

Original Research Article


Evaluation of serum calcium level in total thyroidectomy patients

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Abstract

Background: Thyroidectomy remains to be one of the most common surgeries done and has been associated with few specific complications. One major complication of thyroidectomy is hypocalcemia, which often occurs as a result of inadvertent intra-operative injury to parathyroid glands. Transient hypocalcaemia, which is usually noticed after surgery, resolves well most of the times as it respond to replacement therapy in few days.

Aim of the study: To study the incidence of transient hypocalcemia occurring in patients undergoing total thyroidectomy

Materials and methods: The methods for the study included screening of patients who presented with thyroid swelling alone or along with pain, hoarseness of voice and dysphagia symptoms. Such patients were studied in detail clinically and investigated as per proforma detailed below. Hematologic and biochemical investigations were done. All patients were subjected to ultrasonographic evaluation and thyroid function tests initially. Following which they had undergone a fine needle aspiration biopsy for histological diagnosis. Patients who were suspected to have malignancy were made to undergo other imaging modalities as CT.

Results: 28% of cases developed hypocalcaemia by 6 hours while 24% of cases had hypocalcemia after 72 hours. Post-operatively only 5 patients had developed symptoms of hypoparathyroidism. These were found to have reduced calcium levels at both 6hrs and 72 hours of surgery and hypocalcemia had resolved in 5 patients by 72 hours who had drop in 6 hours post-operatively.

Conclusion: The maximum incidence of clinically symptomatic hypocalcemia was found in the age group of more than 35 to 65 and those cases had reduced serum calcium levels measured at both 6 hours and 72 hours.

Key words

Thyroidectomy, Hypocalcemia, Vitamin D.

Introduction

The thyroid gland has been described throughout history but was first so named by the Romans for being a "shield-shaped" gland. Not only were thyroid masses mentioned in the literature throughout the 12th and 13th century, but in 1170 Robert Frugardi described the extirpation of a goiter [1]. Thyroid surgery was undertaken well before thyroid gland physiology was understood. The procedures were often fraught with complications, including massive hemorrhage, infection, and injury to surrounding structures, all of which were associated with morbidity and mortality rates of nearly 40%. The surgical technique of thyroidectomy, as well as adjunct technology, continued to advance [2]. Most recently, various new instruments and approaches including video assisted thyroidectomy and robot assisted thyroidectomy have emerged. Like any other surgery thyroidectomy has its own complications. Postoperative hypocalcemia is a common complication after thyroid surgery. 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. Severe neurological manifestations may occur if the condition is not adequately treated [3]. 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 [4]. Even though hypocalcemia is well documented in the thyroid surgery literature, there are numerous limitations to the results of previous studies. The most notable is, the reported hypocalcemia incidence rates range widely; studies report that anywhere from 0.3–66.2% of

patients develop hypocalcemia after thyroid surgery [5].

Materials and methods

Totally 50 cases admitted in our hospital from September 2014 to August 2015. The patients whose diagnoses were confirmed were categorised using following factors: age, sex, previous history, co-morbid conditions present, imaging details, preoperative calcium levels after getting the proper informed consent. Following evaluation the patients were subjected to total thyroidectomy who were diagnosed to have multi-nodular goitre or malignancy and completion thyroidectomy in case of patients whose hemithyroidectomy specimen revealed malignant changes. Node dissection was done along with total thyroidectomy for papillary carcinoma patients. Parathyroids were preserved intra-operatively. Time duration of surgery for each case were noted. Postoperatively with all aseptic precaution after 6 hours and 72 hours of surgery, 3 ml blood was taken for serum calcium level measurement. Serum ionised calcium was measured. Patients who developed symptoms of hypocalcemia were treated with intravenous calcium initially till symptoms subside and oral calcium with vitamin D by monitoring subsequent calcium levels later.

Inclusion criteria

- Patients who had undergone total or completion thyroidectomy.
- Patients with no previous history of Parathyroid Disease.
- Patients with normal pre-operative serum calcium levels.

Exclusion criteria

- Patients taking any oral Calcium
- Patients with medical Renal Disease

Results

Age distribution among patients was as per **Chart – 1**. Post-operative comparison of serum calcium level among male and female patients was as per **Table – 1**. The relationship between

sex and post-operative 6 hours calcium value was not significant with p value of 0.756 and chi square value of 0.096.

Chart – 1: Age distribution among the patients.

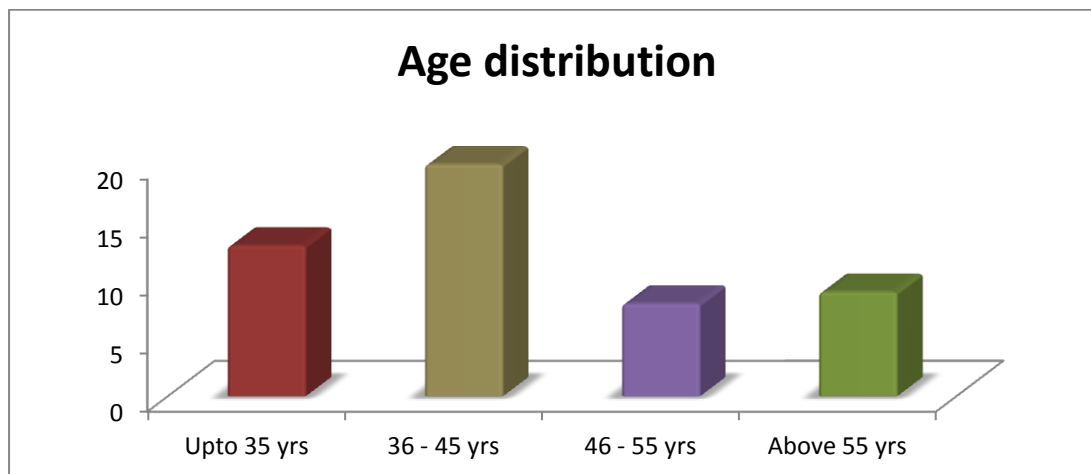


Table – 1: Post-operative comparison of serum calcium level among male and female patients.

| | | | POST OP Ca-6h | | Total |
|-------|------------------------|------------------------|---------------|--------|--------|
| | | | ≥4.4 | < 4.4 | |
| SEX | Female | Count | 32 | 12 | 44 |
| | | % within POST OP Ca-6h | 88.9% | 85.7% | 88.0% |
| | Male | Count | 4 | 2 | 6 |
| | | % within POST OP Ca-6h | 11.1% | 14.3% | 12.0% |
| Total | Count | | 36 | 14 | 50 |
| | % within POST OP Ca-6h | | 100.0% | 100.0% | 100.0% |

Discussion

Majority of the patients in the present series were in the age group of 25 to 45 years. In the present series, out of 50 patients 44 were females and 6 were males. Among the 50 patients 2 had already undergone hemithyroidectomy for solitary nodular goitre and since their post operative specimen showed malignant changes they were subjected to completion thyroidectomy. Patients were classified on the basis of presence and

absence of co-morbid conditions. 9 patients (18%) had Diabetes Mellitus, 5 patients (18%) had hypertension and another 4 patients (8%) had both hypertension and diabetes. One patient had bronchial asthma, one had profound anemia and another one was a known rheumatic heart disease patient. Ischemic heart disease was present in one patient. Hence 28 patients (56%) had no co-morbid factors [6]. The duration of operating time was widely variable depending upon many

factors as operative difficulties, pathology and skill of the surgeon. 18 cases were operated in less than 2 hours, 23 patients in time interval of 2 to 2½ hours, 7 patients within the time of 2½ to 3 hours duration and 2 cases lasted for more than 3 hours. By 6 hours of surgery 14 patients had serum ionised calcium levels less than 4.4 which was taken as cut off value for hypocalcemia [7]. By 72 hours the number had reduced to 12 cases of which 3 patients had delayed onset hypocalcemia and hypocalcemia had resolved in 5 patients by 72 hours who had drop in 6 hours post-operatively. Patients in age group of 35 to 45 had higher incidence of transient hypocalcemia. One disadvantage of this study is that all the patients who developed permanent hypocalcemia were not identified due to time constraints. The drop in serum calcium was seen mostly in cases which underwent surgery for a longer duration of time i.e. more than 2 hours. Post-operatively, only 5 patients had developed symptoms of hypoparathyroidism and all 5 cases had been evaluated completely. These were found to have reduced calcium levels at both 6 hours and 72 hours of surgery [8]. All such patients who developed hypocalcemia clinically were compared for postoperative calcium levels, age, duration of surgery, and to predict clinically relevant hypocalcemia. 2 patients who had developed symptoms are in age group of less than 35 years, while other three had age more than 35 years.

Conclusion

The incidence of hypocalcemia in the present series is highest among females and in patients of age group 35 to 45. The maximum incidence of clinically symptomatic hypocalcemia was found in the age group of more than 35 to 65 and those cases had reduced serum calcium levels measured at both 6 hours and 72 hours. Transient postoperative hypocalcemia was found to be related to the duration of the surgery, which in

turn depends on various factors, as patient factors, pathology and operative difficulties [9, 10].

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