



## ROLE OF PREOPERATIVE VITAMIN D3 AND CALCIUM SUPPLEMENTATION IN PREVENTION OF POST-OPERATIVE HYPOCALCEMIA AFTER TOTAL THYROIDECTOMY - A CASE SERIES

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**ABSTRACT** Total thyroidectomy is a commonly performed surgery and postoperative transient hypocalcemia is a major detriment to early discharge. The aim of this study is to ascertain the usefulness of preoperative calcium and vitamin D3 supplementation in preventing hypocalcemia after total thyroidectomy and making it a routine practice in the preop preparation of all patients undergoing the procedure.

**KEYWORDS :** total thyroidectomy, calcium, vitamin D3 supplementation, hypocalcemia.

### INTRODUCTION

- Hypocalcemia is a well known complication and concern following thyroid surgery. Although in most cases it is only temporary with incidence between 3% to 30% cases even after preservation of one or more parathyroids, permanent hypocalcemia is of around 2-4% reported in the literature.
- It can affect patients quality of life and causes economic burden on health care system.
- Of several, one of the risk factor is low preoperative serum 25 hydroxy vitamin D level and low serum calcium.
- Indeed, preoperative low levels of vitamin D were shown to be an independent risk factor for postoperative hypocalcemia, suggesting that correction of low vitamin D levels might be a useful measure to reduce postoperative hypocalcemia rates
- The active form of vitamin D- calcitriol is the preferred clinical option because of its potency and rapid onset and offset of action.
- Calcitriol regulates the expression of TRPV6, which is a calcium entry channel responsible for calcium absorption in intestine, so the onset of action is only 1 or 2 days compared with 10-14 days for vitamin D3(cholecalciferol)
- We therefore hypothesized that pre-operative administration of calcitriol would reduce the rate of hypocalcemia after total thyroidectomy.
- Moreover, if postsurgical hypocalcemia should occur, pre-operative vitamin calcitriol prophylaxis should be helpful in reducing the time to manage this condition and thus the duration of hospital stay.

### OBJECTIVES

To study the effect of preoperative vitamin D3 and calcium supplementation in prevention of post operative hypocalcemia after total thyroidectomy

### MATERIALS AND METHODS

Study Type : prospective open label study

Study Period : between october 2020 – august 2021

SAMPLE SIZE : 15 patients with calcitriol and Ca supplement.  
15 patients without calcitriol and Ca supplement.

INSTITUTION : King George Hospital associated to Andhra medical college, Visakhapatnam

### METHODS

DOSAGE : Calcitriol - 1 mcg/day  
Calcium - 1 g/day

For a period of 5 days preoperatively.

### Inclusion Criteria:

1. All benign thyroid patients posted for total thyroidectomy
2. Patients willing to give informed consent

### Exclusion Criteria:

1. Patients with thyroid malignancy

2. Patients who are undergoing recurrent thyroid surgery

3. Pregnancy

4. Patients with medical conditions and on medications known to affect calcium metabolism

5. Patients who are not willing to give informed consent

### RESULTS

- 8 patients from Group 2(control) and 1(test) patient from Group 1 developed symptomatic hypocalcemia.
- Laboratory hypocalcemia within 24 hours postoperatively was comparable between both groups, but more patients of 2<sup>nd</sup> group developed hypocalcemia 48 hours post operatively compared to that of the 1<sup>st</sup> group

### Age Incidence

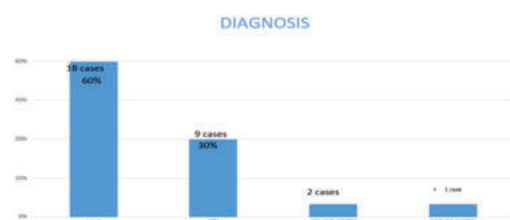
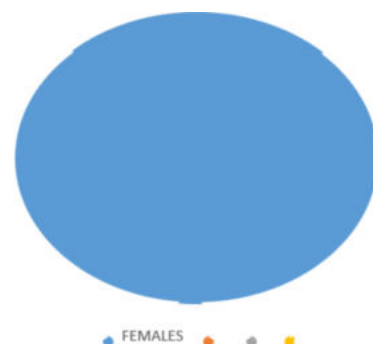
Age distribution of subjects underwent total thyroidectomy in both supplement & non supplement group

	COUNT	PERCENTAGE
21-30 YEARS	4	13.3%
31-40 YEARS	12	40%
41-50 YEARS	7	23.3%
51-60 YEARS	4	13.3%
>60 YEARS	3	10%
TOTAL	30	100%

### Sex Incidence

Gender distribution of subjects that underwent total thyroidectomy

### GENDER



Association between pre operative vit D3 supplement and post operative hypocalcemia

associated with multiple blood sampling

		Post op hypocalcemia symptoms		Total
		Yes	No	
Pre op Vit D3 Supplementation	Yes	1	14	15
	No	8	7	15
Total		9	21	30

- There is no significant association between age groups & post operative hypocalcemic symptoms
- In this study, those who are supplemented with vit D3 preoperatively 1 of them developed post operative hypocalcemic symptoms and 8 of the non supplement group developed post operative hypocalcemic symptoms
- Among subjects with preoperative vit D3 supplementation mean pre operative calcium was  $9.08 \pm 0.5$  and among those without supplementation mean preoperative serum calcium was  $8.9 \pm 0.5$
- Among subjects with preop vit D3 supplementation mean serum calcium(post op day 1) was  $8.6 \pm 0.5$  and among those without supplementation was  $8.4 \pm 0.5$  (the difference was statistically insignificant)
- By post-op day 2, 1 among the supplement group and 8 among the non supplement group developed laboratory confirmed hypocalcemia (<8.5)
- However, there seems to be a significant difference between the supplement group and non supplement group in the development of post operative hypocalcemic symptoms

**DISCUSSION**

- Hypocalcemia is a major post op complication of total thyroidectomy causing severe symptoms and prolonged hospitalization time.
- The mechanism of hypocalcemia after thyroidectomy are multifactorial – factors like surgical technique, parathyroid iatrogenic damage (injury, edema, infarction, ischemia), extent of thyroidectomy, hyperthyroidism, malignancy, gender, perioperative serum calcium drop, presence of thyroiditis, diabetes.

**SYMPTOMS AND SIGNS TO IDENTIFY HYPOCALCEMIA**

**SYMPTOMS :**

- paraesthesias in perioral region ,hands & feet
- cramps, muscle spasms
- irritability , depression & psychotic symptoms
- angina , CCF , syncope
- laryngospasm , bronchospasm , epileptic crisis
- Chvostek sign
- trousseau's sign

**ECG :**

QT & ST prolongation , t wave inversion AV block , ventricular fibrillation

Majority of the subjects were in the age group of 30-50 years with female preponderance

Majority of the subjects who underwent total thyroidectomy were for MNG

Based on the study, 2<sup>nd</sup> post op day is crucial for deciding on early discharge

There was a significant correlation found between preoperative vit D3 and calcium supplementation and the development of post op hypocalcemia symptoms

Herewith , we propose assessment of the drop in Ca levels postoperatively compared to the immediate pre-op levels a useful and simple predictor of hypocalcemia in patients undergoing total thyroidectomy

The results of this study indicate that routine pre-operative vit D3 and Ca supplementation can significantly reduce post-op hypocalcemia, which indirectly decreases prolonged hospitalization & costs

**REFERENCES:**

1. Schwartz's. Thyroid, Parathyroid and Adrenal.In: Brunicaudi FC, Anderson DK, Billar TR, Dunn DL, Hunter JG, Mathews JB et al (eds.). *Principles of surgery* 10<sup>th</sup> ed.: McGraw-Hill Education 2015; 1521-1596
2. Tartaglia F, Giuliani A, Sguella M, Biancari F, Juvonen T, Campana FP. Randomized study on oral administration of calcitriol to prevent symptomatic hypocalcemia after total thyroidectomy. *Am J Surg.* 2005;424-29
3. Kirby-Bott J, Markogiannakis H, Skandarajah A, Cowan M, Fleming B, Palazzo F. Preoperative vitamin D deficiency predicts postoperative hypocalcemia after total thyroidectomy. *World J surg.* 2011;35:324-30