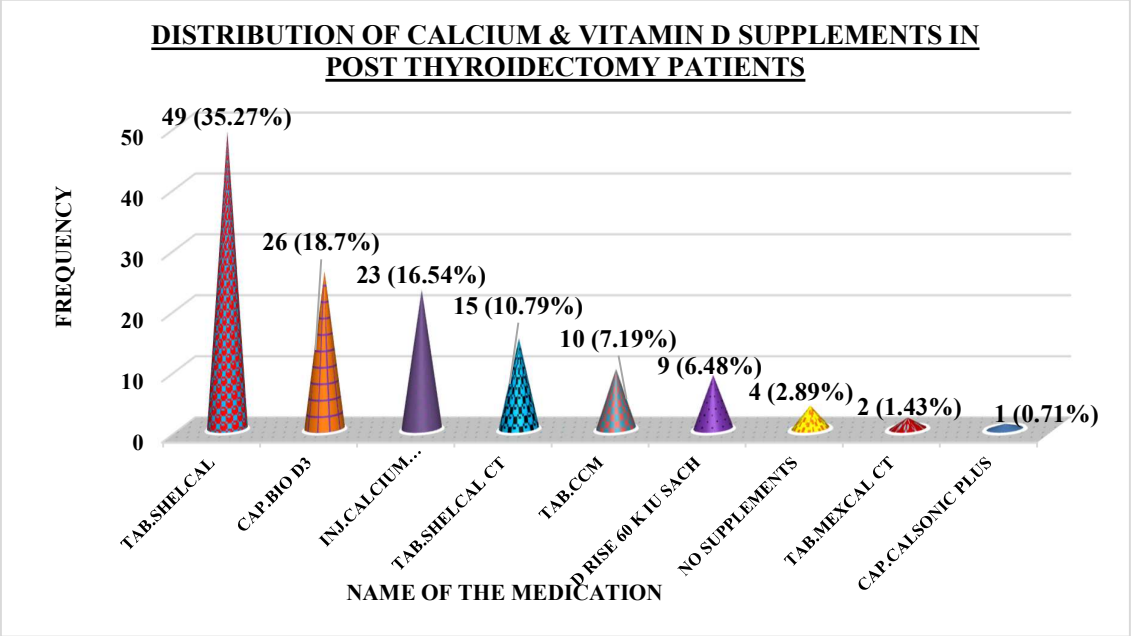

Figure 3: Distribution of Calcium and Vitamin D supplements in post thyroidectomy patients

Table 4: Comparison of Quality of life before and after counselling

Group	Quality of life		t-value	P-value
	Mean	SD		
Before Counselling	13.38	2.37	19.115**	<0.001
After Counselling	21.92	2.13		

** Significant at 0.01 level

Table 5: Determination of pattern of onset of hypocalcemia among post thyroidectomy patients

Pattern of onset of hypocalcemia	No. of patients	Percentage
Temporary hypocalcemia	37	50%
Permanent hypocalcemia	14	18.92%
Normocalcemia	23	31.08%
Total	74	100%

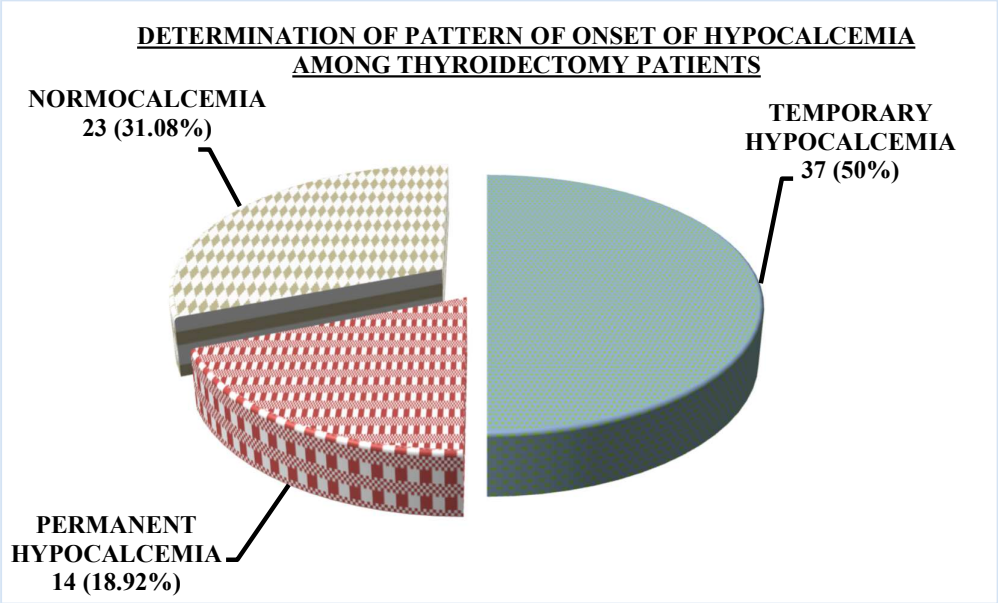

Figure 5: Distribution of pattern of onset of hypocalcemia among post thyroidectomy patients

CONCLUSION

Thyroidectomy is a common surgical procedure with many potential complication as it is performed in an area with complex anatomy of nerves and glands. Since the prevalence of hypocalcemia is very high in post thyroidectomy patients, assessment of it's prescription pattern is thus crucial in patient care . Our study was focused on evaluation of prescription pattern of calcium and vitamin D supplements as it's regular usage may pose risks such as hypercalciuria, hypercalcemia and kidney stones in addition to improvement in calcium levels. Thus individualisation of therapy in each hypocalcemic individuals is necessary by taking into consideration of their calcium levels and health status.

Strict monitoring of calcium levels on each day after surgery till discharge is essential. Identification of risk factors of hypocalcemia may allow for early detection and effective treatment of patients. Further studies in this domain with the inclusion of these parameters with greater sample size and data from multiple centres can be considered.

Lack of awareness about this potential complication may lead to delayed treatment and longer hospital stays. Thus clinical pharmacists play an integral role through educating patients in order to increase their quality of life and health satisfaction.

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Conflict of interest

The authors declared no potential conflicts of interest with respect to the research, authorship and/ publication of this article.

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Ethical Consideration

Institutional Research/ Human Ethics Committee approval was obtained with IEC no:

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