

Original Research Article

## **A Clinical Study of Incidence of Hypocalcaemia in Post-Operative Thyroidectomy Patients**

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**Abstract:** This study focuses on the incidence of hypocalcaemia in post operative thyroidectomy patients. The clinical signs and symptoms of the patients were analyzed and tabulated. The results were concluded accordingly. Patients who attended vinayaka mission hospital with a swelling over the neck in the thyroid region and admitted in surgical ward were included in this study and pre-anesthetic check up was done and patients were posted for surgery according to their clinical and imaging diagnosis and their post operative period was analyzed. Patients with carcinoma are excluded from the study. In the 45 patients included in this study irrespective of the sex and clinical features, 7 patients showed signs of hypocalcaemia, in which only 2 patients showed severe hypocalcaemia. They were treated with intravenous calcium gluconate and oral calcium and vitamin D supplements. Patients who had undergone total thyroidectomy had a higher incidence of hypocalcaemia in the post operative period than the patients who underwent subtotal thyroidectomy. Patients with large goiter also had the same characteristics.

**Keywords:** Hypocalcaemia, Post operative thyroidectomy

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### **INTRODUCTION:**

Hypocalcemia remains a major post-operative complication of total thyroidectomy causing potentially severe symptoms and anxiety in affected patients and increasing hospitalization time. Transient hypocalcemia, often observed after surgery, generally responds favorably to replacement therapy within a few days or weeks. Hypocalcemia is considered permanent when it does not return to normal within 6 months (1.3-3% of cases) [1]. The primary cause of hypocalcemia is secondary hypoparathyroidism following damage to or devascularization of one or more parathyroid glands during surgery. Erroneous parathyroid removal may also be responsible. Risk factors for post-operative hypocalcaemia following total thyroidectomy includes thyroid gland size, substernal extension of the thyroid, type of thyroid disorder, extent of surgery, and whether re-operation was necessary. Hypocalcemia can be asymptomatic, particularly if calcium levels are only mildly reduced, or symptomatic with typical

manifestations such as Chvostek's and Trousseau's signs, muscle spasms and paresthesia [2]. Severe neurological manifestations may occur if the condition is not adequately treated. Post-operative hypocalcemia requires calcium and Vitamin D supplementation, with monitoring until blood calcium returns to normal, thus hospitalization is typically prolonged. Calcium with Vitamin D may be administered for prophylactic purposes but is useless if blood calcium is normal and carries the risk of triggering hypercalcemia. The cut-off value and timing of blood sampling used to define postoperative hypocalcemia differs. Most authors agree on the biochemical diagnosis of hypocalcaemia as a total s-Calcium concentrations <8 mg/dL or 2 mmol/L. Total s-Calcium is cheap and easy to interpret and is preferable to ionized calcium concentrations which are highly dependent on blood sampling, transport and PH. A cut-off of 8 mg/dL (2mmol/L) corrects for recumbence and mild hemodilution, and only exceptionally are symptoms of hypocalcemia observed

above this value. Other authors define hypocalcemia as an s-Calcium <1.8 or 1.9mmol/L but this risks to underestimate the diagnosis of hypocalcemia since patients may develop symptoms when s-Calcium drops below 2mmol/L. Finally, raising the cut-off up to 2.1mmol/L may lead to an over estimation of hypocalcaemia rates and overtreatment [3]. Timing of s-Calcium measurement after thyroidectomy is critical because it has an impact on the prevalence of hypocalcemia rates: the closer the blood sampling is performed to surgery the lower the rates of hypocalcemia will be. On the other hand, if serum Calcium is determined too late, patients may develop clinical symptoms before treatment is commenced. For these reasons, we adhere to the more widespread proposal that postoperative hypocalcemia be defined as a s-Calcium <8 mg/dL (2mmol/L) 24 hours after total thyroidectomy and that oral treatment with calcium and calcitriol be started if s-Calcium drops below this value [4]. This selective therapeutic strategy allows for patients to be discharged home early on the next day and minimizes overtreatment of the normo calcemic patients. The incidence of a low postoperative Parathormone after total thyroidectomy has been highly variable in the literature, ranging between 7 to 37%. Part of this variability is related to the variety of methods used to define this complication. Since surgeons know that this is a potential risk of surgery, many patients are empirically treated with either calcium or calcitriol to try and avoid symptoms. While this supplementation can help minimize symptoms for patients, it makes it difficult to determine who truly has transient hypoparathyroidism and who does not based only on calcium levels, symptoms, or the need for supplementation [5]. One objective measure, and possibly the cleanest method for defining transient hypoparathyroidism, is to look at the Parathormone level immediately after surgery before beginning any supplementation. In this study, we considered anyone with a Parathormone <10 pg/mL to have transient hypoparathyroidism. Hypoparathyroidism is a medical condition caused by a surgeon removing all four of a patient's parathyroid glands [6]. This is a terrible complication of surgery performed on the thyroid or parathyroid glands, and its occurrence should be near zero. It can cause very significant medical problems and can be so severe as to make a person's life quite miserable. Surgery of the thyroid and parathyroid glands can be quite tricky. The parathyroid glands have the most variable anatomy in the body. Because of this, even the most experienced thyroid surgeons in the world could, on occasion, make the mistake of destroying or removing all of patient's parathyroid glands [7].

#### **MATERIALS AND METHODS:**

All patients who had complaints of swelling over the neck attending vinayaka mission medical college, karaikal posted for surgical excision from the year July 2104 to December 2016 were included in this study. Post operative period was managed, monitored and recorded especially serum calcium level, and physical signs of hypocalcaemia. All 45 cases were included in this study, the study was prospective study, and hypocalcaemia were evaluated by signs such as perioral numbness and trousseau's sign and were tabulated. Patients who had carcinoma thyroid and underwent total thyroidectomy were excluded from this study. Patients who had any previous metabolic syndromes such as pheochromocytoma were excluded from the study.

#### **RESULTS:**

45 patients were included in this study and in which 41 patients were female and four patients were male. Gender distribution is not significant because females are more prone. Age distribution was significant as most of the patients were above the age of 40 years. In the 45 patients, 22 patients underwent total thyroidectomy and 23 patients were underwent subtotal thyroidectomy. In that 8 patients were converted from subtotal to total thyroidectomy on table because of the large size of the gland. In all cases parathyroid gland was seen and preserved except for one patient who underwent total thyroidectomy, only one parathyroid gland was identified and preserved because of heavy bleeding and huge goiter. Perioral numbness was the first clinical sign of hypocalcaemia to appear in a post operative patient. In this study perioral numbness was seen in 7 patients that too who underwent total thyroidectomy. In these 7 patients 5 patients improved in the third post operative day with the intravenous infusion of calcium gluconate and oral calcium supplement. Serum calcium was taken after 48 hrs in all patients but in the patients where the clinical signs are present serum calcium is taken after 24 hrs and evaluated. Trousseau's sign is one of the most important sign present in the severe hypocalcemia. Trousseau's sign was seen in 2 patients in this study. Serum calcium level was on the low level for the patients presented with clinical signs. Serum calcium was drastically low in patient presented with trousseau's sign. In 2 patients who underwent total thyroidectomy there was severe hypocalcaemia and they were treated with intravenous calcium gluconate and potassium corrections were given simultaneously. Patient went for respiratory distress for two times in the post operative period. Serum calcium levels started to elevate on the fourth

post operative period. In total thyroidectomy patients, incidence of parathyroid gland injury or hypocalcaemia was very high but in some of the patients there was a need for total thyroidectomy that too in a patient with secondary thyrotoxicosis. Intra-operatively expertise is needed to identify the parathyroid gland. In controversy to the total thyroidectomy, in subtotal thyroidectomy

some of the tissues were left in the tracheoesophageal groove so parathyroid and recurrent laryngeal nerve injury can be avoided. In this study there is no incidence of hypocalcaemia in the patients who underwent subtotal thyroidectomy. Serum calcium levels were in a normal range in patients who underwent subtotal thyroidectomy.

**Table 1: Procedure**

Procedure	No. of patients	%
Total Thyroidectomy	22	48.9
Sub Total Thyroidectomy	23	51.1
Total	45	100.0

**Table 2: Perioral Numbness**

Perioral Numbness	Procedure		Total
	Total Thyroidectomy	Sub Total Thyroidectomy	
Not Present	15(68.2%)	23(100%)	38(84.4%)
Present	7(31.8%)	0(0%)	7(15.6%)
Total	22(100%)	23(100%)	45(100%)

P=0.004\*\*, significant, Fisher Exact test

**Table 3: Trousseau's sign**

Trousseau	Procedure		Total
	Total Thyroidectomy	Sub Total Thyroidectomy	
Negative	20(90.9%)	23(100%)	43(95.6%)
Positive	2(9.1%)	0(0%)	2(4.4%)
Total	22(100%)	23(100%)	45(100%)

P=0.233, not significant, Fisher Exact test

**Table 4: Serum Calcium**

Serum Calcium	Procedure		Total
	Total Thyroidectomy	Sub Total Thyroidectomy	
1-5	1(4.5%)	0(0%)	1(2.2%)
6-10	21(95.5%)	23(100%)	44(97.8%)
Total	22(100%)	23(100%)	45(100%)
Mean ± SD	8.02±1.09	8.35±0.41	8.19±0.82

**DISCUSSION:**

In this study 45 patients were included who have attended vinayaka mission medical college for complaints of multinodular goiter and who underwent either total or subtotal thyroidectomy. Their clinical post operative period was evaluated for five days, their clinical signs; serum calcium levels were recorded and documented. It is a prospective study in which age group more than 20 were included in the study. Most of the patients were females in the study [8]. Only 4 patients were male and there are literatures which suggest female sex is more prone for the multinodular

goiters because of the fluctuation hormones needs and demands. Patients who came with the complaints of swelling in the neck were admitted in the surgical ward and patients were assessed with the imaging modality ultrasonography to confirm the site and extension of the swelling. Thyroid function tests were taken to rule out thyrotoxicosis and fine needle aspiration cytology were done to rule out the malignancy [9]. If the swelling came as malignant in FNAC the patients were excluded from the study. If the patient is in hyperthyroid or thyrotoxicosis state, antithyroid drugs were given and periodic thyroid function test were done. Patients were

subjected to pre-anesthetic checkup and pre-operative thyroid profiles were taken and who were in euthyroid state were subjected to the surgery [10]. Surgery was decided according to size and functional status of the gland. Patient who were in hyperthyroid state and came to euthyroid and who had huge goiter were subjected to total thyroidectomy. Post operative period was well monitored and documented till 5th day for all patients. For all patients serum calcium level was taken 48 hours after surgery and monitored [11].

#### CONCLUSION:

Incidence of hypocalcaemia was high in the patients underwent total thyroidectomy rather than subtotal thyroidectomy. In some patients there was a need for total thyroidectomy where in secondary thyrotoxicosis it is an absolute indication. In total thyroidectomy identifying and preserving the parathyroid and the recurrent laryngeal nerve is a must and expertise is needed [12]. Hypocalcaemia is a graveyard postoperative complication in a total thyroidectomy patients, so oral calcium supplements can be useful in post operative from day zero. In 2 patients serum calcium levels were less than 6. In those, immediate care should be taken and intravenous infusion of calcium gluconate should be given. Serum calcium level will be evaluated only after 48 hours of post operative period. Oral calcium should be started at the earliest [13].

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