

## CASE SERIES OF HYPOCALCEMIA AS A POST OP COMPLICATION IN TOTAL THYROIDECTOMY

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Received : 30/09/2023  
Received in revised form : 23/10/2023  
Accepted : 03/11/2023

### Keywords:

Thyroid Surgery, Hypocalcaemia, Transient, Permanent.

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DOI: 10.47009/jamp.2023.5.6.64

Source of Support: Nil,

Conflict of Interest: None declared

Int J Acad Med Pharm  
2023; 5 (6); 315-318



### Abstract

**Background:** This study aims to evaluate the incidence of hypocalcemia (both transient and permanent) following total thyroidectomy. **Materials and Methods:** To observe the incidence of hypocalcemia (both transient and permanent) following total thyroidectomy. This study was carried out in 120 patients who underwent Total thyroidectomy in the department of general surgery, during the period from 2020 January to October 2023. Patients of both sex and any age presenting with enlargement of both lobes of thyroid (includes both benign and malignant enlargement) proved by ultrasound (US) to be nodular & by laboratory investigations (Thyroid function test) to be euthyroid. **Result:** In our study out of 120 patients there were 23 males (19.2%) and 117 females(81.8%), are overwhelmingly more common in the female sex. But malignancy of thyroid gland was more common in male gender, probably male gender being in a greater risk for malignancy as per the AGES/AMES Criteria for thyroid malignancies. The incidence of hypocalcemia in our study was 26 cases out of 120 operated (21.6%).Out of the 26 cases that developed hypocalcemia in our study 9 patients(34.6%) went in for permanent hypocalcemia or hypoparathyroidism which is defined as hypocalcemia persisting after 6 months of surgery, Permanent hypoparathyroidism is slightly more frequent in cases of thyroidectomy for hyperthyroidism, thyroid carcinoma, or after previous neck surgery—three conditions in which parathyroid preservation may be jeopardized by technical difficulties. Indeed, the number of parathyroid glands preserved during thyroidectomy appeared to be the major determinant of the outcome. **Conclusion:** Postoperative hypocalcemia is the most common and sometimes the most severe and potentially debilitating complication observed after Total thyroidectomy.

## INTRODUCTION

Despite the advances that have been made in thyroid surgery with the use of latest equipment and techniques the danger of hypocalcemia tetany is still real and every surgeon should be thorough about the anatomy of thyroid and parathyroid and be ready to deal with its complications. This dire complication represents a major concern for thyroid surgeons as the consequences of chronic hypocalcaemia are often insidious and potentially severe. Permanent hypocalcaemia is a common cause of malpractice litigation after endocrine surgery.

**Aims & Objectives of the Study:** This study aims to evaluate the incidence of hypocalcemia (both

transient and permanent) following total thyroidectomy.

**This study will include the following;**

Incidence of hypocalcemia following Total thyroidectomy

Follow up of patients upto a period of 6 months.

## MATERIALS AND METHODS

This study was carried out in 120 patients who underwent Total thyroidectomy in the department of general surgery, during the period from 2020 January to October 2023.

**Inclusion Criteria** for patients in this study consist of -Patients of both sex and any age presenting with enlargement of both lobes of thyroid (includes both

benign and malignant enlargement) proved by ultrasound (US) to be nodular & by laboratory investigations (Thyroid function test) to be euthyroid. Patients excluded were those with contra-indications for surgery and general anaesthesia and those who were not in a euthyroid state.

## RESULTS

The findings of the study can be tabulated as follows. [Table 1]

**Table 1: Distribution of hypocalcemia among age groups of patients in the study.**

Age(years)	Hypocalcemia	
	Transient	Permanent
10-20	1	1
20-30	3	-
30-40	2	2
40-50	5	1
>50	15	5
Total	26	9

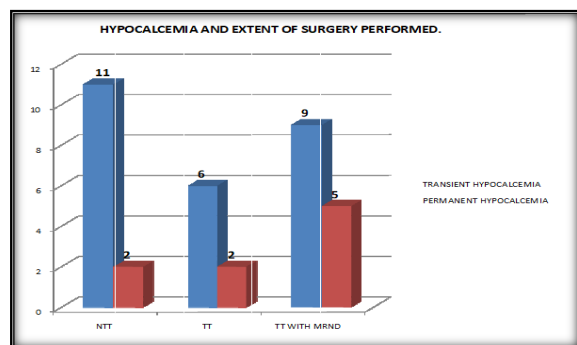
**Table 2: Distribution of hypocalcemia in the study among the diagnoses & procedures performed.**

	Hypocalcemia	
	Transient	Permanent
Diagnosis		
Multinodular goitre	8	1
Colloid goitre	1	-
Toxic goitre	2	2
Carcinoma thyroid	15	6
Procedure		
Total thyroidectomy	17	4
Total thyroidectomy with mrnd	9	5
Total	26	9

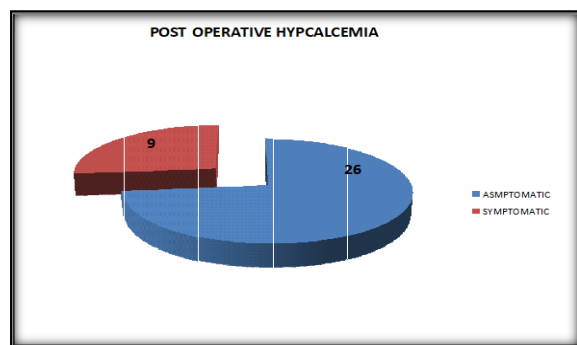
**Table 3: distribution of signs and symptoms of 9 symptomatic patients. Signs & symptoms patients**

Chvostek	3
Paraesthesia&Numbness	5
Trousseau	3
Myalgias	5
Facial spasms	4
Carpal spasms	2
Pedal spasms	1

Total patients with hypocalcemia, n=26 Symptomatic patients=9 (34%)



**Figure 1:**



**Figure 2:**

## DISCUSSION

In our study which is a prospective type 120 patients were included from January 2020 to October 2023. Regarding the sex distribution in this study, as per [Table 2] there were 23 males (19.2%) and 117 females (81.8%), thus we can infer that thyroid disorders are overwhelmingly more common in the fairer sex. But malignancy of thyroid gland was more common in male gender (60% of cases), probably male gender being in a greater risk for malignancy as per the AGES/AMES Criteria for thyroid malignancies. But the benign disorders of thyroid were more common among females in age group of 20-50 yrs(60%) as per Table-I. Malignant disorders of thyroid were more common after 50 yrs of age.<sup>[1,2]</sup> The incidence of hypocalcemia in our study was 26 cases out of 120 operated (21.6%). Out of the 26 cases that developed hypocalcemia in our study 9 patients (34.6%) went in for permanent hypocalcemia or hypoparathyroidism which is defined as hypocalcemia persisting after 6 months of surgery, so we can put it in another way by saying that 35% of patients with transient hypocalcemia went in for

permanent hypoparathyroidism requiring lifelong calcium and/or vitamin D3 supplementation.<sup>[3,4]</sup>

So the incidence of permanent hypocalcemia in our study is 7.5%.

Regarding the distribution of hypocalcemia in our study [Table 2].

There is a greater risk of developing hypocalcemia after malignant disorders of thyroid (58% of hypocalcemic pts). Also the rate of conversion to permanent hypocalcemia is 40% in malignancy of thyroid (6 out of 15 patients went in for permanent hypocalcemia after surgery), while the incidence of permanent hypocalcemia is 3% in benign thyroid disorders, out of which 2 cases developed permanent hypocalcemia, which was due to a Near-total thyroidectomy being performed for Toxic goiter and may be as a result of "Hungry bone syndrome" causing the post-operative hypocalcemia where serum calcium is sequestered in bone after the underlying pathology is removed. This can be explained by figure-II which shows the extent of surgery performed and the occurrence of hypocalcemia which is more after more extensive procedures like Total thyroidectomy with/without modified radical neck dissection. Though the incidence of hypocalcemia after Near Total Thyroidectomy is 11.5% (11 out of 96 operated cases), this was only a transient post-operative hypocalcemia and only two of these patients went in for a permanent hypocalcemic/ hypoparathyroid state which was after surgery for toxic goiter for the reasons mentioned before. In addition the incidence of hypocalcemia following malignant thyroid disorders is more than 50% (62.5%; 15 out of 24 cases.) and out of which 6 patients (25%) went in for permanent hypocalcemia.<sup>[5,6]</sup>

Finally as we can see from figure-III out of 26 cases of hypocalcemia recorded in our study only 9 patients (35%) were symptomatic. Among these 9 symptomatic patients we infer from Table-V that the most common symptom occurring in hypocalcemic patients is paraesthesias, numbness and myalgias (5 cases) followed by facial spasms (4 cases) and Chvostek's and Trousseau's sign (3 cases each). The reported incidence of post-thyroidectomy hypocalcemia varies from 1.6% to 50% when we review literature, estimates of the incidence of post-thyroidectomy hypoparathyroidism vary widely, ranging from 6.9% to 46% for transient and 0.4% to 33% for permanent hypoparathyroidism.<sup>[7]</sup>

Chow et al reported 16% permanent hypocalcaemia after total thyroidectomy, an incidence, which reached to 30% when patients had thyroid cancers. In 310 patients with total thyroidectomy in the Chaudhary series, 17 patients (5.48%) had hypocalcaemia, 12 patients transient, and 5 had permanent hypocalcaemia.<sup>[8]</sup>

A multicenter prospective trial by Thomusch et al of 5846 patients undergoing total thyroidectomy revealed an incidence of transient hypoparathyroidism of 7.3% and permanent hypoparathyroidism of 1.5%. When we compare the

statistics of these authors with ours (transient hypocalcemia-21.6%; permanent hypocalcemia-7.5%), our rates are on the slightly higher side which probably could be due to more extensive surgery performed in our series for more number of malignant disorders of thyroid in our study.

As regard the underlying thyroid pathology, higher incidence of hypocalcaemia with malignant (25%) and Toxic goitre (11.4%) than that in simple nodular goiter (3.6%) the high incidence of hypocalcaemia in thyro-toxicosis was noted also by Wingert et al reported an incidence of 59% for hypocalcaemia after thyroidectomy for thyrotoxicosis versus 3% incidence after thyroidectomy for simple nontoxic goiter (94). Many theories developed to explain this high incidence of hypocalcaemia after thyroidectomy for thyrotoxicosis, Golding and Krane noted that in thyrotoxicosis there is increased bone catabolism and it has been demonstrated that the degree of thyrotoxic osteodystrophy increases proportionally with the severity of thyrotoxicosis. Michie et al postulated that the presence of osteodystrophy that existed after surgery that was called "Hungry bone syndrome" is a possible explanation.

In the Ganecalves series of total thyroidectomy for thyroid cancer, transient hypocalcaemia was reported in 25.5% of cases and permanent hypocalcaemia in 5.1%; when radical neck dissection was added to total thyroidectomies, these rates increased, on comparison with our series our values are higher (transient hypocalcemia-62.5%; permanent hypocalcemia- 25%) again probably due to more frequency of concomitant radical neck dissections performed along with a total thyroidectomy in our series.

According to a study by Vayesberg et al, skill and experience of surgeons in performing total thyroidectomies were evaluated and hypocalcaemia was observed in 6.3% of the patients, the incidence being inversely proportional to skill and experience of surgeon. However a survey by the American College of Surgeons reported an incidence of hypoparathyroidism following total thyroidectomy as 8%. In our study the reported incidence following total thyroidectomy is 28% again due to the more extensive procedures performed (neck dissections combined with total thyroidectomy) and due to the absence of utilisation auto- transplantation of parathyroids in our study.

Finally permanent hypoparathyroidism is slightly more frequent in cases of thyroidectomy for hyperthyroidism, thyroid carcinoma, or after previous neck surgery—three conditions in which parathyroid preservation may be jeopardized by technical difficulties. Indeed, the number of parathyroid glands preserved during thyroidectomy appeared to be the major determinant of the outcome

## CONCLUSION

Postoperative hypocalcemia is the most common and sometimes the most severe and potentially

debilitating complication observed after Total thyroidectomy.

The incidence of hypocalcemia (transient) in our study is 21.6% and permanent hypocalcemia requiring lifelong calcium and/or vitamin D3 supplementation is 7.5%.

So proper planning and meticulous surgical technique with special emphasis in localization and preserving the vascularity of atleast one para- thyroid gland will go a long way in reducing this complication.

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