

Frequency of Hypocalcaemia after Thyroid Surgery

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ABSTRACT

Aim: to investigate the frequency of postoperative hypocalcaemia undergoing thyroid surgery.

Study design: Cross sectional study

Place and duration: Study was conducted at Endocrinology department of general surgery, Bakhtawar Amin Medical and Dental College, Multan, from January 2021 to January 2022.

Methodology: Study was conducted on total 115 patients who were admitted for thyroid surgery. Main variables of study were demographics, preoperative diagnosis, calcium level after surgery at 1st, 2nd and 5th day. SPSS version 23 was used for data analysis, test of significant were applied and p value ≤ 0.05 was taken as significant.

Results: One hundred and fifteen patients were analyzed in our study, with mean age 38.99 ± 4.63 years. There were 54.8% males and 45.2% females. Total thyroidectomy underwent in 46.1% patients and completion thyroidectomy underwent in 53.9% patients. Furthermore, 84.3% developed malignant and 15.7% developed benign. Hypocalcaemia developed in 9.6% patients. Among these, 54.5% malignant and 36.4% benign and only 9.1% developed permanent hypocalcaemia. On the second day of operation, 7.8% patients developed transient hypocalcaemia. While, on the fifth day of operation, 4.3% patients developed transient hypocalcaemia. 2.6% patients required calcium and vitamin D supplements.

Conclusion: Following thyroid surgery hypocalcaemia is a major concern that can be prevented by adopting meticulous operative technique and preserving vascularity of parathyroid glands. Continuous monitoring of serum calcium level in postoperative period and early management in cases of hypocalcaemia can significantly reduce the associated morbidity.

Keywords: Hypocalcaemia, Frequency, Thyroid surgery, Postoperative period

INTRODUCTION

Hypocalcaemia is the most common complication after total thyroidectomy that can be permanent or temporary¹. Previous reports has shown incidence of transient hypocalcaemia range from 1-68% and permanent hypocalcaemia ranges from 0-13% approximately². In addition, approximately 20% of transient hypocalcaemia is due to total thyroidectomy, increasing from 50% to 60% with bilateral central neck dissection³.

Because of prolong hospital stay patients of symptomatic hypocalcaemia found extremely unhappy⁴. Usual symptoms of hypocalcaemia include tingling sensation, cramps, titanic contractions, paresthesia, muscle spasm, seizures and on electrocardiogram prolong QT interval⁵. In surgical field common cause of hypocalcaemia is injury to parathyroid gland after thyroidectomy which may results due to the venous drainage obstruction, inadvertent excision and devascularization of parathyroid⁶.

Most common indications of thyroid surgery include thyroid carcinoma, goiter, hyperthyroidism and suspicious thyroid nodules. Another suggested mechanism of hypocalcaemia after thyroidectomy is hungry bone syndrome which is named because rapid movement of calcium into the bones following thyroidectomy of patient who are found with thyrotoxicosis preoperatively and haemodilution perioperatively⁷. Current literature is focusing on early and reliable predictors of hypocalcaemia after surgery⁸.

Most useful and reliable predictors include monitoring of ionized calcium (Ca^{++}) along with total serum calcium (Ca), measurement of recommended parathyroid hormone level during surgical procedure and combined work on two or more than two values to build a new algorithm⁹. These predictors are useful tool for a thyroid surgeon to decide which patient should be discharged earlier to save hospital budget and to meet the patient's expectations of early recovery^{10,11}. This study was designed to determine the frequency of hypocalcaemia following thyroid surgery.

METHODOLOGY

Study was conducted at Endocrinology department of general surgery, Bakhtawar Amin Medical and Dental College, Multan, from January 2021 to January 2022 in duration of one year. Study was initiated after approval from departmental ethical committee. Patients were informed about study purpose and consent was

taken on predesigned consent form. Sampling technique was non probability consecutive sampling. Sample size was calculated by using World Health Organization calculator for sample size calculation. Patients that were admitted in endocrinology department for thyroid surgery, both gender male female and age limit 14 to 60 years were included in the study. Patients who had prior or concomitant parathyroidectomy, concomitant central neck lymph node dissection, preoperative hypocalcaemia, known hyperparathyroidism and history of previous head and neck related radiotherapy, chemotherapy were excluded and patients who refused give consent were excluded.

Preoperatively a brief history of medicine and hypersensitivity to study and procedure drugs was taken. Chest x-ray, electrocardiography and routine blood investigations were performed. After surgery blood sample was taken in aseptically to measure serum calcium level. Postoperative hypocalcaemia was measured at 1st post operative day, 2nd post operative day, 5th postoperative day and after at 6 months duration. Hypocalcaemia (serum calcium < 8.0 mg/dl) at 1st, 2nd and 5th day was labeled as transient or temporary and continuous hypocalcaemia till six months was or need of vitamin D and calcium supplements was labeled as permanent hypocalcaemia.

Data entry and analysis was performed through Statistical package for social sciences SPSS version 23. Categorical data was shown in form of frequency and percentages like gender and hypocalcaemia incidence. Similarly numeric data was presented in form of mean and standard deviation like age. T-test and chi square test was applied in accordance with nature of data and p values less than or equal to 0.05 was taken as significant.

RESULTS

One hundred and fifteen patients were analyzed in our study, with mean age 38.99 ± 4.63 years. There were 63 (54.8%) males and 52 (45.2%) females. (Table. I). Total thyroidectomy underwent in 53 (46.1%) patients and completion thyroidectomy underwent in 62 (53.9%) patients. Further, 97 (84.3%) developed malignant and 18 (15.7%) developed benign. Hypocalcaemia developed in 11 (9.6%) patients. Among these, 6 (54.5%) malignant and 4 (36.4%) benign and only 1 (9.1%) developed permanent hypocalcaemia. On the second day of operation, 9(7.8%) patients developed transient hypocalcaemia. While, on the fifth day of operation, 5 (4.3%)

patients developed transient hypocalcaemia. 3 (2.6%) patients required calcium and vitamin D supplements. (Table. II).

Table 1: Demographic data of the study patients

Variable	Frequency	Percentage
Gender		
Male	63	54.8
Female	52	45.2
Age (years)		
Mean±S.D	38.99±4.63	
Median±I.Q.R	40.0±6.0	

Table 2: Distribution transient and permanent and hypocalcaemia of the study patients

Variable	Frequency	Percentage
Thyroidectomy		
Total thyroidectomy	53	46.1
Completion thyroidectomy	62	53.9
Malignant		
Malignant	97	84.3
Benign	18	15.7
Hypocalcaemia		
Yes	11	9.6
No	104	90.4
Transient Hypocalcaemia incidence at postoperative		
1 st day	2	1.7
2 nd day	9	7.8
5 th day	5	4.3
Calcium and Vitamin D supplement		
Yes	3	2.6
No	112	97.4

DISCUSSION

Hypocalcaemia after thyroid surgery is a serious complication having both short term and long term morbidity potential. In short term values it often increases the hospital stay, discomfort to patients and overall cost of surgery. Baloch et al¹² conducted a study on incidence of hypocalcaemia after thyroidectomy and concluded that control of hypocalcaemia after total thyroidectomy is a major concern that can be avoided by preserving vascularity of parathyroid gland to attain its proper functioning.

Del et al¹³ conducted a study and patients were given calcium and vitamin D supplements to avoid complications of hypocalcaemia and reported that it's useful in symptomatic patients but cost of supplements enhance the treatment cost and patients discomfort as well. In our study we didn't advice supplements preoperatively because it can distort the incidence of hypocalcaemia after surgery.

In our study we observed hypocalcaemia in 9.6% of patients undergone thyroid surgery which is much lower than study conducted by Esimontas et al¹⁴ who observed transient hypocalcaemia 64.2% of patients. Another local study was conducted by Iqbal et al¹⁵ in 2010 and reported transient hypocalcaemia in 21.6% of patients which is also much higher than incidence ratio of our study. Total 74 patients diagnosed with serum hypocalcaemia after surgical procedure.

In our study continuous decrease in calcium level was found in 4.3% or 5 patients. In a study conducted by Efafe O et al¹⁶ permanent hypocalcaemia was reported in 5.5% or 220 patients and transients hypocalcaemia was found in 6% of patients at 1st postoperative day. Incidence of hypocalcaemia varies with type of surgery, definition of hypocalcaemia and type of disease involved in thyroid. In thyroid surgery with lymph node dissection there are greater chances of hypocalcaemia¹⁷.

In our study 84.3% of patients were operated for malignant disease and 15.7% for benign disease who were observed with hypocalcaemia. A similar study was conducted by Kumar et al¹⁸ who conducted a study on 30 patients and observed clinical hypocalcaemia in 30% of cases, among them 55.6% patients operated for malignant disease and 28.57% for benign condition. Similar results and conclusion was reported by Abboud et al¹⁹ in 2002.

Rosa et al²⁰ conducted a study on this topic in 2015 and concluded that patients who had increased ionized calcium level at 1st day of operation usually have high increased parathyroid hormone level instantly after surgical procedure. Viswanathan et al²¹ concluded from his study that there is statistically significant association between thyroid surgery and incidence of hypocalcaemia at 1st, 2nd and 5th day of surgery.

CONCLUSION

Our results reveal that following thyroid surgery hypocalcaemia is a major concern that can be prevented by adopting meticulous operative technique and preserving vascularity of parathyroid glands. Continuous monitoring of serum calcium level in postoperative period and early management in cases of hypocalcaemia can significantly reduce the associated morbidity.

Limitations: Along with established facts late presentation at tertiary care hospitals, fear of surgery and refusal from inclusion in study are main limitations of our study.

Recommendations: Further studies on role of supplementation of calcium and vitamin D and severity associated with hypocalcaemia after surgery is recommended. Awareness about complications of thyroid problems and importance of surgery in management of these complications is recommended.

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