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Case series on the on the onset of transient hypo-parathyroidism after thyroidectomy

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ABSTRACT

Background: Surgery for thyroid disorders is the common operation in general surgery and total thyroidectomy is widely performed both for carcinoma as well as benign bilateral diseases of the thyroid and the most common complication is transient hypocalcaemia. A preliminary study was conducted to assess the risk factors for transient hypocalcaemia in our hospital.

Methods: This was a prospective observational study conducted from February 2013 to April 2014 at the Mahatma Gandhi Medical College and Research Institute, Pondicherry and have included all patients undergone any type of thyroid surgery with a normal pre-operative serum calcium level. After initial clinical assessment, blood samples were drawn for estimation of thyroid function and serum calcium and albumin. Postoperative hypocalcemia was assessed by eliciting Chovstek's and Troussea's sign and biochemically estimating serum calcium and albumin at 6,24, and 24 hours intervals and 1st and 3rd months during follow-up. The risk factors involved are also studied like sex, age, type of thyroidectomy, identification of parathyroid, Identification of recurrent laryngeal nerve and their histology.

Results: A total of 50 patients who underwent thyroidectomy were included in the study. The hypocalcemia occurred in 28% of patients studied showed that 66.7% of patients developed hypocalcemia at 48-72 hours. There was no statistical significance for the parameters of age or gender, benign and malignant conditions of thyroid. The analysis of type surgery performed showed a significant number of patients developing transient hypocalcaemia after near or total thyroidectomy (p-0.002).

Conclusions: The present study, though consisted of a small group of patients has shown that transient hypocalcaemia after near or total thyroidectomy occurs in early post-operative days. Hence, on an average 2-5 days of hospital stay is mandatory. Near total or total thyroidectomy is a risk factor. Early diagnosis and replacement with calcium intra-venous reduce the morbidity and mortality of hypocalcaemia.

Keywords: Post thyroidectomy, Transient hypocalcemia

INTRODUCTION

Total thyroidectomy is widely performed both for carcinoma as well as benign bilateral diseases of the thyroid. The most common complication following any thyroid surgery is transient hypocalcaemia which occurs in 2-32% of patients.¹ The symptoms of hypoparathyroidism are distressing and potentially fatal and often require extended hospital stay, leading to increase in health care cost. Post-operative hypocalcaemia is an

important factor in the present day ambulatory thyroid surgery when the patients are discharged on the day of surgery. There, it becomes very essential to identify patients developing transient hypocalcaemia and initiate treatment.

Iatrogenic injury of the parathyroid glands is an unintended consequence of total thyroidectomy. Measuring the serum PTH immediately after surgery is a sensitive and specific method of assessing the function of the parathyroid glands and for identifying patients at risk for hypocalcemia. If the postoperative PTH level is low, then administering calcium and activated vitamin D (calcitriol) can reduce the incidence of symptomatic hypocalcemia.

The incidence of a low postoperative PTH after total thyroidectomy has been highly variable in the literature, ranging between 7% to 37%. 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. The supplementation of calcium minimizes symptoms for patients

The majority of patients with parathyroid dysfunction after thyroidectomy return to normal function within a few weeks or 1 month of surgery. Some studies consider patients to be euparathyroid as soon as their serum PTH levels recover to at least 10 pg/mL in the absence of hypocalcemic symptoms.

Different parameters have been used to determine when postoperative hypoparathyroidism should be classified as permanent. Some consider postoperative parathyroid gland injury to be permanent if recovery of function has not occurred within 6 months while others define permanence at 1 year after surgery.

METHODS

This was a prospective observational study conducted from February 2013 to April 2014 at the Mahatma Gandhi Medical College and Research Institute, Pondicherry. The institute medical Ethics committee approved the study. We have included all patients who had undergone any type of thyroid surgery with a normal pre-operative serum calcium level. Patients with a history of pancreatitis, nephritic syndrome, chronic renal failure, mal-absorption and pre-operative abnormal serum calcium were excluded.

After initial clinical assessment, blood samples were drawn for estimation of thyroid function and serum calcium and albumin. Fine needle aspiration was carried out whenever indicated. The type of thyroidectomy was planned according to the diagnosis. Hypocalcaemia was assessed by eliciting Chvostek's and Trousseau's sign and biochemically estimating serum calcium and albumin at 6,24, and 24 hours intervals and 1st and 3rd months during follow-up. Corrected calcium was calculated using

the formula, corrected calcium= serum calcium + (normal albumin-serum albumin) x 0.8. Patients who developed hypocalcaemia were treated with 10% calcium gluconate administered intravenously over a period of 10 minutes. Hypocalcaemia which resolved within a week was labeled as transient and which needed calcium supplementation beyond 3 months as permanent. Patients, who developed hypocalcaemia postoperatively were treated with 10% calcium gluconate intravenously over a period of ten minutes

Statistical analysis

Statistical analysis was performed using SPSS software version 16 and chi-square test was employed to test statistical significance between two variables (p-0.05). The variables analyzed were age, sex, type of thyriodectomy, histology and identification of parathyroid recurrent laryngeal nerve (RLN) during surgery.

RESULTS

A total of 50 patients who underwent thyroidectomy were included in the study. The overall prevalence of hypocalcaemia occurred in 14 (28%) patients. In 2 (3.8%) patients hypocalcaemia progressed to permanent and in 12 (24%) transient hypocalcaemia (Table 1).

Table 1: Incidence of hypocalcemia.

Prevalence	No (percentage)
Transient	12 (85%)
Permanent	2 (15%)
Total	14 (100%)

Hypocalcemia was noticed in 4 (33.3%) patients within 24 hours and in 8 (66.7%) between 24-48 hours (Table 2)

Table 2: Onset of clinical and laboratory hypocalcemia post-operatively.

Appearance of hypocalcemia	Laboratory	Clinical
<24 hrs	5 (35.7%)	4 (33.3%)
24-48 hrs	8 (57.14%)	8 (66.7%)
48-72 hrs	1 (7.1%)	0
>72 hrs	0	0

Of the 50 patients, 39 (78%) were below the age of 50 years and 11 (22%) were above 50 years. There were 42 (84%) females and 8 (16%) males. There was no statistical significance in terms of age or gender. There was no significant difference between benign and malignant conditions of thyroid (p-0.29). Similarly, there was difference between two groups in terms of identification and non-identification of RLN (p-0.24) and parathyroid glands (p-0.29) during surgery. However, the

analysis of type surgery performed showed a significant number of patients developing transient hypocalcaemia

after near or total thyroidectomy (p-0.002) (Table 3).

Table 3: Risk factors and transient hypocalcemia.

Risk factors		No. of patients	No. of patients with transient hypocalcemia	"P" value
Sex	Male	8	2 (25%)	0.94
	Female	42	10 (23.8%)	
Age	<50 years	39	6 (50%)	0.277
	>50 years	11	4 (50.5%)	
Type of throidectomy	Near and total	25	9 (75%)	0.002
	Subtotal and hemi thyroidectomy	20	0	
	Re-surgery	5	3 (25%)	
Identification Of parathyroid	Yes	41	9 (75%)	0.469
	No	9	3 (25%)	
Identification of recurrent laryngeal nerve	Yes	35	10 (83.4%)	0.247
	No	15	2 (16.6%)	
Histology	Benign	31	9 (75%)	0.29
	Malignant	19	3 (25%)	

DISCUSSION

Hypocalcaemia is the most common complication following thyroidectomy causing distressing symptoms and has potential to be harmful often requiring extended hospital stay. Hypocalcaemia is defined as, decrease in the serum calcium level less than the preoperative value with one or more symptoms and it can be either transient or permanent. In literature, the definition of hypocalcaemia differs from study to study. Transient hypocalcaemia usually responds to calcium replacement therapy within a few days or weeks.² It is permanent when the patient depends on calcium supplementation to maintain normal calcium level, the period varies from 3 months to 6 months and the reported incidence is 1.3-3%.3 The primary cause for hypocalcaemia is due to parathyroid insufficiency caused by injury or devascularisation or erroneous removal of one or more of the parathyroid glands.⁴

In our study, among the patients who developed hypocalcaemia, 57.14 % occurred during the second postoperative day. Similar observation has been reported by Tredici et al, 62% of their patients developing hypocalcaemia on the second day.⁵ Viswanathan et al observed hypocalcaemic symptoms appearing in 40% of patients on the first day, 50% on the second day and 10% on the third day.⁶ Therefore, it is very important to identify the risk factors of developing hypocalcaemia in patients who undergo day care surgery as majority of transient hypocalcaemia develop on the second day. Calo et al found hypocalcaemia as the commonest cause for extended hospital stay.⁷

Randall et al observed significantly elevated risk of hypocalcaemia in patients younger than 45 years irrespective of malignancy compared to older age group, have increased protective effect against who hypocalcaemia.8 However, a previous study has shown that patents above the age of 65 years experienced increased incidence of hypocalcaemia. A study by Gann et al has included female sex as one of the factors for increased incidence of hypocalcaemia as women are more prone for calcium and vitamin D deficiency than men.¹⁰ In present study, the age and sex were not significant. In our study, we found that near total thyroidectomy with or without block dissection was a significant risk factor for postoperative transient hypocalcaemia (p-0.002). More aggressive surgery leads to injury to parathyroid and transient hypocalcaemia.11

CONCLUSION

The present study, though consist of a small group of patients has shown that transient hypocalcaemia after near or total thyroidectomy occurs in early post-operative days. Hence, on an average 2-5 days of hospital stay is mandatory. Refined surgical techniques to avoid injury or inadvertent removal of parathyroids in extensive thyroid operations can lower the incidence of transient hypocalcaemia. Early diagnosis and replacement with calcium intra-venous reduce the morbidity and mortality of hypocalcaemia.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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