



Post-Thyroidectomy Hypocalcaemia: An Institutional Study

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ABSTRACT

Background: The transient and permanent hypocalcaemia causes considerable loss of health as well as wealth of the patient. The patients undergoing for thyroid surgery should allow elimination of the particular disease for which it was done and also keeping this post-operative complication of hypocalcaemia to a minimum.

Study design: Case series

Aim of the study: To identify the risk factors, that predispose to post-operative hypocalcaemia.

Methodology: This prospective study was conducted up on 278 patients in surgical unit of Mahathma Gandhi Memorial Hospital, Kakatiya Medical Collage, Warangal, Telangana State, India., from January 2011 to February 2016. Different thyroid surgeries were done for various thyroid disorders and observed for post-operative hypocalcaemia. Results were analysed.

Results: 26 patients were with post-operative transient hypocalcaemia (9.35%) which were treated immediately with intravenous calcium gluconate and followed by serial serum calcium levels and 8 patients remained as persistent hypoparathyroidism (2.87%) which was confirmed by serum parathormone levels. Hypocalcaemia developed in first 3 days of post-operative period. Permanent hypoparathyroidism confirmed after 6 months of followup and confirmed with serum parathormone (PTH) estimation. No mortality (0%).

Conclusion: Proper pre-operative evaluation, preservation of parathyroids with refined surgical technique can lower the incidence of post-thyroidectomy hypocalcaemia. Grave's disease, retrosternal goitres, large volume goitres and recurrent goitres are considered to be risk factors.

KEYWORDS : Thyroidectomy, hypocalcaemia , hypoparathyroidism , parathormone (PTH)

Introduction: The incidence of Post-thyroidectomy complications are low, even though it is uncomfortable, disabling and associated with financial loss to the patient. A magnificent surgeon "Theodor Kocher" reduced mortality of thyroid gland surgeries from 50% to less than 4.5% and he advocated methodical surgical dissection of thyroid gland. Post-thyroidectomy hypocalcaemia shows considerable variation in incidence. These variations likely related to type of thyroid disease and type of thyroidectomy. Estimates indicate that transient hypocalcaemia prevalence rates range between 6.9% to 46% and permanent hypocalcaemia rate vary from 0.4% to 33% [1]. Numerous clinical definitions of hypocalcaemia used at different institutions. Transient hypocalcaemia was considered as the decrease in calcium levels below normal range (9-11mg/dl) and lasting upto six months. Definitive hypoparathyroidism was defined as persistent hypocalcaemia for more than six months with decreased serum calcium and PTH levels which require prolonged treatment.

Hypocalcaemia may occur secondarily to surgical trauma, devascularization, unintentional removal of parathyroid glands reoperation and total thyroidectomy [2]. Even after meticulously performed procedures some temporary parathyroid dysfunction may occur. Post thyroidectomy hypoparathyroidism is usually related to disruption of blood supply rather than inadvertent removal of parathyroids [2]. Although a patient needs a single healthy parathyroid gland to have normal parathyroid function, the surgeon's goal is to leave the patient with four functioning parathyroid glands. This study aims to evaluate the incidence and factors involved to cause hypocalcaemia.

Methodology:

Inclusion criteria: Patients who underwent thyroidectomy with normal pre-operative serum calcium levels.

Exclusion criteria: Patients with concurrent lymph nodal dissection, patients with pre-existing hypocalcaemia, patients who underwent parathyroid auto-transplantation. Patients who underwent previous thyroid surgery or radiotherapy.

No of samplings: 278 patients

All the patients (N=278) selected as per criteria from October 2010 to November 2015 were admitted in surgical unit-2 of Mahathma Gandhi Memorial Hospital, Kakatiya Medical College, Warangal, Telangana State, India, after ethical committee approval and patient consent. All the patients were underwound pre-operative preparation including biochemical (T3 T4 TSH Serum calcium), pathological (fine needle aspiration cytology) radiological (ultrasonography and X ray neck AP, Lateral), ENT (Indirect laryngoscopy) and anti thyroid drugs for toxic goitres. The volume of the thyroid gland measured with ultrasonography. The etiology of thyroid swelling was different in each patient and no selection was made for any single etiology. All the cases were operated with the different procedures of thyroidectomy by different surgeons of our team by collar incision and following standard methodological thyroid dissection as mentioned in literature. The immediate and delayed post operative hypocalcaemia noted for all cases were recorded and analysed.

Results: Two hundred and seventy eight (n=278) patients were operated with the procedure of different thyroidectomy for different etiology. Out of 278 patients 226 patients were females (81.29%) and 52 patients were males (18.70%). The age range was from 26 to 68 years with median age of 42 years. 26 patients were with post-operative transient hypocalcaemia (9.35%) which were treated immediately with intravenous calcium gluconate and followed by serial serum calcium levels and 8 patients remained as persistent hypoparathyroidism

(2.87%) which was confirmed by serum parathormone levels. Hypocalcaemia developed in first 3 days of post-operative period. Permanent hypoparathyroidism confirmed after 6 months of followup and confirmed with serum parathormone (PTH) estimation. No mortality(0%).

Table1: Incidence of hypocalcaemia in different thyroid disease

| S.No | Thyroid disease | Patients with hypocalcaemia | Percentage (%) |
|------|--|-----------------------------|----------------|
| 1. | Non-toxic multi-nodular goitre | 12 | 46.15 |
| 2 | Retrosternal goitre | 2 | 7.6 |
| 3 | Toxic multi-nodular goitre | 2 | 7.6 |
| 4 | Primary thyrotoxicosis (Grave's disease) | 4 | 15.38 |
| 5 | Differentiated thyroid carcinoma | 3 | 11.53 |
| 6 | Lymphocytic thyroiditis | 1 | 3.84 |
| 7 | Recurrent goitre | 2 | 7.6 |

Table 2: Comparison of present and previous study results (post operative hypercalcaemia after thyroidectomy)

| Name of the study | Incidence of Hypercalcaemia (%) | Identified risk factors |
|--------------------------------------|---------------------------------|--|
| Rosato L et al [3] | 10 | Thyroid malignancy |
| Randall L Baldasaree et al [4] | 5.5 | Total thyroidectomy and neck dissection |
| Doğa Kalyoncu et al [5] | 24.2 | Total thyroidectomy |
| Alexandre de Andrade Sousa et al [6] | 40.8 | Hyperthyroidism, reoperation Total thyroidectomy |
| CG Nair et al [7] | 23.6 | -- |
| Present study | 9.35 | Large volume multi-nodular goitres |

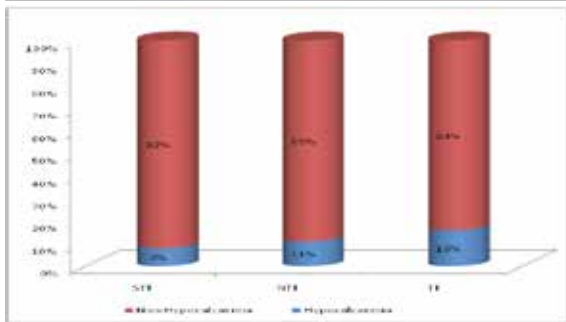


Fig1: Hypocalcaemia and types of thyroidectomy

Discussion: Many studies have been conducted all around the world to determine the incidence and the possible predictors of post-thyroidectomy hypocalcaemia. The mechanism of hypocalcaemia after thyroidectomy is not precisely disclosed, although it is accepted to be multifactorial; factors like surgical technique, not being able to preserve parathyroids (parathyroid injury, edema, infarction, ischaemia), incidental parathyroidectomy extent of thyroidectomy, hyperthyroidism, malignancy secondary thyroid procedures, lymphnode dissection can be considered as etiologic factors [8]. Capsular dissection of thyroid lobes reduce the incidence of hypocalcaemia. Reported incidence of hypocalcaemia ranged from 6.9% to 46% and the present study result within and on lower side [9].

In DogaKalyocuet al study, Alexandre de Andade souse et al study, Randall L. Baldassarre et al, and present study, there was an increased incidence of hypocalcaemic episodes after thyroidectomy which was statistically significant. CG Nair et al study and present study found association of retrosternal extension and incidence of hypocalcaemia. Large volume goitres, recurrent goitres, retrosternal goitres, advanced malignancy, lymphocytic thyroiditis hyperthyroidism and the procedure of total thyroidectomy were found to be the possible risk factors. Preservation of parathyroid is essential to avoid this complication.

Conclusion: Proper pre-operative evaluation, preservation of parathyroids with refined surgical technique can lower the incidence of post-thyroidectomy hypocalcaemia. Grave's disease, retrosternal goitres, large volume goitres and recurrent goitres are considered to be risk factors.

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