POST THYROIDECTOMY TRANSIENT HYPOCALCEMIA AND ASSOCIATED FACTORS IN TWO HOSPITALS, A SIX MONTH PROSPECTIVE STUDY ADDIS ABEBA ETHIOPIA

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THIS THESIS SUBUBMITED TO DEPARTEMENT OF SURGERY, SCHOOL OF MEDICINE, ADDIS ABABA, ETHIOPIA AS PARTIAL REQUIREMENT FOR GRADUATION IN SPECIALITY TRAINING IN GENERAL SURGERY

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ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCINCE

DEPARTMENT OF GENERAL SURGERY

Name of investigator	Alebachew Derebe (MD)
The full title of the research project	post thyroidectomy hypocalcaemia and associated factors in two hospitals, a six month prospective study Addis Ababa Ethiopia
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DECEMBER, 2024

ADDIS ABEBA, ETHIOPIA

Declaration

ADDIS ABABA UNIVERSITY

COLLEGE HEALTH SCIENCE SCHOOL OF MEDICEN

DEPARTMENT OF SURGERY

I, the undersigned MSc student, declare that I have submitted my original work on a title

"Prospective Study of Post Thyroidectomy hypocalcaemia and Associated Factors at Two Hospitals from May 2024 to October 2024 In Addis Ababa, Ethiopia" for the examination.

Submitted by:

_____ _____ _____

Name of student Signature Date

This thesis work has been submitted for examination with my approval as an advisor.

Approved by:

1. _____ _____ _____

Name of Advisor Signature Date

2. _____ _____ _____

Name of second Advisor Signature Date

ACKNOWLEDGMENT

First and foremost, my heartfelt thanks, I owe this achievement to my Lord and Savior, I can do all things through Christ which strengthened me. It has been my faith that has guided me all the way here.

Next to that I would like to extend my acknowledgment to my Advisor Endale Aniberibir **(**MD**,** consultant general surgeon and endocrine surgeon) and Girmaye Tamrat (MD**,** consultant general surgeon and endocrine surgeon) for their fruitful advice, valuable comments and cooperation in preparing this research thesis.

ABBREVIATIONS

MNG-- Multinodular goiter

FN- follicular neoplasm

FTC- follicular thyroid CA

PTC-papilary thyroid ca

MTC- medullary thyroid ca

TT – Total thyroidectomy

HT- hemithyroidectomy

LD-lymph node dissection

TASH -Tikur Anibesa specialized hospital

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SUMMARY

Background

Thyroidectomy is a very common surgical procedure worldwide. It is recommended for benign condition such as symptomatic large goiters, toxic goiters and for the treatment of malignant disease of the thyroid gland. Thyroidectomy has potential complications. The major postoperative complications are hypocalcaemia, hematoma, recurrent laryngeal nerve (RLN) injury,EBSLN injury and hypothyroidism are the most common complication post thyroidectomy is hypocalcaemia

Objectives: To evaluate the prevalence and assess factors affecting post thyroidectomy hypocalcaemia in two Hospitals in Addis Ababa Ethiopia.

Method: A prospective study was conducted in surgical department of TASH and Lancet hospital. The study included patients diagnosed for thyroid swelling and operated from May 1 2024 –October 30, 2024, meeting the following criteria: nodular goiter; operation by surgeons with various experiences; Age, sex, Hospital where the surgery done, indication for surgery preoperative diagnosis, types of surgery, was analyzed as risk factors for post thyroidectomy hypocalcaemia. Data was analyzed using SPSS version 27. P values < 0.05 were considered statistically Significant

Result- Among the 188 patients who underwent thyroidectomies, ages ranged from 15 to 85 years, with a mean age of 44 years. The youngest patient was 13 years old, and the oldest was 83. Of the study population, 155 patients (82.4%) were female, and 33 patients (17.6%) were male, resulting in a male-to-female ratio of 1:4.7. Eighty patients were operated on at TASH, and 100 patients were operated at Lancet Hospital, representing 47% and 53% of the study population, respectively.The diagnoses included toxic nodular goiter (TNG) in 46 patients (24.5%), follicular neoplasm (FN) in 33 patients (17.6%), simple nodular goiter (SNG) and retrosternal goiter in 31 patients (16.5%), papillary thyroid cancer (PTC) in 26 patients (13.8%), recurrent PTC in 15 patients (8%), Graves' disease in 14 patients (7.4%), recurrent TNG and recurrent follicular thyroid carcinoma (FTC) in 6 patients (3.2% each), Hürthle cell neoplasm in 4 patients (2.1%), follicular thyroid cancer in 4 patients (2.1%), and medullary thyroid cancer (MTC) in 3 patients (1.6%).Regarding the type of surgery, 109 patients (58%) underwent total thyroidectomy (TT), 47 patients (25%) had hemi-thyroidectomy (including lobectomy, isthmectomy, Dunhill procedure, or subtotal thyroidectomy), and the remaining patients had total thyroidectomy with lymph node dissection (central, lateral, or both).The rate of post-thyroidectomy hypocalcemia was higher at TASH (40%) compared to Lancet Hospital (29%). Post-operative calcium levels and the type of surgery were significantly correlated (P = 0.000, <0.05). However, no statistically significant associations were found

between post-operative hypocalcemia and age, sex, place of surgery, or pre-operative and post-operative diagnoses, with P-values of 0.474, 0.477, 0.397, 0.618, and 0.408, respectively.

Conclusion - the overall prevalence of post thyroidectomy hypocalcaemia is 34 % and post thyroidectomy hypocalcaemia is strongly associated with the type of surgery with p value of 0.001

1. INTRODUCTION

1.1 Background

Thyroid pathologies are common disorders of the endocrine system worldwide (1). The total goiter prevalence in the world's general population is estimated to be 15.8% and in Africa 28.3%. and thyroidecomy is performed by surgeons with varied training, such as general surgery, thoracic surgery, endocrine surgery, oncological surgery, and head and neck surgery(3).

Specific complications after thyroid surgery, such as injury to the recurrent laryngeal nerve (RLN) or external branch of the superior laryngeal nerve (SLN), hypoparathyroidism, hypocalcemia, hypothyroidism, or recurrent laryngeal nerve ,hyperthyroidism, are feared because they sometimes result in lifelong morbidity and mortality (, 4).

Hypocalcemia was the most frequent complication; 116 (63.7%) developed temporary hypocalcemia while it persisted in three (1.6%) patients. Change of voice was recorded in five (2.7%) while two (1.1%) lost a highpitched voice. Seroma, hematoma, and tracheal injury were reported in 1.6%, 1.1%, and 0.5%, respectively(5).

According to study conducted in Iran Hypocalcemia was the most common complication with a frequency of 54.4%, the chance of late complications increases with age (5).Several studies have shown that increased surgeon experience is significantly associated with decreases in complications after thyroid surgery Complications associated with thyroidectomy are related to the type of disease, extent of disease, removal approaches, surgeon's training, and experience (6).

Most patients undergoing surgery for multinodular goiter (MG) require bilateral thyroid resection, Subtotal thyroidectomy (STT) has been the surgical treatment of choice in surgery for MG, but it does have several inconveniences among which is a high rate of recurrence (10 to 30%) (3, 4, 6).

In previously conducted research, patient factors, the nature of thyroid disease, and the surgeon's level of expertise have been associated with complications following thyroidectomies (6).

1.2 Statement of the Problem

Thyroidectomy is a quite common procedure. During the 19th century thyroid surgery was characterized by high morbidity and mortality (up to 40% mortality reported) mainly due to infection and bleeding. Later, with better understanding of anatomy, improved surgical and hemostatic techniques, developments in anesthesia and aseptic techniques, death from thyroidectomy became rare. Even today, potential complications of thyroidectomy include hemorrhage, respiratory obstruction, recurrent laryngeal nerve (RLN) injury, hypocalcaemia, hypothyroidism, thyroid storm, and wound infection. Hypocalcaemia is the commonest complication in many centers. It is defined as serum calcium of less than 8.8 mg/dL ((<2.20 mmol/L) in the presence of a normal serum protein level.

Morbidity rates are as high as 3.5% for definitive hyperparathyroidism and 3.1% for permanent recurrent laryngeal nerve (RLN) injury, to reach 5% and 17%, respectively, when there are recurrent goiters. These figures are unacceptable for the surgical treatment of a benign pathology occurring in a relatively young population. It has now been seen that with skilled training these complications could be reduced.

Most literature shows considerable variation in the incidence of post-thyroidectomy hypocalcaemia2-4 , with the majority of cases secondary to temporary hyperparathyroidism, with recovery in three weeks to six months. However, 0% to 33% of patients will experience permanent hyperparathyroidism.

The knowledge of magnitude of complications in our set up and identifying the factors which increases the rate of complications may help significantly in reducing the incidence of hypocalcaemia related to this common procedure. Post-thyroidectomy hypocalcaemia is a frequent complication with significant morbidity, and has been shown to increase hospital stay and readmission rate The aim of this study will be to evaluate the prevalence and factors affecting post thyroidectomy hypocalcaemia, in TASH and lancet Hospital.

1.3. Significance of the Study

The results of this study will be used by the respective hospitals to know the magnitude of postthyroidectomy hypocalcemia and associated factors to take appropriate measures to prevent and also treat post thyroidectomy hypocalcemia.

2. LITERATURE REVIEW

Thyroid pathologies are common disorders of the endocrine system worldwide. In 2017, 45,379 new cases of thyroid cancer were reported and 1,892 died of thyroid cancer in the United States (1, 2). During the 19th century thyroid surgery was characterized by high morbidity and mortality (up to 40% mortality reported) mainly due to infection and bleeding. Later, with better understanding of anatomy, improved surgical and hemostatic techniques, developments in anesthesia and aseptic techniques, death from thyroidectomy became rare. Even today, potential complications of thyroidectomy include hemorrhage, respiratory obstruction, recurrent laryngeal nerve (RLN) injury, hypocalcemia, hypothyroidism, thyroid storm, and wound infection (8,9,10,11).

Thyroidectomy is also indicated in cases where an enlarged thyroid gland exhibits toxic symptoms, or where there is a high index of suspicion of malignancy, albeit cosmesis is the most common indication. The type of thyroidectomy is contingent upon the benign or malignant features of lesion, size of the lesion, and degree of impairment. During the eighteenth century, the mortality rate of thyroid surgery was as high as 40% from hemorrhage and sepsis (12). Major postoperative complications of thyroid surgeries include hypocalcaemia wound infection, hematoma/ hemorrhage causing airway compromise, recurrent or superior laryngeal nerve injury, and thyroid storm (13,14).

According to the American College of Surgeons National Surgical Quality Improvement Program database in 2018 a majority of complications arose before discharge are blood transfusion (96%), hematoma formation (68%), pneumonia (53%), and cardiac arrest (67%). Approximately 37% of unplanned reoperations occurred before discharge. Greater than 65% of mortalities occurred after discharge (15).

Study conducted in Saudi Arabia shows that Hypocalcemia was the most frequent post-thyroidectomy complication (63.7%), whereas voice changes (2.7%), seroma (1.6%), hematoma(1.1%,), and tracheal injury (0.5%) are rare complications. Additionally, total thyroidectomy has the highest risk of postoperative hypocalcemia (16).

According to the 2019 Population Health Report for Poland, there has been a steady increase in the incidence of thyroid disease over the past five years; it affects 16% of women and 3% of men (17).

The study by Daba et al. found that post-thyroidectomy complications occurred in 17% of cases, with hypocalcemia and voice change being common, especially due to nerve injuries. Factors like total thyroidectomy and younger patient age were associated with complications, emphasizing the importance of understanding risk factors for better patient education and surgical outcomes (18).

According to American College of Surgeons National Surgical Quality Improvement Program database a majority of complications arose before discharge including blood transfusion (96%), hematoma formation (68%), pneumonia (53%), and cardiac arrest (67%) (19).

The total goiter prevalence in the world's general population is estimated to be 15.8% and in Africa 28.3%. The burden of thyroid disease is very high in Ethiopia, and a large number of patients seek surgical care for various pathologies of the thyroid gland each year (20, 21)

Studies conducted at St. Paul's Hospital Millennium Medical College in Addis Ababa, Ethiopia, and other institutions have highlighted major complications like recurrent laryngeal nerve injury, hypocalcemia, hypothyroidism, and hematoma, influenced by factors such as the type of thyroid pathology, patient comorbidities, extent of surgical resection, and surgeon expertise (18).

Complications associated with thyroidectomy are related to the type of disease, extent of disease, removal approaches, surgeon's training, and experience (22). Several studies have shown that increased surgeon experience is significantly associated with decreases in complications after thyroid surgery (16).

Central lymph node dissection is an independent risk factor for postoperative permanent hyperparathyroidism in patients operated for papillary thyroid cancer (23).

Research in Ethiopia has shown that post-thyroidectomy complications occurred in 17% of cases, with hypocalcaemia and voice change being common, especially due to nerve injuries. Factors like total thyroidectomy and younger patient age were associated with complications, emphasizing the importance of understanding risk factors for better patient education and surgical outcomes (3).

The is considerable variation in the incidence of post-thyroidectomy hypocalcaemia, with the majority of cases secondary to temporary hyperparathyroidism, with recovery in three weeks to six months. However, 0% to 33% of patients will experience permanent hyperparathyroidism. Many factors may be involved in the increased incidence of hypocalcaemia and hyperparathyroidism after thyroidectomy, including total thyroidectomy, reoperation, neck dissection, preoperative hyperthyroidism and surgical procedure performed by inexperienced surgeons. However, not all patients with these factors will develop such complication, probably because in order for it to happen, concur other causes, whose identification seems fundamental to its prevention (24).

Basedow-Graves disease was associated with higher incidence of symptomatic hypocalcemia when compared to colloid goiter and follicular adenoma and to the presence of symptoms, the same happening with permanent hypoparathyroidism when compared to colloid goiter. Factors that may have contributed to it are the more difficult technique in the surgical treatment of Basedow Graves disease and the presence of hyperthyroidism. The operative time was also associated with higher incidence of hypocalcemia. This data is directly linked to the size of the operation and should always be considered in conjunction with the type of surgical procedure. In conclusion, the predictors of postoperative hypocalcaemia include age (> 50 years), extensive surgical procedures and neck dissection. Thyroid diseases indirectly lead to postoperative hypocalcemia in cases of more extensive operation, the same occurring with operative time. The predictors of post-thyroidectomy permanent hyperparathyroidism included type of operation, histological diagnosis and hyperthyroidism (25).

Post-thyroidectomy hypocalcemia is a frequent complication with significant morbidity, and has been shown to increase hospital stay and readmission rates. The evaluation of serum parathyroid hormone (PTH) levels after thyroidectomy represents a reliable method to predict post-thyroidectomy hypocalcemia, but it remains infrequently used. This retrospective study investigates serum PTH values 3 h after thyroidectomy as a predictor of hypocalcemia. In this study, we enrolled 141 patients aged between 27 and 71 years eligible for total thyroidectomy who presented with multinodular goiter, suspicious nodule on cytological examination, Graves' disease, or toxic multinodular goiter.Three hours after total thyroidectomy, 53 patients (37.6%) showed a reduction in serum PTH. Of these patients 75.5% developed hypocalcemia by 24 h after surgery and 100% were hypocalcemic after 48 h ($p < 0.001$). (15,26)

There was no significant difference attributable to the different thyroid diseases, nor to the age of the patients. PTH at 3 h after total thyroidectomy accurately predicts post-operative hypocalcemia. The early detection of patients at risk of developing post-operative hypocalcemia allows for prompt supplementation of calcium and Vitamin D in order to prevent symptoms and allows for a safe and timely discharge.(26)

3. OBJECTIVE

3.1. General objective

To determine the incidence and predictive factors of post thyroidectomy hypocalcaemia

3.2. Specific objectives

- To assess the prevalence post thyroidectomy transient and permanent hypocalcaemia
- To determine factors affecting post thyroidectomy hypocalcaemia

4. METHODOLOGY

4.1. STUDY AREA

The study was conducted in Tikur Anbessa Specialized Hospital and Lancet General Hospital, Addis Ababa, Ethiopia

4.2. Study period

The study was conducted from May 2024 G.C up to October 2024 G.C.

4.3. Study design

Prospective hospital-based cross-sectional study design was used .The study was approved by the ethical review board of the institution and informed written consent was obtained from each study participant. Confidentiality was assured throughout the research.

4.4. Description of Population

4.4.1. Source population

Source populations of this study was all patients' undergone elective surgery during study period, in the specified hospitals were included.

4.4.2. Study population

Study populations are adult who have undergone thyroid surgeries for any type of thyroid disease during the study period.

4.5. ELIGIBILITY CRITERIA

4.5. 1.Inclusion criteria

We included all patients who underwent thyroid surgeries for any type of thyroid disease during the study period. The types of surgeries included total thyroidectomy (TT), hemi-thyroidectomy (including lobectomy, isthmectomy, Dunhill procedure, or subtotal thyroidectomy), and total thyroidectomy with lymph node dissection (central, lateral, or both)

4.5.2. Exclusion criteria

Patients who had symptoms of hypocalcaemia or low serum calcium level during the preoperative evaluation were excluded from the study

4.6. Sampling Methods

4.6.1. Sample size calculation

To determine sample size for primary the objective, single population proportion formula used. Assuming that 95% confidence interval, 5% margin of error and proportion was taken from similar previous study. That was carried out in Addis Ababa University (28) and to get maximum sample size P is taken as 19.16% from research done on evaluation of factors affecting post thyroidectomy outcome

$$n = \frac{(Z\alpha/2)^2 P(1-p)}{d^2}$$

Thus

$$n = \frac{(1.96)^2 0.1916(1-0.1916)}{0.05^2}$$

n=238

Considering 10% non-response rate, the final required sample size became 262.actual data collected and cleaned and those 188 patients found candidate for the study which account about 70% of the expected size population accepted by most research designs

4.6.2. Sampling procedure

Sampling technique and procedure of this study followed the following steps: first all adult who have undergone thyroid surgeries for thyroid disease from both study area (Black Lion hospital and lancet hospital) were considered. 2nd, based on the eligible criteria mentioned in the above inclusion criteria‟ participants were excluded from the sample frame and the rest where proceeded to the next procedure. Finally, from each study area, participants were selected by convenient sampling technique.

4.7. Operational definitions

Hypocalcemia –patient with clinical or biochemical evidence, ionized calcium of less than 1.1 mg/dl and total of less than 8mg/dl considering different laboratory ranges which was determined from the first post-operative day1 to 6month

Symptoms including muscle cramps or spasms, particularly in the hands, feet, and legs, as well as tingling or numbness around the mouth, fingers, or toes

Transient hypocalcemia - clinical or biochemical evidence of hypocalcaemia occurring within a6 month post-thyroid surgery

4.8. Study Variables

4.8.1. Dependent Variables

- Post-operative calcium level

4.8.2. Independent Variable

- Age
- sex
- Indication for surgery
- type of procedure
- hospital where the surgery done

4.9. Data collection procedure

Interviewer-administered questionnaire was pretested and composed of a structured questionnaire used. contain close-ended questions was prepared in English language and then translated to Amharic by language expert and red by data collector to determine factor affecting post thyroidectomy hypocalcaemia during study period.

The data was collected on operation note and patient file on the card and system

4.10. Data quality control

Data collectors were trained on how to collect, for how long to collect, where to collect, how to do with checklists and guides, privacy issue and data saving. While being on data collection, collected data will check daily aligned with perspective checklist/guides. Prior to actual data collection, questionnaire will test on 5% of participants on the BLH hospital participants to

check appropriateness of the question for the respondents. For some inappropriateness and discomfort.

4.11. Data analysis

Data was filled in SPSS program version 27 for analysis. The raw data was handled carefully; Data cleaning will be run again by performing frequency of each variable to check accuracy, inconsistency and missed value of the data. Before analysis of the data, recoding of variables was employed to make easy for analysis.

Descriptive statistics like frequency, and mean to all variables which are related to the objective of the study were computed. Bivariate analysis was carried out to determine association between independent variables and post thyroidectomy hypocalcemia. Multivariate logistic regressions were performed to identify the independent predictor's among Patients who have undergone thyroid surgeries for any type of thyroid disease. Statistical significance of the associations between variables was determined using odds ratio (OR) with 95% confidence interval (CI) and p-value <0.05 considered as significantly associated factors. Finally, result of the study presented in the form of text, tables and figures.

4.12. Ethical consideration

Ethical clearance letter was obtained from Addis Ababa University Department of General Surgery. Then, after approved by study area's research directorate office, final support letter will be obtained. The confidentiality of the information was ensured by keeping the identity of respondent's secret and not requesting their names. Written consent was obtained after convincing respondent's issue of confidentiality that the participant voluntarily answer questionnaire after fully explaining that they have a right to participate or not to participate and to withdraw from any stage of the process. Participants were assured that no harm will be inflicted during carrying out the research work.

Result

Among the 188 patients who underwent thyroidectomies, the ages ranged between 15 and 85 years (the mean age 44 years) the minimum age is 13 and maximum 83. 155 (82.4%) of study population are female and 33 (17.6%) are male making male: female ratio of 1:4.7

	Frequency	Percent
13-25	17	9.0
26-35	44	23.4
36-45	42	22.3
46-55	41	21.8
55 and above	44	23.4
Total	188	100.0

Table 1 age of patients

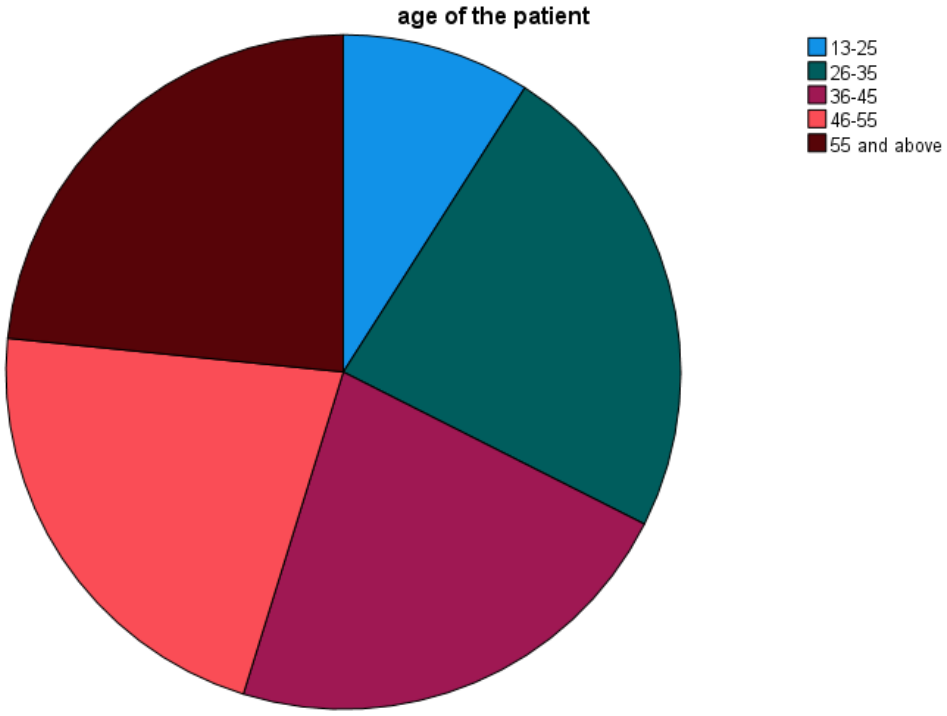


Fig 1 age range of patients

The study involves 80 patents who had done thyroidectomy at TASH and 100 patients from lancet hospital making 47% and 53 % respectively

	Frequency	Percent
TASH	88	46.8
Lancet Hospital	100	53.2
Total	188	100.0

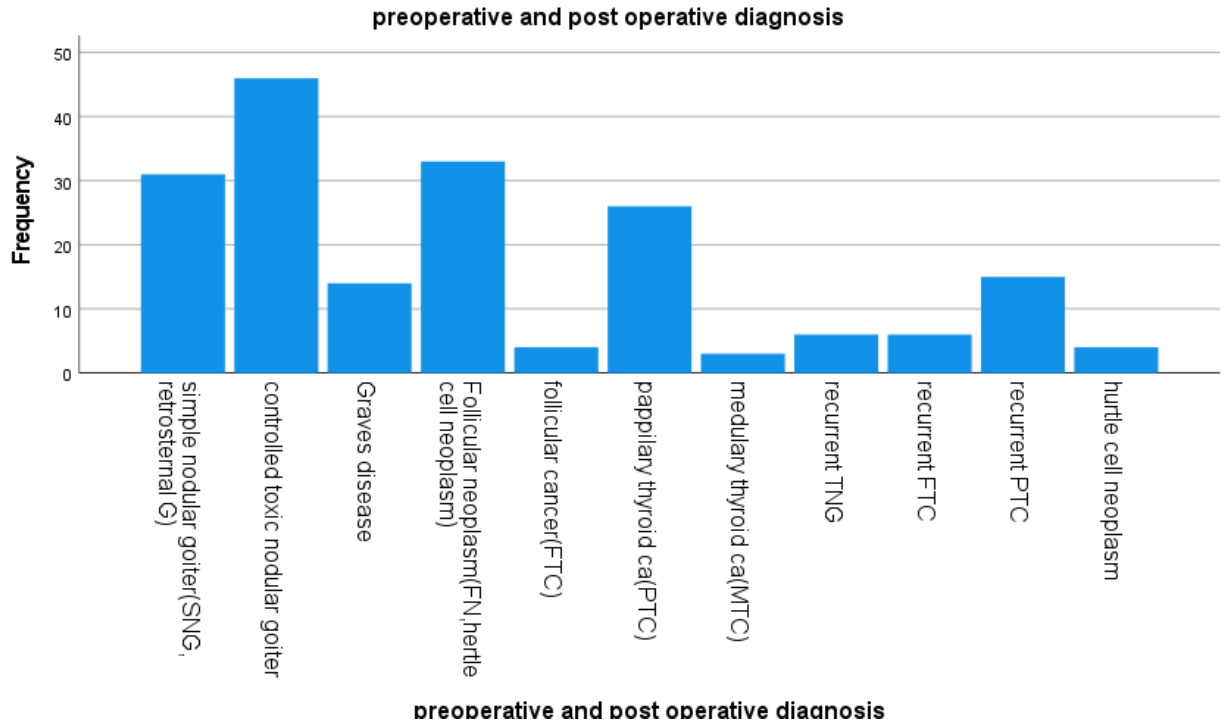
Table 2 the name of hospital where the operation done

	Frequency	Percent
controlled toxic nodular goiter	46	24.5
Follicular neoplasm(FN)	33	17.6

simple nodular goiter(SNG,retrosternal G)	31	16.5
pappilary thyroid ca(PTC)	26	13.8
recurrent PTC	15	8.0
Graves disease	14	7.4
recurrent TNG	6	3.2
recurrent FTC	6	3.2
hurtle cell neoplasm	4	2.1
follicular cancer(FTC)	4	2.1
medulary thyroid ca(MTC)	3	1.6
Total	188	100.0

Table 3 type of thyroid diseases

The diagnosis of the patient was made by preoperative assessment and postoperative tissue diagnosis based on descending order of frequency controlled toxic nodular goiter (CTNG), 46(24.5%) , Follicular neoplasm(FN),33(17.6%), simple nodular goiter(SNG,retrosternal G) 31 (16.5%), papillary thyroid cancer (PTC),26(13.8%), recurrent PTC15(8%), Graves' disease,14(7.4%) recurrent TNG and recurrent FTC 6 patients 3.2% each ,hurtle cell neoplasm and follicular thyroid cancer accounts 4 and 2.1 % each and lastly medullary thyroid cancer(MTC) ,3 (1.6%)



	Frequency	Percent
Total thyroidectomy	109	58.0
hemithyroidectomy(lobectomy ,ishmectomy,dunhills,subtotal thyroiedectomy)	47	25.0
total thyroidectomy+lymph node dissection(centeral,lateral or both)	12	6.4
completion thyroidectomy	10	5.3
completion + lymph node dissection(centeral,lateral or both)	10	5.3
Total	188	100.0

Table 4 type of surgery done

Among 188 pateints who had thyroidectomy 109(58%) had Total thyroidectomy (TT),hemithyroidectomy (lobectomy ,ishmectomy,dunhills,subtotal thyroiedectomy),47(25%), total thyroidectomy+lymph node dissection(centeral,lateral or both)

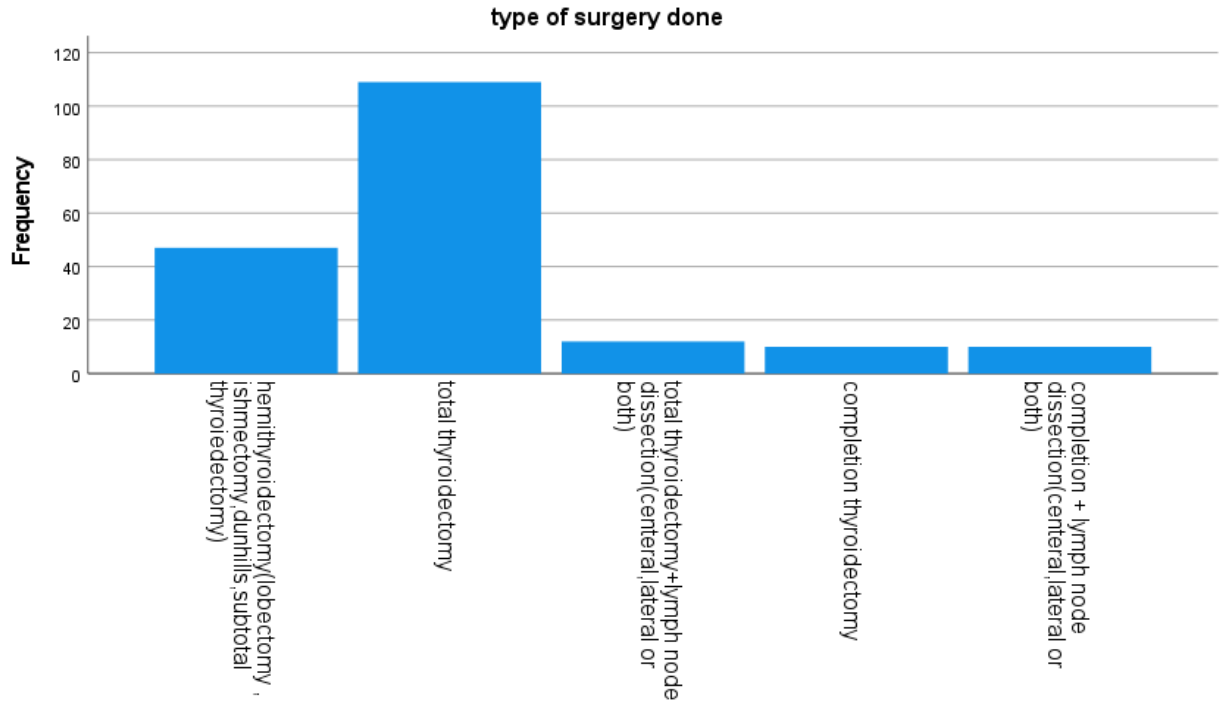
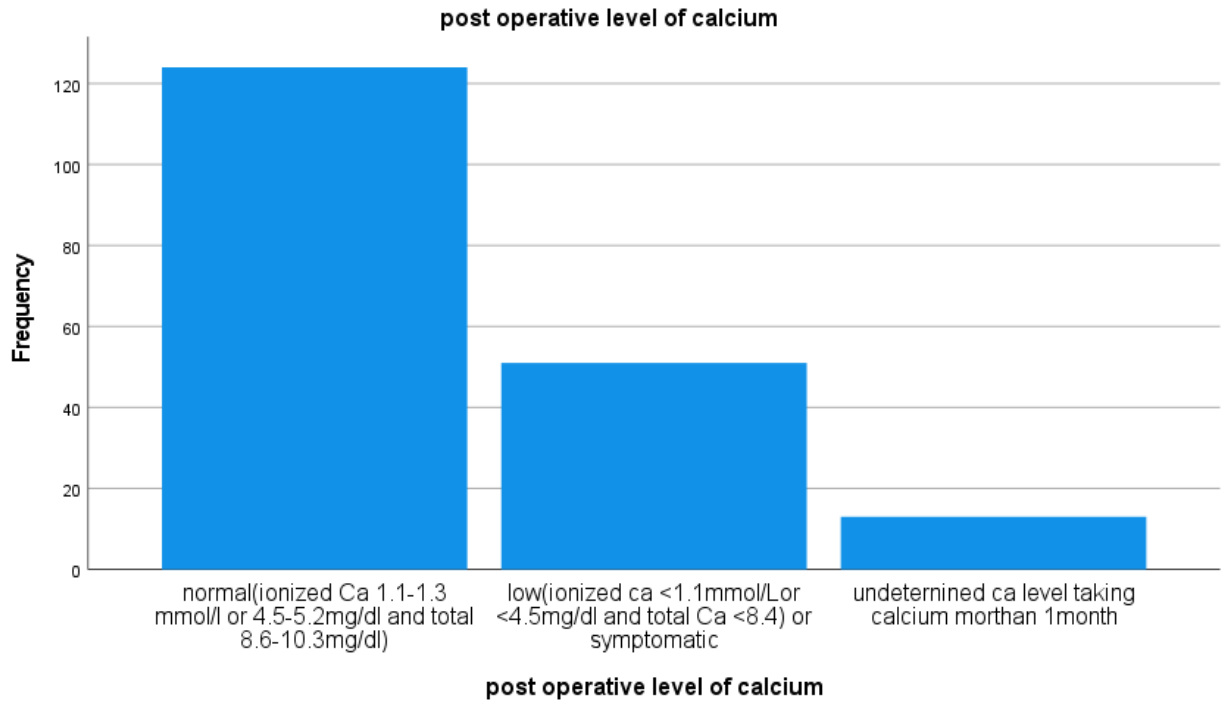


Fig 3 type of surgery done

post operative level of calcium

	Frequency	Percent	Valid Percent	Cumulative Percent
normal(ionized Ca 1.1-1.3mmol/l or 4.5-5.2mg/dl and total 8.6-10.3mg/dl)	124	66.0	66.0	66.0
low(ionized ca <1.1mmol/Lor <4.5mg/dl and total Ca <8.4) or symptomatic	51	27.1	27.1	93.1
undeternined ca level taking calcium morthan 1month	13	6.9	6.9	100.0
Total	188	100.0	100.0	



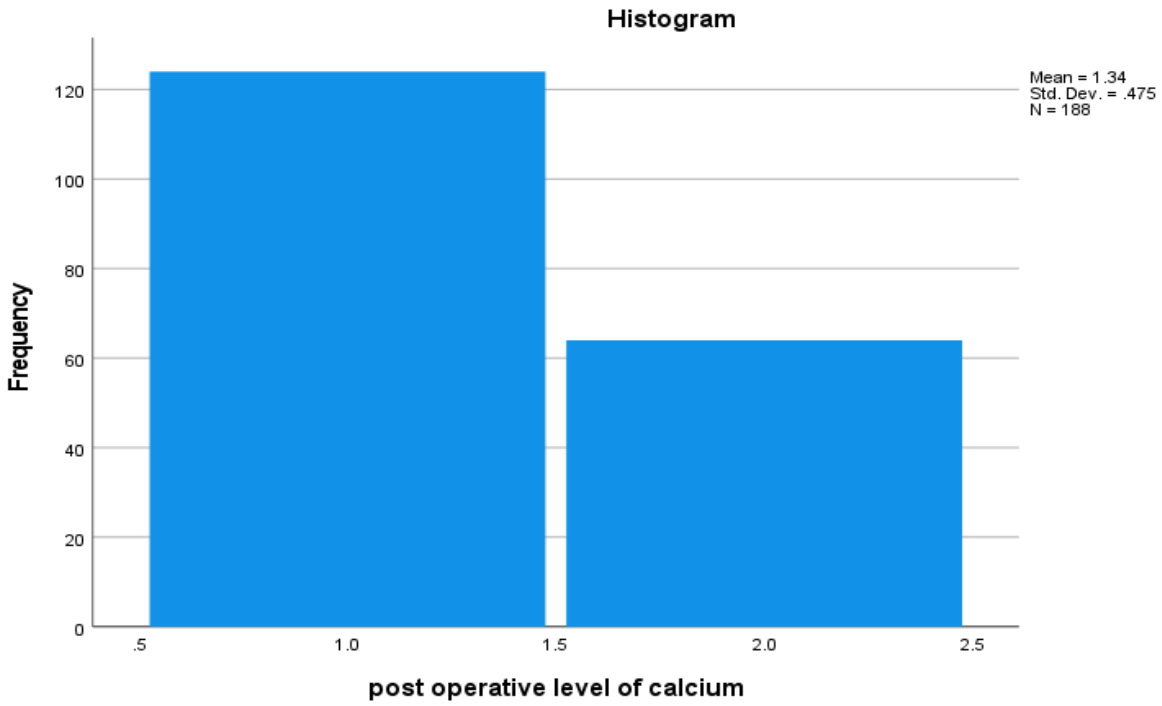


Fig 5 hospital where the surgery done * post-operative level of calcium

Crosstabulation

Count

		post operative level of calcium		
		normal(ionized Ca 1.1-1.3mmol/l or 4.5-5.2mg/dl and total 8.6-10.3mg/dl)	low(ionized ca <1.1mmol/Lor <4.5mg/dl and total Ca <8.4) or symptomatic	Total
the name of hospital where the surgery done	TASH	53	35	88
	LancetHosp	71	29	100
Total		124	64	188

type of surgery done * post operative level of calcium Crosstabulation

Count

		post operative level of calcium		
		low(ionized ca <1.1mmol/Lor <4.5mg/dl and total Ca <8.4) or symptomatic	normal(ionized Ca 1.1-1.3mmol/l or 4.5-5.2mg/dl and total 8.6-10.3mg/dl)	Total
type of surgery done	hemithyroidectomy(lobectomy ,ishmectomy,dunhills,subtotal thyroiedectomy)	2	45	47
	total thyroidectomy	45	64	109
	total thyroidectomy+lymph node dissection(centeral,lateral or both)	5	7	12
	completion thyroidectomy	6	4	10
	completion + lymph node dissection(centeral,lateral or both)	6	4	10
Total		64	124	188

No significant correlation exist between the age of the pt and postoperative level of calcium with Pearson Correlation of -0.53 and significance 0.474,similarly sex of the pt has no significant correlation with postoperative level of calcium Pearson Correlation of -0.011 and significance of 0.881

Post-operative level of calcium and preoperative and post-operative diagnosis have no statically significant association with Pearson Correlation 0.004 and significance of 0.95(>0.05)
Post-operative level of calcium and type of surgery done are correlate significantly with Pearson Correlation of 0.3 and significance of 000 (<0.05)

	B	S.E.	Wald	df	Sig.	Exp(B)

Step 1[a]	type of surgery done	.618	.167	13.739	1	.000	1.855
	Constant	-1.981	.392	25.489	1	.000	.138

a. Variable(s) entered on step 1: type of surgery done.

Case Processing Summary

		N	Marginal Percentage
post operative level of calcium	normal(ionized Ca 1.1-1.3mmol/l or 4.5-5.2mg/dl and total 8.6-10.3mg/dl)	124	66.0%
	low(ionized ca <1.1mmol/Lor <4.5mg/dl and total Ca <8.4) or symptomatic	64	34.0%
age of the patient	13-25	17	9.0%
	26-35	44	23.4%
	36-45	42	22.3%
	46-55	41	21.8%
	55 and above	44	23.4%
sex of the patient	Male	33	17.6%
	Female	155	82.4%
the name of hospital where the surgery done	TASH	88	46.8%
	LancetHosp	100	53.2%
	No	187	99.5%
preoperative and post operative diagnosis	simple nodular goiter(SNG,retrosternal G)	31	16.5%
	controlled toxic nodular goiter	46	24.5%
	Graves disease	14	7.4%
	Follicular neoplasm(FN,hertle cell neoplasm)	33	17.6%
	follicular cancer(FTC)	4	2.1%
	pappilary thyroid ca(PTC)	26	13.8%
	medulary thyroid ca(MTC)	3	1.6%
	recurrent TNG	6	3.2%
	recurrent FTC	6	3.2%
	recurrent PTC	15	8.0%

	hurtle cell neoplasm	4	2.1%
type of surgery done	hemithyroidectomy(lobectomy ,ishmectomy,dunhills,subtotal thyroiedectomy)	47	25.0%
	total thyroidectomy	109	58.0%
	total thyroidectomy+lymph node dissection(centeral,lateral or both)	12	6.4%
	completion thyroidectomy	10	5.3%
	completion + lymph node dissection(centeral,lateral or both)	10	5.3%
Valid		188	100.0%
Missing		0	
Total		188	
Subpopulation		110[a]	

a. The dependent variable has only one value observed in 94 (85.5%) subpopulations.

Likelihood Ratio Tests

	Model Fitting Criteria	Likelihood Ratio Tests		
Effect	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	135.294[a]	.000	0	.
age of the patient	138.822	3.528	4	.474
sex of the patient	135.800	.506	1	.477
the name of hospital where the surgery done	136.011	.717	1	.397
preoperative and post operative diagnosis	145.675	10.381	10	.408
type of surgery done	169.395	34.101	4	.000

Discussion

The study involves 80 patents who had done thyroidectomy at TASH and 100 patients from lancet hospital making 47% and 53 % respectively

In our study, the highest prevalence of thyroidectomy was in women155 (82.4%) of study population are female and 33 (17.6%) are male making male: female ratio of 1:4.7 ,the study goes along most studies with female predominance obviously .study by Burali G in north Uganda showed 1:5, and 1:4.8 Saad M. Alqahtani (24). This can readily explained as Women experience significant hormonal fluctuations throughout their lives, especially during puberty, pregnancy, and menopause. The thyroid gland is closely regulated by hormones like estrogen and progesterone. These hormonal changes can affect thyroid function and contribute to thyroid disorders, such as hypothyroidism or hyperthyroidism**.** the other explanation is Women are more prone to autoimmune diseases in general. Conditions like Hashimoto's thyroiditis and Graves' disease, Among the 188 patients who underwent thyroidectomies, the ages ranged between 15 and 85 years (the mean age 44 years) the minimum age is 13 and maximum 83 the ages ranged between 15 and 95 years (mean 39.87 ± 12.67 years). While thyroid disorders can affect both men and women at any age, they tend to become more common in women as they age, especially around the time of menopause. Hormonal changes during this time can make thyroid disorders more apparent or lead to the development of new issues.

The diagnosis of the patient was made through preoperative assessment and postoperative tissue diagnosis. The most common indication for thyroidectomy was controlled toxic goiter, followed by simple nodular goiter, based on descending order of frequency. Controlled toxic nodular goiter (CTNG) accounted for 46 cases (24.5%), followed by follicular neoplasm (FN) with 33 cases (17.6%), simple nodular goiter (SNG) and retrosternal goiter (RG) with 31 cases (16.5%), papillary thyroid cancer (PTC) with 26 cases (13.8%), recurrent PTC with 15 cases (8%), Graves' disease with 14 cases (7.4%), recurrent toxic nodular goiter (TNG) and recurrent follicular thyroid cancer (FTC) with 6 cases (3.2%) each, Hurthle cell neoplasm and follicular thyroid cancer, accounting for 4 cases and 2.1% each, and finally medullary thyroid cancer (MTC) with 3 cases (1.6%). The findings in our study support the reports from

Mekete Wondwosen, where the most common indication for thyroidectomy was hyperthyroid goiter (62.8%). Alessio Metere reported that TNG accounted for 40%, followed by thyroid cancer at 33%. Some studies analyze preoperative indications as benign and malignant at 67% and 33%, respectively, as noted by Dan Nicolae Păduraru. A study conducted at Gondar Hospital by Abebe B found that the most common preoperative diagnosis was simple nodular goiter (62.2%) for cosmetic reasons. The most common indication for thyroidectomy is thyroid cancer in western setting and toxic nodular goiter are common in developing world where geographic and socioeconomic conditions predispose them to be hypothyroid or hyperthyroid.

In our study, the most common procedure performed was total thyroidectomy (TT), with 109 cases (58%), followed by hemithyroidectomy (lobectomy, isthmectomy, Dunhill's procedure,) with subtotal thyroidectomy)with 47 cases (25%), and total thyroidectomy with lymph node dissection (central, lateral, or both) in some cases. Multiple studies have concluded that total thyroidectomy is the most common thyroid surgery. Chahardah Masumi E and his colleagues in Iran reported that about 57% of patients underwent TT, followed by hemithyroidectomy. The most commonly performed thyroid procedures include total thyroidectomy (TT**)**, which involves the removal of the entire thyroid gland and is frequently performed for conditions such as thyroid cancer, multinodular goiter, or Graves' disease. Hemithyroidectomy , which removes one lobe of the thyroid, is often done when there is a benign nodule or small cancer in a single lobe. Subtotal thyroidectomy is a partial removal of the thyroid gland, typically done in the past for certain conditions, but it is less common today due to the risk of recurrence and hypothyroidism.

The rate of postoperative hypocalcemia was higher in our study, at 40% in TASH and 29% in Lancet Hospital, showing some improvement in complication rates due to procedures performed by high-volume surgeons, which provides insight for further studies and recommendations. Postoperative calcium levels and the type of surgery performed correlated significantly, with a Pearson correlation of 0.3 and significance of 0.000 (<0.05). However, there was no statistically significant association between postoperative hypocalcemia and age, sex, place of surgery, or preoperative and postoperative diagnosis, with p-values of 0.474, 0.477, 0.397, 0.618, and 0.408, respectively.

Postoperative hypocalcemia is a common complication that is associated with prolonged hospitalization and higher costs, according to a study conducted by Karamanakos in Athens. It has been shown that the surgeon's experience is linked to better clinical and financial outcomes. According to most literature, the

incidence of transient hypocalcemia ranges from 0.3% to 63%. Postoperative hypocalcemia has an incidence of 1.2% to 40%, with reports from Asia indicating it as the most common complication, with a frequency of 54.4%. The findings from our study, with an incidence of 34%, are in line with the average incidence seen in most studies. Postoperative calcium levels and the type of surgery performed were significantly correlated, with a Pearson correlation of 0.3 and significance of 0.000 (<0.05), consistent with findings from other investigators, such as Dan Nicolae Păduraru. In his study, larger dissections during thyroidectomy were associated with a higher incidence of hypocalcemia, and interventions for recurrent goiter and second interventions for postoperative bleeding further increased the risk of hypocalcemia, although these results did not have statistical significance according to bivariate logistic regression

Conclusion – the overall prevalence of post thyroidectomy hypocalcaemia is 34 % and post thyroidectomy hypocalcaemia is strongly associated with the type of surgery with p value of 0.001

Recommendation:

- Documenting whether the parathyroids are identified and preserved intraoperatively.
- Documenting the size of the thyroidectomy specimen.
- Promoting thyroidectomies in private settings.
- Determining calcium levels before initiating and terminating calcium treatment

Plan – continue assessing patients for determination of prevalence of permanent hypocalcaemia

Limitations of your study- Some factors were difficult to assess, such as the documentation of intraoperative identification of the parathyroid glands. The time allotted for the research was too short, and it was not possible to assess permanent hypocalcemia.

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