



Hypocalcemia Following Total Thyroidectomy

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Abstract

Aims: To evaluate the incidence of postoperative hypocalcemia in patients subjected to total thyroidectomy.

Settings and Design: A prospective observational study conducted on 50 patients undergoing total thyroidectomy during a period of 2 years at NRIGH, Chinakakani, Guntur.

Materials and Methods: Data collected from the patients undergoing total thyroidectomies by meticulous history taking, careful clinical examination, appropriate radiological, haematological investigations including serum calcium and follow-up of the cases done after surgery for post-operative hypocalcemia. Data collected was analysed using descriptive statistical analysis principles. The study included patients of any gender above 12 years who underwent total thyroidectomy. Patients who had pre-existing hypocalcaemia, who received preoperative calcium supplementation, who underwent completion thyroidectomy were excluded from the study.

Results: Hypocalcaemia presents most commonly in thyroid malignancies. Transient hypocalcaemia is more common than permanent hypocalcaemia in total thyroidectomy.

Conclusion: The study suggests that serum calcium levels significantly decreases after total thyroidectomy. Totally exposing the parathyroid glands during dissection is a key to void complications. Hypocalcaemia was associated more with female and malignant thyroid diseases. Postoperative hypocalcaemia usually manifests within 24 hours after surgery. If clinical sign symptoms of hypocalcaemia are not developed in this period, patient is considered safe. The result, can guide stratifying patients to be discharged early, closely monitor calcium level and early calcium supplementation

Keywords: Total thyroidectomy, complications, hypocalcaemia.

Introduction

Total thyroidectomy is indicated for various thyroid pathological conditions including thyroid malignancies, diffuse thyroid goitre, chronic thyroiditis and goitres causing pressure symptoms. Hypocalcaemia after bilateral surgical resection of thyroid is a potential early complication upto 59%⁽²⁾. From 9.2% to 25% of transient hypocalcaemia are reported in literature and the incidence of

permanent hypocalcaemia ranges from 0.5 to 2 %⁽¹⁾. Careful dissection, identifying and sparing at least 2 parathyroid glands under direct vision is mandatory to avoid postoperative reduced calcium levels and its complications, some studies say that postoperative hypocalcaemia is more frequent following bilateral resection of lobes 9% than unilateral, 1.9%⁽³⁾. Early recognition and prompt management of hypocalcaemia is crucial for a

better outcome of the patient. Many predictors are under study to establish an effective protocol to identify and manage hypocalcaemia postoperatively. But their availability and cost factor makes serum calcium estimation an important tool in post thyroidectomy hypocalcaemia.

Clinical features of hypocalcaemia include muscle cramping, twitching, spasm, circumoral and acral parasthesia and numbness, laryngospasm and bronchospasm, seizures. Severe neurological complications can occur with severe hypocalcaemia. (85) ECG Prolonged QT interval and depressed systolic function and cardiac failure and arrhythmias Symptoms usually manifest about 24- 48 hrs after surgery.(87) the physical signs of hypocalcaemia include Chvosteks sign - Tapping the parotid gland over facial nerve can induce facial muscle spasm, Trousseau sign-mild hypoxia induced by inflation of a blood pressure cuff can induce carpopedal spasm.

Hypocalcaemia is defined as a fall of corrected serum calcium below 8.0 mg/dl⁽³⁾. Criteria for significant hypocalcaemia is defined as a symptomatic patient total calcium level of less than 7.2 mg/dl(81). Permanent hypoparathyroidism is defined as hypoparathyroidism persisting for more than six months following thyroidectomy⁽³⁾.

Subjects and Methods

The prospective study was conducted at NRIGH during a 2year period. Data was collected from 50 patients who underwent total thyroidectomy. Meticulous preoperative work up, diagnosis and indication for total thyroidectomy were noted. Preoperative blood investigations including serum calcium were recorded. Careful surgical dissection, visualization and preservation of parathyroid glands was considered to avoid postoperative hypocalcaemia. Patients were observed postoperatively for symptoms of hypocalcaemia. Serum blood calcium levels were measured in the postoperative period.

Results

A total of 50 patients were included in the study fulfilling the inclusion and exclusion criteria mentioned in the study proposal. After a meticulous preoperative work up including blood investigations and serum calcium levels, diagnosis, total thyroidectomy was done. Postoperative serial serum calcium levels by day1, day 2 and day 7 and records about various presentations of symptoms and signs were maintained. A total of 17, 34% patients presented with hypocalcaemia. Majority of the presentation was in patients with a pathological diagnosis of thyroid malignancies followed by hashimotos thyroiditis. 16 cases were transient and 1 case was permanent (malignancy) hypocalcaemia. Hypocalcaemia was managed with oral or Iv calcium supplementation.

Table 1: Patients presenting with hypocalcaemia

Patients presenting with hypocalcaemia	No of patients	Percentage
Yes	17	34%
No	33	66%

Table 2: Postoperative diagnosis and presentation of hypoglycaemia

Diagnosis	No of cases	No of cases with hypocalcaemia	percentage
Thyroid malignancies	14	10	71.4%
Thyroid adenoma	08	0	0
Toxic MNG	13	2	15.3%
Hashimotos thyroiditis	12	5	41.6%
Nodular/ colloid goitre	03	0	0
Graves disease	0	0	0
Lymphocytic thyroiditis	0	0	0
Total	50	17	

Table 3: Day of presentation of hypocalcaemia symptoms and signs:

Day of presentation	No of patients	percentage
POD – 1	7	41
POD – 2	10	59

Table 4: Presenting symptoms of hypocalcaemia

Presenting symptom	No of cases
Perioral numbness	7
Carpopedal numbness	4
Asymptomatic	6
Depression	0
ECG changes	0

Table 5: Type of hypocalcaemia

Type of hypocalcaemia	No of patients	Percentage
Transient	16	34%
Permanent	01	32%
Total	17	02%

Discussion

Malignant diseases show more incidence of post thyroidectomy hypocalcaemia than the benign diseases, this attribute to the extensive surgical dissection performed in malignant disorders in order to obtain tumour clearance. In a study conducted by sokouti M et al, regarding the incidence of transient and permanent hypocalcaemia after total thyroidectomy for thyroid cancer reveals higher incidence of hypocalcaemia after total thyroidectomy in malignant diseases of thyroid. The incidence increases more with surgeries combined with radical neck dissection⁽²³⁾. The incidence of post thyroidectomy hypocalcaemia is more in the toxic thyroid diseases than non toxic diseases, this also attributes to the extensive surgical dissection in the toxic disorders in order to avoid recurrence of the disease. Indications for total thyroidectomy in our study population shows majority of them are resected for thyroid mass or goitre⁽²³⁾. In our study period we concentrated mainly on immediate postoperative hypocalcaemia. Our study shows the incidence of postoperative hypocalcaemia was approximately 34%, In literature it was reported from 27% to 80%⁽²³⁾. The occurrence of hypocalcaemia after total thyroidectomy takes place on 1, 2 and 7 post-operative days. In our study 17 cases presented with hypocalcaemia, out of which 16 are transient hypocalcaemia and 1 case is permanent hypocalcaemia with incidence of 32% & 2% respectively. The development of post- thyroidectomy hypocalcaemia is multifactorial. The suggested contributory factors include hemodilution secondary to intravenous fluid administration during the perioperative phase, increased urinary calcium excretion secondary to surgical stress, calcitonin release after thyroid gland manipulation, and hungry bone syndrome in patients with metabolic bone disease. However,

hypo-parathyroidism through direct injury, removal or devascularisation of parathyroid glands is the most likely cause of postoperative hypocalcaemia. In conclusion, the study suggests that serum calcium levels significantly decreases after total thyroidectomy and most critical time is first 24 hours of post thyroidectomy period. Hypocalcaemia developed more in female and malignant thyroid diseases. If clinical sign symptoms of hypocalcaemia are not developed in this period, patient is considered safe. The result, can guide which patients will be discharged early as well as closely monitor calcium level and early calcium supplementation.

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