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FREQUENCY OF HYPOCALCAEMIA POST TOTAL THYROIDECTOMY

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ABSTRACT

Background: Hypocalcemia is the most prevalent complication in total thyroidectomy patients and may occur in 10.6% to 50% of cases following total thyroidectomy. It can be a major contributor to extended hospitalisation, necessitating meticulous monitoring of symptoms and regular laboratory testing.

Objective: To determine the frequency of hypocalcemia among post total thyroidectomy patients

Materials and Methods: The present prospective study was conducted at the 'Department of Otorhinolaryngology', MTI, Bacha Khan Medical Complex, Swabi, Pakistan, from January 2018 to December 2022. 167 patients of both genders above 18 years of age, needing total thyroidectomy for both malignant and benign thyroid diseases and having normal serum calcium level were enrolled in the study after taking informed consent and approval of ethical board. Total thyroidectomy was performed under general anaesthesia and 'ost-thyroidectomy serum calcium levels' were obtained at 24 hours and 48 hours. Any hypocalcemia found was noted. The data obtained was analysed by SPSS version 23.

Results: Out of total 167 patients who underwent total thyroidectomy, 43 (25.75%) were biologically male while124 (74.25%) were female . Mean age was 48.31±13.6 years. Post-operative hypocalcemia was noted in 43 (48.31%) patients. Out of 43 patients who developed hypocalcemia, 7 (16.28%) were male and 36 (83.72%) were female and the etiology was malignant in 24 (55.81%) patients while benign in 19 (44.19%) patients,.

Conclusion: Hypocalcemia is one of the biggest concerns after total thyroidectomy. Preventing postoperative hypocalcaemia after thyroid surgery requires meticulous 'surgical technique, identification and preservation of parathyroid glands and their vascularity'. Postoperative calcium

monitoring and early therapy can prevent serious complications and thus save lives.

Keywords: Hypocalcaemia; Total thyroidectomy; Transient hypocalcaemia

INTRODUCTION

Thyroid surgery is widespread all around the world. Total thyroidectomy (TT) is a common procedure for both benign and malignant thyroid gland disorders.[1] Bleeding, hypocalcemia, hematoma development, nerve damage are the main complications of thyroid surgery or thyroidectomy. Hypocalcemia is the most prevalent complication in total thyroidectomy patients. It is expected to be a difficult situation for surgeons, burdensome for the hospital and difficult for the patient who suffers the complications. It is mostly caused by some dysfunction due to the manipulation of the parathyroid gland during total thyroidectomy. Many approaches have been devised to protect parathyroid function following surgery. However, transitory hypoparathyroidism still occurs in many people.[2,3]

Serum calcium levels frequently return to normal within a few months. However, in a rare instances, hypoparathyroidism becomes persistent, resulting in permanent hypocalcemia, as a result of devascularisation, massive surgical injury, or dissection of the parathyroid glands during total thyroidectomy. Several studies found that the frequency of hypocalcaemia ranged between 10.6% and 50%, although some studies suggest it might reach as high as 83%. Postoperative hypocalcemia can induce clinical symptoms, and can be a major contributor to extended hospitalisation, necessitating meticulous monitoring and regular laboratory examinations.[4-6] This extended stay at the hospital increases the burden on the staff, the hospital resources and expenses for the patient. The extended stay is also best avoided as longer hospitalization has been associated with greater changes of contracting infections and overall demonstrates a lack of efficiency in the hospital management.

To minimize post-operative Hypocalcaemia and it's complications following total thyroidectomy, careful dissection is required to locate and save at least two parathyroid glands under direct eyesight. Post-operative hypocalcemia is more common after bilateral lobectomy than after unilateral lobectomy. Post-total thyroidectomy hypocalcemia does not generally manifest itself during the first 24 to 48 hours. As a result, patients are usually admitted to the hospital for two days following surgery to be monitored for clinical and laboratory symptoms of hypocalcemia. Neuromuscular symptoms and, in certain cases, psychiatric problems are rapid clinical manifestations of hypocalcemia. Skin symptoms appear within 6 months of thyroidectomy. Persistent hypocalcemia can cause intracranial lesions and cardiac arrhythmias. Early detection and treatment of post-operative hypocalcemia are critical for a satisfactory outcome in the post-operative period following total thyroidectomy.[7]

The signs and symptoms of hypocalcemia vary according to the degree and duration of the hypocalcemia. If untreated, acute hypocalcemia causes neurological symptoms such as paresthesias in the perioral area and limbs, whih progresses to cramps, hyperreflexia, and muscular spasms. Prolonged hypocalcemia can cause irritability, sadness, and 'psychotic symptoms'. 'Angina pectoris, congestive heart failure, or syncope may occur in severe instances due to anomalies in heart muscle contractility or the cardiac electrical conduction' system. Other symptoms of severe hypocalcemia include laryngospasm, bronchospasm, and convulsions.[8,9]

This study was conducted to determine the incidence of hypocalcemia in patients postoperatively in first 48 hour following total thyroidectomy. This will help narrow down the risk factors for the post op hypocalcaemia and determine which gender is more affected.

MATERIALS AND METHODS

This prospective cohort study, was carried out at the Department of Otorhinolaryngology, MTI, Bacha Khan Medical Complex, Swabi, Pakistan, from January 2018 to December 2022. 1 6 7 patients of both biological genders, whose total thyroidectomies were done were included in the

study. The ‘sample size was calculated’ by taking post-thyroidectomy frequency of hypocalcemia to be 12.5%[10], with confidence interval of 95% and margin of error 5% using Raosoft sample size calculator. All the patients were above 18 years of age and had normal serum calcium level. Patients taking any calcium supplementation, having coexisting parathyroid pathology or suffering from chronic renal insufficiency were excluded from the study. Ethical approval was obtained from institutional ethical review board. All the patient underwent proper history, examination and relevant investigations. Informed written and verbal Consent for surgery, general anesthesia and inclusion in the study was obtained. Total thyroidectomy was done under general anesthesia. No deliberate attempt was made to search for parathyroid glands. Postoperatively patient management was done according to unit protocol. Serum calcium was measured at 6th, 12th,24th & 48th hours postoperatively. Any hypocalcemia found was managed accordingly. The specimens were sent for histopathology and Etiology of the thyroid disease was noted. The data was analysed in SPSS version 23. Means ± standard deviation was calculated for continuous variables while frequencies and percentages were calculated for discrete variables.

RESULTS

Out of total 167 patients who had undergone total thyroidectomy, 43 (25.75%) were biologically male while 124 (74.25%) were biologically female [Fig. 1]. ‘Mean age of the participants was 48.31±13.6 years’. Post-operative hypocalcemia was noted in 43 (48.31%) patients. Out of the 43 patients who developed hypocalcemia, 7 (16.28%) were male and 36 (83.72%) were female [Fig.2]

while the etiology was malignant in 24 (55.81%) patients while benign in 19 (44.19%) patients [Fig. 3], while.

Fig. 1, Gender-wise distribution of patients’ that underwent total thyroidectomy (total=167)

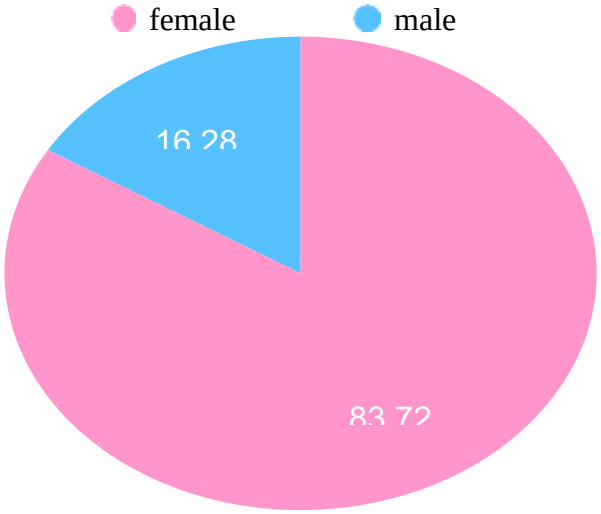


Fig. 2, Gender-wise distribution of Hypocalcemia (out of 43)

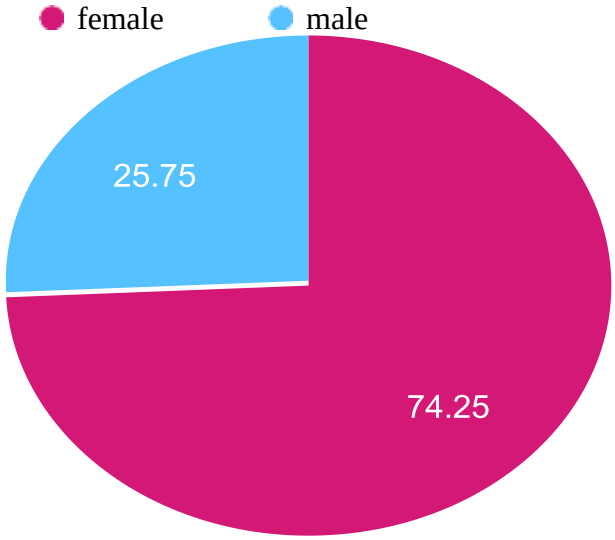
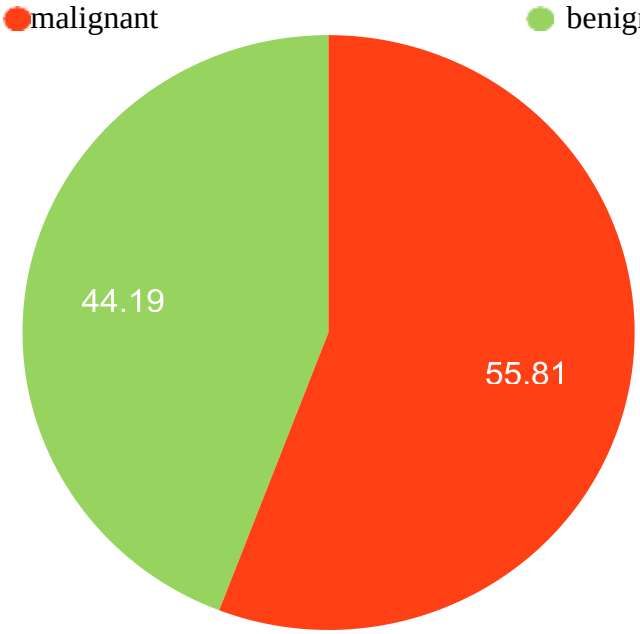


Fig. 3, Etiology-wise distribution of hypocalcemia (total=43)



DISCUSSION

Transient and permanent hypocalcaemia following thyroidectomy is a well-known complication with high morbidity.[11] It typically prolongs hospitalisation and has a substantial impact due to increase in the overall expense of the thyroidectomy as well as the patient's sufferings.[12] Young individuals are more likely to develop post-thyroidectomy hypocalcaemia due to their age[2] and other significant risk factors. Multiple studies revealed lymph node dissection[10,13] Grave's disease presence[14] or malignancy as independent predictors of post-operative hypocalcaemia, as well as complete thyroidectomy.[15,16]

Several practitioners routinely give their patients vitamin D as well as calcium following a thyroidectomy. Though this approach might reduce the overall number of patients with symptoms, it is difficult due to the high price and weak toleration of treatment. It can distort the incidence rate of hypocalcemia following surgery, especially in cases where levels of blood calcium are used for categorization.14, 17 It is excellent for identifying those who may get hypocalcaemia. We can only treat individuals who actually require replacement treatment using this strategy. The ‘intraoperative parathyroid hormone (PTH) assay (quick PTH) has been used to identify hypoparathyroidism as

a Reliable' and speedy approach. However, the exorbitant expense of rapid PTH has frequently limited its use.[18,19]

In this prospective cohort study, female patients with post operative hypocalcemia predominate males who were operated for total thyroidectomies. These observations are similar to study conducted by Baloch N et al. who observed '670 female (78.45%) and 184(21.54%) male patients' after total thyroidectomy for development of post-operative hypocalcemia.[10] We observed mean age to be 48.31±13.6 years which is similar to the results compiled by Mumtaz W et al which is 46.7

± 4.6 years.[20] in our study post-operative hypocalcemia was noted in 43 (48.31%) patients. This is lower than the 64.2% rate of transient hypocalcaemia reported by Esimontas et al.[2] in 257 individuals. Transient hypocalcaemia was seen in 21.62% of 74 patients in a prior local investigation, which is greater than our findings.[1] Various researchers, however, employed different definitions and are not comparable. In our study out of 43 patients who developed hypocalcemia, the etiology was malignant in 24 (55.81%) patients while benign in 19 (44.19%) patients. Kumar et al found hypocalcaemia in '56.6% of malignant thyroid disease and 43% of benign thyroid illness'. Our findings are close to those of Kumar et al.[21]

The Frequency and severity of post total thyroidectomy hypocalcaemia documented in the literature varies greatly.[2] There are several reasons that account for these discrepancies in the literature, including the definition of hypocalcaemia, the kind of thyroid illness, and the surgical method used for thyroidectomy.[14,22] future studies should be done to take into consideration, surgical technique, experience of the surgeon, etiology, size of the swelling, duration of the surgery etc. further studies are recommended to have a larger sample size, a more varied population to determine which of these individual factors influence the outcomes of hypocalcaemia the most. It should be investigated as to why females are more frequently affected by post total thyroidectomy hypocalcemia.

CONCLUSION

Hypocalcemia is still one of the biggest concerns after total thyroidectomy. Preventing postoperative hypocalcaemia after thyroid surgery requires meticulous 'surgical technique, identification and preservation of parathyroid glands and vascularity'. Postoperative calcium 'monitoring and early therapy' can prevent severe complications and thus save lives.

Conflicts of Interest: None.

Source of funding: None.

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