

Incidence of post-operative hypocalcaemia after thyroidectomy - a retrospective study

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Key words: Thyroidectomy; post-operative; serum calcium level

Abstract

Introduction

Post-operative hypocalcaemia following thyroidectomy can lead to distressing symptoms and increase the period of hospitalization. Iatrogenic injury to parathyroid glands is the primary cause for hypocalcaemia.

Aim

This study aims to describe the incidence of postoperative hypocalcaemia and its demographic distribution.

Method

A retrospective analysis was made in 240 consecutive patients who had undergone total thyroidectomy in the professorial surgical unit, Teaching Hospital Jaffna. The post-operative calcium level, symptoms and signs of hypocalcaemia were considered and correlated with their demographic details and histology report of the specimen.

Results

The overall incidence of hypocalcaemia was 10.83% (n=26). Among them, 96.15% (n=25) had transient hypocalcaemia and 88.46% had symptomatic hypocalcaemia (n=23) with biochemical evidence of hypocalcaemia. The rate of inadvertent parathyroidectomy was 6.25%.

Conclusion

Hypocalcaemia is common in the first three days of postoperative period and most of the hypocalcaemic events are transient.

Introduction

Thyroidectomy is a common operation in Sri Lanka, including the northern region. The incidence of postoperative hypocalcaemia has not been analysed in northern region. The aim of this study is to describe the incidence of hypocalcaemia after total thyroidectomy and its demographic distribution.

Post-operative hypocalcaemia is frequently seen within the first few days after total thyroidectomy [1, 2]. It is most often transient and may indicate iatrogenic injury to parathyroid gland [1, 2]. The incidence of inadvertent parathyroidectomy was reported to be 12-16.4% in the literature. The risk factors include total thyroidectomy, extra thyroidal extension and thyroiditis [1, 2, 3]. The response to calcium replacement therapy for transient hypocalcaemia after thyroidectomy can be seen in a few days to weeks [4]. The persistent hypocalcaemia after 6 months of thyroidectomy is considered permanent hypocalcaemia [5]. The incidence of permanent hypocalcaemia is less than 1-2% [6, 7].

Hypocalcaemia may be asymptomatic or symptomatic depending on the serum calcium level. Chvostek's and Trousseau's signs, paraesthesia and muscle spasm are clinical manifestations of hypocalcaemia [8].

Materials and Methods

A retrospective analysis was carried out in the professorial surgical unit of Teaching Hospital Jaffna from 1st January 2011 to 1st July 2016. Data of consecutive patients who underwent thyroidectomy during this period were collected. The inclusion criteria were patients who underwent total, near total or completion thyroidectomy. Exclusion criteria were previous history of parathyroid diseases, renal insufficiency, patients with preoperative calcium replacement therapy and abnormal pre-operative calcium level. Data collected include age, sex, indication for thyroidectomy, pre and post-operative serum calcium level, the presence of postoperative symptoms and signs of hypocalcaemia and the histology report of the specimen. Serum calcium levels in these patients were monitored preoperatively and postoperatively daily up to day six and then weekly up to six weeks. Thereafter serum calcium level was monitored monthly in patients whose calcium levels were low after six weeks. Hypocalcaemia was defined as the corrected calcium level below 8.5 mg/dl. Permanent

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hypocalcaemia was defined as persistent hypocalcaemia after 6 months of thyroidectomy.

Data were entered and analysed using the statistical package for social science (SPSS) and the results were expressed as a percentage, mean, standard deviation and ratio. This study is approved by the Ethical Review Committee, Faculty of Medicine, University of Jaffna.

Result

A total of 240 patients were included in our study. The number of patients who underwent thyroidectomy and their diagnosis is listed in table 1.

All patients had pre-operative normal calcium levels. The overall incidence of hypocalcaemia was 10.83% (n=26). Symptomatic hypocalcaemia was observed in 88.46% (n=23) of patients with evidence of biochemical hypocalcaemia. The details of frequency of hypocalcaemia, the age and gender distribution are indicated in tables 2 and 3.

The onset of hypocalcaemia after thyroidectomy is indicated in table 4. The hypocalcaemia in these patients was managed with calcium supplements and Vitamin D. Transient hypocalcaemia was noted in 25 patients and one patient

suffered from permanent hypocalcaemia. The time of recovery for patients with transient hypocalcaemia is shown in table 5.

The histopathology reports revealed accidental removal of parathyroid glands in 15 patients (6.25%). Of these 15 patients, 4 developed hypocalcaemia. Among these 4 patients two parathyroid glands have been removed in 3 patients and one removed in 1 patient. Permanent hypocalcaemia was noted in one patient after thyroidectomy with accidental removal of 2 parathyroid glands. Nine patients with accidental removal of one parathyroid gland and 2 patients with removal of two parathyroid glands did not develop hypocalcaemia.

Discussion

The overall incidence of postoperative hypocalcaemia in this study is 10.8%. The incidence of hypocalcaemia was 10 – 46 % noted in most of the literatures [5, 7, 9]. Transient hypocalcaemia is a common occurrence after total thyroidectomy [1, 10, 11]. In this study, 96.15% of hypocalcaemia cases are transient. A patient undergoing total thyroidectomy risks vascular injury to the four parathyroid glands due to the requirement for bilateral dissection [12]. It is recommended that with careful dissection of the blood supply of the

Table 1: Diagnosis of patients underwent thyroidectomy

Diagnosis	Number of patients
Multi nodular goitre (MNG)	77
Graves	28
Toxic MNG	26
Thyroid Malignancy (Solitary)	58
Thyroid Malignancy (MNG)	38
Recurrent Goitre	13

Table 2: Age Distribution of the patients and frequency of hypocalcaemia

Age Distribution	Number of Patients	Percentage	Number of patients who developed hypocalcaemia	Percentage
<19 years	75	31.3%	5	6.66%
20 – 49 years	110	45.8%	14	12.72%
>50 years	55	22.9%	7	12.72%

Table 3: Gender distribution of patients and frequency of hypocalcaemia

Sex	Number of patients	Percentage	Number of Patients who developed Hypocalcaemia	Percentage
Male	43	17.9%	5	11.62%
Female	197	82.1%	21	10.65%

Table 4: Time of onset of biochemical hypocalcaemia

Post-Operative Day	D1	D2	D3	D4	D5
Number of patients	3	12	9	1	1
Percentage	1.25%	5%	3.75%	0.4%	0.4%

Table 5: Time of recovery of patients with hypocalcaemia.

Time of recovery	Number of Patients with transient hypocalcaemia
First week	21
Second week	4

parathyroid glands they can be spared. Ligation of the inferior thyroid artery close to the thyroid capsule is better in preserving the integrity of the parathyroid gland than ligating close to its origin. Identification of parathyroid gland during surgery is an important factor to prevent post-operative hypocalcaemia as described in various literature. Accidental removal of parathyroid gland was observed as 6.25% in this study as compared to other studies where it was 17.7% of the patients undergoing total thyroidectomy [6]. It is reported that identification and preservation of less than three parathyroid glands are associated with permanent hypocalcaemia according to the literatures [13]. The removal of two parathyroid glands leads to permanent hypocalcaemia in our study. Most of the patients who developed hypocalcaemia were observed within first three days, which correlates with other studies [6].

Conclusion

Hypocalcaemia commonly occurs during the first three days of postoperative period. Most of the hypocalcaemic incidences in post-thyroidectomy are transient in nature and will recover within a period of one week.

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