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Original Research Article

Role of preoperative serum calcium levels in predicting postoperative transient hypocalcemia in patients undergoing hemithyroidectomy surgery

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ABSTRACT

Background: There is increase in incidence of thyroid disease and thyroid surgery over the years, mostly affecting females. Hypocalcemia following thyroid surgery can be fatal and increases hospital stay and cost. Transient hypocalcemia in postoperative period following hemithyroidectomy is seldom seen and often overlooked. We studied the role of preoperative serum calcium levels in predicting the postoperative transient hypocalcemia in patients undergoing hemithyroidectomy.
Methods: This is a prospective study on patients undergoing hemithyroidectomy at tertiary care hospital from June 2022 to February 2023. The serum calcium levels were recorded preoperatively and in immediate postoperative period (within 24 hrs after surgery). The serum calcium level of 9-11 mg/dl was considered normal range and level below 9 mg/dl was considered as hypocalcemia.
Results: Gender distribution was 50 females (90.9%) and 5 males (9.09%) with mean age of 38.6 years. Out of 55 patients who underwent hemithyroidectomy, 15 patients had low serum calcium levels (<9 mg/dl) preoperatively. Out of these 15 patients, 10 patients (66.6%) developed postoperative transient hypocalcemia. None of the patients had symptoms of hypocalcemia in postoperative period.
Conclusions: The preoperative serum calcium levels can predict the postoperative transient hypocalcemia in patients undergoing hemithyroidectomy surgery. In two-thirds of patient who had serum calcium levels below 9 mg/dl preoperatively developed postoperative transient hypocalcemia. Further studies are required to know the cause of low serum calcium levels preoperatively and postoperative transient hypocalcemia in patients undergoing hemithyroidectomy surgery.

Keywords: Serum calcium levels, Hemithyroidectomy surgery, Postoperative transient hypocalcemia

INTRODUCTION

The rate of hypocalcemia following thyroid surgery has decreased as parathyroid preserving techniques have improved over years. Hypocalcemia following thyroid surgery is a well-known recognized complication and prolongs the hospital stay.[1] Post total thyroidectomy hypocalcemia is more common and potentially life threatening. Following hemithyroidectomy temporary or permanent hypocalcemia is seldom seen and hence the perioperative predictors of postoperative hypocalcemia is often overlooked.

With wider availability and lower cost of Serum calcium assay, it can be used for predicting the postoperative hypocalcemia in patients undergoing hemithyroidectomy. This study was conducted to evaluate the role of preoperative serum calcium levels as predictor of post operative hypocalcemia in patients undergoing hemithyroidectomy which facilitate early diagnosis, early management and shorter hospital stay.

METHODS

This is a prospective study on patients undergoing hemithyroidectomy at tertiary care hospital from June 2022 to February 2023.

Patients undergoing hemithyroidectomy for any clinical indications were included in the study. Patients with accidental injury to parathyroids or who received preoperative calcium therapy or renal insufficiency or whose postoperative histopathological report showed malignancy were excluded from the study.

All hemithyroidectomies were performed by the same surgical team under general anesthesia after taking informed consent. This was done to reduce the bias of surgical experience in preserving the parathyroid glands during hemithyroidectomy. In all the surgeries parathyroids were positively identified and preserved with its blood supply.

The serum calcium levels were recorded preoperatively and in immediate postoperative period (within 24 hrs after surgery). The serum calcium level of 9-11 mg/dl was considered normal range and level below 9 mg/dl was considered as hypocalcemia. The renal function test of all patients was checked preoperatively and was normal.

Statistical analysis: All the data was charted on excel sheet and was analysed. Histogram and pie charts were used to depict the data wherever necessary.

RESULTS

A total of 55 patients were included in the study during study period. The gender distribution was 50 females (90.9%) and 5 males (9.09%) giving female is to male ratio of 10:1 (Figure 1). The mean age of patients was 38.6 years (21-55 years). Of the 55 patients, 40 patients underwent right hemithyroidectomy and 15 underwent left hemithyroidectomy (Figure 2).

Out of the 55 patients who underwent serum calcium level assay preoperatively, 15 patients showed serum calcium levels below 9 mg/dl before the surgery. Out of these 15 patients, 10 patients (66.6%) developed transient hypocalcemia in immediate postoperative period (Table 1). None of patients showed any symptoms in postoperative period. Mean serum calcium levels in preoperative and postoperative period were 9.2 mg/dl.

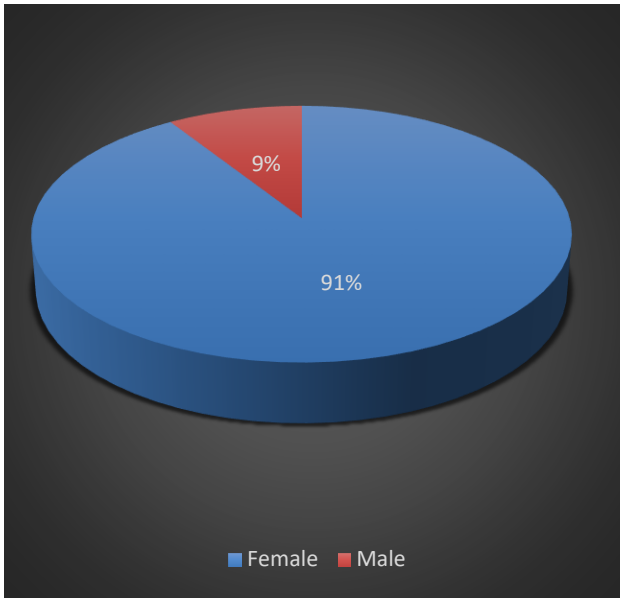

Figure 1: Gender distribution in our study showed female preponderance.

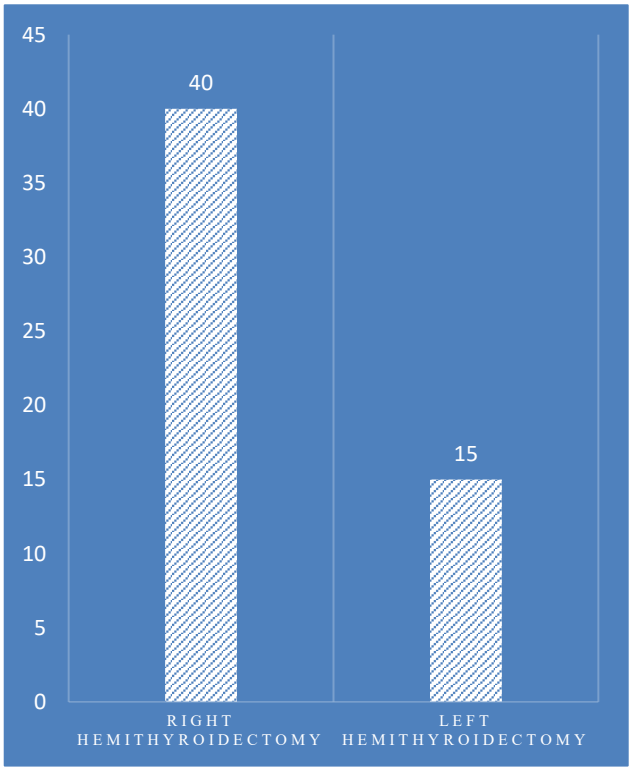

Figure 2: Right hemithyroidectomy were more common in our study.

Table 1: Percentage of patients with low preoperative serum calcium levels who developed postoperative transient hypocalcemia.

Number of patients in study	Patients who had low pre operative serum calcium levels (<9 mg/dl)	Patients who developed transient hypocalcemia after hemithyroidectomy (<9 mg/dl)	Percentage
55	15	10	66.6%

DISCUSSION

The incidence of thyroid diseases and thyroid surgery has increased over the years.[2] Hemithyroidectomy is performed for various indications like compression symptoms secondary to unilateral gland enlargement (benign pathology), cosmetic reasons and indeterminant pathology on FNAC.[3] The risk of developing hypothyroidism and hypocalcemia following hemithyroidectomy is very low due to presence of normal thyroid and parathyroid glands on opposite side.

Transient or permanent hypocalcemia is one of the complications following total thyroidectomy which is seldom seen following hemithyroidectomy. There are various etiological factors for postoperative hypocalcemia like surgical technique, iatrogenic parathyroid injury, extent of thyroidectomy, malignancy, gender, preoperative serum calcium levels, parathyroid hormone levels, vitamin D levels, presence of hypothyroidism, thyroiditis and diabetes.[4-6] As the hypocalcemia is less commonly encountered following hemithyroidectomy, the preoperative predictor of the hypocalcemia in hemithyroidectomy surgery are often overlooked.

As per study conducted by Edafe et al the role of serum calcium as preoperative predictor for postoperative hypocalcemia is unreliable and multifactorial.[7] However, there are various study which evaluated the preoperative serum calcium as predictor of transient hypocalcemia in thyroid surgery.[8-14]

In our study, postoperative transient hypocalcemia was seen in 10 patients (18.18%) of the 55 patients who underwent hemithyroidectomy. All 10 patients were asymptomatic. We used the preoperative serum calcium levels in predicting postoperative transient hypocalcemia. In our study we found that, out of 15 cases who had preoperative low serum calcium levels (<9 mg/dl), 10 cases (66.6%) developed postoperative transient hypocalcemia. However, we could not find any significant relationship between serum calcium levels and disease pathology or gender. Also, we could not find any reason for the postoperative transient hypocalcemia in patients undergoing hemithyroidectomy. The post operative transient hypocalcemia is mostly corrected by contralateral normal functioning parathyroid glands and return of parathyroid glands function on the side of surgery. Further studies are required to know the reason for low preoperative serum calcium levels in unilateral thyroid disease and postoperative transient hypocalcemia in patients undergoing hemithyroidectomy.

CONCLUSION

To conclude, postoperative transient hypocalcemia in patients undergoing hemithyroidectomy can be predicted using preoperative serum calcium levels. In two-thirds of patients who had serum calcium levels below 9mg/dl preoperatively developed transient hypocalcemia in postoperative period. Due to wider availability and affordability of serum calcium assay, it can be used as predictor of postoperative transient hypocalcemia in patients undergoing hemithyroidectomy surgery.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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