

Frequency of Hypocalcemia after Thyroid Surgery

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ABSTRACT

Objective: The purpose of this study is to determine the prevalence of hypocalcemia among patients after thyroid surgery.

Study Design: Descriptive study/ Cross-sectional

Place and Duration: The study was conducted at the surgical department of Mayo Hospital, Lahore for the duration of eighteen months from July 2020 to December 2021.

Methods: Fifty-five male and female subjects participated in this research. Patients ranged in age from 17 to 62 years. After obtaining written permission from the patient, demographic information such as age, sex, BMI, and tumors type was collected. Contralateral lobe cancer was also shown to be a problem. Before surgery and on the first post-operative day, the blood calcium levels of the patients were measured. Patients who received a full thyroidectomy were evaluated for signs of hypocalcemia. Analysis was performed using SPSS 22.0.

Results: Among 55 patients, majority of the cases were females 30 (54.5%) were females and the rest were males 25 (45.5%). The patients mean age was 37.16 ± 14.52 years and had mean BMI 24.45 ± 6.62 kg/m². Papillary cancer was the most common tumor found in 42 (76.4%) cases, followed by follicular cancer in 9 (16.4%) case and 4 (7.3%) cases had hurthle cell carcinoma. We found frequency of hypocalcemia in 14 (25.5%) cases. Among 14 patients of hypocalcemia 10 (71.4%) were females and 4 (38.6%) were males. Retrosternal of goiter found in 5 (35.7%) cases and no retrosternal extension found in 9 (64.3%) case. Post-operative other complications among all cases were seroma, transient hoarseness of voice and neck hematoma.

Conclusion: In this study we found higher frequency of hypocalcemia in 25.5% cases after thyroid surgery. Majority of the cases were females and had no retrosternal extension. Except hypocalcemia other complications among all cases were seroma, transient hoarseness of voice and neck hematoma.

Keywords: Thyroid Surgery, Tumors, Complications, Hypocalcemia

INTRODUCTION

For benign bilateral nodular thyroid goitre, the conventional surgical therapy is complete thyroidectomy. It is the most prevalent complication of this treatment that causes hypocalcemia. 20%-30% probability of hypocalcaemia, with moderate tingling and paresthesia to severe cramping, tremors, and seizures. Hypocalcaemia may be life-threatening. Within the first 24 to 48 hours after surgery, nidr is often used to address hypocalcaemia (low calcium levels). [1] Between 2.10 and 2.6 mmol/l and 8.8 to 10.5 mg/dl is the typical range for serum calcium levels. At 2mmol/l (8mg/dl), hypocalcaemia symptoms become more prevalent, although they are still very uncommon. Hypocalcaemia has been reported in as many as 83 percent of individuals in different research, ranging from 10.6 percent to 50 percent, according to various investigations. Because of an increase in urine calcium excretion, a rise in the production of the hormone calcitonin, or the "hungry bone syndrome," it is possible that calcium hemodilution owing to surgical stress is to blame. [1,2] It is most probable that the hypoparathyroidism in individuals with substantial hypocalcemia is caused by a trauma, devascularization, or an accidental excision of one or more parathyroid glands during surgery. [3-5] If you have a high-risk goitre, such as toxic goitre, retrosternal goitre, or recurring goitre, you should have your post-operative blood calcium levels closely monitored. Establishing a foundation for an outpatient thyroidectomy that may be done safely is essential [6]. Between 3% to 52% and 0.4% to 13.2% of individuals who have had their thyroids removed suffer from hypocalcemia, the most frequent consequence of thyroid surgery, according to studies. [7,8] Following surgery, hypocalcemia may be detected in many ways. Due to the fact that the lowest level of hypocalcemia usually occurs within 48 hours following surgery, many medical facilities all over the globe continue to employ the standard two-day hospitalisation and serum calcium monitoring procedure. [9] We agree that patients should be monitored for haemorrhage and airway obstruction in the first 24 hours after surgery, but calcium monitoring is often unnecessary in the absence of apparent perioperative complications because patients

typically experience only mild postoperative pain and quickly return to their normal daily activities.

This may assist to lower the risk of hypocalcemia and shorten the length of hospitalisation following surgery, as stated by certain surgeons. When hypocalcemia is identified in an outpatient or short-stay environment, regular usage is the norm.. A list of prescriptions for elemental calcium supplements may be sent home with patients if hypocalcemia is suspected. [10] Hypocalcemia may be detected sooner with the short half-life of parathyroid hormone (IPTH) than previously assumed, according to recent studies. [11] Regularly testing IPTH in order to determine the risk of postoperative hypocalcemia is not yet standard practise. Studies can't easily be compared because of differences in assays, measurement periods, and cutoff values. [12]

We set out to investigate the issue of post-thyroid surgery hypoparathyroidism and the utility of PTH levels in identifying patients at risk for hypocalcemia.

MATERIAL AND METHODS

This Cross-sectional/Descriptive study was conducted at the surgical department of Mayo Hospital, Lahore for the duration of eighteen months from July 2020 to December 2021 and it comprised 55 patients. After obtaining written permission from the patient, demographic information such as age, sex, BMI, and tumour type was collected. Patients who underwent parathyroid autotransplantation, pre-existing hypocalcemia, who received calcium supplementation and patients with hyperparathyroidism were excluded from this study.

Patients ranged in age from 17 to 62 years. Prior neck dissection or parathyroid surgery has never been performed on any of the patients. There were no complications for any of the patients prior to their procedure. Neither of the patients had any symptoms or signs of metabolic bone disease or was taking any medications known to affect serum calcium metabolism, such as oral calcium/vitamin D supplementation, antiresorptive agents, postmenopausal women's hormone replacement therapy, anabolic agents, thiazide type diuretics or antiepileptic drugs. A complete blood count (CBC), thyroid function tests, calcium and PTH levels,

coagulation profile (CPS), liver and kidney function tests, and a fasting blood sugar level were all performed on the donated blood. Thyroid scan, plain chest X-ray P-A view, and neck CT with contrast were all performed on the patients. Frequency of hypocalcemia was recorded. Analysis was performed using SPSS 22.0.

RESULTS

Among 55 patients, majority of the cases were females 30 (54.5%) were females and the rest were males 25 (45.5%).(fig 1)

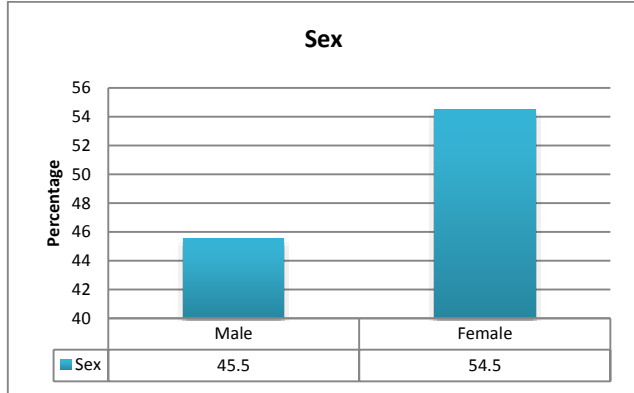


Figure-1: Gender distribution of enrolled cases

The patients mean age was 37.16±14.52 years and had mean BMI 24.45±6.62 kg/m². Papillary cancer was the most common tumor found in 42 (76.4%) cases, followed by follicular cancer in 9 (16.4%) case and 4 (7.3%) cases had hurthle cell carcinoma. Frequency of malignancy in contralateral lobe was found in 28 (50.9%) cases.(table 1)

Table 1: Details demographics of enrolled cases

Variables	Frequency	%age
Mean age (years)	37.16±14.52	
Mean Body Mass Index (kg/m ²)	24.45±6.62	
Tumor Types		
Hurthle cell carcinoma	4	7.3
Follicular cancer	9	16.4
Papillary cancer	42	76.4
Presence of malignancy		
Yes	28	50.9
No	27	49.1

We found frequency of hypocalcemia in 14 (25.5%) cases and 41 (74.5%) patients ahd no hypocalcemia.(fig 2)

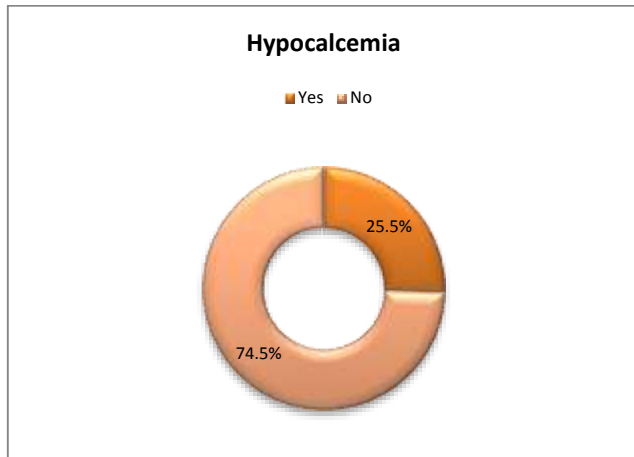


Table-2: After thyroid surgery frequency of hypocalcemia

Among 14 patients of hypocalcemia 10 (71.4%) were females and 4 (38.6%) were males with mean age 32.11±9.78 years. Frequency of transient hypocalcemia was found in 11 (78.6%) cases. (table-2)

Table-2: Age and gender among patients of hypocalcemia

Variables	Frequency (n=14)	%age
Mean age (years)	32.11±9.78	
Sex		
Females	10	71.4
Males	4	38.6
Transient Hypocalcemia		
Yes	11	78.6
No	3	21.4

Retrosternal of goiter found in 5 (35.7%) cases and no retrosternal extension found in 9 (64.3%) case.(table 3)

Table-3: Hypocalcemia and retrosternal extension at discharge were linked in the instances that were examined.

Variables	Frequency (n=14)	%age
Retrosternal extension		
Retrosternal of goiter	5	35.7
No	9	64.3

Post-operative other complications among all cases were seroma, transient hoarseness of voice and neck hematoma. (table4)

Table 2: Frequency of other complication among patients

Variables	Frequency (n=55)	%age
Complications		
seroma	3	5.5
transient hoarseness of voice	2	3.6
neck hematoma	4	7.3

DISCUSSION

There were 25.5% cases in our analysis showed hypocalcemia after thyroid surgery, which is consistent with the global incidence reported by Asari et al. [13]. Not every patient had symptoms or evidence of hypocalcemia following a month's follow-up. Only 6% of the patients had clinical hypocalcemia. It is more trustworthy to use the proportion of symptomatic patients, since this is the group of patients that would need greater attention. Postoperative blood calcium levels alone are insufficient to identify thyroid surgery patients who may be at risk of clinical hypocalcemia, as shown by these findings Hypocalcemia was shown to be a substantial risk factor for patients who had surgery. The incidence of temporary hypocalcemia after complete thyroidectomy was 78.6 percent, while the incidence of permanent hypocalcemia following total thyroidectomy was 21.4 percent.

In current study seventy, among 55 patients, majority of the cases were females 30 (54.5%) were females and the rest were males 25 (45.5%). The patients mean age was 37.16±14.52 years and had mean BMI 24.45±6.62 kg/m². Papillary cancer was the most common tumor found in 42 (76.4%) cases, followed by follicular cancer in 9 (16.4%) case and 4 (7.3%) cases had hurthle cell carcinoma. Some of the earlier research' conclusions were similar to these results. [14,15] Frequency of malignancy in contralateral lobe was found in 28 (50.9%) cases.[16]

Greek researchers did a similar analysis on 2043 instances of thyroid surgery at a university hospital, and their findings were almost identical to ours.[17] A complete thyroidectomy patient had a hypocalcemia rate of 40.4 percent compared to 24.7 percent of patients who had a near total thyroidectomy and 9.05 percent of patients who had a partial thyroidectomy. Transient hypocalcemia may vary from 5.4 to 26 percent, whereas persistent hypocalcemia can range from 0.5 to 24 percent, according to Fahmy et al. [18]. Trottier et al. [19] found that individuals who underwent complete thyroidectomies had the highest prevalence of hypocalcemia. According to Mehanna et al., [20], hypocalcemia following

complete thyroidectomy occurs in 0.33% to 66% of patients. According to Asari et al.[21], the incidence ranges from 1.6% to 50%. As he validated that literature has indicated a significant frequency of hypocalcemia between 0.1 percent to 32% after complete thyroidectomy, Kerimoglu et al. [22] observed a lower range. These results of previous studies were similar to our findings among 25.5% case of hypocalcemia only 5.5% cases had permanent hypocalcemia but the rest were 20% had transient hypocalcemia.

Among 14 patients of hypocalcemia 10 (71.4%) were females and 4 (38.6%) were males with mean age 32.11±9.78 years. Retrosternal goiter found in 5 (35.7%) cases and no retrosternal extension found in 9 (64.3%) cases. These results were comparable to the studies conducted in past.[23,24] Post-operative other complications among all cases were seroma, transient hoarseness of voice and neck hematoma.[25,26] Shortly after surgery, hypocalcemia is a common occurrence. Hypocalcemia following thyroid surgery has been a hot topic recently, and researchers are trying to find out why. Disagreement arises as to which measures are most important and when they should be taken in order to accurately forecast whether a patient will have temporary or chronic hypoparathyroidism after surgery. [27]

A failure-safe mechanism should the PTH level be falsely normal, Terris et al. still recommend routine calcium monitoring after outpatient thyroidectomy, even if postoperative PTH levels are measured.[28] The American Thyroid Association [29] and the Australian Endocrine Surgeons Society [29] are two major international health organisations that have adopted an outpatient thyroidectomy protocol. Thyroid surgery can be performed safely as an outpatient procedure with a low complication rate when patients are carefully selected and assessed before surgery, according to a Canadian study of outpatient thyroid surgery.

Post-operative hypocalcemia has traditionally been diagnosed using serum calcium concentrations, but this has been supplanted by PTH levels, which are more sensitive and specific to the early detection of both transitory and permanent hypocalcemia. An overall accuracy of 98% in predicting persistent hypocalcemia in our research using the postoperative PTH, also known as the fast PTH test, was identified in our study, and complete thyroidectomy is indicated to minimise difficulties and redo. [30]

CONCLUSION

In this study we found higher frequency of hypocalcemia in 25.5% cases after thyroid surgery. Majority of the cases were females and had no retrosternal extension. Except hypocalcemia other complications among all cases were seroma, transient hoarseness of voice and neck hematoma.

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