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Research Article

**STUDY OF POST-THYROIDECTOMY HYPOCALCEMIA IN
CASES UNDERGOING THYROIDECTOMY AT TERTIARY
CARE HOSPITAL**¹Dr. Karim Shah Faizi,²Muhammad faisal khan, ³Dr. Fatima¹Assistant Professor of Surgery, Naizi Medical College Sargodha²Demonstrator, Department Of Anatomy, Gujranwala Medical College, Gujranwala³House Officer, Lahore General Hospital Lahore

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Abstract:

Objective: To Study the post-thyroidectomy hypocalcemia in cases undergoing thyroidectomy at tertiary care hospital.

Material and methods: This case series study was conducted at Department of Surgery, Niazi Medical College, Sargodha from February 2019 to August 2019 over the period of 6 months. Total 50 patients who had undergone total, near total or subtotal thyroidectomy by bilateral exploration having age range from 20-70 years wither male or female were included in the study. Post thyroidectomy hypocalcemia was assessed in selected patients.

Results: Mean age of the patients was 40.157 ± 14.33 years. Total 46 were females and 4 were males 4 (8%) patients were male and 46 (92%) patients were female. Out of 50 patients, post thyroidectomy hypocalcemia was found in 15 (30%) patients, of which Transient was noted in 13 (86.67%) patients and permanent in 2 (13.33%) patients. Most of patients 35 (70%) had simple/multinodular goiter and in 34(68%) patients, subtotal thyroidectomy was performed.

Conclusion: Results of this study showed higher percentage of post thyroidectomy hypocalcemia. Most of the patients found with transient hypocalcemia. A higher percentage of patients was found with multinodular goiter and subtotal thyroidectomy was performed in most the cases.

Key words: Hypocalcemia, thyroidectomy, serum calcium

Corresponding author:

Dr. Karim Shah Faizi,
Assistant Professor of Surgery,
Naizi Medical College Sargodha

QR code



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INTRODUCTION:

Postoperative hypocalcemia is one of the common complications after thyroidectomy and also known that postoperative hypocalcemia is a major morbidity in patients that undergone thyroidectomy.¹⁻² Patients must therefore be carefully observed in the postoperative period and have their lab workup done, especially those categorized as high risk patients.³ Postoperative hypocalcemia is often causes of longer hospitalization and the performance excessive tests, and it significantly because increased the health care costs of thyroidectomy.⁴ The incidence of post-thyroidectomy hypocalcemia among reports is considerably heterogeneous, but it is estimated between 1 to 15%.⁵

Hypocalcemia may occur secondarily to surgical trauma, devascularization, unintentional removal of parathyroid glands, reoperation and total thyroidectomy⁶. Even after meticulously performed procedures, some temporary parathyroid dysfunction may occur⁷. Surgery extension has been seen as a risk factor, as in total thyroidectomy there is potential blood supply involvement resulting from bilateral surgical manipulation. Lobectomy patients are at extremely low risk of postoperative hypocalcemia, as parathyroid glands usually remain functional at the non-operated side.⁸ Some situations are considered to be risk factors for the onset of transient and permanent hyperparathyroidism, such as Graves' disease, recurring goiter, and thyroid carcinoma.⁹ However, other factors are related to the chosen surgical procedure and its impact on devascularization or accidental removal of the parathyroid glands.¹⁰

The recommended surgical strategy is meticulous dissection and preservation of the parathyroid glands and their blood supply⁵. While the removal of one gland is not associated with postoperative hypocalcemia, the same cannot be

said when two or more glands are removed⁴. The best way to avoid accidental excision is properly identifying the parathyroid glands. Risk of complication is higher when fewer than three glands are identified during surgery^{4,8,9}.

MATERIAL AND METHODS:

This case series study was conducted at Department of Surgery, Niazi Medical College, Sargodha from February 2019 to August 2019 over the period of 6 months. Total 50 patients who had undergone total, near total or subtotal thyroidectomy by bilateral exploration having age range from 20-70 years wither male or female were included in the study. The patients with concurrent lymph node dissection and pre-existing hypocalcemia were excluded. Study was approved by ethical committee and written informed consent was taken from every patient.

Preliminary work up included complete clinical examination, biochemical assay of hormone profile. Ultrasound imaging of the thyroid gland and neck in general was done routinely. Aspiration cytology was performed from all solitary nodules and nodules showing suspicious features on clinical examination or ultrasound imaging. Plain helical computerized tomography was done when clinical evidences of mediastinal extension were noted. Hyperthyroidism was controlled before operation. Vocal cords were assessed by indirect laryngoscopy prior to operation.

After 24 hours of surgery, blood sample was drawn and sent to laboratory for serum calcium level. Finding were noted on pre-designed proforma in term of hypocalcemia (Yes/No). Demographic data including age, gender, type of surgery was also entered.

All the collected was entered in SPSS version 20 and analyzed. Mean and SD was calculated for numerical data and frequencies were calculated for categorical data.

Fig. 1: Frequency of hypocalcemia

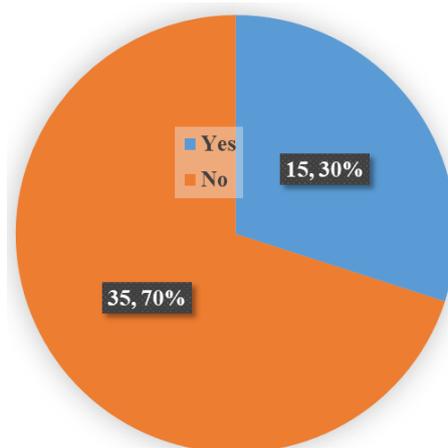


Fig. 2: Type of hypocalcemia

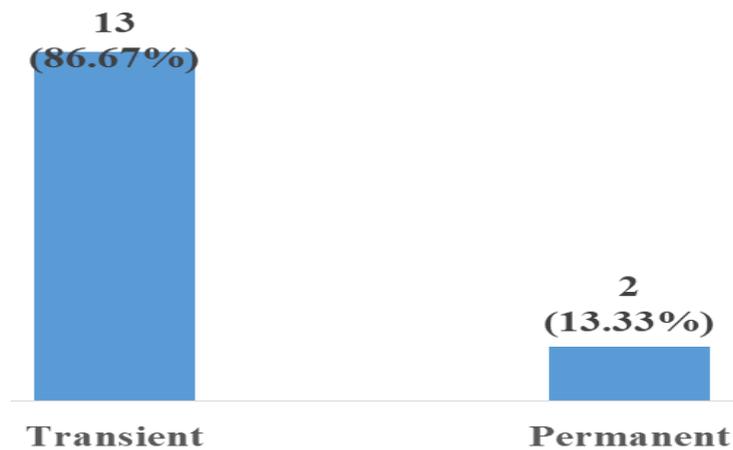


Table 1: Type of thyroid disease

Thyroid disease	N	%
Multinodular goiter/simple	35	70%
Grave's disease	6	12%
Toxic nodular goiter	4	8%
Thyroiditis	3	6%
Cancer	2	4%

Table 2: Type of surgery

Type of surgery	N	Hypocalcemia
Total thyroidectomy	5(10%)	4(8%)
Near total thyroidectomy	11(22%)	5(10%)
Subtotal thyroidectomy	34(68%)	6(12%)

DISCUSSION:

The development of post-thyroidectomy hypocalcemia is multifactorial. The suggested contributory factors include hemodilution secondary to intravenous fluid administration during the perioperative phase, increased urinary calcium excretion secondary to surgical stress, calcitonin release after thyroid gland manipulation, and hungry bone syndrome in patients with metabolic bone disease. However, hypoparathyroidism through direct injury, removal or devascularization of parathyroid glands is the most likely cause of postoperative hypocalcemia.¹¹ The symptoms range from mild paraesthesia to cramps or tetany. In literature, its incidence fluctuates within a very wide range (from 1.7% to 68%). This variability might reflect differences in criteria in defining it (asymptomatic hypocalcaemia or symptomatic hypocalcaemia) and the lack of uniformity in perioperative treatment with calcium.¹² Hypocalcaemia usually develops within the first 48 hours of surgery, but the serum calcium concentration in many cases takes 72 hours to stabilize.¹³

The result of this study showed that the incidence of hypocalcaemia is 30% and it was transient in the majority of the cases. Regarding the age, most of the patients who had transient hypocalcemia (33.3%) belong to the 31-40 years age group and most of the patients who had permanent hypocalcemia (66.6%) belong to that age group also, which is nearly similar to (Chaudhary IA et al study).¹⁴ Regarding the gender, most of the patients who had transient hypocalcemia (91.66%) were females, and most of the patients who had permanent hypocalcemia (66.66%) were females also, which is similar to Thomusch O et al study.¹⁵

Regarding the type and extent of the surgical procedure, we found that the incidence of transient hypocalcaemia was 60% after total thyroidectomy while it was 36.3% after near total thyroidectomy and it was only 14.7% after subtotal thyroidectomy. The incidence of permanent hypocalcemia was 20% after total thyroidectomy while it was 9% after near total thyroidectomy and only 2.9% after subtotal thyroidectomy. These figures are consistent with those reported in other studies Chaudhary IA et al, Nair et al, and Wingert DJ et al, that showed that the

extent of resection and surgical technique has greater impact on the rate of post-thyroidectomy hypocalcaemia.^{14,16-17} Regarding the ligation of the inferior thyroid artery, author found that (66.6%) of the patients who underwent bilateral ligation of that artery had post-thyroidectomy hypocalcaemia while 33.4% of the patients who underwent a unilateral ligation of that artery had hypocalcaemia, so making that procedure as an important risk factor. This result was due to the inadvertent excision of parathyroid gland in total thyroidectomy and for interference blood supply of the parathyroid gland in case of method of truncal inferior thyroid a. ligation.¹⁸⁻¹⁹ Regarding the clinical and the pathological diagnosis, author found that all the patients with CA had post thyroidectomy hypocalcemia, while 66.66% of patients with thyroiditis had hypocalcemia and only (33.33%) of those with Grave's disease had hypocalcemia, and 50% of those with toxic nodular goiter had hypocalcemia and only 20% of those with simple multi nodular goiter had hypocalcemia. These findings are in agreement with other studies showed that the thyroid cancer is a risk factor for inadvertent parathyroid excision.^{15-16,20}

This was due to the radical removal of thyroid tissue, excessive dissection and truncal ligation of inferior thyroid a. All these factors might lead to unintentional removal of parathyroid gland and subsequent hypocalcaemia.²¹⁻²² Regarding the muscular built of the patient, author found that only 13.3% of the patients who had post-thyroidectomy hypocalcemia were obese and of a short neck, so making that parameter is not so significant.

CONCLUSION:

Results of this study showed higher percentage of post thyroidectomy hypocalcemia. Most of the patients found with transient hypocalcemia. A higher percentage of patients was found with multinodular goiter and subtotal thyroidectomy was performed in most the cases.

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