

**HYPOCALCEMIA AFTER TOTAL THYROIDECTOMY: A COMPARISON BETWEEN HASHIMOTO'S THYROIDITIS AND MULTINODULAR GOITER**

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(ABSTRACT) **INTRODUCTION:** Thyroidectomy is associated with three primary sequelae: recurrent laryngeal nerve injury, hypothyroidism, and hypocalcemia. Persistent hypocalcemia can result in intracranial lesions and cardiac arrhythmias. In cases where a definitive diagnosis of Hashimoto's thyroiditis was not possible due to lack of antibody testing, surgery proceeded under the diagnosis of multinodular goiter. This study aimed to determine the incidence of postoperative hypocalcemia following total thyroidectomy performed by skilled surgeons in patients with multinodular goiter and Hashimoto's thyroiditis. **MATERIALS, PATIENTS AND METHODS:** This cross-sectional study aimed to compare the incidence of hypocalcemia in patients with biopsy-proven Hashimoto's thyroiditis and multinodular goiter. After obtaining approval from the institutional review board and ethics committee, data was collected from the surgical records of 73 patients who underwent total thyroidectomy at a tertiary care center over six months. **RESULTS:** The incidence of postoperative hypocalcemia was significantly higher in patients with Hashimoto's thyroiditis (65.2%) than those with multinodular goiter (49.5%) following total thyroidectomy. Furthermore, 12.2% of patients with Hashimoto's thyroiditis developed permanent hypocalcemia, while only 8.6% of patients with multinodular goiter developed persistent hypocalcemia requiring supplementation. **CONCLUSIONS:** The significant risk of postoperative hypocalcemia should be considered when opting for total thyroidectomy for benign thyroid lesions. Surgery should only be pursued if significant symptoms persist despite pharmacological measures. This study highlights the importance of preoperative evaluation with antithyroid antibodies to confirm the diagnosis of Hashimoto's thyroiditis, especially in the presence of thyroid nodules

KEYWORDS : Hypocalcemia Total Thyroidectomy, Hashimoto's Thyroiditis, Multinodular Goiter

INTRODUCTION

Thyroidectomy is associated with **three primary sequelae: recurrent laryngeal nerve injury, hypothyroidism, and hypocalcemia**¹.

Persistent hypocalcemia can result in **intracranial lesions and cardiac arrhythmias**.

In cases where a definitive diagnosis of Hashimoto's thyroiditis was not possible due to lack of antibody testing, surgery proceeded under the diagnosis of multinodular goiter. **Hypocalcaemia** is a major post-operative complication of **total thyroidectomy**, causing **severe symptoms and increasing hospitalization time**²

Acute symptomatic **hypocalcaemia and permanent hypocalcaemia were once quite common with thyroid surgery** especially in patients having total thyroidectomy.

Rates of these problems have decreased dramatically as the understanding of the **anatomy and physiology of the parathyroid glands has increased**.

Large series of thyroid operations have been reported in which the rates of **permanent hypocalcaemia due to hypoparathyroidism** are less than 1-2%³

AIM OF THE STUDY

This study aimed to **determine the incidence of postoperative hypocalcemia following total thyroidectomy in patients with multinodular goiter and Hashimoto's thyroiditis**

MATERIALS AND METHODOLOGY

PLACE OF STUDY—KVG MCH, SULLIA

STUDY DESIGN—Cross sectional study

STUDY GROUP - Post-operative hypocalcaemia following total thyroidectomy in patients with multinodular goitre and Hashimoto's thyroiditis

STUDY PERIOD—DEC 2022 - MAY 2023

SAMPLE SIZE—73

The categorical variables were compared using the **Chi squared test**. The mean values for serum calcium in the two groups were compared using the **Student t-test**

Inclusion Criteria

All patients **above the age of 18 years**, who had **undergone total thyroidectomy for HT and MNG with post operative hypocalcemia** serum calcium level **below 8 mg/dl**.

Exclusion Criteria

pre-operative hypocalcaemia were excluded

Of the **132 patients** who underwent thyroidectomy in this tertiary care hospital during the study period, **73 were done for benign lesions of the thyroid**. Of these the histopathological diagnosis was **multinodular goiter is 46(63.01%) patients and hashimoto's in 27(49.5%)**.

Table shows that a larger number of females (87.8%) have undergone total thyroidectomy. More than half of the patients belonged to the age group of 30-49 years.

Almost all the patients presented with swelling in the neck as the chief symptom

Baseline characteristics		Biopsy Diagnosis Hashimoto's (27)	Biopsy Diagnosis Mng(46)	Total 73	P Value
AGE	10-29	2	3	5	0.24
	30-49	18	24	42	
	50-69	6	20	26	
GENDER	Male	2	7	9	0.32
	Female	25	39	64	
SYMPTOMS	C/O-swelling In The Neck	25	45	70	0.27
	Hoarse Voice	1	4	5	0.41
	Pressure symptoms	4	9	13	0.60
	Heat/cold Intolerance	5	13	18	0.35
	Hair Loss	4	6	10	0.83
	Palpitation	3	6	9	0.80
	Weight Loss/gain	9	10	19	0.27

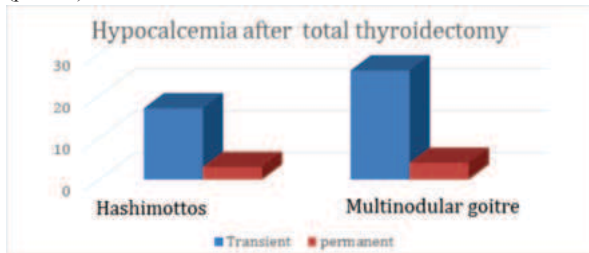
CLINICAL /CYTOLOGICAL DIAGNOSIS	Hashimoto's Thyroiditis	25	2	27	<0.05
	Multinodular Goitre	1	45	46	
TRANSIENT HYPOCALCEMIA	PRESENT ABSENT	18 9	23 23	41 32	0.16
PERMANENT HYPOCALCEMIA	PRESENT ABSENT	2 25	2 44	4 69	0.57

Nearly 80% of the patients did not suffer from pressure symptoms due to the swelling

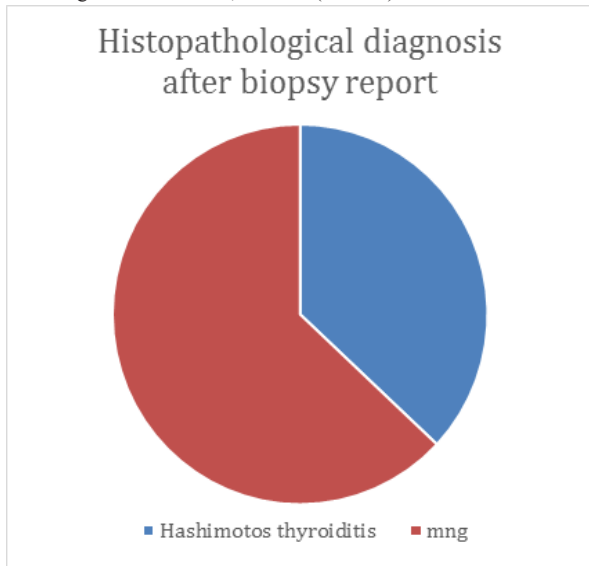
Of the 73 total thyroidectomies performed during the period for benign lesions, the biopsy report revealed 27 had Hashimoto's disease and 46 had multinodular goitre

Transient hypocalcaemia: Of the 27 patients with Hashimoto's thyroiditis who underwent total thyroidectomy, 17(62.2%) developed transient hypocalcaemia compared to 23(49.5%) of patients with multinodular goitre (p=0.16).

Permanent hypocalcaemia: There were 3 (12.2%) patients with Hashimoto's thyroiditis who developed permanent hypocalcaemia compared to 4 (8.6 %) of the 46 patients with multinodular goitre (p=0.57).



After biopsy the histopathological diagnosis showed that 27(36.9%) were diagnosed to have HT, while 46 (63.01%) had MNG



During the early post-operative period, the mean serum calcium level in the Hashimoto group was 7.45 (SD 0.77) and in the multinodular goitre group it was 7.62 (SD 0.72). Of the 73 patients who underwent total thyroidectomy, 76 (61.8%) developed transient hypocalcaemia, while 16 (13.0 %) suffered from permanent hypocalcaemia following surgery.

The incidence of transient hypocalcaemia following total thyroidectomy was 62.2% in patients with Hashimoto's thyroiditis compared to 46.9% in multinodular goitre. The incidence of permanent hypocalcaemia was 12.2% in Hashimoto's thyroiditis while it was

8.6% in multinodular goitre.

DISCUSSION

In this study we found that more than half the patients operated were in the age group 30 to 49 years and over a third were in the age group 50 to 69 years. Most of the patients were females (87.8%).

A parallel observation was seen in a similar study where a majority of the patients with benign thyroid lesions were over 40 years of age (52.9%) and of these a majority were females (82.1%)³

All cases of Hashimoto's thyroiditis were not diagnosed preoperatively as thyroid antibodies were not routinely done for evaluation of thyroid gland enlargement in our institution

When the clinical, sonological and cytological evaluation revealed a symptomatic multi-nodular thyroid swelling with no conclusive indication of thyroiditis, the decision to perform a total thyroidectomy was made

The histopathological biopsy report in 46 (63.4%) of the 73 total thyroidectomies done, showed multinodular goitre while HT was the histopathological diagnosis in the remaining 27 (37.1%)

Various studies have shown that around 60% of total thyroidectomies were done for multinodular goitre, which is similar to our observation (63.4%) in this study as well^{3,4}.

The size of the thyroid swelling varied in all operated specimens. There were no cases with retrosternal extension and none of the patients required cutting the strap muscle for thyroidectomy.

Regarding lymph node status in these thyroidectomies, there was no significant cervical lymphadenopathy and lymph node dissection was not done in any of these patients

Transient hypocalcaemia: Of the 27 patients with Hashimoto's thyroiditis who underwent total thyroidectomy, 17(62.2%) developed transient hypocalcaemia compared to 23(49.5%) of patients with multinodular goitre (p=0.16)

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Few observational studies had noted up to 50% of transient and 4% permanent hypocalcaemia after thyroidectomy^{5,6}.

From our study it was observed that the incidence of post-operative hypocalcaemia was significantly higher in patients who underwent total thyroidectomy for Hashimoto's thyroiditis than for those who underwent the surgery for multinodular goitre

In some cases of Hashimoto's thyroiditis, pharmacotherapy and hormone replacement may not suffice to manage the symptoms and surgical therapy is required.

Thyroidectomy is indicated in patients suffering from severe, painful goitre or experiencing pressure symptoms resulting from tracheal encroachment, which include dysphasia or dyspnoea. Thomas and Rutledge have attempted to create the following guidelines for thyroid resection

The notion of difficulty in thyroid surgery literature remains subjective and is limited to case reports, opinion, and technique papers.

Traditionally cited factors contributing to difficulty in thyroid surgery include increased vascularity, inflammation, friability, fibrosis, and large gland size "Total thyroidectomy may be considered for patients with a dominant mass unresponsive to thyroxine therapy, an increase in the size of the mass despite thyroxine therapy, history or physical examination findings suggestive of malignancy and indeterminate findings on cutting needle biopsy".

A small group of patients with Hashimoto's thyroiditis present with pain and tenderness, and thyroidectomy has been proven to be effective⁸.

However, the limitations of this study are the small numbers and the lack of antibody testing for Hashimoto's thyroiditis. The small number of patients with Hashimoto's thyroiditis (27) included in this study may have limited our outcome. More prospective studies need to be done to confirm that there is a real risk in performing total thyroidectomy for Hashimoto's disease.”.

“This study highlights the importance of preoperative evaluation of thyroid with thyroid antibodies in diagnosing Hashimoto's thyroiditis, especially when there are thyroid nodules.

Making a diagnosis based on clinical evaluation and cytological report may lead to missing the thyroiditis component, as the fine needle aspiration cytology (FNAC) may be reported as a colloid nodule. Even with a diagnosis of multinodular goitre, there may be a co-existent Hashimoto's thyroiditis, which could be confirmed by doing antibody testing

“When considering total thyroidectomy for benign lesions of the thyroid, it is important to keep in mind the significant risk of post-operative hypocalcaemia. Surgery should only be considered as a last resort if significant symptoms persist that are not responding to pharmacological measures

CONCLUSION

It is important to keep in mind the significant risk of post-operative hypocalcaemia when opting for total thyroidectomy for benign lesions of the thyroid. The decision to opt for surgery must be made only if significant symptoms persist that are not responding to pharmacological measures.

This study throws light on the importance of doing a pre-operative evaluation with antithyroid antibodies to confirm the diagnosis of Hashimoto's thyroiditis especially when there are thyroid nodule.

Statements And Declarations

- Competing Interests: The authors have no relevant financial or non-Financial interests to disclose.
- Funding: No funding was received to assist with the preparation of this manuscript.
- Ethical Approval: Approval was obtained from the Institutional Ethics Committee. The procedures used in this study adhere to the tenets of the Declaration of Helsinki.
- Data Availability: This study encompasses all data generated or scrutinized within its scope, comprehensively integrated within this article.
- Consent to participate: Written informed consent was obtained from the patient.
- Consent to publish: The patient has consented to the submission of the case report to the journal.

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